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"Socio-spatial aspects of substance use and abstinence: 'interpreted space' as a concept for environmental prevention"

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Mag.rer.soc.oec. Angelina Brotherhood

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Chapter overview

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PART 1: THEORY

The foundations of the present thesis are presented in four chapters:

- Chapter 1, “Introduction”, states how this thesis started in follow-up to an earlier project, what were its research questions and aims, and how the thesis is structured. The chapter then describes broader considerations that shaped the present work, relating to prevention, the sociology of space, the role of gender, paradigms in mixed-methods research, research ethics and reflexivity. Section 1.2.6 provides a brief timeline of the project.

- Chapter 2, “Environmental prevention of substance use”, formulates a practical point of departure for this thesis. The chapter suggests that the current theoretical foundations of environmental prevention may limit its possibilities with regard to intervention points and effectiveness, and that they may also predispose it toward restrictive and coercive strategies. The present ‘sociology of space’ perspective is thus framed as an opportunity to explore possible alternatives to current prevention approaches.

- Chapter 3, “Sociology of space”, describes the theoretical frameworks underpinning the present research. The chapter introduces socio-spatial theory and relational approaches with reference to Löw’s ‘sociology of space’. It discusses their relevance for the substance use field. However, rather than seeking to apply existing theoretical frameworks, the thesis formulates a need to develop a framework that reflects how people themselves construe space. Kelly’s personal construct theory and the associated repertory grid technique are briefly introduced as the conceptual and methodological tools to support this aim.

- Chapter 4, “Socio-spatial aspects of substance use: from prior research to the present study”, reviews the existing quantitative and qualitative literature on substance use and space, with a focus on alcohol and cigarette use by non-vulnerable populations. Special attention is given to theoretical and methodological aspects, so as to design an empirical study that addresses the limitations of prior research. Section 4.2 then introduces the present study, including specific research questions and the draft conceptual model that guided this study.

1. Introduction

1.1. Introductory words and thesis outline

This thesis is about how we interpret our everyday spaces, with a focus on substance use and situational abstention from use. At the heart of this research are three *basic questions*:

- How do people think about their everyday spaces?
- How does this relate to their substance use in those spaces?
- How can the answers to these questions inform prevention interventions?

The idea for this project was first conceived in 2009. I had recently completed my master's thesis, which was an analysis of how women perceive their everyday way back home (Kurtev, 2008). One of my findings was that existing frameworks for the sociological analysis of spaces (e.g., Löw, 2001) may not fully grasp how people experience space, reflecting rather theoretical ideas and researcher perspectives. A question that emerged from that research was therefore: *in what categories do people think about their everyday spaces?*

I did not think I would pursue this further until I heard a presentation by Prof Harry Sumnall on the repertory grid technique: I was immediately struck by the possibilities that repertory grids offered in relation to the above question, as they can elicit how people think about a given topic. It quickly became clear that combining 'sociology of space' *theory* with repertory grid *methodology* could further our understanding of how settings are perceived and of how such perceptions may relate to substance use. Prof Sumnall, our colleague Cathy Montgomery and I thus conducted a small pilot study in 2010, and a few years later, I built upon this initial work to undertake the doctoral research presented in this thesis.

I first conceptualised this project as heavily oriented toward developing socio-spatial theory, but as time passed on I became interested in possible implications for the prevention of substance use. A recently published report on environmental substance use prevention (Oncioiu et al., 2018) inspired me to explore how a 'sociology of space' approach could inform environmental prevention theories and practices. I was particularly concerned about the emphasis on coercive and restrictive measures in that report, and I wondered whether a different theoretical approach would support other prevention strategies.

Socio-spatial theorising still remained an important part of this work. The early 2010's brought about a 'spatial turn' in the qualitatively oriented substance use field, with increasing attention given to 'assemblages' and 'actor-networks'. However, prevention research was little affected

by these new developments. This encouraged me to explore how socio-spatial theory could be made more relevant to prevention. Theoretically, the thesis thus contributes to discussions of how the 'environment' can be conceptualised in general, in relation to substance use, and specifically for prevention.

The present study therefore pursued *several aims*: to develop an empirically based framework of socio-spatial aspects and thereby contribute to socio-spatial theory (Chapter 10); to show how this framework can be applied to study alcohol and cigarette use, thereby demonstrating its usefulness (Chapters 11 and 12); and to integrate the findings into a socio-spatial theory tailored to the needs of prevention research (Chapter 13).

The thesis is structured in four parts:

- *Part 1* contextualises the empirical study by outlining broader conceptual and methodological perspectives (section 1.2) and the most relevant research fields: environmental prevention (Chapter 2), socio-spatial theory (Chapter 3), and empirical research on socio-spatial aspects and substance use (Chapter 4). Section 4.2. introduces the empirical study, including scope and research questions.

- *Part 2* then describes the empirical methodology, with separate chapters focussing on study participants (Chapter 5), techniques for data collection (Chapter 6), data analysis (Chapter 7), and measures to ensure an ethical approach (Chapter 8).

- *Part 3* presents the results in four chapters (Chapters 9-12), each addressing a different research question and analytical approach.

- *Part 4* (Chapter 13) summarises the results as a proposed theoretical model, which is discussed in relation to existing literature and the study's own strengths and limitations. The thesis concludes with implications for research, intervention and theory.

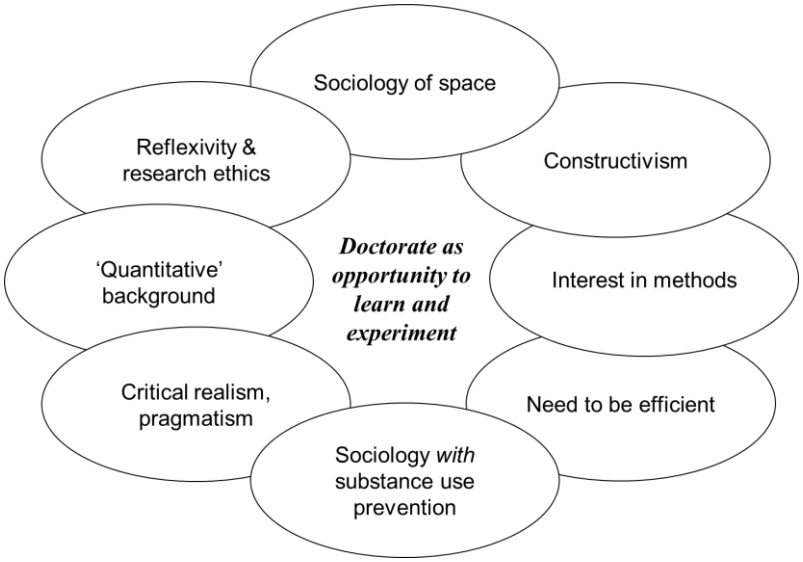
Chapter overviews are given at the beginning of each part.

Chapter 13 summarises the unique contributions of this thesis. Further key chapters include Chapters 2 to 4 and 10 to 12. The remaining chapters as well as the footnotes mostly provide contextual and methodological details to evidence the study's rigour.

1.2. Positioning the research: broader conceptual and methodological perspectives

Newman et al. (2003: 174) suggest that researchers view and conduct studies through a 'lens' which is the product of their "autobiographies, who they are, their lives […] their values, beliefs, experiences, age, and gender as well as their social, psychological, and spiritual development". The authors observe that researchers rarely make their 'lens' explicit, which makes it more difficult to understand project aims and theoretical or methodological choices. Similarly, Miles et al. (2014: 312) identify a need for researchers to be "explicit and as self-aware as possible about personal assumptions, values and biases, and affective states", and Krajic et al. (2017: 25) encourage health sociologists in particular to engage in self-reflection.

Figure 1: Values and perspectives informing the present study



In response to such considerations, the present section describes how broader perspectives shaped the present study. Figure 1 above takes up the metaphor of a 'lens' to present these perspectives visually, focussing on the core value of the *doctorate as an opportunity to learn and experiment*. The perspectives can be briefly summarised as:

- sociology *with* substance use prevention (section 1.2.1);
- sociology of space (section 1.2.2);
- an interest in methodological and paradigmatic pluralism (section 1.2.4);
- a commitment to reflexivity and research ethics (section 1.2.5); and
- the tension between a desire to explore and a need to be efficient (section 1.2.6); but
- not a 'gender' lens (explained in section 1.2.3).

As Part 1 unfolds, it will become clear that the present research emerges from the unique combination of these perspectives. Thus, an understanding of main conceptual influences and practical conditions of this project should help readers appreciate its scope and aims, the study design and the presented arguments more fully. Readers interested in outcomes rather than processes may choose to move on to Chapter 2 at this point.

1.2.1. The sociologist-preventionist schism

Working in substance use prevention can raise various challenges for a sociologist: the interdisciplinary nature of public health and the preponderance of psychologists in prevention science can lead to many paradigmatic troubles. However, a fundamental issue concerns the apparent incompatibility of sociology and prevention in terms of *values*. This section explores this further and should help sociologists appreciate the study's 'prevention' lens better, while it also provides useful context for readers from other disciplines. It complements Chapter 2.

The tension between sociology and prevention

Although there are differences in how sociology is practised, characteristic traits and worldviews of sociologists include a desire for social justice. From the beginning (e.g., Engels, 2010/1892), sociologists were concerned not only with how society functions but also with how to improve it (e.g., how to address social injustices). If prevention is understood as an activity meant to improve quality of life in general and for the socially disadvantaged in particular, it should align well with a sociologist's commitment to creating a 'better world'[1]. Yet, sociologists tend to view prevention critically. One reason for this is another characteristic trait: generalised scepticism toward 'those in power'. As sociologists began to view societal phenomena as socially constructed (e.g., Berger and Luckmann, 1971/1966), 'problems' came to be understood as emerging from specific social contexts, construed as such by communities for specific purposes. This resulted in a critical stance toward those powerful actors who define what 'problems' exist and how to address them.

Thus, there are many sociological (and anthropological) critiques of substance use prevention (e.g., Quensel, 2010; Bell, 2013a; Dennis, 2014; Roumeliotis, 2015), the wider substance use field (e.g., Moore et al., 2017; Kiepek et al., 2019; Fraser, 2020), other types of prevention (e.g., obesity prevention, Mik-Meyer, 2014), prevention and health promotion in general (e.g., Eakin et al., 1996; Baum and Fisher, 2014; Krajic et al., 2017) and the biomedical approach to

[1] Burawoy (2005: 5) also notes that it is "passion for social justice, economic equality, human rights, sustainable environment, political freedom or simply a better world" that attracts many sociologists to their discipline.

health (e.g., Lock and Nguyen, 2010) (see also Mykhalovskiy et al., 2019). It is beyond the present scope to review this body of literature, but key points informing this thesis included:

- The view of prevention as *one-sided and prohibitionist*, as operating in an abstinence-oriented paradigm in which substance use is only viewed as a problem, while its potential benefits and people's rights to use substances are dismissed or denied (see e.g., Holt and Treloar, 2008, and Moore, 2008, on the erasure of 'pleasure' from drugs discourses). This perspective highlights potential iatrogenic effects, if prevention frames target groups as "problem people" (Mik-Meyer, 2014: 33) or if it relies on restrictive, stigma and fear-based approaches. In this view, prevention appears as diametrically opposed to harm reduction.

- The view of prevention as *a paternalistic, neoliberal or moral project*. The critique is that prevention professionals assume health as a universal goal and, on this basis, feel justified to decide what is 'good' or 'bad' on behalf of target populations. 'Health' can also appear as only a purported aim, while prevention rather serves to ensure a productive workforce that incurs low costs to society (e.g., Roumeliotis, 2015) or to enforce the ideals of mainstream society (e.g., Mik-Meyer, 2014: 32–34). 'Health' thus transforms from an individual right to an individual responsibility (Lock and Nguyen, 2010: 79–81). Far from being apolitical then, prevention researchers are entangled in, and contribute to, political goals and projects concerning substance use as well as wider societal issues.

- The view of prevention as an *inappropriate solution to societal challenges*. In this view, prevention merely helps people to cope with difficult living circumstances, but it does not improve the structural conditions that produce these circumstances: the distal determinants of health and well-being (e.g., poverty, marginalisation; e.g., Roumeliotis, 2015: 753). Prevention is also critiqued for its incomplete understanding of substance use practices, addressing substance use as decontextualised 'behaviour'. Another identified issue refers to how health is understood: typically reduced to measurable physical health[2] and seen in strict opposition to disease.

Thus emerges prevention's image as a dubious affair incompatible with a sociological position.

Much of the above may seem bewildering to psychologists and other public health researchers. After all, the negative acute and long-term health and social consequences of substance use are well documented (e.g., Jones et al., 2011; Murray, 2014; Verstraete and Legrand, 2014;

[2] By contrast, the World Health Organization (WHO) definition (first proposed in 1948) describes health as "a state of complete physical, mental and social well-being", to be "seen as a resource for everyday life, not the objective of living", with a later addition also recognising the "spiritual dimension of health" (WHO, 1998: 1).

Kuntsche et al., 2017; WHO, 2019b, 2019a); tackling the use of alcohol, tobacco and illegal substances is an established policy priority at national and international levels (e.g., for Europe: Council of the European Union, 2012; for Austria: Bundesministerium für Gesundheit, 2015; Rendi-Wagner, 2015); and the shift over the last decades from addressing substance use as a moral or criminal issue to rather a health issue represents a substantial improvement.

To understand the above critique of prevention, it is helpful to put it into context. It can be understood as a response to the challenges experienced by researchers whose work does not align strictly with abstinence and 'zero tolerance'-oriented goals and values (Bell, 2013b; Dennis, 2014; Kiepek et al., 2019). Scepticism regarding prevention must also be viewed against the emotional and ideologically fraught ways in which substance use has been approached over the centuries. These arguments also reflect wider academic discourses, such as the long-standing debate between scholars with a positivist, quantitative orientation and scholars with an interpretative, qualitative orientation. Another important discourse refers to the "division of sociological labour", as Burawoy (2005: 11) calls it, whereby "*critical* sociology largely defines itself by its opposition to *professional* ('mainstream') sociology, itself viewed as inseparable from renegade *policy* sociology" (ibid., emphases added). Although the different forms of sociological enquiry can be seen as complementary (Burawoy, 2005), Straus' (1957: 203) distinction between a "sociology *of* medicine" and a "sociology *in* medicine" established *critical* and *professional* social sciences as two distinct (and ostensibly incompatible) arenas in health research (Mykhalovskiy et al., 2019).

Implications for the present research

The apparent incompatibility of sociology and substance use prevention, alongside fellow sociologists' negative views on prevention research, were part of the reason why I chose initially to pursue this project without a substance use focus. Even after adding the substance use focus, I was at first careful not to frame the project as prevention research: I did not want to be seen as doing sociology *in* prevention (or in Burawoy's words: 'policy sociology'[3]), and my socio-spatial research questions did not call for a critical 'sociology *of* prevention' approach, either. I was also hesitant to write a sociological thesis in a field traditionally associated with psychological approaches. Still, it felt strange to write a thesis that would purposefully bracket prevention, while conducting prevention research in other projects. I struggled to articulate this

[3] Burawoy (2005: 9) describes "policy sociology" as "sociology in the service of a goal defined by a client. Policy sociology's *raison d'etre* is to provide solutions to problems that are presented to us, or to legitimate solutions that have already been reached" (original emphasis). Even though policy sociology can emerge from and inform other forms of sociology (and should hence not be dismissed) (Burawoy, 2005: 10), at one point Burawoy refers to it as a "renegade" (2005: 11): this, in my experience, captures more accurately how policy research is often viewed.

unease at first, and eventually understood that my prevention 'lens' would represent an unaccounted-for bias if I did not make it explicit (Brotherhood, 2016).

I consequently had to grasp sociology and prevention as mutually enriching, not as being in conflict with each other: I had to overcome the "in/of dichotomy" (Mykhalovskiy et al., 2019: 526) and understand how to do critical sociology "*with"* prevention[4]. I consequently engaged with critical writings on prevention[5] and sought to apply this 'critical sociology' lens to my own work. I was able to dismiss some of the criticism outlined earlier as not reflecting my own experience or understanding of prevention[6]. However, I also agreed with many points, finding that they echoed and extended existing concerns within the prevention community[7]. I also noticed that such 'critical' perspectives had already informed my earlier work on quality standards to ensure ethical and user-oriented substance use prevention (Brotherhood and Sumnall, 2011; Brotherhood, 2018a). Finally, I realised I could draw on Rorty's (1989) concept of "irony"[8] to reconciliate both identities: to understand myself as a prevention researcher who is aware that there is no ultimate justification for prevention, thereby allowing myself to be critical regarding its goals and methods.

As a result, the sociologist-preventionist schism influenced the present research in a number of ways. The research is, in its final form, specifically framed as a sociological contribution to a (mostly) non-sociological research field. Vis-à-vis my prevention colleagues, it gave me the courage to develop a critical review of environmental substance use prevention – as the prevention approach most relevant to 'space' – in the present thesis. Vis-à-vis my fellow sociologists, it gave me the courage to *remain* in a 'prevention' logic and consider how environmental prevention could be reframed using a strengths-based perspective[9] rather than

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[4] In analogy to other authors' use of phrases such as "sociology *with* medicine" or "critical social science *with* public health" to describe approaches which acknowledge tensions such as those described in this section, yet still seek to produce insights that are useful to health practitioners (see Mykhalovskiy et al., 2019: 526).

[5] I explored these issues more fully in a term paper entitled "*Are prevention researchers 'bad guys'? A view from inside*" and I would like to thank Prof Bernhard Hadolt for the thought-provoking seminar which inspired that paper. I am also grateful for the feedback I received from European Society for Prevention Research (EUSPR) Board Members Dr Gregor Burkhart, Prof Rosaria Galanti and Dr Jeremy Segrott on that paper.

[6] Prevention is further discussed in Chapter 2, but briefly, in the European context, prevention is not opposed to harm reduction but is seen as a complementary pillar (EMCDDA, 2017). It covers a diverse range of policies and interventions, including those which are not strictly abstinence-oriented and which also address positive aspects of substance use (e.g., as part of providing accurate information about substance use).

[7] For example, Fernandez-Hermida et al. (2012: 1572) question whether typical outcome measures (e.g., age of first use) are appropriate predictors of meaningful health or social outcomes (e.g., injury, morbidity, mortality, quality of life).

[8] Bacon (2017: 954) summarises Rorty's notion of "irony" as follows: "Rorty does not mean irony in the standard sense of saying one thing while meaning its opposite. Rather, the ironist is the person who is aware that her beliefs are historically contingent".

[9] It was not feasible to review the concept of 'strengths-based' interventions in this thesis (for overviews, see e.g., Linley, 2009; Saleebey, 2009). Briefly, in this thesis, the concept was interpreted to mean that interventions focus on existing strengths and aim to open up opportunities rather than restrict opportunities. Of course, any intervention can be described either way, but in the present case, this specifically translated into a focus on spaces of no or rare substance use as well as consideration for what would characterise an 'ideal' space from participants' point of view.

be dismissed altogether. It also encouraged me to consider the implications that could be drawn from this study. This resulted in a study design which purposefully deviated from a conventional 'sociology *in* prevention' logic, as will be shown later on.

The conceptualisation of terms such as 'abstinence' and 'prevention' in the present thesis may thus not reflect broader understandings of 'abstinence' (a term which is often used paradigmatically, yet is used here matter-of-factly to refer to situational instances of no or rare substance use[10]) or of 'prevention' (which may, for example, be associated with positions that are less critical regarding the use of coercive or restrictive approaches).

Nevertheless, reconciling two professional identities is not a one-off activity but something to be established continuously. I did not always succeed and whilst readers will no doubt notice incongruences in the thesis, I was personally reminded of this most clearly during the fieldwork whenever study participants were irritated by my 'prevention' lens.

1.2.2. A 'mentalist' study in a 'materialist' context?

This section relates to this study's *theoretical underpinnings* and will be of particular interest to readers familiar with 'posthuman' and 'more-than-human' theories or requiring further context regarding the socio-spatial theories used in this project. I will argue that Löw's 'sociology of space' represents more-than-human thinking. The section complements Chapters 3 and 4.

The starting point for this study was Löw's (2001, 2016) 'sociology of space'. Löw offers a set of concepts for the sociological analysis of spaces, understood as "relational arrangement[s] of living beings and social goods" (Löw, 2016: ix)[11]. Löw's concept of 'synthesis' was especially important: it describes how "goods and people are amalgamated to spaces by way of processes of perception, imagination, and memory" (Löw, 2016: 135). The present study also employed the repertory grid technique, which draws upon Kelly's (1963/1955) theory of personal constructs. Both approaches are situated in a broadly interpretative/constructivist paradigm (see next section). Chapter 3 introduces the approaches further; here, I provide additional context because their relevance to and correspondence with current trends in the substance use field may not be immediately obvious.

The present study sought to elicit aspects along which people perceive, imagine and remember spaces and which therefore play a role in the 'synthesis' of spaces. The emphasis on

[10] The phrase 'situational abstention' is more accurate, but 'abstinence' is the more accessible term.
[11] Löw (2016: vii) gives the following examples of spaces in her introduction: "architectural spaces, urban spaces, regions, nationstates, bedrooms, recreation parks, river landscapes, etc.".

"processes of perception, imagination, and memory" (Löw, 2016: 135) suggests that such synthesis takes place in a person's *mind*. As Kelly's 'personal constructs' can also be understood as 'located' in the mind, the present study may be seen to represent a 'mentalist' approach[12,13]. This distinguishes it from two key areas in substance use research which can serve as reference points for the present project. Both of these are characterised by a more 'materialist' approach, albeit in different ways.

Two 'materialist' points of reference

The first one is the field of *environmental prevention*, which here includes the measures themselves, research on the effectiveness and implementation of such measures as well as the theories and aetiological studies which inform their development. Chapter 2 will show that this body of research tends to be quantitatively oriented and linked to disciplines such as psychology. It generally follow a stimulus-response logic in the sense that it focusses on how an external condition (e.g., a law, the design of a bar, the shape of a glass, the action of a fellow smoker) affects a person's behaviour, with only limited consideration for the person's *interpretation* of the situation[14]. It can therefore be understood to represent a 'materialist' perspective, as it deals with the influence of matter (the physical environment) on matter (use of substances). Against this background, the 'mentalist' approach of the present study is novel and valuable, as it can help to understand how purported cause and effect relate to each other and why assumed cause-effect relationships may or may not be found in practice. In addition, the present study entertained the possibility that a better understanding of how situations are interpreted may hint at new intervention points or strategies for environmental prevention. Thus, environmental prevention was chosen as the main point of reference for the present study in terms of its practical relevance, and it is further explored in Chapter 2.

The second body of research relevant to this study also studies the relationship between space and substance use but tends to be qualitatively oriented and linked to disciplines such as sociology and anthropology (examples are cited in Chapters 3 and 4). This research often positions itself as 'critical' research (e.g., 'critical drug studies'). As Chapters 2 to 4 will show,

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[12] The use of the term 'mentalism' in this section was inspired by Reckwitz (2002). Reckwitz (2002: 247) uses the term to describe those theories which "locate[.] the social or collective in the human mind […] because mind is the place of knowledge and meaning structures". He offers Schütz's (1932) social phenomenology as a prototypical example of the mentalist approach, as it aims "to describe the subjective acts of (mental) interpretations of the agents and their schemes of interpretation" (Reckwitz, 2002: 247), which has clear parallels with the present study.
[13] The link between personal construct theory and mentalism is also found in Kelly's own work: in passing, Kelly (1963/1955: 154) refers to the criticism that "The psychology of personal constructs is *nothing but* mentalism" (original emphasis) as an example for "preemptive" thinking.
[14] If the person is considered, then this is typically done by including socio-demographic factors (e.g., age, gender), the general substance use position (e.g., type of smoker) or psychological traits (e.g., impulsivity) as moderators.

this research does not seem to inform the field of environmental prevention and if it makes practice recommendations, these typically refer to harm reduction rather than prevention. This research is 'materialist' in the sense that it focusses, for example, on substance users' bodies and how they interact with things[15]. It differs from psychological studies because it highlights the emergent and relational nature of space using theories such as non-representational theory, theories of affect, new materialisms, actor-network-theory and assemblage thinking (known as 'posthuman' or 'more-than-human' theories, e.g., Duff, 2018; Maller, 2018).

It was not feasible within the present thesis to devote a separate chapter to this latter body of work[16]. However, as it represents a key area of contemporary sociological research on substance use and space, the remainder of this section positions the current study (and Löw's 'sociology of space') vis-à-vis this literature, addressing also potential points of criticism. From a 'posthuman' or 'more-than-human' perspective, the present study's 'mentalist' approach could be viewed critically as outdated or as disregarding the material nature of substance use. Also, the fact that I did not choose to work with one of the theories mentioned above could be viewed critically. I will argue that *Löw's approach represents 'more-than-human' thinking* and is therefore compatible (and should be grouped together) with the above-mentioned theories. I also highlight that Löw's approach is an established theory in the German speaking countries.

Löw's 'sociology of space'

Löw's 'sociology of space' was an essential aspect of this project from its inception. I was first acquainted with Löw's (2001) book *Raumsoziologie* (sociology of space) in 2004 during my master's studies at the University of Vienna, where it was taught as a key text for the sociological study of spaces. Löw reviews existing theories on space and proposes a novel conceptualisation of space for sociological enquiry. The book ignited my interest in the subject and I subsequently developed a methodological master's thesis project to explore the usefulness of Löw's approach (Kurtev, 2008). The present study emerged in 2009 as a direct response to the master's thesis (further described in section 3.4.1); the use of Löw's approach was therefore the logical choice. Moreover, when the present project was first conceived, the substance use field was still in the early days of incorporating socio-spatial perspectives. The

[15] It can also be said that this research locates 'the social' in the materiality of bodies and things. Reckwitz (2002) distinguishes different strands of social theory based on where they locate 'the social': mentalism (mind); textualism (discourse); intersubjectivism (interaction); and practice theory (practices). As Reckwitz wrote that text in 2002, he could not consider the approaches that have since become popular in the social sciences, but I suggest that 'materialism' would nowadays be another relevant category (possibly subsuming the category 'practice theory').
[16] Some of these approaches are discussed in Chapters 3 and 4; Maller (2018) offers an accessible and comprehensive introduction which also highlights the heterogeneity *within* approaches.

present project was intended to stimulate these developments further by introducing Löw's conceptualisation of space to an international audience of substance use researchers.

An opportunity yet also challenge for the present study was therefore that Löw's 'sociology of space' is relatively little known internationally (e.g., not at all cited in major compendiums on spatial theory such as Hubbard and Kitchin, 2011 or Gieseking et al., 2014). This stands in contrast to its position in the German-speaking context, where it is regarded as a seminal work (e.g., Günzel and Kümmerling, 2010: 97–98; Kusenbach, 2017: 1032; Knoblauch and Steets, 2020). The German edition of *Raumsoziologie* was published in 2001, thus around *the same time or before* other more-than-human theories gained traction, including in the substance use field[17]. Löw's work might have become part of the corpus of 'more-than-human' theories if the 2001 book had been published in English. However, the English translation (Löw, 2016) was published 15 years later[18] and thus *after* the establishment of other approaches as the main streams of more-than-human thinking. Löw did not use the 2016 book or other recent publications (e.g., Fuller and Löw, 2017) to claim the 'more-than-human' label for her own approach or to explicitly position herself vis-à-vis such approaches, even when referring to relevant concepts[19]. In my view, this represents a missed opportunity, as it means that her approach may not be easily placed and appreciated by the international scientific community.

However, Löw's approach should not be reduced to a 'mentalist' approach. In Chapter 3, the 'materialist' and 'more-than-human' features of Löw's approach will quickly become evident. To give a few examples of similarities with established more-than-human theories, Löw highlights the relational and emergent nature of space and considers materiality (including smells, sounds and textures) as co-constitutive of spaces; she explicitly includes animals as living beings that co-constitute space (Löw, 2016: 131); and she includes 'spacing' as one of the main processes of space constitution: the *material* positioning of bodies and things (Löw, 2016: 134–136). The act of 'spacing' is distinguished from the 'synthesis' of spaces in the mind, but this is done rather for analytical purposes: "In the everyday act of space constitution,

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[17] e.g., for practice theory: Schatzki et al., 2001; Reckwitz, 2002; Blue et al., 2016; Supski et al., 2017; e.g., for actor-network-theory: Law and Hassard, 1999; Latour, 2005; Demant, 2009. This is not to imply that these approaches were not already known or written about before these texts, but these texts point to moments in time at which these approaches became more formalised and established.

[18] An English language article based on *Raumsoziologie* was published in 2008, but this was a summary of key concepts rather than a full introduction to Löw's theory.

[19] For example, Fuller and Löw (2017: 476) refer to assemblage theory and non-representational theory only in a general manner as "recent developments in social theory at large". Knoblauch and Löw (2017: 4) use the term 'assemblage' interchangeably with 'space'. In a methodological text, Löw (2018: 71ff.) incorporates concepts from Reckwitz' practice theory but without drawing an explicit link. It is also interesting to note that the English language title of Löw's book refers to 'materiality' ("The Sociology of Space: Materiality, Social Structures, and Action") although the German title ("Raumsoziologie") did not. This was possibly an editorial decision to situate Löw's work within the international research focus on materiality.

operations of synthesis and spacing are simultaneous because action is always processual" (Löw, 2016: 135). Through this distinction of 'spacing' and 'synthesis', Löw achieves an approach which at the same time *centres on* the human (it is concerned with how people interpret spaces) and *de-centres* the human (by acknowledging that humans are not the only actors within a space).

Thus, the label 'more-than-human' (rather than 'posthuman') is fitting for Löw's approach. Considering other theories in this field, Löw's work can be aligned most closely with practice theory (both approaches draw heavily upon the works of Giddens and Bourdieu)[20] as well as non-representational theory (Löw builds upon work by human geographers). The continuum of 'more-than-human' theories suggested by Maller (2018: 81) illustrates this further:

> one way of thinking about the status of human-centrism in more-than-human theories is a sliding scale, with practices on the more human-centric end, new materialisms and assemblages on the opposite more decentred end, and affective and non-representational approaches somewhere in the middle.

A key difference between Löw's theory and the other more-than-human approaches discussed above is that Löw's is a middle-range theory specifically developed for socio-spatial research, whereas the other approaches can also been seen as broader social theories or paradigms.

Löw's approach was therefore best suited to address the present study's research questions regarding the aspects which people refer to in their construal of spaces. Research applying Löw's approach can take a more 'materialist' or a more 'mentalist' perspective, exploring the relationship between space and substance use from different angles. In the present case, it was only possible to take a more 'mentalist' perspective[21], but as Chapter 13 will show, the findings complement the more 'materialist' research discussed here.

Finally, it is a question of 'vocabularies' (Rorty, 1989: 3–22). If we understand the different theoretical approaches as contingent vocabularies which are independent of reality and whose merit cannot be judged objectively (i.e., we cannot claim that one vocabulary describes reality better than another), then we should regard them merely as 'tools' that may or may not be appropriate for a specific purpose. For example, the pathways presented in Chapter 12 could have been developed using alternative vocabularies (e.g., as assemblages), but the chosen

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[20] In recent publications (e.g., Löw, 2018), Löw also incorporates elements from Reckwitz's practice theory; and Christmann (2016b) notes the overlap between practice theory and communicative constructivism (to which Löw's approach has been linked). Mental activities and knowledge (including implicit knowledge, meanings) are also regarded as essential elements of social practices (e.g., Reckwitz, 2002: 251–254; Blue et al., 2016: 42).

[21] I would have preferred to combine a 'mentalist' with a 'materialist' approach (e.g., through observations or an additional analysis of the interviews with a focus on physical and material 'actors' such as furniture or smells), but resource limitations precluded further data collection and analysis.

vocabulary was deemed to fit the present study's 'prevention' lens better. The study can thus also serve as an introduction to Löw's vocabulary, even if I ultimately depart from her proposed aspects of space constitution.

1.2.3. The role of gender: a study with *but not necessarily about* young female substance users

The third point refers to the *empirical scope of this research* as evidenced by the composition of its study participants. Participants were female, 18 to 26 years old and studied business/ economics, statistics or mathematics at the University of Vienna. They reported using alcohol or cigarettes in the three months prior to study sign-up, but no use of illegal substances in the previous 12 months and no significant health and social problems. This section complements Chapter 5, which describes the study sample further. Here, I address possible misconceptions of the study's *theoretical* background that may arise from this empirical scope. Although a range of characteristics will be discussed, I will focus on gender: this is a key category in the social sciences, and my decision to limit the study to women was frequently questioned (including by the institutional ethics review board).

The reference to categories such as gender or substance use status might be seen to represent essentialist understandings, whereby women or substance users are understood as intrinsically different from men or 'non substance users' (on gender essentialism, see e.g., Grosz, 1989; Witt, 1995; Stone, 2004; Heilmann, 2011)[22]. This is not the case. Rather, in view of the variety of *substances/products* and *spaces* already considered in the empirical study, it was advisable to choose a fairly homogenous *participant group* in order to avoid an overly complex study design. In defining the participant group, I referred to key characteristics that are commonly used in sociological and drugs research (e.g., age, gender, occupation) and which research has related to substance use and socio-spatial construing. I did not understand these characteristics to be relevant as such but saw them primarily as categories that are assigned significant meaning in our society and thus shape people's lifeworlds (Schütz and Luckmann, 2017/2003). Limiting the empirical study to women (cf. including women *and* men), was thus a way to increase the likelihood that participant lifeworlds would have shared features

[22] For example, Witt (1995: 322) explains 'gender essentialism' as follows: "Generic gender essentialism holds that there is a commonality of experience or a characteristic that unites all women, a core of properties that constitutes the generic Woman and that must be satisfied if something is to count as a woman". Grosz (1989) points out that: "Essentialism entails the belief that those characteristics defined as women's essence are shared in common by all women at all times: It implies a limit on the variations and possibilities of change–It is not possible for a subject to act in a manner contrary to her nature".

(e.g., patterns of substance use, everyday spaces), which is not to say that all women have identical lifeworlds or that men and women cannot have similar lifeworlds.

Of course, by using established categories – especially those such as gender which are linked to power and inequalities in society – the research runs a risk of perpetuating existing dividing lines and also producing differences (on the ontopolitical potential of research, see e.g., Fraser, 2020). In this regard, it is important to note that the present research, although undertaken *with* female students who use substances, is not *about* female students or 'substance users'.

The study is not about 'substance users'. Current users of illegal substances were *not* eligible for study participation[23], and only two study participants reported recent non-medical use of medicines. The sample did include daily smokers and heavier users of alcohol, but only if they did not report poor mental health or significant health or social problems when registering for the study. This study also included individuals who reported never having tried a cigarette in their life-time and whose reported alcohol use pattern consisted of 1-2 alcoholic beverages on a less than monthly basis. This hardly corresponds to mainstream images of 'substance users' as socially marginalised users of illegal substances. Although the inclusion of very seldom users emerged from fieldwork realities rather than being intended (explained in Chapter 5), use of the term 'substance users' in this study was always intended as a conscious effort to disrupt taken-for-granted categories (further explained in section 1.2.5).

In a similar vein, most participants did not correspond to prevailing notions of 'university students' as being heavily engaged in alcohol and other drug use. To the contrary, participants in the present study generally reported restricting heavier patterns of alcohol use to certain time periods (i.e., during term breaks, at the start of the term, after the exam period) and engaging in abstinence (or only limited alcohol use) in the weeks or months leading up to their exams in order to perform well academically. Some participants reported how, over the course their studies, they had gradually reduced their alcohol use to improve academic performance or as part of adopting a healthier lifestyle (similar to the young people interviewed by Caluzzi et al., 2020). A student representative at one of the fieldwork sites, who was also interviewed for this study (see section 6.5), reported likewise that alcohol and other drug use did not generally play a great role in this student population's everyday lives due to the high academic pressures. Thus, the eligibility criteria of the present study (e.g., specific subject areas, no first-year students, no recent users of illegal substances) focussed the research on a different type of student than might be expected in a substance use study.

[23] This was an institutional ethics requirement (see Chapter 8).

In addition, the present study is not primarily *about* the study participants *as representatives* of these categories. The empirical scope might suggest that the study sought to relate primarily to literature on substance use and gender (e.g., Measham, 2002; Plant, 2008; Hunt and Antin, 2019), substance use among University students (e.g., Kilmer et al., 2014; Supski et al., 2017; Tanner et al., 2019), youth drug studies (e.g., Moore, 2002), socially integrated ('mainstream' or 'normalised') substance use (e.g., Hammersley, 2011), and so on. However, women were not interviewed due to a specific interest in *women's* construal of their everyday spaces. Rather, women were interviewed because the study had to be limited to one gender for methodological reasons, and there were more arguments in favour of interviewing women in the present context (see section 5.3).

The result is an unusual constellation in that only women were interviewed but gender is not a focus and the study does not take a feminist or other gender-oriented perspective: I did not specifically analyse the interview transcripts for gender-relevant aspects[24]. Therefore, describing this study as being about *women's* socio-spatial construing is rather a description of its empirical scope than an expression of its theoretical positioning.

Especially for a category such as gender, such an approach might be seen to neglect important societal issues and to preclude potentially important insights[25]. To clarify, I believe that 'gender' perspectives are important, but I am not convinced that a 'gender' lens should be a mandatory focus or 'add-on' to all research. A discussion of this viewpoint would go beyond this introduction, but the important point is that taking a 'gender' perspective seriously would have required a different set of research questions and analytical techniques. The present study's focus was on construed socio-spatial aspects *in general*: this meant that analytically speaking, there was no requirement for any one participant group. This was a very different situation to my master's thesis (Kurtev, 2008), in which the focus on women was an analytical requirement because I was interested in the extent to which fears of (sexual) assault by men featured in

[24] If I noticed gender-relevant aspects during the analysis, I noted them but did not analyse them further or report them in the results unless they were construed as such also by the participant. For example, in Chapter 12, the father-mother-daughter relationships in Pathway 1 could have been interpreted as gendered relationships. Also, the relationships in Pathway 6 between the participant and her partner and his male friends (focussed on alcohol), vis-à-vis her relationship with a female relative (focussed on cigarettes), could have been fruitfully analysed using a 'gender' perspective. However, participants did not offer such views and so they were not included in the results.

[25] For example, Greaves (2020: 3) highlights "[c]ollecting sex- and/or gender-related data and reporting but not interpreting or analyzing them" as an issue of the substance use literature in that it precludes sex and gender related insights. Furthermore, a study by Tutenges and Sandberg (2013), in which the authors drew on "folkloristics" (Tutenges and Sandberg, 2014: 348) to explore drinking stories, was heavily criticised for not applying a 'gender' lens or at least commenting on the role of "gender, sexuality and the taken for granted heteronormativity that characterise many of the stories analysed" (Radcliffe and Measham, 2014: 346; also e.g., Ettorre, 2014; Griffin, 2014). However, Gunby and Atkinson (2014: 362) understood this as an issue of "different epistemological approaches". While the Tutenges/Sandberg case was extreme, it points to the challenges researchers can face if the empirical material is seen to call for a conceptual lens different to the one employed by the authors.

women's construals of their everyday way home. Gendered aspects of socio-spatial construing and socio-spatial practices were thus explored in *that* thesis (also reviewing relevant literature, e.g., Koskela, 1999; Ruhne, 2003), but were outside the confines of the present research.

Earlier, I introduced the concept of a 'lens' (Newman et al., 2003) to explain theoretical and methodological choices – but if the 'socio-spatial' lens did not limit the empirical scope of the study, and a 'gender' lens was not applied, what lens influenced the study's empirical scope? Section 5.3 identifies four perspectives, which are also evident from the sections in the present chapter: a 'prevention' lens; a 'methodological' lens; an 'ethics' lens; and an 'efficiency' lens. For example, the focus on young people resulted not from a 'youth studies' lens but from using substance use *prevention* as a reference point; the focus on university students emerged in part from a need for *efficient* research; and the exclusion of users of illegal substances was an institutional *ethics* requirement. These lenses were not analytical or theoretical but rather practical and in part political: the 'prevention' lens, for example, served to highlight the practical relevance and political potential of the present research[26].

The implication of this is that, from the socio-spatial perspective, the research could have also been conducted with a very different group (e.g., male, socially excluded users of illegal substances in their late 50's, living in rural areas) and still allowed insights regarding the research questions (albeit with a treatment or harm reduction focus). I will return to the issue of generalisation of study findings and the role of gender when discussing the study's strengths and limitations in section 13.4. Here, I wish to highlight the contingent nature of the study population, given that the choice of study population was independent of the study's main conceptual focus. References to literature and statistics in this thesis which appear to underline the relevance of studying a particular population group[27] must thus be seen as attempts to conform to the rules of scientific writing and not as expressing a genuine conviction that one population group (e.g., 'women') might be intrinsically different from or more worthy of research than another (e.g., 'men').

[26] Feedback from peers and senior colleagues suggested that the originally envisioned study, focussed on settings of everyday life and aspects used for socio-spatial construing *without a substance use focus*, would have been misunderstood as a merely theoretical exercise, of interest to only a few spatial theorists. Thus the 'prevention' lens was added to elaborate exemplary socio-spatial aspects (in Chapter 10) *as well as* highlight their potential for understanding contested practices such as substance use (in Chapters 11 and 12) with a view to providing evidence which could help to improve prevention practice from a strengths-based perspective (see Chapter 13).

[27] For example, where I write that "studying women was also of interest in the light of findings suggesting that smoking is particularly prevalent among females in Austria" (in section 5.3.1 of this thesis).

1.2.4. The (paradigmatic) perils of mixed methods and repertory grids

The fourth perspective emerges from the study's *methodological approach*. I will first comment on the 'mixed methods' nature of the present study and highlight some of the challenges associated with the research design. I then focus on one of these challenges: the choice of paradigm. The section resolves this with reference to paradigmatic 'pluralism' and identifies three relevant paradigms: constructivism; critical realism; and pragmatism. Paradigmatic coherence is achieved by drawing parallels among the paradigms and in relation to the present study. This section also serves to make explicit basic assumptions underpinning this research (e.g., on the nature of scientific truth). The section complements Chapters 6 and 7.

Mixed methods and associated challenges

The study represents a 'mixed methods' design (i.e., combining qualitative and quantitative methods[28]) in two respects. Firstly, the study applied the repertory grid technique. This is an inherently mixed-methods technique[29], as it generates free descriptions (elicited constructs) as well as numbers (grid ratings). In the present study, these data were analysed qualitatively and quantitatively[30]. Secondly, the study generated interview transcripts which were analysed separately using qualitative techniques. Thus, the overall more quantitative approach of repertory grids[31] was combined with a more qualitative approach to interview transcripts.

This twofold 'mixed methods' approach resulted from the basic research questions. The first question, "*how do people think about their everyday spaces?*", referred to the categories which people use when thinking about spaces and thus required a qualitative approach to *elicit* these categories. The second question, "*how does this relate to their substance use in those spaces?*", was translated into both a quantitative and a qualitative approach. The quantitative approach focussed on *quantifiable differences* between spaces on the elicited categories, while the qualitative approach focussed on the *detailed mechanisms* through which these

[28] In line with the literature (e.g., Tashakkori and Teddlie, 2003; Miles et al., 2014: 42–45; Ghiara, 2020), 'mixed methods' refers to the use of quantitative and qualitative methods within a single research project. However, the distinction between 'quantitative' and 'qualitative' research is not straightforward (e.g., Small, 2011). References to 'quantitative' and 'qualitative' in this section reflect how these terms are typically understood in sociology and public health, whilst acknowledging the overlap between the two categories.

[29] Manuals on repertory grids (e.g., Fransella et al., 2004; Jankowicz, 2004) do not frame them explicitly as 'mixed methods', but Jankowicz (2004: 15, 71-72) presents the repertory grid as a technique that bridges (and questions) the traditional divide between qualitative and quantitative approaches. More explicitly, repertory grids are discussed as an example of mixed methods in the *Handbook of Mixed Methods* (Rocco et al., 2003).

[30] Data collection and analysis methods are further described in Chapters 6 and 7.

[31] Although repertory grids are meant to assign equal weight to qualitative and quantitative data, in my view, the repertory grid technique represents a more *quantitative* approach overall, as quantitative analyses can be rather advanced while the possibilities for qualitative data analysis are limited by the rudimentary nature of the qualitative data generated (i.e., short bipolar phrases; interview transcripts are not typically generated or analysed).

categories (framed as socio-spatial aspects) were connected to substance use practices. The repertory grid technique was highly suitable for the present study, as it allowed (with some enhancements, see Chapter 6) the generation of data pertaining to all these aspects in a single interview session. A 'mixed methods' approach suited me also personally, as I trained in sociology with a quantitative orientation[32] but have an interest in qualitative approaches.

This research design brought forth several challenges or 'perils'. The different perspectives outlined above translated into an extensive data analysis phase which increased the size of the project considerably. The repertory grid technique is not widely known in the scientific community, which increased the need to explain and justify its use. Also, repertory grids are a special case of mixed methods, so that much of the guidance on mixed methods does not apply[33]. Nevertheless, some of the typical 'mixed methods' issues still affected the present study. One of these was: *what paradigm should the present study subscribe to*? The remainder of this section focusses on this question.

Paradigms in mixed methods research and in the present study

Certain methods tend to be associated with certain (seemingly incompatible) worldviews. The paradigmatic[34] challenge in mixed methods is therefore that combining methods can lead to contradictions in the basic assumptions underpinning a research project. This raises questions as to whether and how paradigms (and methods) can or should be combined (Ghiara, 2020)[35].

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[32] When I first enrolled in sociology in 2002, the University of Vienna offered two different sociology courses: one focused on legal, social and economic sciences ("rechts-, sozial- und wirtschaftswissenschaftliche Studienrichtung") (which is the one I took) and another one on humanities and cultural studies ("geistes- und kulturwissenschaftliche Studienrichtung"), with relatively little overlap between the two. My 'quantitative' socialisation is worth noting because it set the tone for the present study. For example, I generally followed a linear rather than an iterative-cyclical research process, I used content analysis instead of more interpretative approaches to examine qualitative data, I took as given that 'space' is somehow important to people's substance use rather than exploring this assumption using a more open approach to inquiry, I focussed on the relationship between two 'variables' (construed socio-spatial aspects and situated substance use), and so on.

[33] The 'mixed methods' literature is oriented towards research with distinct quantitative and qualitative elements (e.g., a survey followed by in-depth interviews with a subsample of survey participants), whereas repertory grids generate qualitative and quantitative data within the same interview session using a single instrument.

[34] According to Ghiara (2020), two uses of the term '*paradigm'* can be distinguished in the mixed methods literature. On the one hand, the term can refer to research communities, more specifically to shared examples of good practice which illustrate how research should be carried out (Ghiara, 2020: 13). From this point of view, it can be meaningful to speak of a 'qualitative', 'quantitative' or 'mixed methods' paradigm. On the other hand, the term can refer to "philosophical worldviews based on ontological, epistemological, and methodological assumptions" (Ghiara, 2020: 15). Such worldviews define, for example, what counts as reality, truth or knowledge in science. In this case, 'mixed methods' cannot be considered a paradigm; instead, examples of paradigms would include postpositivism, constructivism, critical realism, pragmatism and so on (Ghiara, 2020: 14–15). The latter meaning is relevant here.

[35] These issues have been extensively discussed for decades (e.g., Reason and Rowan, 1981; Denzin and Lincoln, 2000; Greene and Caracelli, 2003; Sandelowski, 2003; Teddlie and Tashakkori, 2003) and further discussion is beyond the scope of this thesis (see Ghiara, 2020, for a recent overview).

The classical solution in mixed methods research has been to adopt a pragmatic stance: disregarding the issue in favour of "practice orientation" (Small, 2011: 62) and judging research based on whether the methods were appropriate to answering the research questions (e.g., Greene and Caracelli, 2003; Morgan, 2014). However, taking a pragmatic stance was not desirable for the present study: eschewing the paradigm question did not seem appropriate for a doctoral thesis, where paradigmatic clarity or engagement with paradigms can be considered indicators of a study's rigour[36]. In addition, paradigmatic positioning can have distinct advantages. Ideally, paradigms offer ready-made answers to fundamental questions, so that the individual researcher does not have to work through basic assumptions from scratch (e.g., what is 'reality'). This was attractive in the present context given some of the tensions identified during data analysis (discussed below). Finally, the theories and methodologies used in the present study were themselves associated with certain worldviews, which suggested constructivism as a possible paradigm for the present study.

Thus, *not* using a paradigm was not an option in the present study. The question became rather whether constructivism offered the most suitable paradigm. I had commenced the research assuming that it was embedded in a broadly interpretivist or constructivist paradigm, but during data analyses, I started questioning if a different paradigm might be better suited to achieve paradigmatic coherence. The following two issues illustrate this:

- With its focus on how space is perceived, the present research is at the same time about *objective* physical-material arrangements as well as the *subjective* mental constructions of such arrangements. I started (and ended[37]) this research thinking that these two levels could be clearly distinguished, but during the preparation of pathways for Chapter 12 (to show how socio-spatial aspects relate to situated substance use), I realised that it is impossible to 'capture' an objective reality that is not already pre-interpreted (regardless of data collection method). This led me to question the meaning and location of 'reality' in the present study (e.g., what do the pathways ultimately refer to?) and produced a sense of paradigmatic ambiguity which I wanted to resolve or at least address.

- Although 'mixed methods' is considered a third paradigm in addition to qualitative and quantitative research, actual analysis and write-up still required frequent decisions

[36] Other doctoral researchers have also felt an obligation or desire to position themselves paradigmatically. For example, DeForge and Shaw (2012: 83) sought "philosophical-theoretical-methodological integrity and coherence" in their own research to meet academic expectations. At the same time, they observe that, for doctoral researchers, a paradigm may also serve as a "label to hide behind that will adequately defend [… the researcher and their] methodological decisions" (DeForge and Shaw, 2012: 87).

[37] The final solution was to use a tripartite model distinguishing: the 'objective' physical environment; the 'perceived' environment; and the 'interpreted' environment (see Chapter 13).

between a 'qualitative' *or* a 'quantitative' approach. Given my quantitative background and the study's orientation toward public health, an overall more quantitative perspective was preferable. Thus, I was grateful that manuals on qualitative analysis accommodated 'quantitative' vocabularies by offering guidance on the integration of variables (Gläser and Laudel, 2010), causation coding (Saldaña, 2013) and causal networks (Miles et al., 2014). However, the use of 'quantitative' concepts (e.g., 'variables', 'cause-and-effect', 'outcomes') in qualitative analysis also produces paradigmatic ambiguity[38]. I was also aware that quantitatively oriented researchers would likely question the use of quantitative concepts in what is, in many ways, a 'qualitative' study (e.g., small sample sizes, importance of verbal data). This again highlighted the boundary-crossing nature of the analyses and the need to clarify the underlying paradigm to achieve greater coherence.

I thus embarked onto a brief journey into the philosophy of science (which provides the basis for the formulation of research paradigms)[39]. Having trained as a quantitative sociologist, I did not have in-depth knowledge in this area and was surprised to find that there was no consistent list of research paradigms[40] and that the same paradigm was often described in contradictory ways. Finally, the concept of '*dialectical pluralism'* offered reassurance, whereby researchers are encouraged to consider and draw upon multiple paradigms in their work:

> The user of DP [dialectical pluralism] needs to ask ''What are my ontological commitments?'' That is, what reality or truths of key importance do you see as existing? [...] Simply stated, reality is multiple—there are multiple true statements that can be made about reality. [...] The user of DP understands that no single ontology fully "gets it right" [...] *The presence of multiple ontologies and the tensions they produce are treated as strengths in DP* (Johnson, 2017: 162–164, original emphasis)

The tensions I identified during data analysis suggested this approach as the best way forward. As a result, three paradigms were identified as relevant to the present study: *constructivism; critical realism;* and *pragmatism*. It is beyond the scope of this introduction to discuss these

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[38] For example, Saldaña (2013: 174) cautions that "Causation Coding carries with it the risk of too easily assuming surface and positivist-driven causes and effects". Also, the manuals appeared to utilise different paradigms: Gläser and Laudel (2010) seek to reconstruct an objective reality, while Saldaña (2013: 163–165) views causation coding as tapping into causal *beliefs*.

[39] It was helpful to read researchers' accounts of how applying a particular paradigm affected the design of their empirical studies (e.g., Feilzer, 2010; DeForge and Shaw, 2012; Allmark and Machaczek, 2018).

[40] Authors generally agree that (post-)positivism and interpretivism/constructivism are two fundamental paradigms for the social sciences (because these mirror the quantitative/qualitative distinction). Beyond these two paradigms, there is less consensus. E.g., Alvesson and Sköldberg (2009: 15–52) distinguish "three reference points in the philosophy of science": (post-)positivism, social constructionism, critical realism. Ghiara (2020: 15) identifies seven paradigms frequently used in mixed methods: pragmatism, transformativism, critical realism, postpositivism, constructivism, realism, and feminism. Johnson (2017: 165) lists 30 items including pragmatism, feminism, postpositivism, but also e.g., poststructuralism, functionalism, objectivism. DeForge and Shaw (2012: 84) describe the "paradigmatic landscape" as comprising: positivism, post-positivism, interpretive/constructive(tion)ism, critical theory, the 'posts' (poststructuralism and postmodernism); but then go on to discuss critical realism and pragmatism.

paradigms, but the following paragraphs highlight elements associated with these paradigms that echo distinctive features of the present research. In doing so, implicit values are made explicit and the tensions outlined earlier are addressed.

Constructivism

The relevance of constructivism[41] emerged from two angles. Firstly, Löw's 'sociology of space' is associated with social constructionism (Berger and Luckmann, 1971/1966) and its more recent variant, communicative constructivism (Knoblauch, 2020; see also Christmann, 2016a; Löw, 2018: 23, 168; Knoblauch and Steets, 2020)[42]. Secondly, repertory grid methodology is associated with personal construct theory (Kelly, 1963/1955), which is regarded as a form of constructivism (e.g., Raskin, 2002; Butt and Warren, 2016: 18). However, the present study did not explore the societal processes which shape our socio-spatial thinking, and so it is not a 'social constructionist' study[43]. Its conceptual and methodological approach aligns more strongly with personal construct theory. Specifically, this study conceptualises 'construed socio-spatial aspects' in relation to 'personal constructs' that study participants have developed regarding everyday spaces. Also in line with personal construct theory, the study considers how such constructs may guide an individual's actions.

The question of reality – of relevance here due to the tensions identified earlier – is discussed ambiguously in the personal construct theory literature. Pavlović (2011) and Raskin (2002) emphasise the personal and individualistic nature of meaning-making within personal construct theory[44]. However, the theory's founder, George Kelly, appeared to assume a two-layered reality, consisting of a connected objective and subjective part[45], and Butt and Warren (2016:

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[41] For the purposes of this section, I subsume 'constructionism' under 'constructivism'. The terms are frequently used interchangeably in the literature. I use the term '*constructionism'* to emphasise how people (as individuals, groups or societies) produce (e.g., through language) phenomena that then appear to them as naturally given (in the sense of Berger and Luckmann (1971/1966). By contrast, '*constructivism'* addresses the relationship between mind and external reality (e.g., whether we have direct access to an external reality and whether such reality exists).

[42] However, Löw's 'sociology of space' approach does not *prescribe* the use of any particular paradigm. On methods, Löw (2016: 184) writes: "The production of spaces in action can be researched in open, unstandardized quantitative and qualitative procedures".

[43] An empirical social constructionist study would typically show how a specific phenomenon is societally produced rather than being naturally given (Alvesson and Sköldberg, 2009: 24, 34).

[44] For example, Raskin (2002: 4–5) places the theory in the same group as von Glasersfeld's radical constructivism, adding that "personal construct psychology generally conceptualizes people as more or less locked within their own personal meaning systems" (Raskin, 2002: 9).

[45] Consider the following excerpts: "We presume that the universe is really existing *and that man [sic] is gradually coming to understand it* […] it is a real world we shall be talking about, not a world composed solely of the flitting shadows of people's thoughts. But […] people's thoughts also really exist, though the correspondence between what people really think exists and what really does exist is a *continually changing* one […] A person may misrepresent a real phenomenon, such as his income or his ills, and yet his misrepresentation will itself be entirely real […] Constructs are used for predictions of things to come, and the world keeps rolling along and revealing these predictions *to be either correct or misleading*. […] Some of the alternative ways of construing are better adapted to man's purposes than are others. Thus, *man comes to understand his world* through an infinite series of successive approximations" (Kelly, 1963/1955: 6, 8, 14, 43, emphasis added).

15) highlight how much Kelly was opposed to the notion of "a private self within the body". According to Raskin (2002: 5-6, 9-10), some scholars consider personal construct theory to represent limited realism and argue that it should *not* be considered a constructivist theory[46]. For the present research, a 'limited realism'-reading of personal construct theory was more appropriate, as it could accommodate the role of physical-material arrangements more easily. Section 3.4.2 further discusses the role of personal construct theory in the present study.

Critical realism

Another relevant paradigm was critical realism[47]. Stevens' (2020) argument for the application of Bhaskar's (1975) 'critical realism' to drug policy research highlighted to me most strongly its relevance, and Miles et al. (2014) – whose handbook on qualitative analysis substantially guided the present study – also situate themselves "in the critical realist tradition" (ibid.: 311).

In Chapter 12, I map exemplary mechanisms through which a given situation is interpreted as representing particular socio-spatial aspects and, through this interpretation, results in specific substance use related outcomes. This approach resonates with critical realism's emphasis on developing complex causal mechanisms that are embedded in specific contexts and offer explanations for *why* variables may be related. Whilst the anticipation of events features also in personal construct theory, it is at the core of a critical realist approach[48]. Moreover, Stevens (2020: 6, 8) highlights that critical realists understand reality as "relational and emergent", so that the seemingly static nature of scientific descriptions, rather than suggesting a reality that is "fixed and stable", must be seen as a practical necessity[49]. These accounts align well with a relational understanding of space (see Chapter 3) and my critique of environmental prevention (see Chapter 2). They also help make paradigmatic sense of the pathways in Chapter 12: to understand them not as describing universal laws of cause and effect but as offering heuristic models to illustrate how multiple factors may interplay in a given context.

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[46] Although Butt and Warren (2016: 21) argue that personal construct theory "qualifies as a strong form of constructivism", they appear to understand the term 'constructivism' differently to Raskin. Butt and Warren highlight how, according to personal construct theory, reality is *constructed* through interaction (thus a constructivist theory similar to social constructionism), whereas Raskin reserves the term for those theories which assume that we have no direct access to an external reality but experience it only through our *constructions* of it. My way of making sense of this is that personal construct theory may be considered a *constructionist* (highlighting the constructed nature of reality) *rather than a constructivist* theory (not limiting reality to our constructions of it).

[47] It is important to note, however, that this is not a 'critical realist' study: critical realism was not chosen ex ante as a paradigm to guide the research, nor did I apply 'critical realist' concepts or vocabulary retrospectively.

[48] So much so that valentine and Seear (2020: 3) criticise this exclusive focus on causal mechanisms as disregarding other legitimate research purposes: "Stevens seems to imply that the worth of [academic] work is to be assessed based on a single criteria [sic] (his own), namely: whether such work produces knowledge that can directly inform policy *by proposing causal mechanisms of the phenomena concerned*" (emphasis added).

[49] So writes Stevens (2020: 8): "We need to capture discontinuous moments of the heterogeneous flux of reality in order to produce [research] accounts of it".

Critical realism can be seen to give primacy to the objective world (Alvesson and Sköldberg, 2009: 40). A focus on participants' subjective beliefs – which represent partial if not erroneous accounts – may thus appear to contradict the paradigm's premises. However, Alvesson and Sköldberg offer the following definition of 'reality' in critical realism:

> Something is real [in critical realism] if it has a causal effect, that is, if it affects behaviour and makes a difference. Reality does not just consist of material objects. Ideas and discourses are real and can have causal effects. (Alvesson and Sköldberg, 2009: 42)

I take this definition to support the view of subjective beliefs as something real in the present study – especially since the outcome of interest is *the same people's* thoughts, actions, and feelings[50]. A further implication of the above definition is that the distinction between an objective or subjective reality becomes less relevant (what matters is the causal effect), which helps to resolve some of the tensions highlighted earlier.

Pragmatism

The third relevant paradigm was pragmatism. Although I previously denounced a pragmatic stance as eschewing the paradigm question, there is a difference between "narrow approaches that reduce pragmatism to practicality" and those that make "serious contact with the philosophical foundations of pragmatism" (Morgan, 2014: 1045). For the present study, multiple threads highlight the relevance of pragmatism. While personal construct theory can be associated with several philosophies, Dewey's pragmatism is the one Kelly himself referred to[51]. Pragmatism has also been considered to be the source of Kelly's treatment of "how we think, feel, and behave [… as inseparable] components of action" (Butt and Warren, 2016: 14). Pragmatism can also be linked to social constructionism, as Berger and Luckmann (1971/1966: 29) acknowledge Mead's influence on their work[52].

My own worldviews were shaped in large part by my reading of Rorty's (1989) *Contingency, irony, and solidarity* during my master's studies, so that Rorty's pragmatist influence is palpable

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[50] Always assuming that, despite the many processes that go on during an interview, study participants' narrations are sufficiently accurate representations of their actual construing and practices (and not primarily artefacts produced by the interview). On this topic, Kelly (1963/1955: 136) notes: "The construct of the person from whom the communication takes place is real; so is the communicated construct, but the communicated construct is a construction of the original construct and hence not identical with it". On the paralysis we would experience if we were to assume that reality is produced primarily through the research act, see for example Stevens (2020).

[51] So writes Kelly (1963/1955: 154, 157): "Dewey, whose philosophy and psychology can be read between many of the lines of the psychology of personal constructs, envisioned the universe as an ongoing affair which had to be anticipated to be understood. […] Where Dewey would have said that we understand events through anticipating them, we would add that our lives are wholly oriented toward the anticipation of events".

[52] Although Mead is known in sociology for his work on symbolic interactionism, he was also a pragmatist (Morgan, 2014; Butt and Warren, 2016: 12).

in many parts of this thesis. As shown in the previous sections, this includes my 'ironic' take on being a sociologist-preventionist, my understanding of different theories as 'vocabularies' that may or may not offer useful tools to make sense of the world, and my being aware of the contingent nature of this research, including its study population. Not mentioned so far is Rorty's commitment to reducing suffering[53], the basis for his engagement with solidarity. Such commitment is generally shared by sociologists and preventionists (at least in principle, see section 1.2.1). It is also evident in Kelly's work (who was a psychotherapist) and in critical realism (Alvesson and Sköldberg, 2009: 44; DeForge and Shaw, 2012: 91), but Rorty's emphasis on it is particularly striking.

The research implication of this that we must consider the consequences of our methodological choices (Morgan, 2014: 1046). In the present thesis, the critical stance toward restrictive and stigmatising interventions in Chapter 2, as well as the efforts made to avoid producing evidence that would support such interventions (e.g., through reflexivity and a purposefully 'disruptive' research design, explained in section 13.4), can be understood also from this perspective.

Pragmatism is sometimes reduced to practicality and a disregard for paradigms because its proponents argue that metaphysical discussions (e.g., on the nature of reality) do not help people in practice. A 'true' statement in pragmatist thinking is not one that corresponds to an external reality, but one that is practically *useful* (Feilzer, 2010: 8, with reference to Rorty, 1991). It is important to clarify, however, what this usefulness refers to: ideally, it should refer to those who suffer from social injustice and who should therefore be the main beneficiaries of research (Morgan, 2014: 1049–1050). My interpretation of this is that from a pragmatist perspective, research must, above all else, be *useful to reduce suffering*. This point of view can also help frame the present research, albeit in an extreme reading: it might matter less to what extent the proposed socio-spatial aspects (Chapter 10) or pathways (Chapter 12) represent something 'real'; what might matter more is whether they offer useful heuristics, for example, to inform alternative approaches to environmental prevention that can better address the needs of substance users and other preventive target populations.

1.2.5. Research ethics, reflexivity, language and length

Another defining feature of this study was its focus on research ethics and reflexivity. This is not to imply that the study was executed flawlessly but highlights these aspects as priorities which guided the research. This section explains why they were important, how they were

[53] E.g. "Liberal ironists are people who include among these ungroundable desires their own hope that suffering will be diminished, that the humiliation of human beings by other human beings may cease" (Rorty, 1989: xv).

addressed and to what effect, using 'language' as an example. The section also comments briefly on the length of this thesis, which resulted in part from this engagement with ethics and reflexivity. This section complements Chapter 8.

Reflexivity as a means of practising research ethics

The importance of research ethics is self-evident, yet it must be put into context. In Austria, until very recently, research ethics were not as formalised as they are in many other countries. At the time of preparing this research at the University of Vienna, there was no requirement for students to obtain approval from an institutional ethics review board and there were no institutional templates available to support ethical research practice (e.g., consent forms)[54]. My experience of working as a researcher in England showed that the situation there was different, but that ethical practice could sometimes be reduced to completing an application for ethical review. This observation was not new (e.g., Guillemin and Gillam, 2004: 263–264) but, fuelled by my prior work on quality standards and ethical drug prevention (Brotherhood and Sumnall, 2011), it led me to wonder what it would mean to take a commitment to research ethics seriously. Also, I intended to conduct interviews with cannabis users, but I had never before undertaken primary research on the use of illegal substances. I thus felt anxious and, like others before me[55], saw engagement with research ethics as a way to overcome this anxiety.

This explains unusual features of the present research. I applied for institutional ethics approval *even though* it was not required, and I agreed to change a major aspect (i.e., to limit the study to legal substances, see Chapter 8) to obtain such approval *even though* I had the option to forego the approval and proceed with the original study design. I also put considerable effort into designing a recruitment strategy that would best protect study participants, which culminated in a novel technique for separating sensitive and identifying information at the point of online data collection (described in section 8.3.3; Brotherhood, 2018b).

Further ethical considerations are outlined in Chapter 8. At this point, an interesting question is *how* decisions relating to research ethics can be made. Guillemin and Gillam (2004) observe that whilst a formal review procedure helps to address main issues, many ethical issues faced in day-to-day research practice cannot be covered by general procedures. They go on to suggest reflexivity as a tool for developing sensitivity for potential ethical issues and ways of

[54] This has since changed, in part due to the introduction of the EU General Data Protection Regulation (GDPR).
[55] Consider for instance this reflection by Petrova et al. (2016: 451) regarding her own post-graduate research: "The study discussed here was clearly a small-scale study by a novice researcher. Thus, the researcher may have been inexperienced in matters related to research ethics and may have been highly sensitised to issues such as confidentiality to make sure things were done 'right'. […] A more experienced researcher may have responded differently to the whole issue about confidentiality right from the start of the research".

addressing them. Reflexivity played a key role in the present study, in relation to ethics but also more broadly, as the following paragraphs show.

Turning thus to *reflexivity*, Lumsden et al. (2019: 2) note: "Although social scientists now tend to agree on the importance of being reflexive, they do not share a coherent conception of what 'being reflexive' means or how to practice reflexivity". Correspondingly, reflexivity can be exercised in different ways and for different purposes[56]. In the present study, reflexivity meant continuous thinking, talking and writing about the research to assure its quality and to develop as a researcher. This was supported by a range of tools and strategies, including a research diary, post-interview protocols, self-evaluation, structured monthly reflections, participation in doctoral writing groups[57], and reading other researchers' reflexive accounts (e.g., Watt, 2007; Haines-Saah, 2013; Grant, 2014; Wilkinson, 2014). My research diary was particularly important: like Watt (2007: 85, 91), I often entered into a written dialogue with myself and conducted reflective exercises (see section 8.2.2 and Brotherhood, 2016, for examples).

Reflexivity was crucial to practising research ethics, as it helped me identify and address ethical and other methodological issues relating to the fieldwork. It also helped me develop a better understanding of my implicit assumptions and values: without this, I could not have integrated my 'prevention' lens in the present project. Subsequently, I also became more aware of my responsibilities as a researcher, given the potential (at least in principle) for this work to inform prevention practice and thereby affect people's lives. This made me appreciate that research ethics extended beyond the protection of study participants and prompted me to also consider the purposes to which research findings could be put after project completion.

'Substances' and 'substance users': a few notes on language

The final paragraphs in this section address how reflexivity shaped the thesis as text. In the present context, reflexivity was primarily a process; intertwining my reflexive writing with the writing of the thesis was therefore not a priority[58]. A notable exception is the present section

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[56] For example, to explore one's own influence on the research, to reflect on researcher-participant relationships or collaborations, or to generate data based on one's own experiences (i.e., researcher as study participant) (e.g., Finlay and Gough, 2003: 6–16; Kuehner et al., 2016).

[57] Besides participating in my academic supervisor's discussion groups for his doctoral students, for five years I was also part of a self-managed writing group with two other doctoral students (initially face-to-face, later virtual). Especially when it was not possible to attend other meetings due to personal circumstances (see section 1.2.6), this peer group offered an important source of feedback and support. The particular circumstances of the group (regular meetings with the same people, small number of participants, no other professional or personal relationship to each other, agreed code of conduct emphasising confidentiality) allowed a high level of detail and openness, which supported especially the discussion of ethical issues in practice.

[58] The literature on reflexivity, rather than addressing the practice and benefits of being reflexive while the research project is *ongoing*, sometimes focuses on the *final text* as a representation or performance of such reflexivity (see e.g., the examples in Finlay and Gough, 2003).

1.2, which is the 'reflexive' piece in this thesis[59]. Still, reflexivity shaped the thesis as a whole, including its content, structure, language and length.

A key consideration was that different terms have different theoretical and political implications. Thus, it was a conscious decision to refer to, for example, 'substances' or 'products'[60] rather than the more emotive 'drugs'; 'substance use' rather than the more evaluative 'substance abuse'; 'users of illegal substances' rather than 'illegal substance users' (to avoid stigmatisation of users); a 'general substance use position' rather than a 'substance user identity' (many participants did not identify as substance users) or 'motivation' (a concept at odds with personal construct theory, where it is understood to imply persons as "inert […] psychological objects", Kelly, 1963/1955: 37); 'practices' as a sociological concept to complement 'behaviours'; 'construed socio-spatial aspects' rather than 'personal constructs' or 'environmental characteristics'; and so on.

While it is not possible to comment on each point, my rationale for using the terms *'substances'* and *'substance users'* can serve to illustrate the thinking behind such choices. Referring to 'substances' rather than 'drugs' might be seen to reinforce the notion that 'drugs' comprise illegal drugs but not alcohol or tobacco. I do not share this view, but I learnt over the course of this study that 'drugs' tended to distract (e.g., prompting discussions on cannabis legalisation), while the more neutral 'substances' helped to maintain the study focus[61]. Sometimes, I followed a different logic. Speaking to others about my study of 'substance users' and spaces, I found that they often imagined stereotypical 'addicts'. Therefore, although describing the participants in this study as 'substance users' may seem inappropriate (many reported only limited use), this experience encouraged me to focus on this mainstream population and to retain this term in an effort to counter this 'othering' of substance users[62, 63].

In relation to academic writing, it should be noted that this engagement with research ethics and reflexivity also increased the length of this thesis. 'Length' was a recurring topic during the production process. While the length reflects methodological features (e.g., mixed-methods

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[59] Hence the first person voice is used in section 1.2, whereas the remaining thesis refers to 'the study author'.
[60] In the present study, 'substances' refers to psychoactive substances (e.g., alcohol, nicotine), whereas 'products' refers to (manufactured) end-user products containing these substances (e.g., wine, beer, cigarettes, cigars). For increased legibility, 'products' are generally included when the thesis speaks of 'substances', and vice versa.
[61] For similar reasons, I decided to use 'substances' as shorthand for the more accurate 'psychoactive substances'.
[62] I thereby diverge from the (harm reduction) literature which uses terms such as 'people who use drugs' (PWUD), but this must be seen in the context of the explanation given above. It should also be noted that I use terms such as 'smokers', while Haines-Saah (2013: 153) comments, "I use the terms 'tobacco user' and 'people who smoke' to counter the pejorative implications of the term 'smoker(s)'". I did not feel a need to replace this term, likely because of the generally favourable views on smokers and smoking in Austrian culture (cf. the stigmatisation of smokers in other countries). Another important consideration is that the present study explicitly highlights situations in which substances are *not* used, thus it does not reduce the participants to being substance users.
[63] Which is, however, not to deny the differences (e.g., experiences, needs) between heavier and lighter users.

design, use of little known or novel methods for participant recruitment, data collection and analysis), several chapters might not have been written (or would have been much shorter) without this focus on research ethics and reflexivity. Another reason for increased thesis length was the dual aim of the study as contributing to socio-spatial theory *and* to prevention practice: this is addressed in the final section of this chapter.

1.2.6. The journey of this research project

The final section in this chapter outlines the *practical circumstances* under which the present study was carried out. This will help readers to better appreciate the theoretical outlook and methodology of the thesis. Box 1 below provides the necessary context via a narrative timeline of major project milestones and life events.

Box 1: Project background and timeline

The project started formally in 2011 as an unfunded doctorate in sociology at the University of Vienna. It followed on from two prior projects: my master's study on Löw's 'sociology of space' (also at the University of Vienna), and an unfunded repertory grid study on spaces of substance use which I had led at Liverpool John Moores University (LJMU). For the latter, I had developed instruments and carried out a few interviews, but other (funded) priorities eventually took over. I thus decided to pursue the repertory grid research through a part-time doctorate, initially *without* the substance use focus. Following on from my master's research, I sought to understand how people think about everyday spaces in general and to discuss this vis-à-vis the urban studies literature. However, feedback suggested that this proposal lacked practical relevance. In 2013, I therefore returned to the original project idea of studying spaces in relation to substance use. This suited me personally, as by that time I had come to identify more strongly with the substance use field than with urban sociology. When one of my other main projects finished in 2015, I used the opportunity to become a full-time student. The project thus developed broadly in two phases: a long lead-up (2009-2015), followed by the actual study and thesis writing (2016-2021).

The research in its present form started in 2016. As a full-time student, I soon finalised data collection materials and applied for institutional ethics review. Ethical approval was received in January 2017; recruitment started on the same day, and the first interviews followed a few weeks later. However, I was already seven months pregnant at the time of these interviews and had to pause the fieldwork for health reasons. After the birth of our daughter, my husband took paternity leave, and this was the timeframe available to me to complete the fieldwork. After that, I outsourced most of the interview transcription. My own involvement intensified again in December 2018, as my daughter settled into kindergarten. This was the beginning of the data analysis and writing-up stage, which lasted over two years, with some delays due to the Coronavirus crisis (thanks again to my Mum and my husband for helping me so much during this time!). One of the last major developments was the receipt of a competitive grant from the University of Vienna: this supported the project in the lead-up to its completion in spring 2021.

Several threads can be identified in Box 1, including:

- *Oscillating between 'sociology of space' in Vienna and international projects on substance use prevention:* negotiating different professional interests and academic 'homes' was one of the greatest challenges in this project. I wanted to include additional analyses focussed

on space or relating only to prevention, but finally I had to accept that these were outside the scope of this thesis[64]. A challenge in writing the theory part was how to balance discussions of socio-spatial theory, sociology, substance use, and environmental prevention. The close connection to both research fields explains, however, the overall approach of this study, the focus on spaces and socio-spatial aspects that are not *per se* related to substance use, and why Chapter 12 concludes with assertions on the emergence and effect of interpreted space (rather than focussing on substance use).

- *Pursuing an unfunded project*: in Austria, it is common for social scientists to pursue their doctoral studies outside the context of a funded position, as funded places are very limited. I applied for funded positions or competitive funding to support this project in 2009, 2012, 2015, 2017 and 2019 but was only successful with the last application. Lack of funding affected the content and duration of the project, especially in the first years.

- *Becoming a parent:* as a new mother, I had to de-prioritise additional data collection (e.g., interviews, observations) and analyses. I engaged research assistants to support interview transcription and also for participant recruitment (described in section 5.4.3). The latter was unusual for a doctoral study, but it was necessary to keep the project going. Because of the time span between fieldwork and analysis, techniques such as 'member checking' (to discuss researcher interpretations with participants) could not be employed as intended[65].

Carrying out this project as outlined above was challenging, but it also had benefits. Had I completed in 2015 as originally intended, I could not have drawn upon the English language translation of Löw's *Raumsoziologie* (see Chapter 3) or the EMCDDA's work on environmental prevention (see Chapter 2). My research interests developed over the years and I came to understand the project better through reflexive engagement. This greatly shaped the final thesis, and a thesis submitted earlier would not have included the reflections offered in the present chapter, nor the recommendations for practice offered in Chapter 13.

[64] Some additional analyses exploring how study participants mapped, remembered and talked about their everyday spaces were presented as Brotherhood (2019).
[65] For example, I did not contact participants to individually review their pathways (Chapter 12) with them. However, participants *were* contacted to address ethical questions (e.g., anonymity), and all participants who had asked to review the thesis prior to submission received a copy of the draft dissertation for comment.

2. Environmental prevention of substance use[66, 67]

Environmental prevention of substance use is chosen in the present thesis as an example to illustrate the practical significance of applying socio-spatial theory. The chapter offers a review of environmental prevention interventions, including in relation to their theoretical foundations, conceptualisation of the 'environment' and presumed mechanisms of action, to show how a 'sociology of space' perspective (to be introduced in Chapter 3) could help enhance this field.

Environmental prevention is a relatively recent field, and the term can refer to different aims and strategies (e.g., Room, 2006). This chapter focusses on the concept as used in a recent publication (Oncioiu et al., 2018) by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) – Europe's leading agency on substance use – and related publications (e.g., Burkhart, 2011; Foxcroft, 2014a)[68]. Relevant approaches are also known as 'cueing interventions' (Papies, 2017), 'nudging' or 'choice architecture' (Marteau et al., 2011; Pechey et al., 2020) or 'situational' prevention (Welsh et al., 2018); these are also considered below.

2.1. Introduction

2.1.1. Prevention definitions and taxonomies

The present thesis is based on the notion that prevention seeks to prevent or delay the onset of substance use or, where this is not feasible, to support 'lighter' patterns of use (e.g., in terms of substances used, quantities, frequency of use) (similar e.g., EMCDDA, 2017: 22; UNODC and WHO, 2018: 2). This definition is necessarily narrow in order to distinguish prevention from treatment, harm reduction[69] and social reintegration (see also EMCDDA, 2017: 22, 26-28).

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[66] I am extremely grateful to Dr. Gregor Burkhart and Prof. Katalin Felvinczi for their in-depth review of an earlier version of this chapter. Their thoughtful comments supported a substantial revision of the initial text, in particular a revised chapter structure, clearer presentation of key arguments, and additional clarifications (e.g., regarding the chapter aims, making the 'sociology of space' and 'critical sociology' lenses explicit). Their feedback also helped to identify potential misunderstandings and discrepant views (some are noted in section 2.1.3). The overall tone of the chapter was consequently adapted (e.g., "appeared to suggest", "may") to highlight that this is but one possible interpretation of the reviewed literature. The main arguments were maintained as in the original version.

[67] As outlined in Chapter 1, this study's original focus was on space. Environmental prevention emerged during the project as a possible area for the practical application of study findings. Hence, although presented as a point of departure, the following literature review and discussion were completed after the empirical study.

[68] Burkhart and Foxcroft were co-authors on the EMCDDA's key report on environmental prevention (Oncioiu et al. (2018) but have also published separately on the topic (e.g., Burkhart, 2011; Foxcroft, 2014a). This work is also referenced in Oncioiu et al. (2018). For the present chapter, this body of literature was considered together.

[69] In practice, the boundaries between prevention and harm reduction are often blurred, but generally speaking, harm reduction was understood in this thesis to refer to interventions which seek to prevent substance use related

Prevention is understood here to operate within a 'demand reduction' rather than a 'supply reduction' framework, so that its primary aim is to reduce people's desire for substance use (cf. limiting access to substances[70]. Consequently, although all interventions addressing substance use may be broadly classed as 'prevention', the term as used in this thesis refers to a narrower set of activities.

Substance use prevention can be related to certain ideologies or moral judgements concerning substance use. As understood in this thesis, the main justification for prevention is to prevent negative health and social consequences of substance use (e.g., accidents, respiratory diseases, cancers, dependence) (see also section 1.2.1).

There are various classification systems that make reference to 'environmental prevention'. The EMCDDA (2017: 26) distinguishes "universal", "selective", "indicated", and "environmental" approaches, based on the target. While universal, selective and indicated prevention address population groups[71], environmental prevention aims "to change the cultural, social, physical and economic environments in which people make choices about drug use" (EMCDDA, 2017: 26). Thus, one of its defining features is that it does not address people directly but does so *indirectly* by targeting relevant environments[72]. By contrast, Foxcroft (2014c, 2014a) suggests that environmental prevention could be understood to refer to the "function" of an intervention. Prevention interventions could then be characterised as taking an "environmental", "developmental" or "informational" approach, depending on whether they seek to prevent substance use via changes in the environment, the development of skills (e.g., life skills), or information provision (Foxcroft, 2014a: 820)[73].

Discussing environmental prevention alongside other prevention approaches is a rather recent development. Traditionally, discussions of prevention focussed on approaches which address

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harms without necessarily trying to prevent substance use as such (e.g., use of plastic cups does not necessarily prevent alcohol use but may prevent alcohol-related injuries). Such distinctions can be useful for defining outcomes and target populations as well as for thinking through intervention mechanisms.

[70] This is in line with how prevention has been situated, for example, by the United Nations (UNDCP, 1994; see Ritter and McDonald, 2008: 29) and reflects the typical activities of universal, selective and indicated prevention.

[71] Universal prevention addresses entire (sub)populations in a given setting regardless of their vulnerability (e.g., all pupils in a school classroom), while selective and indicated prevention address groups and individuals considered to be more likely (i.e., 'at risk') to use substances and develop dependence (e.g., disadvantaged neighbourhoods, individuals with low impulse control).

[72] However, section 2.4.2 will show that people can also be directly targeted by environmental prevention. One consideration in this regard could be that substance users are part of the environment insofar that, by drinking or smoking, they can act *as substance use related cues for others* and contribute to a normalisation of substance use. From this perspective, interventions targeting substance users could still be understood to target the environment.

[73] Foxcroft (2014a: 820), original emphasis) suggests the following definitions: "Environmental prevention comprises interventions that aim to limit the *availability* of maladaptive behaviour opportunities, through system wide policies, restrictions and actions. [...] Developmental preventive interventions aim to promote adaptive behaviours, and prevent maladaptive behaviours, by focusing on the development of *skills* that are key in socialization and social development of appropriate behaviours. [...] Informational prevention interventions aim to increase *knowledge* and raise awareness about specific risk behaviours, through communications" (see the original text for examples).

target populations directly via informational or developmental strategies. However, challenges of those approaches (e.g., limited effectiveness, resource intense) prompted a reframing of prevention to include environmental approaches, many of which were typically considered under separate banners such as policy/legislation or setting-based health promotion. Environmental interventions are thought to hold greater promise in terms of effectiveness[74], cost, ease and sustainability of implementation, coverage of target populations, acceptance by policy-makers and target populations (for some strategies), and reduction of health inequalities between socioeconomic groups[75]; and they may also support the delivery and effectiveness of informational and developmental approaches (e.g., Room, 2006; Burkhart, 2011; Faggiano, 2011; Marteau et al., 2012; Hollands et al., 2013; Foxcroft, 2014c; Oncioiu et al., 2018; Pechey et al., 2020). These advantages arise from practical differences in delivery (cf. informational/development approaches) but also from theoretical differences in how substance use is explained, as described below. This chapter explores these theoretical underpinnings of environmental prevention, in line with the thesis focus on socio-spatial theory.

2.1.2. 'Norms'-based versus 'prompts and cues'-based approaches

As noted earlier, environmental prevention is an emerging field, and it can be conceptualised differently. The following two excerpts illustrate different perspectives:

> [Environmental prevention can be defined] as strategies that aim to alter physical, social and economic environment without relying on persuasion. [... E]nvironmental prevention comprises approaches that operate on the level of social, formal, peer and cultural *norms* about alcohol, tobacco and also illicit drugs. (Burkhart, 2011: 87, 89, emphasis added)

> The purpose of environmental prevention policies and interventions is to limit exposure to unhealthy or risky behaviour opportunities (or to promote the availability of healthy opportunities). [...] Environmental prevention measures target the contexts for behaviour through changing the *prompts and cues* that guide behaviour. [...] Environmental prevention operates by changing the physical, economic, or regulatory contexts for behaviour. (Oncioiu et al., 2018: 5, 13, 48, emphasis added)

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[74] Evidence on effectiveness of environmental prevention is not discussed here, not least because it differs by intervention type (e.g., Perman-Howe et al., 2018: 90). A selection of reviews is presented in section 4.1.2 below, and interested readers will find further evidence reviews in the cited literature (e.g., Papies, 2017).

[75] Socially disadvantaged groups are considered less likely to have the resources needed to benefit from traditional prevention approaches: traditional approaches may therefore increase health disparities by further improving the health of already-privileged groups while not benefitting disadvantaged groups; by contrast, environmental approaches may reduce health inequalities because they require fewer resources from target populations and may therefore benefit groups not served by traditional approaches (e.g., Foxcroft, 2014c; Oncioiu et al., 2018).

It is suggested here that these phrases (emphasised in the excerpts above) point toward two different theoretical approaches discernible in the environmental prevention literature[76]. The former approach – prominent in Burkhart's 2011 publication – emphasises *norms* as the primary mechanism and refers to the wider environments in which people live (e.g., society, community, school, family). It is compatible with the assumptions underpinning informational and developmental interventions[77]. The more recent approach – the focus of the EMCDDA's 2018 publication – emphasises *prompts and cues* located in the immediate environment in which substance use may occur, with automatic processes (e.g., ease of access, learnt associations) as the primary mechanism to explain how environments shape behaviour[78]. It is presented in the reviewed literature as *a significant departure* from the traditional prevention logic and is of particular interest to the present thesis.

This distinction between a 'norms'-based and a 'prompts and cues'-based approach to environmental prevention was not made explicit in the above-cited publications; the reason being that the immediate environment (e.g., availability or lack of ashtrays, cigarette butts and smoking people) also communicates prevailing norms (e.g., around smoking), and norms can themselves be understood as prompts and cues (G. Burkhart, personal communication, 9.10.2020). Also, interventions (e.g., school-based 'no smoking' policy) typically utilise both approaches in practice. The proposed distinction mirrors, however, existing distinctions in the literature[79]. It is also important from a theoretical point of view, as argued below.

A key tenet of the newer 'prompts and cues' strand of environmental prevention is that theories underpinning informational and developmental prevention fail to account for major influences on behaviour. Instead of assuming a primacy of, for example, reasoned thought (e.g., appreciating norms and forming intentions), this approach assumes that people mostly go

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[76] A third theoretical approach can be linked to health promotion (Burkhart, 2011), well-being (EMCDDA, 2019: 118–119), and nurturing environments (Biglan et al., 2012). Example interventions include those that aim to change the 'culture', 'climate' or 'ethos' of a context (e.g., 'whole school' approaches, interventions focussed on parenting skills, community coalitions). It is debated whether these should be considered as environmental prevention measures (e.g., due to their overlap with developmental prevention and the field of health promotion) (e.g., Burkhart, 2011; Foxcroft, 2014b, 2014a). This intervention group is not a focus of the EMCDDA's key publication on environmental prevention Oncioiu et al. (2018) and is therefore not considered further in this chapter.

[77] For example, in the Theory of Planned Behavior (Ajzen, 1991), individual beliefs about prevailing norms are thought to influence behavioural intentions and subsequently behaviour. Environmental prevention can thus seek to change a given context in order to affect individual beliefs and subsequent intentions and behaviours.

[78] A visual model in the EMCDDA report (Oncioiu et al., 2018: 15) refers also to long-term effects of environment on behaviour via changes in traditional mediators (e.g. norms, beliefs, values, attitudes) but these are not a focus of the main text (e.g., norms are discussed only in relation to traditional prevention approaches). The EMCDDA report is thus understood here to represent the 'prompts and cues' approach rather than the 'norms' approach.

[79] In another publication, the EMCDDA (2019: 117) distinguishes between interventions on the "social environment – reinforcing non-use norms and attitudes" and the "physical environment – limiting access to and availability of alcohol, tobacco products and other substances". Similar distinctions are also found in Papies (2017: 5) ('cueing social norms' vs. 'nudging and prompting') and Welsh et al. (2018) ('community crime prevention' vs. 'situational crime prevention').

about daily activities by following established routines ('habits') and responding automatically to external and internal stimuli. Behaviour is regarded as far more context-dependent than is the case in traditional theories of behaviour (e.g., Foxcroft, 2014b: 830). Hence, environmental prevention makes use of "the automatic system of behaviour" (Oncioiu et al., 2018: 13) and affects behaviour by targeting "the prompts and cues that guide behaviour" (ibid.).

It can thus appear as if the key distinguishing feature of environmental prevention (vis-a-vis other prevention approaches) *is* its focus on automatic processes. Consequently, although environmental prevention could be defined as any intervention targeting environments for preventive purposes (regardless of mechanism), it can instead appear to be characterised via a specific mechanism (i.e., as targeting automatic and nonconscious processes; e.g., Oncioiu et al., 2018: 13)[80].

The key advantage of environmental prevention, conceptualised this way, is that it requires minimal effort from target populations. By contrast, informational approaches typically require target populations to actively process information and to translate these knowledge gains into actual behaviour change. The relative effortlessness of environmental prevention is why it is associated with the potential benefits listed earlier (e.g., why it may be more effective in general and especially for those who are unwilling or unable to engage with traditional interventions).

Compared with the 'norms' model, the 'prompts and cues' model assumes a stronger and more direct relationship between the immediate environment and behaviour, and interventions are more likely to be timed and placed very closely to the point at which substances would be obtained or used[81]. As Papies (2017: 5) would put it, the intervention is "situated by integrating it into the critical situation in which behaviour change is desired". In line with this, the present thesis is particularly interested in measures which target "proximal physical micro-environments" (Hollands et al., 2017) where substances are typically obtained or used, in other words, where we would expect *immediate effects of environment on behaviour*[82]. Regulatory and economic measures[83] are also of interest insofar as they materialise physically (e.g., as 'no smoking' signs, price labels) or affect the perception of micro-environments in other ways

[80] Also the earlier text by Burkhart (2011: 81), emphasis added) defines environmental prevention via a specific mechanism: "as strategies that aim to alter physical, social and economic environment *without relying on persuasion*".
[81] This is true for most example interventions listed in Oncioiu et al. (2018: 19–20) for alcohol or tobacco. The main exception is "Bans and restrictions on alcohol [or tobacco] advertising and promotion" which can also refer to advertising that is not situated close to the point of sale or use.
[82] The visual model in the EMCDDA report (Oncioiu et al., 2018: 15) refers also to long-term effects of environment on behaviour, but the thesis at hand is concerned primarily with immediate ('situated') effects.
[83] Environmental approaches span a very diverse range of measures, including physical ones (e.g., positioning of alcohol or tobacco products in a shop) but also regulatory (e.g., restrictions on advertising and sponsorship) and economic ones (e.g., tax increases on alcoholic and tobacco products) (Oncioiu et al., 2018).

(e.g., merely knowing that a smoking ban is in place can affect the perception of a space, i.e., without a physical reminder).

This focus on 'prompts and cues'-based approaches to environmental prevention corresponds with the present study's interest in how spaces are momentarily constituted through processes of interpretation (Löw's "operation of synthesis", to be described in Chapter 3).

2.1.3. Points of interest to the present thesis

The following sections review environmental prevention from several perspectives: 'sociology of space', 'critical sociology *with* prevention' and 'quality in prevention'. These perspectives were noted in sections 1.2.1 and 1.2.2, and Chapter 3 will further introduce Löw's (2001, 2016) 'sociology of space'. Briefly, the latter is a sociological approach which highlights the socially produced and socially meaningful aspects of physical environments. 'Space' in this sense is more than the physical environment that is sensorily perceived: it emerges from how specific arrangements of living beings and social things are *produced and interpreted* by humans as members of social groups. Socio-spatial theorists such as Löw offer frameworks for the structured analysis of space (further discussed in Chapter 3), and the present thesis develops its own suggestion for such a framework in Parts 3 and 4.

The present chapter therefore considers how 'environment' is conceptualised in environmental prevention and to what extent this reflects socio-spatial theory (especially sociological notions of space as per Löw). To this end, section 2.2 outlines main theories that currently appear to inform environmental prevention. The subsequent analysis will show that socio-spatial theory is so far underutilised, which opens up an opportunity for the present thesis to explore the potential value of applying a 'sociology of space' approach to environmental prevention.

From this emerges a discussion of potential areas in current environmental prevention which could be developed further using socio-spatial theory. Three areas are identified:

- A 'sociology of space' perspective suggests that current conceptualisations of 'environment' may not reveal potentially useful intervention points and mechanisms (section 2.4.1).

- A 'critical sociology' perspective highlights the focus on restrictive and coercive intervention strategies as an issue worthy of attention: are these supported by the theories currently underpinning environmental prevention and could socio-spatial theory help to identify alternative approaches? (section 2.4.2)

- A ‘quality in prevention’ perspective invites us to consider if current theoretical foundations may in some way limit the effectiveness of environmental prevention as well as the ability to identify undesirable effects (section 2.4.3).

Consequently, this chapter argues that, as intervention strategies and outcomes emerge from theoretical foundations, use of a different theoretical approach may produce other strategies or outcomes. Thus, the goal here is not to assess prevention as such (for examples of such critique, see section 1.2.1) but to reflect on how the underpinning theories shape environmental prevention and what contributions socio-spatial theory could make to this field[84]. Possible implications for future research will be formulated, and the present research offers an example for how most of these implications can be put into practice.

A note on using the EMCDDA report as a reference point for discussion[85]

The argument is developed specifically in relation to the EMCDDA’s seminal report on the topic (Oncioiu et al., 2018) and related publications. The report was chosen as a recent exemplary publication devoted to the topic, published by a leading agency with the aim of informing policy and practice.

It is important to highlight that the EMCDDA report served a specific purpose (e.g., as a basic introduction to environmental prevention for non-academic audiences, to make the concept more broadly known and outline some of the underlying concepts); this scope limited the extent of detail that could be included. Environmental prevention is a developing field, and the present chapter will note some recent developments that occurred after the publication of the EMCDDA report in 2018. It is clear, however, that the EMCDDA report could not incorporate these. Furthermore, the present chapter reflects the study author’s own reading of the report. Subsequent exchanges with one of the report authors (G. Burkhart) highlighted other possible or intended readings (e.g., greater emphasis on long-term effects via norms, no exclusive focus on automatic processes, no assumption of universality of cues, list of example interventions not intended to be exhaustive or representative but based on practical considerations for data collection). The present chapter hence discusses one possible reading of the report and the potential challenges and opportunities that arise in that case.

[84] Due to the practice orientation of the present thesis (see section 1.2.1), this chapter operates *within* the logic of environmental prevention. Therefore, certain tenets of environmental prevention are accepted as given (e.g., that environmental aspects are targeted through intervention in order to reduce substance use).
[85] Thanks to Gregor Burkhart for kindly offering further insights into the aims and scope of the EMCDDA report.

Finally, given the emerging nature of this field, the authors of the EMCDDA report could not draw on an established body of literature. The report was therefore also meant to stimulate further work in this area, and the review in this chapter follows this invitation. The present aim is hence not to question the value of the EMCDDA report but to highlight possible areas for future consideration and indicate how a 'sociology of space' perspective – and consequently the present thesis – could support further developments in environmental prevention.

2.2. Main theories informing environmental prevention

This section identifies main theories informing environmental prevention, as evident in the EMCDDA's publications on the topic (in particular Oncioiu et al., 2018) and other publications by the same authors (e.g., Burkhart, 2011; Foxcroft, 2014a).

In prevention research and practice, 'theory' can be understood to refer to "a set of interrelated concepts that are used to describe, explain and predict how various aspects of human behaviour are related to each other" (EMCDDA, 2019: 44). For the present thesis, 'theory' also included models about how interventions might affect behaviours. The identified theories and approaches could be grouped into six categories, labelled 'choice architecture', 'dual-process theories', 'COM-B', 'affordances', 'crime prevention through environmental design (CPTED)' and 'broken windows'[86].

It is important to note that the reviewed publications did not provide a structured overview of underpinning theories, and so this overview was developed specifically for this thesis, based on concepts mentioned in the reviewed documents; it may therefore not be exhaustive. The following pages briefly introduce the theories in order of prominence in the reviewed literature. Table 1 below shows key features of each theory. The issues highlighted in the last row of Table 1 are then explored in a separate discussion from section 2.3 onwards.

[86] Examples of "important prevention theories" given in a general EMCDDA handbook on prevention (2019: 45) include Ajzen's (1991) 'Theory of Planned Behavior', Bronfenbrenner's (1979) 'Ecology of Human Development' as well as Biglan and Hinds' (2009) 'Nurturing Environments'. Although the latter two have a socio-spatial dimension, they do not feature strongly in the publications on environmental prevention. The likely reasons for this are that, although Bronfenbrenner identifies various contexts that influence a child's development, his focus is on social relationships (e.g., between parents and children) rather than the regulatory, economic or physical environment. Bronfenbrenner is thus referred to in Burkhart's (2011) publication, which used a broader notion of environmental prevention, but is not mentioned in the EMCDDA's later publication (Oncioiu et al., 2018). Biglan and colleagues' theory of nurturing environments refers to the economic (e.g., reducing poverty) and physical environment (e.g., providing high-quality public spaces); however, this theory rather represents the 'health promotion' stream of environmental prevention (see also footnote 76 in section 2.1.2).

Table 1: Main theories informing environmental prevention of substance use

Key feature	Choice architecture	Dual-process theories	COM-B	Affordances	CPTED	Broken windows
Related concepts (e.g.,)	Nudging	Type 1/2; 'automatic' vs. 'reflective' system	Behaviour change wheel	Functional meaning	Situational crime prevention	Order-maintenance
Example authors/ publications (e.g.,)	Thaler and Sunstein, 2008; Hollands et al., 2017	Kahneman, 2011; Evans and Stanovich, 2013	Michie et al., 2011	Gibson, 1966, 1979; Hill, 2014	Jeffery, 1971; Cozens and Love, 2015	Wilson and Kelling, 1982; Wagers et al., 2017
Disciplines (e.g.,)	Behavioural economics, psychology	Behavioural economics, cognitive psychology/ neuroscience	Psychology	Ecological psychology	Environmental criminology, urban design, architecture	Criminology, social psychology
Purposes (e.g.,)	To show how behaviour change can be achieved with minimal restrictions and minimum effort by target populations, through altering choice presentation	To explain deviations from rational choice model (including intention-behaviour gap) by distinguishing two types of mental processes	To identify key conditions for behaviour, illustrate breadth of possible interventions and support selection of appropriate behaviour change strategy	To offer an account of environment, perception and action that does not rely on cognition as a mediator	To offer a set of practical strategies to reduce crime through improvements in the (built) environment (1st generation CPTED) or community (2nd generation CPTED)	To explain how minor evidence of neglect (e.g., a broken window) can result in gradual neighbourhood decline and to highlight a potential role for police
Conceptualisation of environment as an array of …	Potential behavioural choices	Tasks to be accomplished	Opportunities that prompt, enable or constrain behaviour	Action opportunities emerging from person and environment	Opportunities (or not) for crime	Environmental cues indicating & reinforcing prevailing norms
Relevance to environmental prevention of substance use[a]	Key concept	Basis for 'choice architecture' and 'COM-B'	Situating environmental interventions within portfolio of behaviour change interventions	Mentioned as something that can be modified by intervention	In relation to surveillance measures	Highlighting links between environmental cues and norms
Specific to env. prevention?	No	No	No	No	Yes, in relation to crime prevention	Yes, in relation to crime prevention
Potential issues in relation to environmental prevention (e.g.,)	Relative disregard for thought processes, only recent interest in exploring mechanisms	Promotes thinking in dualisms, presumed mutual exclusivity of the two processes	Potentially narrow view of environmental interventions, may support restrictions	May not fully explain complex behaviours, 'meaning' reduced to (physical) function	Limited applicability to substance use as such ('crime' focus), focus on surveillance	Potentially overstates link between environment and serious crime

Note. Contents of this table are based on interpretation of theories by the author of this thesis.

[a] In publications by EMCDDA and related authors (e.g., Burkhart, 2011, 2014; Foxcroft, 2014a; Oncioiu et al., 2018).

2.2.1. Choice architecture

'Choice architecture' interventions are a key element of environmental prevention (Oncioiu et al., 2018: 12). The concepts 'choice architecture' and 'nudging' were developed by Thaler and Sunstein (2008; also Thaler et al., 2012). In this perspective, the environment appears as an array of *potential behavioural choices*. People can be 'nudged' into making certain choices based on how choices are presented (those who decide on the presentation are called 'choice architects'). Thaler and Sunstein's work is attractive to intervention designers because it suggests specific strategies, such as ensuring that the default option represents the behaviour desired by the choice architect. An important aspect of nudging as conceptualised by Thaler and Sunstein, however, is that people are free to choose another option than the one suggested by the choice architect (a position they describe as 'libertarian paternalism'). Thus, nudges would not include interventions that force or forbid certain options (e.g., restrictions on availability, economic (dis)incentives large enough to constrain choice) (also Münscher et al., 2016: 511). However, in practice, such interventions are also typically considered in order to map out the entire spectrum available to a choice architect. In this vein, Hollands and colleagues (e.g., 2013; 2017; Pechey et al., 2020) have applied and developed the approach[87] further in relation to the use of food, alcohol and tobacco products, and their work has been highly influential for environmental prevention[88]. Their focus is on physical aspects, specifically the availability and positioning of products, related objects or objects in the wider environment, their functionality, presentation, size, and information about the products or their use (Hollands et al., 2017: 3). Research regarding the mechanisms underpinning 'choice architecture' interventions is still in its infancy (Hollands et al., 2017; Lindenberg and Papies, 2019; Pechey et al., 2020). Section 2.4 below will argue that this is because explanations commonly refer to automatic processes (e.g., Marteau et al., 2012) – a concept from dual-process theories.

2.2.2. Dual-process theories

Dual-process theories (also known as e.g., dual-system models) describe a group of theories positing the existence of two types of mental processing. It is common to contrast the types using lists of opposing characteristics. To give examples, the processes known as 'Type 1' or

[87] Due to controversies associated with 'choice architecture' and 'nudging', as well as inconsistent usage of the terms, the authors have on occasion distanced themselves from these concepts (e.g., Hollands et al., 2017: 3). A more recent publication, however, situated itself again in the 'choice architecture' tradition (Pechey et al., 2020).
[88] For example, Oncioiu et al. (2018: 56) refer to Hollands et al. (2013) as one the key publications used to identify environmental prevention interventions for illicit drugs, alcohol and tobacco.

'automatic' are typically characterised as intuitive, impulsive, fast, nonconscious, and associative, whereas the processes known as 'Type 2' or 'reflective' are characterised as reasoned, slow, conscious, controlled and rule-based (e.g., Keren and Schul, 2009: 533; Evans and Stanovich, 2013: 225, 227; Melnikoff and Bargh, 2018a: 669). The environment is not a key focus in these theories and seems to be conceptualised as a series of *tasks to be accomplished*. Nevertheless, dual-process theories are important in the present context because they have greatly influenced the environmental prevention literature. They can help explain why intentions do not translate into behaviours. Moreover, environmental interventions are typically explained to work via "the automatic system"[89].

However, this is not the full story. Although dual-process theories have become associated with Kahneman's (2011) book, '*Thinking, Fast and Slow'*, there is a multiplicity of dual-process theories[90]. This is important because of the common misperception that there is just *one* dual-process theory (Evans and Stanovich, 2013: 226). Instead, the theories differ with regard to which aspect(s) are key to distinguishing the two processes. Also, different theories may use the same terms in different ways, and concepts can take on different meanings once they are applied outside the original context. 'Automatic' illustrates this point well, as it can refer to a process that is, for example, fast, routinised, nonconscious, involuntary, uncontrollable or unmediated[91]. Also, while dual-process literature merely suggests that 'automatic' processes do not *require* conscious awareness (e.g., Evans and Stanovich, 2013: 236; Melnikoff and Bargh, 2018b: 281), this can be interpreted to mean that they are *necessarily* nonconscious (and cannot be made conscious). Finally, the theories have been revised over time.

All this has caused considerable confusion and debate, including doubts regarding the accuracy and usefulness of dual-process theories (e.g., Keren and Schul, 2009; Melnikoff and Bargh, 2018b; Grayot, 2020). It has also produced discrepancies between how the theories have been intended and how they have been understood (Evans and Stanovich, 2013: 227; Pennycook et al., 2018) and contradictions in how they have been presented (Melnikoff and Bargh, 2018a). To give an example, the common "received view" (Evans and Stanovich, 2013: 227) is that there are two completely distinct types of processes (or mutually exclusive

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[89] For example, Oncioiu et al. (2018: 13) state that environmental prevention "differs from traditional behavioural prevention approaches as it targets the automatic system of behaviour (one that does not require deliberate cognition)". Elsewhere, "behavioural insights" (i.e., the use of dual-process theories in policy-making) are identified as "the foundation of environmental prevention" (EMCDDA, 2019: 117).

[90] Relevant ideas can be traced "as far back as Aristotle" (Keren and Schul, 2009: 533), with the contemporary versions being developed from the 1970s onwards by numerous authors in different fields (briefly reviewed by Evans and Stanovich, 2013; Melnikoff and Bargh, 2018b: 281). Specific versions relating to health and addictive behaviours have also been proposed (briefly reviewed in Wiers et al., 2018).

[91] These are important distinctions because, for example, a process that starts involuntarily may still be mediated by a series of steps and be amenable to control (therefore Papies can speak of 'automatic' behaviours but still suggest mindfulness training as a possible intervention; see e.g., Papies et al., 2020).

systems) which are each characterised by the features shown earlier ("the 'list-of-features' view" of dual-process theory, Pennycook et al., 2018: 667). This has sometimes been understood to imply that behaviours belong to either one system *or* the other[92], and that a behaviour is thus characterised by *all* of the typical features of the system it belongs to (e.g., a behaviour belonging to the 'automatic' system would be nonconscious, fast, etc.)[93]. Related to this is a thinking in extremes, whereby a process is regarded as, for example, fully conscious *or* nonconscious, intentional *or* unintentional[94]. However, Melnikoff and Bargh (2018b) argue that processes can be both (e.g., intentional *and* unintentional) and belong to both types of 'systems' (e.g., intentional yet nonconscious). Responding to similar criticisms in the past, Evans and Stanovich (2013) clarify that in their theory, there are only two defining features[95], with the remaining features merely representing "typical correlates" rather than "necessary and defining features" (ibid.: 227). Thus, key authors have distanced themselves from the 'list-of-features' or 'systems' view and clarified that this does not represent current dual-process theorising (e.g., Pennycook et al., 2018). Melnikoff and Bargh (2018a: 669) suggest that "the dual-process typology should be abandoned" due to its fundamental flaws.

2.2.3. COM-B

The 'COM-B' model and the related behaviour change wheel (BCW) were developed by Michie et al. (2011) to illustrate the spectrum of available behaviour change approaches and thereby support the selection of approaches. The model identifies three key conditions for 'Behaviour': 'Capability', 'Opportunity', and 'Motivation' (hence 'COM-B'); divided further into six components: psychological and physical capability; social and physical opportunity; and reflective and automatic motivation (Michie et al., 2011: 4). The environment appears as an array of *opportunities that prompt, enable or constrain behaviour*[96]. Michie et al. (2011: 8) also offer an overview of how the six COM-B components relate to specific intervention approaches and how these may be supported by policy.

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[92] In fact, while some authors refer to 'systems' rather than 'types', Evans and Stanovich (2013: 225) caution that this "suggests (falsely) that the two types of processes are located in just two specific cognitive or neurological systems".
[93] Discussed in the literature as features being wrongly understood to represent "clusters" or to be "aligned" (e.g., Evans and Stanovich, 2013; Melnikoff and Bargh, 2018b).
[94] Discussed in the literature as features being "discrete" versus representing a "continuum" (e.g., Evans and Stanovich, 2013; Grayot, 2020).
[95] The most important feature is that Type 1 processes do not require working memory, but Type 2 processes do (Evans and Stanovich, 2013: 225).
[96] "Opportunity is defined as all the factors that lie outside the individual that make the behaviour possible *or prompt it*" (Michie et al., 2011: 4, emphasis added).

The relevance to environmental prevention is apparent, given the inclusion of social and physical opportunity as COM-B components[97], as well as of "environmental restructuring" as an intervention approach and of "Environmental/social planning" as a policy option (Michie et al., 2011: 7). The relevance of the COM-B model for environmental prevention has been pointed out by Burkhart (2014). In his view, the COM-B model can help identify (and reach agreement on) those intervention approaches that represent environmental prevention. Burkhart's discussion highlights that 'environmental restructuring' is not the only relevant approach; rather, he links environmental prevention to Michie et al.'s (2011) categories of environmental restructuring, coercion, restrictions, and "maybe" enablement (Burkhart, 2014: 826, 827). An inspection of the COM-B model for the present thesis suggested that further intervention approaches could be conceptualised as 'environmental' interventions if they were integrated in the actual behavioural context (i.e., "situated" as per Papies, 2017).

2.2.4. Affordances

In the 'affordance' perspective, the environment is conceptualised as an "array of affordances, or *action opportunities*" (Hill, 2014: ii, emphasis added). Although 'affordances' play a less explicit role in the environmental prevention literature, the EMCDDA's key publication on the topic mentions them as a potential intervention target. They are defined as "a property of an object or an aspect of the environment, which can be inferred from visual or other perceptual signals" , exemplified as "light, noise, density of crowd, dirt" (Oncioiu et al., 2018: 30). Hill and colleagues (2014, 2018a, 2018b) have applied affordance theory to alcohol prevention. In contrast to the EMCDDA's definition, Hill (2014: 54) sees 'affordances' as "*inherently relational action potentials* which are *directly* perceived by individuals as they navigate their world" (emphases added). In Hill's examples, affordances refer to something being "grasp-able", "access-able", "consume-able", "communicate-with-able", "listen-to-able" and so on (Hill et al., 2018a: 459; 2018b: 749). The discrepancies between the definitions and examples offered by Hill and the EMCDDA report illustrate 'affordance' theory as well as some of its issues.

The original concept was developed by Gibson (1966, 1979) as an alternative theory of visual perception[98]. Gibson developed the notion that people perceive the environment: i) with their entire body (not just their eyes) and ii) directly (without the need for external information to be interpreted by the brain); and that iii) perception is not limited to 'seeing' what there is but also

[97] However, the "social" environment refers to the "cultural milieu that dictates the way that we think about things (*e.g.,* the words and concepts that make up our language)" (Michie et al., 2011: 4, original emphasis): hence it is broader than, for example, the people present in a specific situation. Physical environment is not defined in detail
[98] The description of Gibson's work in this section is based on contemporary interpretations (e.g., Bruce et al., 2003; Withagen et al., 2012; Hill, 2014; Costall and Morris, 2015; Costall, 2017).

what actions it 'affords' (see Hill's examples above). In other words, for Gibson, perception includes the ability to *instantaneously* understand how objects in the environment can be used. Such "functional meaning"[99] (Hill, 2014: 46, with reference to Heft, 2003) depends on what a person is physically capable of. As in Hill's definition above, affordances are therefore not located solely in the environment, but emerge from the relationship between person and environment. It is doubtful to what extent 'affordance' theory can be used to explain complex (e.g., cultural) meaning and behaviours (Bruce et al., 2003: 410–412) or how people choose from available affordances in a given situation (Withagen et al., 2012: 252): understandable limitations given the theory's origin in visual perception. Still, affordance theory offers an interesting perspective to environmental prevention, as it indicates how a person can – through their body – make direct sense and use of their environment. It thereby complements approaches based on dual-process theories with a greater emphasis on bodily aspects.

Like the dual-process theories covered earlier, Gibson's 'affordances' are characterised by ambivalence[100]. Costall (2017: 221, 225; see also Costall and Morris, 2015) describes how Gibson is "widely misrepresented as an extreme stimulus–response theorist", even though Gibson explicitly distanced himself from stimulus-response thinking (also Withagen et al., 2012: 250). Thus, the simplified portrayal of 'affordances' by Oncioiu et al. (2018) as located in the environment (rather than in the relation between environment and person), thereby implying a person who responds to 'external' affordances (rather than one actively seeking out and co-constituting affordances), is not unique. However, such an interpretation supports an understanding of affordances as something to be targeted by intervention[101].

2.2.5. Crime prevention through environmental design (CPTED)

The final approaches come from crime prevention. Foxcroft (2014a: 820) includes "situational crime prevention" as an exemplary approach in defining environmental prevention and lists "Improved street lighting" and "CCTV [video surveillance] in town centres" as examples of environmental prevention (ibid.: 821). It is also likely the basis for the inclusion of "Good lighting

[99] In affordance theory, 'meaning' refers to what one can *do* with an object (hence 'functional meaning') rather than the social, symbolic or other more interpretative forms of meaning typically referred to in sociological literature.
[100] Hill (2014: 48) also considers that Gibson's theory never entered mainstream psychology, possibly "due to issues with defining the affordance construct, incorporating the social nature of behaviour into the theory, or due to Gibson's often challenging and opaque writing style".
[101] Withagen et al. (2012: 253) argue that "in Gibson's terms, to improve an affordance is to make the environment more compatible with the action capabilities of the human body, not to make it [certain aspects of the environment] more prominent". From this perspective, manipulating environments to prevent substance use would not be unequivocally supported by affordance theory.

in public spaces", "CCTV", "Police presence" and similar examples in the EMCDDA's key publication on environmental prevention (Oncioiu et al., 2018: 20).

'Situational crime prevention' can refer to different approaches. Increased lighting and video surveillance are classic examples of Crime Prevention Through Environmental Design (CPTED), which can be seen as "one of the earliest formal models of situational/environmental crime prevention" (Wortley and Tilley, 2014: 5172)[102]. Contemporary CPTED is defined through a series of components[103]; however, as Armitage and Monchuk (2019: 313) point out, the composition of these varies by author. A common component is 'surveillance', and CPTED is sometimes reduced to this aspect (as in the examples above). The environment thus appears to be conceptualised in terms of *whether it offers opportunities for crime or not*. Herein lies an important difference to the theories discussed earlier: CPTED (implicitly) presumes there is a 'rational choice' individual with an intention to offend, looking for a 'weak' target (further discussed in section 2.3).

The reviewed publications (EMCDDA, 2017: 138; Oncioiu et al., 2018: 19) also listed environmental interventions in nightlife settings (e.g., server training, use of plastic cups, measures to reduce crowding) which have a history in violence prevention and the prevention of alcohol-related problems (e.g., Graham and Homel, 1997, 2008). These do not reflect the CPTED approach as such, but are rather related to another situational crime prevention approach developed by Cornish and Clarke (see Box 3, p. 64).

2.2.6. Broken windows

The last theory to be addressed is 'broken windows', which is referenced in Burkhart (2014: 826–827) and also informs the link between norms and environmental cues in environmental prevention[104]. Briefly, the 'broken windows' argument is typically portrayed to state that

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[102] The term dates back to Jeffery (1971) but is also closely associated with Newman's (1973) architectural concept of 'defensible space' as well as earlier works by urban activists (e.g., Jacobs, 1961) which are labelled as 'environmental design theory' in a recent review by Wilcox and Cullen (2018). Thus, this approach took an 'urban design' perspective from the start. Since then, CPTED has been developed further by several authors, incorporating also insights from 'broken windows' (discussed next) and Cornish and Clarke's 'situational crime prevention' (described in section 2.3) (see also Cozens and Love, 2015: 395).

[103] For example, Cozens and Love (2015) list the following seven components for "first-generation" CPTED: "territorial reinforcement, surveillance, image, access control, legitimate activity support, and target hardening", as well as "geographical juxtaposition (surrounding environment)" (ibid.: 396). It is worth noting that although the initial focus on the built environment has since been extended with a consideration for 'community' aspects (e.g., social cohesion, collective efficacy; known as "second-generation" CPTED; see Cozens and Love, 2015), CPTED is often reduced to the physical aspects (i.e., "first-generation" CPTED).

[104] For example, Burkhart (2014: 826–827) writes: "If we do not discard litter on clean streets (descriptive norms) or because we saw somebody else putting our dropped litter in a bin (injunctive norms), it is [... b]ecause of these normative mechanisms, *as in the broken window theory* (Kelling and Wilson 1982)" (emphasis added).

'evidence'[105] of physical and social disorder (e.g., broken windows, graffiti, litter, alcohol use in public, sex workers) provides, in modern terms, "visual cues" (Wagers et al., 2017: 335; Welsh et al., 2018: 148) that deviant behaviour is acceptable and social control is weak, which in turn promotes crime. The environment thus appears as an array of *environmental cues indicating and reinforcing prevailing norms*. The argument dates back to Wilson and Kelling (1982) who wrote, for example, that "Untended property becomes fair game for people out for fun or plunder and *even for people who ordinarily would not dream of doing such things* and who probably consider themselves law-abiding" (emphasis added). The authors also suggested a role for the police in preventing such negative outcomes[106].

Although the theory has been popular with policy-makers, researchers have criticised it, for example, for not considering other factors as causes of *both* disorder *and* crime, or neighbourhood context as moderator of effect, or because crime caused directly by disorder is likely to be limited to minor offences (Sousa and Kelling, 2014: 3355–3356; Neubacher, 2017: 96–98; Welsh et al., 2018: 149). Recent publications (e.g., Sousa and Kelling, 2014; Wagers et al., 2017) emphasise that 'broken windows' *never claimed a direct relationship* between environment and crime and that the original argument was misunderstood. Rather than causing crime directly, it is hypothesised that disorderly areas are attractive to "would-be offenders" and "criminal invasion" (Wagers et al., 2017: 339f., 345)[107].

Two conclusions can be drawn regarding 'broken windows' and related research. Firstly, environmental disorder may produce minor offences with limited geographical scope[108], while the relationship between environmental disorder and serious crime is more complex and evolves over a longer time period (Neubacher, 2017: 96–98). Secondly, Wilson and Kelling's work focussed on preventing gradual neighbourhood decline, and 'broken windows' does not

[105] As graffiti, alcohol use in public, sex work et cetera are not necessarily evidence of social disorder, the term is put here in inverted commas.
[106] As a result, the theory has caused considerable debate because it was used to justify 'zero tolerance' policing in New York in the 1990s (including harsh punishments for minor offences) (e.g., Neubacher, 2017: 95; but see Sousa and Kelling, 2014: 3356, for a contrasting view). Recent publications emphasise that, in stark contrast with 'zero tolerance' policing, 'broken windows' policing (also known as 'order maintenance' policing) was intended to mean that police officers build relationships with the community, support the community with exerting informal control, and use discretion in handling offences, based on local norms (e.g., Wagers et al., 2017: 340–345).
[107] Also Sousa and Kelling (2014: 3355) clarify: "the 'broken windows' hypothesis as stated by Wilson and Kelling does not propose a direct connection between disorder and serious crime – the hypothesized connection is indirect, mediated by increases in citizen fear and breakdowns in informal social control mechanisms".
[108] Neubacher (2017: 97) highlights that offences which result directly from disorder do not spread geographically. This means that a person seeing litter on a street may be more likely to throw their litter on the *same* street, but evidence does not suggest that they would then also throw litter on a different, clean street.

detail a mechanism to explain direct effects of immediate environment on crime[109]. The latter has been addressed by other crime prevention theories, mentioned in the next section.

2.3. General appraisal of the identified theories[110, 111]

The previous section described theoretical approaches used in the environmental prevention literature (e.g., Oncioiu et al., 2018) to conceptualise the relationship between environment and substance use. All the reviewed theories can advance the prevention field by highlighting the influence of situational factors on behaviour vis-à-vis the intentions, dispositions and other 'personal' aspects that a person may 'bring' to a situation. However, as Table 1 (p. 53) shows, the disciplinary background of the theories lies primarily in psychology, behavioural economics, and criminology. This is noteworthy, given the substantial work that has been done on person-environment relationships in disciplines such as sociology and human geography, including in relation to substance use (reviewed in Chapters 3 and 4).

The discussion in section 2.2 also showed that the identified theories can be interpreted in multiple and contradictory ways. The environmental prevention literature reviewed here generally referred to the theories as they are commonly understood: what Evans and Stanovich (2013: 224) call the "received version" of a theory[112]. Section 2.2 highlighted that such 'received' versions often stand in contrast with the original authors' intentions or refer to earlier versions of the theory[113]. The brief review of dual-process theories, for example, suggested

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[109] The closest explanation offered by Wilson and Kelling (1982) is this: "Window-breaking does not necessarily occur on a large scale because some areas are inhabited by determined window-breakers whereas others are populated by window-lovers; rather, *one unrepaired broken window is a signal that no one cares, and so breaking more windows costs nothing. (It has always been fun.)*" (emphasis added).

[110] Although the identified theories differ on important aspects, the remainder of this chapter generally refers to them as a group of related theories. This approach results from the required brevity in the present thesis, but it also reflects how the theories were used in the reviewed publications and elsewhere (e.g., Bouhana, 2013).

[111] To assess the use of theory in the reviewed publications on environmental prevention, Michie and Prestwich's (2010) 'Theory Coding Scheme' was used as a guide. Michie and Prestwich (2010: 6) offer the following questions: 1. "Is Theory Mentioned?"; 2. "Are the Relevant Theoretical Constructs Targeted?"; 3. "Is Theory Used To Select Recipients or Tailor Interventions?"; 4. "Are the Relevant Theoretical Constructs Measured?"; 5. "Is Theory Tested?"; and 6. "Is Theory Refined?". This review considered two additional questions not included by Michie and Prestwich, namely "How is theory interpreted?" and "Is the most appropriate theory used?". The results from this exercise informed this chapter but it was beyond the present scope to document the results in detail.

[112] This made understanding and reviewing the theoretical basis of environmental prevention (as attempted here) more difficult because of the different levels involved (e.g., an issue might apply to the 'received version' but not to the original theory).

[113] To reiterate, contemporary choice architecture does not necessarily incorporate the 'liberal paternalism' aspect highlighted by the original authors; dual-process theories are typically interpreted to suggest that there are two distinct, mutually exclusive types of mental processes, but authors developing such theories have sought to clarify that this is a misunderstanding; it is not clear which of the intervention types in the COM-B model should count toward environmental prevention; Gibson's 'affordances' are typically framed within a stimulus-response (S-R) logic, but Gibson distanced himself from S-R thinking; CPTED is often reduced to 'surveillance'; and 'broken windows' is typically interpreted to claim direct effects of environmental disorder on crime, while the authors have sought to clarify that it rather refers to indirect effects that develop over time (see section 2.2).

that references to an 'automatic system' should be viewed cautiously as not reflecting current theory. Also, the 'received' versions of the theories were more compatible with each other (cf. their 'intended' versions)[114]. Overall, the 'received' theories supported a focus on the physical environment, a strong influence of immediate environment on behaviour, and prominence of automatic processes. This tied in with the notion of environmental prevention as using 'prompts and cues' to target the 'automatic system', as described earlier.

Generally, the identified theories appeared to be situated in (or interpreted in) a behaviourist paradigm, reflecting a tradition of behaviourism in psychology and in substance use research. Bell (2017: 33–37) retraces how behaviourism – as a focus on what can be directly observed – emerged at the beginning of the 20th century to establish psychology as a natural science and to distance it from the more speculative psychoanalytic approaches. Although behaviourism became less popular from the 1950s onwards, it still informs much psychological research. Of interest to the present argument, Bell (2017: 35f.) specifically discusses 'nudging' (i.e., choice architecture) as a "return to the old behaviourist model" and as "re-importing classic behaviourist principles", such as stimulus-response thinking. Bell (2017: 35f.) further highlights how dual-process theories are used to reconcile apparent discrepancies between behaviourist and the more recent, cognitive approaches in psychology: while the latter are seen as appropriate for studying the "reflective, goal oriented system" (Bell, 2017: 36, citing Marteau et al., 2011: 263), a behaviourist approach appears to be appropriate for addressing the "automatic, affective system" of human behaviour, given that this is characterised by "little or no cognitive engagement" (Bell, 2017: 36, citing Marteau et al., 2011: 263). It can hence be argued that the focus on automatic processes in environmental prevention both guides and emerges from a behaviourist interpretation of the theories outlined in section 2.2[115].

As a consequence, processes such a remembering, imagining and meaning-making, which are crucial to a 'sociology of space' perspective (to be described in Chapter 3), can be assigned a relatively minor role in current discussions of environmental prevention. Instead, the person

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[114] This may be explained via the concept of "assimilation of dissidence" (Costall and Morris, 2015). Discrepancies between 'intended' and 'received' versions can be coincidental (e.g., if authors contradict themselves or leave too much open to interpretation), but they can also result from "assimilation of dissidence" by the scientific community: Costall and Morris (2015) argue that new theory is often interpreted to *support* what is already known, while aspects contradicting current knowledge are disregarded. The authors thus explain how Gibson's affordance theory came to be understood as representing a 'stimulus-response' (S-R) model, whereby exposure to a stimulus automatically elicits a particular response, although Gibson explicitly distanced himself from S-R thinking (also Costall, 2017).

[115] Other theories currently underpinning environmental prevention have also been linked to behaviourism; for situational crime prevention: e.g., Tilley and Sidebottom, 2014: 4867; for Gibson's affordances: e.g., Bruce et al., 2003: 310 – though Bruce et al. (2003: 310) also note differences: "It would be [..] legitimate to compare Gibson to the behaviourists, who looked at stimuli and responses but did not care to speculate on intervening stages of processing. On the other hand, the behaviourists saw animals as prodded into action by discrete stimuli or sensations—while for Gibson, perception and action are intimately interlinked".

may appear as a "Pavlovian automaton at the whim of environmental stimuli" (Bell, 2017: 46)[116]. A further implication is that substance use may be understood as primarily a physical act (cf. a complex and meaningful practice). These are areas where a 'sociology of space' perspective may make useful contributions, as later sections in this chapter will show.

A broader question concerns whether the theories in section 2.2 are appropriate for a prevention context, given that they mostly assume well-established patterns of behaviour[117]. Substance use is not always a habitual activity, and target populations for preventive activity (especially those without established substance use patterns) do not necessarily engage in substance use automatically (e.g., without deliberation). Therefore, the focus on automatic processes as the main route to understanding substance use may not be appropriate for a prevention sample[118], suggesting a potential need for alternative theories.

Additional theories of interest

The present literature review identified additional theories from psychology and criminology which could usefully inform environmental prevention but which were not referenced in the reviewed publications. They included stronger cognitive elements and are highlighted here as examples which point toward potential similarities between a 'sociology of space' approach and existing theoretical approaches from psychology and criminology.

Papies' work on 'situated conceptualizations', situated interventions and a 'grounded-cognition theory of desire' (e.g., Papies and Barsalou, 2015; Papies, 2017; Lindenberg and Papies, 2019; Papies et al., 2020) offers an interesting approach that refers to automatic processes, yet overcomes the dual-process dichotomy[119] and considers mental representations as important mediators and moderators (see Box 2 below and section 2.4.3). Drawing on Papies et al. (2020), desire could be viewed as a key mental process. In this case, intervention mechanisms could be distinguished depending on whether they primarily aim to affect the *emergence* of desire, or primarily aim to affect if people can *act upon* their ('elicited' or pre-

[116] Bell refers to Macnaughton et al. (2012: 459) for the term "Pavlovan automaton".
[117] The premise of environmental prevention targeting automatic processes rests on the assumption that substance use is a routinised activity. For example, Marteau et al. (2012: 1493) refers to "highly routine behaviors, including what and when we eat". It could therefore be argued that interventions informed by a focus on 'automatic processes' would be better understood as environmental 'treatment' than 'prevention'. For example, Marteau et al.'s (2012: 1493) focus on behaviours that are "persistent" and "resistant to change" seems to imply a 'treatment' population.
[118] While Foxcroft (2014b: 830) speaks of a "risk behavior that is determined by largely automatic, unconscious, action-oriented predictive processing", the literature acknowledges that new behaviours draw more heavily on 'reflective' processes and only become 'automatic' through repetition over time (e.g., Rose et al., 2013; Hollands et al., 2016: 383).
[119] For example, Papies et al. do not strictly distinguish between conscious and nonconscious processes, as evident from their definition of desire as "the *conscious or unconscious* state of motivation for a specific stimulus or experience that is anticipated to be rewarding" (Papies et al., 2020: 193, emphasis added).

existing) desire (see e.g., Hofmann et al., 2015; Best and Papies, 2017). The reviewed literature on environmental prevention did not explore these differences, but such distinctions may open up new avenues for prevention as well as help consider differential effects (e.g., for inexperienced versus established substance users).

Box 2: Grounded-cognition theory of desire (Papies, Barsalou & Rusz)

The "grounded-cognition theory of desire" (Papies and Barsalou, 2015; Papies, 2017; Papies et al., 2020) suggests that situational cues produce behaviour by activating *situated conceptualisations* of previous rewarding experiences. For example, we might buy a pack of crisps in the supermarket because it reminds us (possibly below consciousness) of a fun night we had with friends during which we also ate crisps. This memory creates a desire (which may or may not be consciously experienced) to re-experience such a night, resulting in the purchase of the crisps. "Situated conceptualizations" (e.g., Papies and Barsalou, 2015: 39–40) thus refer to embodied, aggregated memories of similar situations experienced in the past, relating not to one specific environmental aspect but to complex situations comprising many aspects[120]. Papies and Barsalou (2015: 38) suggest that when we have a rewarding experience, "all of this situational content is captured and integrated at the time of the original experience in a comprehensive representation that we refer to as a *situated conceptualization*" (original emphasis). Once activated by an external or internal cue, these situated conceptualisations can (via a series of additional steps) produce desire as in the example above. One of these steps is "pattern completion inferences" (see Papies and Barsalou, 2015: 40–41), whereby re-experiencing one aspect of the stored memory can be sufficient to remember the entire situation. The second step is "embodied simulations" (Papies and Barsalou, 2015: 50), whereby remembering a situation can trigger physiological responses as if we really were in the remembered situation.

Box 3: Extended 'rational choice' perspective in situational crime prevention (Cornish & Clarke)

Although the term is used interchangeably with CPTED, 'situational crime prevention' also denotes a specific approach proposed by Clarke (1980) and later revised by Cornish and Clarke (2003). Here, 25 techniques for situational crime prevention are presented under five broad mechanisms: "Increase the Effort", "Increase the Risks", "Reduce the Rewards", "Reduce Provocations", and "Remove Excuses" (Cornish and Clarke, 2003: 90). 'Provocations' were added in 2003 to incorporate Wortley's (2001) work on situational crime precipitators. In developing their framework over the years, Clarke and colleagues started with "a simple choice model", which soon became "a rational choice one" (Cornish and Clarke, 2017: 31), which was then extended to incorporate – via the 'provocations' – affective and nonconscious processes (e.g., frustrations, stress, emotional arousal, imitation; see Cornish and Clarke, 2003: 90). Thus, the authors did not abandon the rational choice perspective but modified it to make it more realistic. Although this has been met with criticism and doubts regarding the adequacy or necessity of the 'rational choice' label (e.g., Bouhana, 2013; Tilley and Sidebottom, 2014: 4872), it also illustrates how the dichotomy of dual-process theories can be avoided.

Table 1 (p. 53) showed that while most of the theories identified in section 2.2 were geared toward intervention design, none were specific to environmental substance use prevention. Theories from environmental crime prevention came closest in this regard.

[120] This points to the *relationality* of environmental aspects, in that a certain aspect (e.g., a bottle of wine) does not hold meaning on its own but obtains meaning in relation to other aspects (further explored in Chapter 3).

Environmental crime prevention has a relatively long history (since 1960s) and offers a wealth of situational theories (see e.g., Wortley and Tilley, 2014; Welsh et al., 2018; Wilcox and Cullen, 2018). In particular, Wortley's work (e.g., 2017) on situational precipitators, Wikström's (e.g., 2010) 'Situational Action Theory', Cornish and Clarke's (2003) taxonomies of intervention techniques[121] and offending types, as well as 'Design against Crime'[122] (e.g., Ekblom, 2017) could inform the development of interventions, typologies and mechanisms in the field of environmental substance use prevention[123,]. Cornish and Clarke also offer an interesting perspective on how 'automatic' and 'reflective' processes can be integrated into a single framework (see Box 3 above).

Implications arising from general discussion of theories:

- *Ensure that the chosen theory is appropriate for the phenomenon of interest (e.g., can explain substance use as a complex and meaningful practice, can explain non-habitual substance use, can incorporate mediators and moderators)*
- *Consider using theories from a greater range of disciplines or paradigms*

2.4. Potential areas for further development

The following sections outline example areas within environmental prevention to which a 'sociology of space' approach (to be described in Chapter 3) may make a contribution, namely:

- the way the environment and person-environment relationships are conceptualised;
- the choice of intervention strategy;
- understanding how interventions work with a view to strengthening intended outcomes and minimising undesirable effects.

[121] As noted in section 2.2.5, the reviewed publications listed interventions consistent with Cornish and Clarke's approach. The reviewed publications did not, however, link these interventions to a specific theory, and therefore Cornish and Clarke's approach is included here rather than in section 2.2.
[122] Design against Crime (DAC) differs from CPTED in that it focusses on the design of specific products. As Wortley and Tilley (2014: 5172) put it, DAC "explores the premise that some products encourage crime and that these criminogenic features may be designed out at the production stage". There are strong parallels with the 'properties' interventions included in the TIPPME framework (Hollands et al., 2017).
[123] These are not recommendations but examples that might inspire further work in the substance use field. For example, Wortley outlines 16 types of environmental aspects and various mechanisms through which environment may (co)produce crime. The framework has, however, limitations (e.g., categories not clearly distinguished, unclear evidence base). More broadly, the 'crime' focus of such theories needs to be taken into account.

2.4.1. Conceptualising the environment

The environment as such

It is important to consider how 'environment' is conceptualised in environmental prevention, given that this is the basis (explicitly or implicitly) for deciding what environmental aspects to target. In relation to this, it is also useful to consider *how* specific environmental aspects are chosen as foci for environmental interventions[124].

In the reviewed literature, the immediate environment was reduced from the outset to specific aspects, in particular to physical aspects relating to substance use. From a 'sociology of space' perspective, we might first consider what aspects define an environment *in general* (i.e., unrelated to substance use), and, in a second step, consider which of these aspects relate to *substance use or abstinence* to identify potential targets for preventive action: this is the approach taken in the present thesis (Chapters 3, 10-13). As the following paragraphs show, the reviewed literature often appeared to follow a different approach. Conceptualisations of the environment often lacked detail, and an explicit discussion of general theories, typologies or categories relating to space or socio-spatial aspects was not common[125]. Where detailed socio-spatial aspects were developed, this was typically done *from the outset in relation to* the interventions or behaviours of interest (e.g., substance use). It was often unclear on what basis specific socio-spatial aspects had been chosen. Thus, rather than starting with a conceptualisation of the environment and narrowing this down to substance use related aspects, it sometimes appeared that the conceptualisation started with substance use (or existing interventions) to infer possible environmental aspects[126]. There was also a tendency for the literature to focus on environmental aspects related to substance use, while aspects related to 'naturally' (i.e., not intentionally produced through intervention) occurring situational abstinence were not separately considered. Finally, conceptualisations of the environment tended to focus on physical aspects, whereas a 'sociology of space' perspective invites us to also consider symbolic and social meanings of the environment (and of substance use)[127]. Although the foci on physical aspects or substance use in the existing literature are useful,

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[124] Such decisions could be based on untested (plausible) hypotheses about what environmental aspects are most likely to affect substance use or be based on empirical data from correlational research, experimental studies (e.g., cue-reactivity paradigm), or qualitative (or mixed-methods) studies. Of these, qualitative approaches (e.g., open-ended questions) are particularly well placed to systematically identify aspects that people refer to in their construal of environments (for example designs, see e.g., Best and Papies, 2017: 351).
[125] Counter to what might be expected, also the 'cue' concept was not usually elaborated further.
[126] Hollands et al. (2017: 5) also suggest that the TIPPME intervention types (availability; position; functionality; presentation; size; and information) may "be informative in attempts to describe physical features of environments".
[127] This critique thus echoes, albeit from a different angle, existing critiques of the 'health behaviour' concept (e.g., Cohn, 2014; Blue et al., 2016; Bell, 2017).

they may produce narrow conceptualisations of the environment that limit our perspective on intervention possibilities. The approach taken in the present thesis should thus complement existing approaches and may help to identify further intervention points or strategies.

Specifically, the EMCDDA report by Oncioiu et al. (2018: 13–14) did not define 'environment' as such. Instead, it suggested that environmental measures could be categorised[128] based on whether they targeted the *regulatory* (e.g., laws, rules), *economic* (e.g., via taxes or subsidies) or *physical* environment, thereby going beyond a merely physical conceptualisation of the environment in principle. However, given that the broader literature often distinguishes physical and social aspects (see Chapters 3 and 4), it was noteworthy that a 'social' environment was not specifically included. Rather, "social context", understood as "social interactions", was suggested as a moderator and mediator in the relationship between environmental interventions and outcomes (Oncioiu et al., 2018: 14–15). Physical environment referred to "properties or the placement of objects, stimuli or any built element within microenvironments (such as offices and bars) or macroenvironments (such as cityscape and landscape)" (ibid.: 13). While socio-spatial aspects could be inferred from examples in the text, 'objects, stimuli or any built element' were not detailed further into a typology from which intervention strategies could be systematically developed.

In terms of main theories underpinning environmental prevention, the review in section 2.2 suggested that these conceptualise the environment predominantly as behavioural choices, tasks or opportunities, or as cues indicating prevailing norms (see Table 1, p. 53). Approaches within affordance theory and choice architecture offered structured and detailed conceptualisations of the environment and socio-spatial aspects[129], but these focussed on physical aspects, as described below.

For affordances (see section 2.2.4), Hill (2014; Hill et al., 2018a, 2018b) started – similarly to the present thesis – with a general conceptualisation of the environment and used empirical research to identify those aspects related to substance use and momentary abstinence. However, they referred primarily to physical "action opportunities" (Hill et al., 2018b: 747).

For choice architecture (see section 2.2.1), the "typology of interventions in proximal physical micro-environments" (TIPPME) suggested by Hollands et al. (2017) categorises interventions based on whether they target the availability, position, functionality, presentation, size or

[128] The authors acknowledge, however, that "the same intervention could be described as belonging to different categories […] for example, standardised packaging of tobacco products is a regulatory measure but is physical in nature" (Oncioiu et al., 2018: 14, 31).
[129] The principles within CPTED can also be understood as socio-spatial aspects; however, as noted in section 2.2.5, the 'received' version (also in the reviewed publications) often reduces CPTED to the 'surveillance' aspect.

information regarding the product of interest, related objects, or the wider environment (ibid.: 3). The authors deliberately chose to focus on physical environments: "As we are concerned with the consumption of food, alcohol and tobacco products *that are themselves objects within the physical micro-environment*, the stated focus of [the] TIPPME [typology] is on the physical micro-environment" (Hollands et al., 2017: 2, emphasis added)[130]. Thus, alcohol and tobacco were conceptualised from the outset as physical rather than socially or symbolically meaningful objects. Furthermore, the authors limited 'environment' to what is "sensorily perceptible (that is, able to be seen, heard, smelt, touched or tasted)" (Hollands et al., 2017: 2). This was intended to delimit the scope of the TIPPME typology to situations that can be directly experienced, but also reinforces a focus on isolated physical cues. Less manifest aspects (e.g., atmospheres) which emerge from relational arrangements (described in Chapter 3) may thus be missed more easily. Although the TIPPME typology offers a list of socio-spatial aspects, the "wider environment" is not conceptualised in detail[131].

Implications arising from discussion of 'environment':

- *Consider using a comprehensive conceptualisation of environment as a starting point, ideally one that offers an empirically grounded typology of environmental aspects*
- *Do not limit immediate environments to manifest physical aspects (i.e., what can be seen, heard, smelled, touched, or tasted) – refer to socio-spatial theory and qualitative research to understand how people may experience environments in ways that are less tangible (e.g., atmospheres)*
- *Consider also socio-spatial aspects related to situational abstinence*

The environment: causing, inviting or merely supporting actions?

The literature on environmental prevention and the underpinning theories appeared to represent different assumptions about how the immediate environment may affect people and their actions (e.g., substance use). These assumptions can be summarised as follows[132]:

[130] The conceptualisation by Hollands and colleagues draws upon the 'ANGELO' framework which distinguishes four types of environment: "physical (what is available), economic (what are the costs), political (what are the 'rules'), and sociocultural (what are the attitudes and beliefs)" (Swinburn et al., 1999: 563).
[131] Supplementary Figure I to Hollands et al. (2017) provides a range of examples (e.g., entrances, windows, furniture, walls, sounds and smells, temperature, lighting), but a structured framework is not provided.
[132] To present possible person-environment constellations in a structured way, this overview (developed for the present thesis) draws upon Withagen et al.'s (2012) article on affordances as opportunities or invitations, as well as on Cornish and Clarke's (2003) "offender types". Regarding the latter, the three models suggested here correspond to Cornish and Clarke's (2003) categories approximately as follows: "direct cause" ≈ "Provoked offenders"; "invitation" ≈ "Mundane offenders"; "mere opportunity" ≈ "Anti-social predators".

- *As a direct cause* – this is evident in statements such as "people may not intend to get drunk or eat unhealthily, but could still *yield* to a vast array of stimuli" (Oncioiu et al., 2018: 12, emphasis added). In other words, the environment can be understood to set in motion an action and exert such a strong influence that a certain outcome will be produced regardless of other factors (e.g., personal preferences, intentions). Also in terms of abstinence, a certain environmental aspect (e.g., no alcoholic beverages) may be considered sufficient to produce (situational) abstinence. *('received' version of Choice architecture; 'received' version of Broken windows)*[133]

- *As an invitation* – the environment can appear to 'suggest' a particular course of action (e.g., a large selection of alcoholic beverages at a party may 'suggest' alcohol use). However, as Withagen et al. (2012: 257) note: "invitations are not causes. An invitation can always be declined". The person is thus given greater agency than in the 'direct cause' model, but the environment can still 'prompt' behaviour, for example if the person has no strong views against the suggested action or has (from a psychological perspective) poor impulse-control. *(Choice architecture as intended by Thaler/Sunstein; COM-B; 'received' version of Affordances; CPTED)*

- *As a mere opportunity* – the environment can support or hinder intended behaviour. In this case, the person intends to carry out a specific action (e.g., intend to get drunk, intend to abstain), and the question is to what extent the environment supports the intended action (e.g., what drinks are available at a party). The difference to the 'direct cause' model is that the immediate environment does not produce the intention, nor does it necessarily determine the outcome: the person may actively modify the environment to enable the intended behaviour (e.g., bring their own drinks, go to a different party). *(COM-B; Affordances as intended by Gibson; CPTED)*

In this overview, the environment exerts the strongest influence in the deterministic 'direct cause' model and the weakest influence as a 'mere opportunity'. Conversely, the person has the greatest agency in the 'mere opportunity' model and virtually disappears in the 'direct

[133] The theories discussed in section 2.2 are allocated to the models based on what person-environment relationship they seemed to utilise the most. Where the review identified discrepant interpretations of the same theory, the phrases 'as intended' and 'received version' are used to indicate which interpretation is being referred to. Dual-process theories and Broken windows 'as intended' are not shown because they do not specifically discuss person-environment relationships in the sense relevant to the present context.

cause' model. The same environmental aspect may be allocated to any model, depending on the person-environment constellation and the theoretical inclination[134].

The present review suggests that environmental prevention draws mostly upon the 'direct cause' and (to a lesser extent) the 'invitation' model, whereby the influence of the environment on the person is explained primarily via 'automatic processes'. As later sections will show, this can limit our understanding of how environments relate to substance use and thereby negatively affect intervention planning and outcomes. The present thesis will show that a 'sociology of space' approach aligns most closely with the 'invitation' model. The 'invitation' model may also best support the consideration of a range of mediating processes and moderating influences in person-environment interactions, and it may be best placed to explain a broad range of outcomes relating to situational substance use and abstinence.

Focus on 'automatic processes' as key mechanism

In explaining how environments can cause or contribute to substance use, the reviewed literature referred to instinctive or spontaneous reactions to stimuli, habitual[135] or learnt behaviour, automatic or nonconscious processes (e.g., Foxcroft, 2014b: 830; Oncioiu et al., 2018: 11–12). Conscious thoughts appeared to play a minor role, for example, limited to situations in which environments do not meet prior expectations (e.g., Foxcroft, 2014b: 830).

In an article on interventions targeting automatic processes, Marteau et al. (2012: 1493) distinguish two basic approaches. The first key mechanism relates to the "law of least effort" (ibid.): people will generally do whatever requires the least effort. Relevant interventions include those that change default options, the availability and positioning of options, or product design. The second key mechanism refers to "associations" (ibid.) between environmental stimuli and responses. This relies on removing or presenting stimuli that evoke certain associations[136]. Thus, the two key mechanisms of environmental prevention relate to: i) what is (physically) possible; and ii) routinised or conditioned responses to environmental stimuli.

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[134] Consider the following scenario for illustration: You go to a party with a strong intention to drink alcohol. When you arrive, you see that there is no alcohol available and nobody has been drinking. If you now, too, stay sober, then this situational abstinence can be considered to have been *directly caused* by the immediate environment. If, however, you leave and come back with alcoholic drinks, then the initial environment merely *hindered your behaviour* (but did not determine the final outcome). A researcher inclined toward the 'direct cause' model might consider the latter outcome to be highly unlikely.

[135] In this context, "habit-like behaviour" is commonly understood as "based upon *stimulus-response associations*, in which behavior (e.g. substance intake) is *triggered by a cue* with *little or no mediation by the intention* to engage in substance use, or *anticipated outcomes* of substance use" (Rose et al., 2013: 415, emphasis added); or as Best and Papies (2017: 337) put it: "isolated cue-response associations".

[136] Marteau et al. (2012: 1493–1494) give the example of coupling a product with existing positive or negative associations (e.g., displaying fun words or pictures on vegetable packaging).

Although Marteau and colleagues do not highlight this, the former mechanism is particularly attractive because it can be assumed to be universally applicable to all humans (whereas associations are more likely to be shaped by culture and individual experience).

This focus on automatic processes advances the prevention field by highlighting that environmental aspects can effect action via *embodied* processes as well as mental processes *below conscious awareness*. As such, it can overcome shortcomings of major theories in the prevention field (e.g., Theory of Planned Behaviour) which do not appropriately account for situational influences (which may overturn intentions). This perspective could also be seen to mirror recent developments in social theory which seek to decentre the thinking human subject and focus instead on bodies and materialities (see section 1.2.2). Moreover, as public health has been repeatedly criticised for making health the responsibility of individuals rather than society (see section 1.2.1), the move to considering environmental influences and automatic processes should be welcomed.

However, in the reviewed literature, the concept of 'automatic processes' appeared to be situated in a rather deterministic and behaviourist stimulus-response paradigm, as described earlier. People's thoughts and experiences appeared to be understood exclusively as conscious deliberations taking place *outside* of 'automatic processes'. As a result, the focus on automatic processes was associated with a relative disregard for what people thought or experienced. Thoughts occasionally appeared to be discredited, as in the following quote[137]:

> humans often act automatically and impulsively, while virtually *inventing* a posteriori the supposed rationale for their behaviour (Nisbett and Wilson, 1977). For example, individuals who go along with a poor decision because everyone else agrees […] frequently rationalise their behaviour post hoc, convincing themselves and others that it was the result of a conscious decision when, in reality, it was an *automatic reaction to environmental cues*. (Oncioiu et al., 2018: 11, emphasis added)

Critics of dual-process thinking (e.g., Melnikoff and Bargh, 2018b) have already argued that an a priori or forced distinction between 'automatic' and 'reflective' processes may be unhelpful, for example because phenomena which do not align neatly within the automatic/ reflective dichotomy may be overlooked or dismissed (e.g., processes that are neither fully conscious nor fully nonconscious). Despite proposing a dual-process framework, Michie et al. (2011: 5) nevertheless suggest that, for example, coercion may work via reflective processes

[137] Bell (2017: 47) makes a similar observation, writing that "proponents of nudging would suggest that he [one of Bell's study participants who argued that warning labels would not affect his behaviour] is largely unaware of the impact of packaging on his smoking and his *introspections therefore tell us little of value*" (emphasis added).

("changing conscious evaluations of the options") or automatic ones ("negative feelings")[138]. The focus on automatic processes in choice architecture must also be seen against its original background[139]. A 'sociology of space' perspective points to thoughts and actions involved in the construal of spaces which can be automatic and reflective (described in Chapter 3). Conceptualising the influence of the environment on people and their actions exclusively or primarily via 'automatic processes' as above may thus allow only incomplete insights into person-environment relationships and may not adequately explain substance use. A related question concerns whether 'habits' should indeed be referred to as an explanation: a more useful approach may be to view them as something *to be explained*[140].

A 'sociology of space' perspective suggests to consider a range of mental processes, including conscious and nonconscious thoughts and bodily sensations, and to study them in detail if we are to understand how environments shape complex phenomena such as substance use. This may be especially important for 'prevention' populations who have not developed habitual or conditioned patterns of substance use, as argued earlier. The focus on 'automatic processes' as a distinguishing feature of environmental prevention can therefore be questioned.

Implications arising from discussion of 'automatic processes':

- *Consider a broader range of mental processes and avoid 'automatic/reflective' dichotomy (e.g., do not assume that processes 'belong' to one category or the other)*
- *Use methods that can help elicit thoughts and experiences that study participants might not be fully aware of*

Implied universality of cues and effects

The reviewed literature occasionally appeared to suggest that cues are universal: that the same socio-spatial aspect produces the same substance use outcomes across persons and

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[138] Similarly, while the common view is that informational and developmental approaches require cognitive engagement and complex processing, they can also work via automatic processes (e.g., emotional responses, nonconscious internalisation of messages, forming new associations). An interesting case in this regard are situated interventions which employ written information or imagery (e.g., goal priming, 'no smoking' signs, warning labels on cigarette packs). They were typically included in literature relevant to environmental prevention (e.g., Best and Papies, 2017; Hollands et al., 2017), but they were not covered as environmental prevention in Oncioiu et al. (2018), suggesting that assumptions about their underlying mechanisms can differ.

[139] Thaler and Sunstein's (2008) commitment to 'liberal paternalism' and the concept of 'nudging' suggest that a focus on the 'automatic' system was initially chosen for value-based reasons (e.g., in opposition to regulatory approaches where costs and benefits clearly outweigh each other, so that the rational choice agent is forced to choose one option over another). Subsequent interpretations of 'choice architecture' appear to have moved away from 'liberal paternalism' and 'nudging' but retained the focus on automatic processes, now understood as the main mechanism in person-environment relationships.

[140] For example, Best and Papies (2017: 334) suggest that we should rather investigate the processes that "*give rise to* habitual behavior" (emphasis added). This view of habit as an outcome to be explained deviates from the common view in which habit (e.g., as 'associations') is used to explain environment-behaviour relationships.

situations. For example, the reviewed literature generally presented environmental interventions without discussing how effects may differ by population group or context. Though this may have been due to required brevity in publications (as noted in section 2.1.3), it also aligns with the literature's other features as outlined earlier (e.g., behaviourist paradigm, focus on physical environments, tendency toward deterministic understanding of environmental effects, automatic processes). However, whether or not a particular socio-spatial aspect acts as a substance use cue likely depends on multiple factors (e.g., individual experience and memories, specific situation or substance use practice), as the following paragraphs outline.

While a 'sociology of space' perspective supports the notion that environments can hold similar meanings for different people, it also highlights aspects such as gender and class that shape our construals of space (further explored in section 3.2). Similar arguments have also been put forward from within the substance use field. For example, Best and Papies (2017: 351) suggest that a "salient cue for one consumer may not be the most salient cue for another". The literature on cue reactivity emphasises the role of moderators as well as the insight that, while cues affect cravings, they do not reliably predict substance use (e.g., Rose et al., 2013). Papies (2017: 11) highlights motivation as a potential moderator but notes that it has been little explored in relation to choice architecture. Papies' 'situated conceptualizations' (ibid.: 3-4) point to the role of individual experience in defining what aspects of the environment can become cues for substance use, and Stummvoll (2009: 146) notes the potential for cultural differences in the interpretation of environmental aspects[141]. Also, the same environmental aspect may act as a substance use related cue in one situation *but not in another*[142]. Moreover, different substance use practices (e.g., smoking alone vs. smoking in company) may relate to different cues (Best and Papies, 2017: 341).

The present review also found that existing approaches tended to focus on environmental aspects that represent substance use in obvious ways (e.g., substance availability, advertising). However, Papies' work (see Box 2, p. 64) highlights that environmental aspects that are not inherently related to substance use can still act as subjective cues for substance use because they featured in past substance use situations.

The above may suggest that environmental prevention is a futile exercise: if there is such a variety and changeability of potentially relevant cues, then environmental intervention targeted

[141] For example, he notes that "parks with thick shrubs may be seen as hiding places for offenders in high-crime societies and as exciting playgrounds for children in low-crime societies" (Stummvoll, 2009: 146).
[142] For example, Papies et al. (2020: 195) report that seeing tomato soup in a kitchen context increased desire and expected liking more than when it was seen in a cinema context.

at just a few aspects may not have a great impact and the task of identifying appropriate cues may be an impossible one. The following quote expresses this sentiment:

> "[…] a large number of very diverse cues may potentially be involved in triggering reward simulations, making this strategy [of removing or avoiding cues] difficult to put into practice. We further assume that these cues may often be difficult for an individual to identify, as situated conceptualizations typically do not reach conscious awareness. In addition, controlling one's environment in ways such as removing or avoiding relevant cues may often simply not be possible" (Papies and Barsalou, 2015: 53).

Similarly, Marteau (2018: 117) speaks of a "myriad of cues" and of "Identifying the most potent cues" as "a Herculean task". It also explains why Papies (2017: 11-12) implies our understanding of cues to be limited, despite the literature on situational aspects of use (see Chapter 4).

Implications arising from discussion of 'implied universality':

- *Do not assume without empirical study that environmental aspects affect substance use in predictable/universal ways across substance use practices, situations or people*
- *Consider that cues may not inherently represent substance use (i.e., relationship to substance use may not be immediately obvious)*
- *Consider types of situations and their interpretations as cues, rather than physical aspects taken out of context*

Moving beyond the status quo

While the above issues highlight the inherent complexities of the topic, they may also emerge from how the environment has been conceptualised thus far (e.g., as isolated physical cues). The present thesis suggests that referring to socio-spatial theory and a comprehensive conceptualisation of the environment may offer a promising way forward, especially if this includes a framework or typology of environmental aspects. This could enable a more systematic consideration of the environment and thereby address two challenges identified above: firstly, it could help identify aspects that are relevant but not inherently related to substance use; and secondly, in a typology, the number of possible aspects would be limited from the start. This thesis will suggest that this can be achieved by moving away from purely physical notions of environments to considering how environments are *interpreted*, and by moving away from considering socio-spatial aspects in isolation to considering *spaces as relational arrangements*. The above points also emphasise the need for an empirical evidence base which draws upon substance users' own conceptualisations of environment and cues for substance use (cf. exclusively researcher-defined environmental aspects).

2.4.2. Intervention strategies

The previous section outlined how the theories identified in section 2.2 may provide a limited theoretical framework to understand the environment, person-environment relationships and therefore situated substance use and abstinence. The main concern was that useful intervention points and strategies may be missed. Contemplating new intervention possibilities is of interest not only from a general preventionist position: in the context of environmental prevention, there are further considerations pertaining to ethics and effectiveness. While the following sections cannot offer a detailed discussion, they indicate practical issues that can emerge from a focus on physical aspects of the immediate environment and on automatic processes relating to substance use (as in e.g., Oncioiu et al., 2018). These are put forward as issues which may be addressed with a 'sociology of space' perspective due to its alternative conceptualisation of the environment[143].

To give a preview of the following sections, most of the example interventions listed in Oncioiu et al. (2018) were found to utilise restrictions or coercion, including toward substance users. In relation to this, a readiness to purposefully use negative affect to achieve outcomes is identifiable as a theme in environmental prevention. These features may have resulted from the historical development of environmental prevention but may also relate to its underpinning theories. From the perspective of the present thesis, such approaches raise ethical concerns, are less likely to meet relevant quality standards and may produce undetected iatrogenic effects.

A review of example interventions: restriction/coercion as a key strategy?

The EMCDDA report on environmental prevention (Oncioiu et al., 2018: 19–20) lists 38 example interventions for alcohol or tobacco[144]. These were submitted to an ad hoc coding

[143] The ethical points raised here differ from those typically formulated in relation to environmental prevention. For example, it has been debated whether choice architecture strategies are manipulative (e.g., Sunstein, 2015; Schmidt and Engelen, 2020). Such points, although important, are less relevant for the present thesis which explicitly assumes a preventionist stance, as described in section 1.2.1.

[144] As noted earlier, environmental prevention is an emerging field and there are different perspectives on what constitutes 'environmental prevention' interventions. Room (2006: 2) notes that "the discussions of environmental strategies come up with strikingly different lists of concrete policy initiatives", including drug testing at workplaces in schools as well as provision of harm reduction services or public housing. The list shown in Oncioiu et al. is described as "an *illustrative non-exhaustive* list of measures […] The examples of environmental prevention measures included in the survey were collected from several publications […] The adequacy/relevance of the measures included in the final version of the questionnaire was checked independently by one junior and two senior researchers in the prevention field" (ibid.: 43, emphasis added). Though the list was not meant to be complete or representative (see also section 2.1.3), in the present context it was understood as an indication for what might be considered typical interventions within environmental prevention.

exercise for the present thesis[145]. The results, summarised in Table 2 below, show that most example interventions referred to restrictive/coercive approaches (e.g., prohibitions, restrictions, tax/price increases, surveillance), and this was also the main approach in interventions targeting (potential) substance users. Relatively few approaches were less restrictive/coercive (i.e., lower prices for non-alcoholic drinks, 'drug-free' youth establishments, altering music, server training, altering the design or material of glassware, lighting, public transport), and these did not typically target (potential) substance users directly.

Table 2: Preliminary results from ad hoc coding of 38 environmental alcohol/tobacco interventions

Type of measure	**Primary target**				
	Alcohol/tobacco industry	(Potential) Substance users	Both	Other (e.g., public services)	**Total**
Restrictive/coercive	17	4[a]	7[b]	2	30
Less restrictive/coercive	4	0	1[c]	3	8
Total	21	4	8	5	38

Note. Example interventions as included in Oncioiu et al. (2018: 19–20), see Appendix B for full list and further details. [a] Such as "Prohibition to use alcoholic beverages in workplaces", "Drink driving legislation (maximum blood concentration)". [b] Such as "Age-related prohibition of alcohol purchase/consumption", "Increase the taxes and prices of alcoholic beverages", "Smoke-free indoor public and working premises". [c] "Lower the prices of soft drinks in recreational venues (i.e. pubs, bars, etc.)".

From an ethical perspective, it is important to distinguish whether interventions target industry or substance users, and the present section focusses on *interventions targeting (potential) substance users* (highlighted cells in Table 2). Considering the underpinning theories (section 2.2), theoretical support for restrictive/coercive approaches targeting substance users appears to come primarily from CPTED (e.g., surveillance focus) as well as from COM-B (Michie et al., 2011)[146]. The COM-B behaviour change wheel includes 'coercion' as an intervention type, defined as "Creating expectation of punishment or cost" (ibid.: 7). It also offers a definition of

[145] Space constraints mean that this exercise cannot be covered in detail. Briefly, 38 interventions relating to alcohol and tobacco were pasted in a separate table and coded depending on whether they represented demand, supply and/or harm reduction, whose actions were most directly affected ("primary target") and whether they represented more or less restrictive/coercive approaches. Regulatory, economic and physical measures were all considered, due to only few physical examples included in the list and regulatory/economic measures usually having physical components (e.g., 'no smoking' signs). Restrictions on advertising, sales, as well interventions in night-time venues (e.g., server training, altering glassware) were coded as targeting industry; restrictions on the use of products (e.g., drink-driving) were coded as targeting (potential) substance users; interventions covering sales and use/purchase (e.g., smoke-free settings, tax increases) were coded as targeting both industry and users. Interventions coded as targeting 'others' included those relating to, e.g., police, social work and urban planning. Restrictive/coercive interventions were generally those that appeared to correspond to the definitions of 'restriction' or 'coercion' in the COM-B model (Michie et al., 2011). Less restrictive/coercive approaches were found to correspond to the COM-B categories 'incentivisation', 'environmental restructuring' and 'persuasion'. In Table 2, restrictions targeting industry (e.g., advertising bans) were coded as restrictions (rather than e.g., 'environmental restructuring'). This was *an ad hoc exercise to inform this chapter* and so a second coder was not involved and the results are indicative rather than definitive. A table with further detail is available from Appendix B.

[146] Though it should be noted that, *in their 'received' versions*, other theories such as choice architecture and 'broken windows' can also be interpreted to support restrictive/coercive approaches toward (potential) substance users.

'restriction' as "Using rules to reduce the opportunity to engage in the target behaviour (or to increase the target behaviour by reducing the opportunity to engage in competing behaviours)" (ibid.)[147]. The effectiveness or ethics of specific interventions types was not discussed by Michie et al. (2011).

There has been a debate in the environmental prevention literature whether restricting opportunities should be its key focus. Foxcroft (2014a: 820) defined 'environmental prevention' as "interventions that aim to limit the availability of maladaptive behaviour opportunities, through system-wide policies, restrictions, and actions" (emphasis removed). This focus on opportunity restrictions was contested in a commentary by Burkhart (2014: 825–826):

> David [Foxcroft] seems to interpret environmental prevention as restricted to regulation alone. However, non-coercive environmental influences on behavior can also be classed as environmental prevention, even if sometimes the borders with health promotion may be ill-defined. Examples are positive school or learning climate and the spatial and logistical arrangement of nightlife events. […] If we conceive environmental prevention as all approaches that act on context but not through persuasion, such a category should not only embrace the COM-B functions "coercion" and "restriction," but also "environmental restructuring" and maybe "enablement"—that is not only regulatory aspects[148].

Burkhart's justification for not focussing on restrictions was that it does not cover all possible environmental prevention strategies. However, another argument against restrictions targeting substance users can be based on professional values. Such values are encapsulated, for example, in documents such as the European Drug Prevention Quality Standards (EDPQS) (Brotherhood and Sumnall, 2011, 2013). Within the component "Designing for quality and effectiveness", these standards specify that:

> 4.1.3 The programme builds on positive relationships with the participants. i.e. relationships between staff members and participants are marked by reciprocity, partnership, and mutual respect. […]
> 4.1.9 The programme helps participants discover and realise their own resources. It is positively orientated towards participants' strengths, and highlights alternatives to unhealthy choices […]
> 4.1.10 [...] Participants are likely to experience the intervention as meaningful, productive, and relevant. (Brotherhood and Sumnall, 2011: 136, 138-139).

[147] Restrictive and coercive approaches are considered together in this section because, in practice, restrictions are often supported by threat of punishment or cost.
[148] See section 2.2.3 for further notes on the correspondence of environmental prevention with COM-B categories.

If the aim is to comply with such standards, (threat of) punishment or restriction of opportunities would likely not be the first choice for environmental interventions targeting substance users.

The exchange between Burkhart and Foxcroft appears to be reflected in Oncioiu et al.'s (2018: 13) report, where the purpose of environmental prevention is described as follows: "to limit exposure to unhealthy or risky behaviour opportunities (or to promote the availability of healthy opportunities)". Thus, the strengths-based perspective suggested above is reflected in the promotion of healthy opportunities, although – as indicated by the bracketing of this option and the findings in Table 2 above – it can play a relatively minor role.

Furthermore, the choice of words by Oncioiu et al. ("to limit exposure") suggests a middle path between empowerment and restriction/coercion, whereby target populations are *protected* from harmful environmental influences. This ties in with the idea of "alcogenic" (Huckle et al., 2008) or "intoxigenic" (McCreanor et al., 2008) environments in which "[e]verything is telling you to drink" (Hill et al., 2018a: 462). The terms 'alcogenic' and 'intoxigenic' are typically used in relation to efforts by the alcohol or tobacco industry to normalise substance use (e.g., advertising and promotions, density of alcohol retail outlets). Thus, it can be argued that "environmental prevention limits the freedom of some industries, rather than that of citizens" (Burkhart, 2011: 96; similar Marteau et al., 2011; Lindenberg and Papies, 2019: 254). This is an important argument to support restrictions on industry.

Nevertheless, the above review of example interventions found that environmental prevention may also target substance users (not merely industry), with restrictive/coercive approaches possibly seen as a key strategy. While the selection of examples in the EMCDDA report was guided by practical considerations (noted in section 2.1.3), and other authors have described other approaches (e.g., harm reduction services and general social policy in Room, 2006), the potential misconception of environmental prevention as relying primarily on restriction and coercion, *including in relation to substance users*, is highlighted here as an issue worthy of consideration. In the present context, it also provides an argument to consider alternative intervention strategies using a 'sociology of space' approach.

Purposeful use of negative affect

The use of restrictive or coercive approaches raises questions about the mechanisms through which these approaches are intended to achieve outcomes. The present review found that assumed mechanisms were not always detailed or they differed from what might be expected.

For example, what is the presumed mechanism for smoke-free regulation and related 'no smoking' signage[149]? From a dual-process perspective, it could be expected that such signs are intended to stop the 'automatic system' from carrying out a habit (i.e., smoking in a particular place) by presenting information incongruent with that habit. The smoker is thus prompted to engage their 'reflective system' and recognise the importance of the ban (e.g., in line with the technique 'set rules' by Cornish and Clarke, 2003: 90). However, the literature suggests another mechanism. Best and Papies (2017) explain that 'no smoking' signs are "likely to operate by reinforcing the [smoking] ban, such that the thought of the habitual behavior itself becomes less desirable *by changing the affective state* associated with engaging in the habitual behavior in consumers' stored situated conceptualizations" (ibid.: 350, emphasis added). The authors appear to suggest that the 'no smoking' sign, by linking the ban and smoking, produces an association of smoking with negative affect, which in turn reduces the desire to smoke. Thus, rather than stopping an automatic script from running, 'no smoking' signs are thought to alter the associations themselves[150].

Best and Papies were unable to provide empirical evidence for the proposition above, but it ties in with a broader theme within environmental prevention that inducing negative affect is seen as a legitimate means to change associations and behaviour. 'Affect' is, for example, one of the categories in Dolan et al.'s (2012) MINDSPACE framework for choice architecture interventions, and the authors give examples of how disgust has been used to promote hand-washing (ibid.: 271). In relation to encouraging physical activity, Marteau et al. (2012: 1493) cite a 1981 study by van Houten et al., in which setting up elevator doors to stay open for longer (e.g., 26 seconds instead of 10 seconds) reduced elevator use[151]. Another article by Marteau et al. (2011: 264) includes a comic strip showing an elevator soiled with urine and excrements to illustrate humorously how lifts can be made less appealing. Negative affect thus appears as a key mediator in relation to coercive approaches.

The suggestion that environmental prevention may purposefully utilise negative affect emerges as an issue in the present thesis due to its 'critical sociology' lens (described in section 1.2.1).

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[149] Although it may be argued that 'no smoking' signs represent *informational* prevention, there are several reasons to consider them as *environmental* prevention: i) they are 'situated' (i.e., in the situation where people might smoke); ii) they can work by targeting 'automatic processes'; iii) their aim is to support smoke-free regulations (which are examples of environmental measures as per Oncioiu et al. (2018: 19); iv) the information they provide refers to the smoking ban rather than substance use as such; and v) choice architecture taxonomies typically include information-based approaches if they are situated (e.g., Hollands et al., 2017; Münscher et al., 2016).

[150] A similar mechanism is proposed for financial interventions that increase the cost of a product as well as for health-warning labels (e.g., on cigarette packs) (Best and Papies, 2017: 348).

[151] Negative affect likely played a role in this study, given that, on the first day of the door delay experiment, "the University received 21 complaints that the elevator was not working properly" (van Houten et al., 1981: 379). People were not asked about their reasons for not using the elevator. The authors explained the results with reference to physical effort and time needed to obtain a "reinforcer" (van Houten et al., 1981: 386).

Other scholars with a similar lens (e.g., Hastings et al., 2004: 971–976; Williamson et al., 2014) have also argued that using negative affect (e.g., fear, disgust, shame) as the primary method to achieve behaviour change should be avoided or at least recognised as an ethical issue. It also arises as an issue from the present commitment to ethics and quality in prevention, and interventions using negative affect align less well with quality standards such as those cited earlier. Especially if environmental prevention is seen as suitable for reaching disadvantaged populations (see section 2.1), the notion that negative affect may be a method of environmental prevention is worthy of debate.

Moving beyond the status quo

Thus, restrictive and coercive approaches directed at substance users raise ethical questions and align less well with quality standards, yet they can appear as a key element of environmental prevention. Although such approaches can be justified with reference to proportionality (e.g., potential harms produced by the intervention are overall likely to be smaller than potential harms from substance use) (see also Bayer, 2008), a preferable route may be to consider alternative or supplementary strategies to minimise harmful effects from the start. The less restrictive/coercive examples identified earlier also highlight that prevention does not necessarily have to operate via restriction and coercion.

A possible explanation for the reliance on restrictions is that, due to the notion that we live in 'alcogenic' or 'intoxigenic' environments *and due to the way the environment is conceptualised*, the environmental prevention literature tends to attribute substance use to environmental factors, in particular accessibility (within the 'ease of effort' mechanism) and substance use related cues (within the 'associations' mechanism, see section 2.4.1). The logical conclusion within that line of reasoning is therefore to *remove or alter* anything in the environment that might facilitate access to substances or that might act as a cue for substance use. On this basis, healthier alternatives to substance use (as starting points for strengths-based approaches) are difficult to envision, especially for cigarettes[152]. Goal priming (e.g., Papies, 2017) is an example of a strengths-based approach based on a more elaborate concept of

[152] The proportion of limiting unhealthy options versus promoting healthier options is overall more balanced in Hollands et al.'s (2017) TIPPME framework of choice architecture interventions. This is likely because TIPPME includes interventions targeting diet, where promotion of healthier alternatives (e.g., fruit and vegetables) plays a greater role and where the evidence base for environmental intervention is more developed (also Hollands et al., 2013). A closer inspection of the framework reveals that the included examples for promoting healthier alternatives all relate to food or alcohol (e.g., "adding non-alcoholic options to a bar's range of drinks", "Marking alcohol consumption units on glasses"; Hollands et al., 2017: Supplementary Figure 1) but do not cover tobacco. This suggests that, particularly for cigarettes (where there is no directly conceivable alternative like vegetables or water – except other nicotine delivery devices which are, however, more relevant as harm reduction for established smokers rather than for prevention in the narrower sense), the prevailing approach to substance use and person-environment relationships may limit the perceived range of interventions to those that are restrictive or coercive.

person-environment interactions[153]. Moreover, with regard to negative affect and coercion, it is worth noting that some environmental strategies originated in other contexts where such approaches are more common (e.g., supply reduction, law enforcement). However, using affect to form new associations also echoes behaviourist methods of operant conditioning (i.e., use of rewards and punishments). The persistence of this approach may thus be a consequence of the theoretical foundations of environmental prevention, in particular the behaviourist interpretation of the theories as noted earlier.

To summarise, the current theoretical basis may predispose environmental prevention toward the use of restrictive/coercive approaches. Against this background, a 'sociology of space' perspective – with its focus on symbolic meanings and relational arrangements – may help identify alternative intervention strategies that raise fewer ethical concerns and are better aligned with quality standards.

Implications arising from discussion of 'intervention strategies':

- *Research how restrictive/coercive approaches work in practice (not pursued in this thesis)*
- *Design research to support the development of strengths-based approaches*

2.4.3. Understanding what interventions do

Potential for limited effectiveness and undesirable side effects

In light of the above, it is evident that environmental interventions may have iatrogenic effects (i.e., negative effects caused by intervention). This section points toward possible 'psychological harms', 'group and social harms', and 'equity harms' (categories suggested by Lorenc and Oliver, 2014) as well as 'paradoxical effects' (i.e., iatrogenic effects on targeted behavioural aspects) and 'harmful externalities' (i.e., iatrogenic effects on aspects not targeted by the intervention) (categories suggested by Bonell et al., 2015).

Marteau et al. (2011: 264) cautioned already a decade ago: "Direct harm may arise from perverse response to nudges. [... E]valuations must include the capacity to identify paradoxical or unexpected effects of seemingly benign nudges". The reviewed literature (e.g., Oncioiu et al., 2018) did not address this issue. While lack of consideration for adverse effects of public

[153] Goal priming is an approach whereby a person is exposed to a cue (e.g., words or images relating to diet) intended to 'activate' a certain goal that the person already holds (e.g., to lose weight). The so-activated personal goal then directs subsequent choices (e.g., choosing a healthier food option). Best and Papies (2017: 344) emphasise that the prime should refer to a "*rewarding* outcome of behaving in accordance with the goal [… e.g.,] represent the goal state of being thin, *rather than the negative outcome* of being overweight" (emphasis added).

health intervention is not limited to the environmental prevention field – Lorenc and Oliver (2014) identify this as a general blind spot in public health –, environmental prevention's theoretical foundations (as outlined earlier) may predispose this field toward it. As the next section will explain, the apparent assumption of a relatively universal and direct (i.e., unmediated) relationship between environment and behaviour suggests there may be less felt need to consider detailed mechanisms and differential effects. In addition, an overall behaviourist paradigm means that people's thoughts and experiences can be systematically disregarded, whether as mediators or as outcomes.

When iatrogenic effects reduce the effectiveness of the intervention, an argument to address iatrogenic effects can be easily made. However, sometimes the intended outcomes (e.g., reduced substance use) are achieved, and undesirable side effects appear to be relevant only from an ethical or quality perspective. Such iatrogenic effects may be accepted because long-term or population-level benefits produced by the intervention (e.g., decreased mortality) are thought to outweigh its short-term or individual-level harms (e.g., negative affect). As noted earlier, another approach – pursued here – is to consider alternative intervention possibilities that may be better suited to avoid or reduce harms arising from intervention. The following paragraphs also show that effectiveness issues cannot always be clearly separated from considerations regarding ethics and quality.

Armitage and Monchuk (2019: 328) provide examples of how CPTED measures may actually attract rather than deter crime[154]. Displacement (i.e., that harmful behaviours are not prevented but merely displaced, e.g., to a different time, place, or behaviour) is another concern in the crime prevention literature. There are some indications that displacement may happen but that it does not offset the effects achieved by situational crime prevention (e.g., Tilley and Sidebottom, 2014: 4870). Still, for smoking bans, Blue et al. (2016: 46) view displacement as an indication of how a practice is *transformed* rather than eradicated[155]. Another consideration in relation to smoking bans is that 'no smoking' signs may themselves elicit cravings[156]. Furthermore, Hastings et al. (2004: 972) point to the issue of "collateral damage", whereby "unintended audiences" may suffer from exposure to an intervention. This is noteworthy, given

[154] For example, they found that "CPTED guidance recommends high rear fences (1.8m minimum) where the rear boundary of a property borders a footpath […]. Offenders specifically stated that this attracted them and that a low or no fence would deter them" (Armitage and Monchuk, 2019: 328).
[155] They write that "smoking is demonstrably resilient and is therefore capable of adapting to changing conditions. For instance, new meanings of smoking are formed when people have to go outside to do it, and as these meanings take hold, new variants of the practice emerge" (Blue et al., 2016: 46).
[156] Although an experimental study of 207 daily smokers found no effect of 'no smoking' signs on craving or smoking (Shiffman et al., 2013), the signs in this experiment "were presented as still images on a TV monitor" in an "exposure chamber" (ibid.: 266). The situation may be different in real-world contexts. For example, two of the smokers interviewed by Burton et al. (2015) reported that seeing health-warning messages in a shop context triggered thoughts about smoking (ibid.: 2071).

that the reviewed literature (e.g., Hollands et al., 2017; Oncioiu et al., 2018) appeared to conceptualise environmental prevention as not requiring tailoring to population subgroups.

In relation to fear-based media campaigns[157] (e.g., to prevent smoking), Hastings et al. (2004: 971–976) highlight the possibility of anxiety, distress and anger being experienced, especially among socially disadvantaged groups. Such effects can be considered undesirable from an ethical point of view, and they can also affect intervention effectiveness and lead to further negative outcomes. Counter to Best and Papies' (2017) argument that negative affect decreases smoking desire (presented earlier), Hastings et al. (2004: 975) suggest that, where the subjective function of substance use is to cope with negative emotions, interventions using negative affect may "trigger the very behavior [e.g., smoking] that the ad is designed to prevent" (similar Lorenc and Oliver, 2014: 288). In the area of environmental prevention, smoking bans have been linked to the (intentional) stigmatisation of smokers (e.g., Bayer, 2008; Bell, 2013a; Williamson et al., 2014), and Lorenc and Oliver (2014: 289) highlight that target groups are more likely to reject an intervention if they feel that it stigmatises them.

Moreover, while it has been argued that environmental prevention can help reduce health inequalities (section 2.1), Pechey et al. (2020: 11) suggest that if prior preferences moderate the environment-behaviour relationship, then environmental prevention may actually benefit privileged population groups more because they are more likely to hold preferences for healthier options. In other words, it is possible that interventions targeting immediate environments do not work predominantly via universal automatic processes, in which case they may not be more effective for disadvantaged groups, at least not in the short-term[158].

The above points are not to imply that environmental prevention will necessarily bring about iatrogenic outcomes. Indeed, smokers who are trying to quit or reduce their cigarette use might view smoking restrictions positively as supporting their goals. The above points rather highlight the need for careful consideration (and empirical study) of mechanisms, including a variety of mental processes, population groups and outcomes[159], if we are to understand the impact of interventions fully. The main concern here – also from a quality standards perspective[160] – is

[157] While media campaigns represent informational rather than environmental prevention, the example highlights the potential for undesirable outcomes resulting from the use of negative affect.
[158] They may still be effective in the long run via gradual changes in norms (G. Burkhart, personal communication, 15.1.2021).
[159] Lorenc and Oliver (2014: 289) argue that "many potential adverse effects may concern impacts which are diffuse and hard to measure—such as attitudes, emotional reactions, or social relationships or norms—rather than the more tractable health status or behavioural outcomes which are usually the focus of public health evaluation research. While evaluations should continue to consider the possibility of adverse effects on the latter type of outcome, a broader scope may be required to achieve a fuller understanding of the total impact of interventions".
[160] For example, basic standard D.7 in the European Drug Prevention Quality Standards is: "Potential disadvantages and risks for the target population […] are outlined and considered" (Brotherhood and Sumnall, 2011: 77).

that *the potential for such effects has so far been little considered in the literature* relating to environmental prevention. There appear to be no strategies in place to identify iatrogenic effects, even though relevant guidance (e.g., Bonell et al., 2015) is available. Adding this to the earlier observations, one may conclude that interventions on the theoretical basis outlined in section 2.2. are more likely to use restrictive/coercive approaches while including few provisions to measure undesirable effects.

The importance of mediators, moderators and broad outcomes

The previous section points to the importance of considering mediators, moderators and a range of outcomes to understand how and under what circumstances an intervention will work, including whether it works as intended and for whom. This is also an important basis for the evaluation and development of interventions.

In the reviewed literature (e.g., Oncioiu et al., 2018), moderators of the environment-behaviour relationship (e.g., impulse control, "social context") were relatively little discussed[161]. There was only limited consideration for how mechanisms or effects may differ by population group or by situation[162]. For mediators, reference was made to automatic processes, but there appeared to be no clear elaboration of intermediary steps that should be empirically analysed to explore how interventions work[163]. For the EMCDDA report, this has to be seen against the scope of that report (as noted above in section 2.1.3), but similar tendencies were also notable in the literature reviewed in section 2.2.

The broader choice architecture literature (e.g., Münscher et al., 2016) points to the importance of complex mental processes (e.g., judging what is acceptable behaviour), and Bauer and Reisch (2019: 19) specifically caution that "external stimuli should not be seen as simply pushing a mental button that triggers a specific behavioural response". Yet, detailed mechanisms to model the influence of environment on behaviour, including intermediary steps

[161] For example, Oncioiu et al. (2018: 14–15) include 'social context' as a potential moderator in a generalised way (i.e., no discussion of how it may moderate the environment-behaviour relationship in a specific situation).
[162] Hollands et al. (2017: 2) clarify that their TIPPME typology "excludes interventions that are designed to be interactive or tailored, meaning those in which the intervention content is not standardized for all recipients and is intended or enabled to vary dependent on their characteristics or responses". Foxcroft (2014a: 821) includes examples of 'selective' and 'indicated' environmental prevention which target certain settings (e.g., "high-risk neighbourhoods") or population groups (e.g., young people, "violent individuals"). However, this appeared to delineate the scope of intervention rather than discuss differential effects (similarly in Oncioiu et al., 2018).
[163] For example, Oncioiu et al. (2018: 15) depict a "working model of environmental prevention" in which an arrow directly connects prevention measures with behaviours (i.e., unmediated). The figure includes a third box which refers to cultural milieu, behavioural norms, beliefs, values, attitudes and expectations as 'social context'. This is presented as a moderator and – in the case of longer-term impacts of environment on behaviour – a mediator (Oncioiu et al., 2018: 14; G. Burkhart, personal communication, 15.1.2021). Automatic processes, although highlighted in the report as key to environmental prevention, are not explicitly shown in the figure (they are likely implied in the unmediated relationship between interventions and behaviours).

(i.e., mediators) and factors that affect the specifics of such influences (i.e., moderators), have not been a focus of the choice architecture literature until recently. Primary studies appear to address moderators often (Szaszi et al., 2018), but the present review found that overview papers typically discussed mechanisms in an unstructured way (e.g., reviews by Münscher et al., 2016; Bauer and Reisch, 2019).

A recent paper by Pechey et al. (2020) is one of the first[164] to systematically and more elaborately discuss and compare several mechanisms (including mediators and moderators) for a specific group of choice architecture interventions targeting substance use. That paper, co-authored by Hollands and Marteau, represents a shift from the author group's earlier work (described in previous sections). Specifically, despite focussing on 'availability' interventions, Pechey et al. go beyond physical 'ease of effort' mechanisms to consider prior preferences, situational 'liking' of products and social norms (ibid.: 6-9). Social norms are seen not as "mere imitation" (ibid.: 7) but include, for example, the need to 'fit in' or be liked. Also of interest to the present argument, Pechey and colleagues found that salience and visual attention have not been shown to directly affect behaviour independently of preferences, concluding: "the potential for increased visual attention to lead to changes in behaviour in real-world contexts is yet to be demonstrated" (ibid.: 8).

Lindenberg and Papies (2019: 230) observe that "the discussion of nudging in the literature is so overpowered by ethical issues and the question whether nudging is or is not paternalistic and manipulative […], that there is almost no attention to the mechanisms underlying nudging". While this suggests that the relative lack of attention to mechanisms may be due to choice architecture researchers being preoccupied with other issues, the present review suggests that *it may also relate to the theoretical foundations*. As outlined earlier, currently used theories typically conceptualise the environment (as well as substance use itself) in terms of physical aspects, so that symbolic or social meanings are not systematically accounted for. Consequently, there may be no felt need to consider how (potential) substance users interpret their immediate environments. Also, the *theoretical* explanation via 'automatic processes' may be seen to suffice and not warrant further empirical work to explore mediators. Moreover, if the relevant mental processes are assumed to be 'automatic' and therefore (in a simplified dual-process logic) also nonconscious, this can suggest that it is not possible to collect verbal data on these mental processes in a valid and reliable way. Thus, there would be little value in discussing mechanisms with (potential) substance users because any explanations offered by them would

[164] Previously, interventions were categorised by assumed mechanism (e.g., Dolan et al., 2012), including in the substance use field (e.g., Hollands et al., 2013), but due to a focus on categorising interventions, mechanisms were presented as givens rather than studied.

be – so suggests that line of reasoning – ex post facto fabrications rather than accurate descriptions of what happened (see also the quote on p. 71). Thus, a focus on 'automatic processes' can lead to methodological disregard for substance users' experiences.

However, while it can be difficult to generate data on thoughts and experiences, it is still important to attempt it. Melnikoff and Bargh (2018b: 284) highlight recent empirical work to suggest that people have greater awareness of implicit processes than has been assumed by researchers. Similarly, the present thesis is based on the notion that people *are* able to elicit substantial (though not all) implicit knowledge. But even if we regard interview data as a partial account, there is value in knowing what people *think* because these constructions may still influence behaviour[165]. Moreover, the way target populations experience an intervention may determine effectiveness and be relevant from an ethical point of view (e.g., iatrogenic effects as outlined earlier). Lack of clarity about (actual or assumed) mechanisms may thus affect implementation, effectiveness, and possibilities for evaluation.

An understanding of detailed mechanisms is also relevant for intervention development. Specially, it would be useful to understand the conditions under which an environmental 'invitation' is accepted or declined (see also Withagen et al., 2012 in relation to affordances). A 'sociology of space' perspective suggests that substance users' construals of space could be relevant to understanding such conditions. By contrast, limiting mechanisms to automatic physical reactions or automatic mental associations which are not further detailed is likely to give an incomplete account, especially for a complex behaviour such as substance use (e.g., as a behaviour that is imbued with meaning; hence social scientists prefer the term 'practices' over 'behaviours', e.g., Cohn, 2014; Blue et al., 2016)[166].

Paradoxically, the work by Hill and colleagues (2018a, 2018b) on unmediated affordances also underlines the importance of substance users' thoughts and other experiences. The authors frequently described or hypothesised about such processes in their explanations of environmental influences on substance use[167] – showing that, despite the premises of affordance theory, it is difficult to give unmediated accounts of substance use in practice.

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[165] For example, in deciding whether to attend the party tonight, it might be more important how I *remember* the last party than whether I *actually* had a good time there. The importance of personal construing as a basis for one's actions is also a cornerstone of personal construct theory, to be described further in section 3.4.2.

[166] Similarly, Bruce et al. (2003) argue that while 'affordances' can help explain limb movements and motor control (e.g., catching a ball, moving a leg), their applicability to complex (e.g., cultural) behaviours must be questioned.

[167] For example, Hill et al. (2018a) identify dancing to music as an affordance theme. While they suggest that affordances produce situational use or abstinence directly (i.e., unmediated), they also cite a study participant as follows: "You drink less [when dancing to music] because it's just a hassle sort of having a drink with people bumping into you and then often people get into fights about drinks being spilled over them" (Hill et al., 2018a: 461). Hence, the wish to avoid unpleasant situations could be understood as a mediator in this example.

The present review also identified broader issues, for example that the aims (i.e., intended outcomes) of the example interventions in Oncioiu et al. (2018: 19–20) were not always clear and seemed to be rather heterogeneous: 'environmental prevention' appeared as a general term for *any* intervention targeting substance use via the environment, regardless of whether outcomes were specifically related to prevention (in the narrow sense of section 2.1.1)[168]. Interventions were also difficult to classify during the ad hoc coding exercise (see section 2.4.2). Such issues may limit understanding and progress made in this field. Previous attempts at developing taxonomies have found that interventions can be difficult to classify if the "primary mechanism of action" is unclear (Ritter and McDonald, 2008: 29) or if they contribute to multiple types of outcome (Brotherhood et al., 2013: 13). The specification of mechanisms could hence also help to address such issues.

Moving beyond the status quo

The broader literature suggests possible mediators and moderators that could be considered in mechanisms underpinning environmental prevention. As noted earlier, recent choice architecture literature offers insights into possible moderators, such as prior goals and preferences or norm perceptions (e.g., Szaszi et al., 2018; Pechey et al., 2020). The cue-reactivity literature highlights the role of outcome expectancies (e.g., Rose et al., 2013: 415). In situational crime prevention, complex mental processes have traditionally been assigned great importance under the so-called 'rational choice perspective' (Cornish and Clarke, 2017). Wortley's (2017) alternative 'situational precipitators' perspective also highlights, for example, the role of excuses that offenders make to permit themselves the committal of a crime.

The psychological 'grounded-cognition theory of desire' by Papies and colleagues (described in section 2.3) was the only model identified in the present review[169] that systematically described a detailed mechanism of how environmental aspects can affect health behaviours. Key *moderators* in Papies' framework include past experiences, transformed into situated memories, while key *mediators* relate to retrieving memories, performing mental simulations and experiencing desire. As noted in section 2.3, this work highlights two principle mechanisms, namely that interventions can target the *emergence* of desire or the *ability to act upon* desire.

[168] Indeed, the definitions of environmental prevention shown in section 2.1.2 highlight the role of the environment *but not* the aims at the level of beneficiaries. This may also be linked to the theoretical foundations because none of the identified theories was specific to substance use prevention in the narrow sense.
[169] However, this review did not include targeted searches for mediated models, hence other models might exist that could not be covered within the confines of the present literature review.

A ‘sociology of space’ perspective complements existing work by offering the *interpretation* of situations as a possible mediator – for example, how people construe environmental aspects in general and in relation to substance use or abstinence. A ‘sociology of space’ perspective may thus improve our understanding of mechanisms and thereby help increase effectiveness as well as serve to identify (and thereby avoid or minimise) potential undesirable effects.

Implications arising from discussion of ‘iatrogenic effects’ and ‘mechanisms’:

- *Develop complex pathways with mediators and moderators to better understand under what circumstances environmental ‘invitations’ are accepted/declined and to what effect (e.g., differential effects according to population/situation, undesirable effects)*
- *Consider as potential mediators e.g., how situations are interpreted (focus of this thesis) or the role of desire (not pursued in this thesis)*
- *Consider as potential moderators e.g., memories, prior goals and preferences, norm perceptions, etc.*
- *Do not limit outcomes to narrow substance use indicators only, consider the possibility of iatrogenic effects on substance use as well as on other aspects*
- *Define target populations and (intended/undesirable) outcomes also for environmental interventions (not pursued in this thesis)*

2.5. Brief summary: towards a ‘sociology of space’ perspective

Chapter 2 reviewed the theoretical basis of ‘environmental prevention’ as implied in a recent key report by the EMCDDA (Oncioiu et al., 2018) and related publications. Choice architecture, dual-process theories, the COM-B model, affordance theory, CPTED and ‘broken windows’ were identified as key influences (section 2.2). The review found that these theories were interpreted in a specific way that echoed behaviourist stimulus-response models (section 2.3). This affected how the environment itself as well as person-environment interactions were conceptualised. It was argued that a too narrow view on these matters (e.g., immediate environment conceptualised in physical terms, automatic processes as main explanation) may preclude the identification of other useful intervention points and strategies (section 2.4.1). The current theoretical basis may also predispose environmental prevention toward intervention strategies that rely on restrictions and coercion, including toward substance users (section 2.4.2), and it may potentially limit intervention effectiveness and the identification of undesirable effects (section 2.4.3). Reviewing the theoretical foundations of environmental prevention thus revealed potential issues and avenues for further development.

The review in the present chapter emerged from a range of perspectives, as outlined in Chapter 1. From a theoretical point of view, the 'sociology of space' perspective was most important. The identified theories did not include work from fields such as sociology or human geography, and this is suggested here as a potential 'root cause' for the identified issues[170]. The thesis will therefore proceed from the assumption that socio-spatial theory (as developed in sociology and related fields) could enrich environmental prevention by offering a richer conceptualisation of the environment and of person-environment interactions.

Chapter 2 thus outlined a practical point of departure for the present thesis: an entry point for a theoretical and empirical enquiry into socio-spatial aspects of substance use. The next chapter introduces socio-spatial theory, with a focus on Löw's (2001, 2016) 'sociology of space'.

[170] Section 2.3 hinted at the fact that relevant theories have also been developed within the field of psychology (further examples include e.g., Lewin's, 1951, field theory). It could hence be argued that some of the identified issues emerge from a behaviourist perspective rather than the choice of discipline per se.

3. Sociology of space

3.1. Introduction

This project started with an interest in *relational concepts of space*[171], especially in how such concepts can support research and intervention on everyday spaces (e.g., neighbourhoods) in practice. This was already a focus in the present author's earlier work[172] and was thought to hold potential for substance use prevention. This section outlines the theoretical perspective which informed this study and upon which the critique of environmental prevention in Chapter 2 was based. The section clarifies how 'space' can be understood sociologically and how this may further our understanding of substance use and intervention. It concludes by highlighting the potential of personal construct theory to advance socio-spatial theory.

In literature on spatial sociology, Simmel (e.g., 2009/1908; 2014/1903) is often cited as one of the earliest scholars to address space; according to Löw (2016: 44), he first used the phrase "Sociology of space" ("Soziologie des Raumes") in 1903. However, as Löw (2001, 2016)[173] shows, it was not until several decades later that 'space' became a central topic in the social sciences. For a long time, prevailing notions of space – for example, as territory or as the physical backdrop to social life – rendered sociological interest in 'space' irrelevant, even "reactionary" (Löw, 2016: 3). 'Space' became academically interesting only when authors such as Lefebvre, in '*The Production of Space*' (1991, originally published in 1974), started arguing for a different understanding of space, namely as a product of human activity that in turn may impact on people, and which may therefore be used to study social processes. This renewed interest in 'space', and space as a social product as per Lefebvre, is known as the 'spatial turn' in the social sciences (Löw, 2016: vii; Knoblauch and Steets, 2020: 134).

In the last decades, literature on space (and place) has flourished, not least because 'space' is of interest to many disciplines: sociology, geography, architecture, urban studies, planning, art, philosophy, psychology, and so on. This wealth of literature is evident in readers on the topic (e.g., Hubbard and Kitchin, 2011; Gieseking et al., 2014) and its "dizzying turns-within-

[171] Some authors focus on 'place' as that which is invested with meaning, disregarding 'space' as something 'empty' (e.g., Gieryn, 2000; more examples available from Hamzei et al., 2020: 33–34). The present thesis conceptualises 'space' as meaningful and as subsuming the concept of 'place' (see section 3.2.2 and Fuller and Löw, 2017: 477).
[172] Specifically, the present author's master's thesis (Kurtev, 2008) explored the practical applicability of Löw's (2001) 'sociology of space' approach (described below); and the present author contributed to the development and application of a framework for the study of urban neighbourhoods (Reinprecht et al., 2009).
[173] As noted in section 1.2.2, Löw (2016) is the English language translation of Löw (2001). For ease of reference, this section generally refers to the English version only.

the-turn" (Fuller and Löw, 2017: 476). Increased interest in space has also resulted from broader developments in social theory (e.g., social practice theories, theories of affect, Latour's actor-network theory, Deleuze and Guattari's assemblage theory) which emphasise the role of bodies and materiality and have stimulated research into spaces from another entry point. It is not possible to discuss these literatures in detail here, and interested readers are referred to other publications (e.g., Christmann, 2016b; Duff, 2007; Günzel and Kümmerling, 2010; Fuller and Löw, 2017; Maller, 2018; Hamzei et al., 2020; some points were already addressed in section 1.2.2 and in Kurtev, 2008). Instead, this section will outline the understanding of 'space' that informed the present research and relate it to the issues identified in Chapter 2.

Why focus on Löw's 'sociology of space' in the present thesis?

This study follows up on an earlier work by the present author (Kurtev, 2008) which applied and assessed Löw's (2001, 2016) 'sociology of space' approach. Subsequently, Löw was the main point of reference also for the present work (further explained in section 3.4). However, Löw's is not the only available approach to study spaces. Section 1.2.2 noted that 'posthuman' or 'more-than-human' theories are commonly used in the substance use field, and this is further explored in section 3.3 below. In urban studies, empirical research frequently refers to other authors[174] (especially outside German-speaking contexts, as noted in section 1.2.2). It is thus worth pointing out theoretical and practical considerations that made Löw's approach attractive for the present study, before moving on to describing the approach itself.

Socio-spatial theories are often developed in specific contexts (e.g., social criticism) that are not concerned with space *per se*; thus, it is not their main intention to define space but rather to, for example, highlight the importance of space (Malpas, 2012: 228). As a result, existing conceptualisations often lack detail or are limited to certain socio-spatial phenomena (e.g., particular types of spaces), so that – despite the wealth of available literature on space – 'space' can still be viewed "as a theoretically underdeveloped concept" (Löw, 2016: ix)[175]. By contrast, Löw set out to develop a precise concept of space that could be useful for sociological analysis: "as a basic sociological concept" and "a shared understanding of space" (Löw, 2016: ix-x)[176]. To achieve this, Löw reviewed and integrated existing socio-spatial concepts (drawing on e.g., Simmel, Schütz, Merleau-Ponty, Lefebvre, Giddens, Foucault, Bourdieu, and Einstein)

[174] It is beyond the scope of this thesis to discuss authors and theories used in other empirical work, but the works included in Hubbard and Kitchin (2011) and Gieseking et al. (2014) provide an overview.
[175] At the level of empirical research, this also means that studies typically refer to relational concepts of space only in general terms to clarify their overall conceptual outlook (Löw, 2016: viii).
[176] In doing so, Löw built upon and continued a thread in German sociology, whereby frameworks are formulated to propose specific aspects for the analysis of space (briefly outlined in section 3.4.1).

to develop a novel approach that is *sociological, applicable to any type of space, and very comprehensive*. Löw also illustrates how her framework can inform the analysis of spaces[177]. This theoretical rigour made Löw's approach attractive for the earlier work (Kurtev, 2008) and positioned it as a useful reference point also for the framework of socio-spatial aspects to be developed in the present study.

Moreover, Löw's approach encourages us to consider how spaces are constituted by those who are part of them. Other socio-spatial approaches tend to assume the view of an outsider looking in: a researcher comes 'into' a space (such as a neighbourhood) to 'objectively' describe it[178]. Of particular importance to this study was Löw's concept of "synthesis" (described in section 3.2.1), which aligned well with the present aims of understanding how people construe spaces.

A final consideration relates to the ease with which Löw's approach can be understood by those unfamiliar with socio-spatial theory. As the present study aimed to inform prevention work, it was essential that any theory used would be accessible to psychologists and other non-sociologists working in public health[179]. Relational concepts of space can be counterintuitive (i.e., they do not correspond to everyday notions of space) and can be therefore easily dismissed as disconnected from reality. Part of Löw's success in the German-speaking countries (where it is considered a seminal work of socio-spatial theory) can be attributed to her understandable writing style and relative avoidance of jargon[180]. This was a further argument to draw upon Löw for the present introduction to relational concepts of space.

3.2. Thinking 'space' relationally

In the present thesis, space is conceptualised as "a relational arrangement of living beings and social goods" (Löw, 2016: ix). This short quote contains all the key elements to a relational understanding of space, and the following paragraphs will explore these in turn. While the following descriptions are mostly based on Löw, Löw's work is representative of broader writings on relational space. Other authors have thus made similar points, but to keep the text

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[177] Löw did not, however, provide detailed methodological guidance on how to use the aspects in practice. This is a shortcoming of Löw's book, and the present author addressed this in her master's thesis (see section 3.4).
[178] This point is elaborated further in Kurtev (2008: 14-15).
[179] Adams and Buetow (2014: 93–96) highlight that psychology in particular is a field where students are not well acquainted with theory, instead coming to understand theory as "difficult, unnecessary, and unconnected with the real world" (ibid.: 93). They write further: "Reading theory is seen as requiring too much effort: too many big words, too much confusion, too many ideas that are difficult to access" (ibid.: 96); "unfamiliar terminology" (ibid.) can act as a barrier to engagement with theory.
[180] Similarly, Kusenbach (2017: 1033) describes the English translation as "an easily readable work of theory, *especially when compared to some other key texts in this area*" (emphasis added).

concise other authors are cited here mostly for details not elaborated by Löw. Instances where the notion of 'space' in the present study departs from Löw's will be noted, as well as extensions developed during the present study (e.g., suggesting 'situation' as the smallest socio-spatial unit). In recent years, Löw's approach has been developed further in the context of communicative constructivism (e.g., Christmann, 2016a; Knoblauch and Löw, 2017; Knoblauch, 2020: 208ff; Knoblauch and Steets, 2020): these developments are reflected below insofar as they are relevant to the argument at hand. As the following can only offer an overview, readers are directed to key texts (e.g., Löw, 2008, 2016; Fuller and Löw, 2017; Löw, 2018) for more detail if needed.

3.2.1. Relational arrangements, spacing and synthesis

Löw (2016: 9ff.) uses the term '*relational'* space primarily in contrast to 'absolutist' notions of space (also known as 'container space'), building upon earlier work discussing different notions of space (e.g., Einstein, 1969; Läpple, 1991a). Briefly, the absolutist notion of space can be characterised via two features: i) space is like a container that surrounds us and which exists independently of (and hence prior to) the living beings and things within it – we live 'in' space; and ii) space can be described using three-dimensional Euclidean geometry (e.g., Läpple, 1991a: 189–190). Space thus appears as static and naturally given, and it appears to be 'empty' when there are no living beings or things 'in' it (Läpple, 1991a: 189, with reference to Einstein). To illustrate, in this perspective, a nightclub is always the same space, regardless of what music is being played or what patrons are present. This notion represents how people in 'Western culture' generally perceive space (Läpple, 1991a: 164)[181]. However, this conception of 'space' cannot be fruitfully utilised in the social sciences because it cannot accommodate well the relationship between society and space (Läpple, 1991a: 195; Löw, 2016).

By contrast, a relational understanding implies that space does not exist independently of living beings and things but *emerges from* these living beings and things as well as the (meaningful) relations between them[182]. In this understanding, space cannot be 'empty' because it is always constituted by its elements and their relations; and it is not possible for us to live 'in' space, because we are *part of* it[183]. Space is therefore socially produced and in constant flux[184]. To

[181] It also underpins the theories presented in section 2.2.
[182] 'Relativistic' theories give primacy to the relations between elements; Löw (2016: 132) therefore uses the term 'relational' to highlight that the elements themselves must also be considered.
[183] This idea is so unconventional that our language does not cater for it easily, nor does it reflect how space was discussed in the interviews. The present thesis will therefore occasionally refer to space as something we live 'in'.
[184] The dynamic, processual nature of space is further underlined by the constant interplay of interaction (spacing) and interpretation (synthesis) as well as the 'duality' of structure and action (explained further below).

return to the nightclub, in this perspective the space changes constantly depending on who is present, what music is being played and so on. This underlines why 'space' is preferred here over terms such as 'context' or 'environment': though these are common in the substance use literature, they imply absolutist notions of space that limit the scope for sociological analysis.

Moving on to the term 'arrangement' in the earlier definition, Löw (2016: 134ff.) distinguishes two key processes of space constitution, namely spacing and synthesis. They are so central to Löw's approach that her theory is sometimes reduced to this distinction (e.g., Christmann, 2016b: 14-15). '*Spacing'* refers to "the placing of social goods and people or [.] the positioning of markings that are primarily symbolic [...] Spacing thus means erecting, deploying, or positioning […] in relation to other placements" (Löw, 2016: 134). Examples given by Löw include "how goods are displayed in the supermarket, how people position themselves toward other people" (ibid.). At first, this definition may appear overly narrow, for example, as limited to intentional behaviour, to movement, or to the use of things. However, Löw's descriptions highlight that 'spacing' is something we do all the time – it is inherent to our existence as material bodies surrounded by matter; we cannot avoid positioning ourselves. Moreover, although Löw discusses spacing and synthesis primarily as processes through which *people* constitute space, it is clear that 'spacing' also applies to other living beings and things[185].

By contrast, '*synthesis'* (or 'operation of synthesis'[186]) refers to how "goods and people are amalgamated to spaces by way of processes of perception, imagination, and memory" (Löw, 2016: 135). In other words, a physical arrangement of living beings and things becomes a sociologically relevant space only when there is a person to perceive, imagine or remember it. In this vein, Löw (2016: 189) writes: "Spaces are not naturally existent, but have to be actively (re-)produced through an operation of synthesis"[187]. This argument will be revisited below. At this point, it is important to highlight a further implication of synthesis instead, namely that individual elements (i.e., living beings, things) are not perceived separately but together to form "ensembles" (Löw, 2016: 189)[188]. Thus, they are perceived – and obtain their specific meaning

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[185] More-than-human theories (see section 1.2.2) emphasise the agency of non-humans in the constitution of space. Though Löw's approach is human-centred, she considers other living beings and things (e.g., as the 'bodies' of space constitution): "Although people are more active than social goods in their possibilities of moving and making decisions, it would fall short of the mark to assume that in contrast to people, social goods are passive objects"; "Like people, other living beings can also be involved in the constitution of spaces" (2016: 132, 188).

[186] The term 'operation of synthesis' is used in Löw (2016) as the translation for the German '*Syntheseleistung'*. The present author agrees with Kusenbach (2017: 1033) who describes this translation as "unfortunately [.] somewhat unclear". In the present thesis, the simpler term 'synthesis' is generally used.

[187] Similarly here: "All spaces are *social spaces* inasmuch as no spaces exist that are not constituted by people who synthesize" (Löw, 2016: 192, original emphasis).

[188] Löw gives the following example: "One city quarter, for example, which consists of various social goods and people, can be perceived as *one* element that is relationally linked with other city quarters to form the space of the city. The city quarter can also be regarded as a space for itself" (2016: 133, original emphasis).

– in relation to each other. Löw (2016: xiv) offers this example: “An empty bowl on a table may look dismal, but if a bouquet of roses is placed next to it, the same bowl suddenly shines splendidly, almost full of promise”. Löw’s concept of ‘synthesis’ could thus be understood as a prerequisite for the development and activation of ‘situated conceptualizations’ as per Papies’ theory (summarised earlier in Box 2, p. 64). Löw’s reference to imagination and memory also emphasises the role of living beings and things that are *not* physically present at the time of synthesis. It further highlights that people will synthesise the same physical arrangement differently (e.g., depending on past experience). Synthesis is therefore not merely a perceptual task in which people receive and process sensory input in a predictable fashion, but it refers to complex *meaning-making*[189]. In the present thesis, references to spaces being ‘construed’, ‘perceived’, ‘experienced’ or ‘interpreted’ express this concept of ‘synthesis’.

Spacing and synthesis might be understood to refer to the material and the mental aspect of space constitution, respectively. Portrayals of Löw’s approach occasionally imply such a distinction and criticise the concept of ‘synthesis’ accordingly (e.g., as overly mentalist, so that spaces become merely subjective abstractions in the head; see e.g., Christmann, 2016b: 14; Knoblauch, 2020: 210; Knoblauch and Steets, 2020: 138). However, such a clear delineation was likely not intended by Löw. Rather, Löw emphasises that spacing and synthesis are separated in her theory only for analytical purposes, being interdependent in practice (Löw, 2016: 135). She also highlights the role of the body in her discussions of ‘perception’ (Löw, 2016: 164, 2018: 25). Thus, synthesis has material components, while spacing requires mental processes. Löw’s writings (e.g., on institutionalisation or the role of habitus) also highlight that synthesis is societally embedded, hence the resulting spaces are *not* only subjective. Another important clarification is that synthesis does not imply full consciousness. Although synthesis *can* be conscious (e.g., when planning a room) and be (at least partially) made conscious and verbalised (e.g., when talking about spaces), it typically occurs below consciousness as we navigate everyday life (Löw, 2016: 135–137). Nevertheless, the need for these clarifications highlights some issues with Löw’s definition of ‘synthesis’. Kurtev (2008) also noted that Löw’s definition does not sufficiently capture the role of feelings. ‘Synthesis’ is thus understood in this thesis to draw on mental processes in a broad sense.

Processes of spacing and synthesis are informed by (*implicit) knowledge.* This aspect is not discussed separately by Löw[190] but, drawing on communicative constructivism, Knoblauch and Steets (2020: 142) suggest that such ‘space knowledge’ (“Raum-Wissen”) develops as we

[189] Fuller and Löw (2017: 476) describe ‘synthesis’ as “making-sense of the meaning of particular spaces”, and the editors’ preface to Löw’s 2016 book describes synthesis as “the interpretive act of imagining” (Löw, 2016: v).
[190] ‘Knowledge’ is a recurring topic in Löw’s (2001, 2016) book, but it is not addressed in a separate section.

experience materiality (with our own body) in relation to social (i.e., communicative) meanings. These experiences remain accessible beyond the immediate situation as memories in which the material and the symbolic become synonymous. Again, this parallels Papies' concept of 'situated conceptualizations' (as summarised in Box 2 above).

3.2.2. Place – setting – sociosphere – micro-space

Considering the above, what is the difference between *space* and *place*? Löw's use of 'place' is somewhat ambiguous (Kurtev, 2008: 19–20; Hamedinger, 2019: 696). This is because place takes on a double meaning in Löw's theory. On the one hand, "place denotes an area, a site, which can be specifically named, usually geographically marked" (Löw, 2008: 42); what might be called a "location" (Löw, 2016: xvii). It is a *condition* for spacing and synthesis: "For it to be possible to place oneself or something, there have to be places where it is possible to place" (Löw, 2016: 167). On the other hand, places are the meaningful, symbolic sites that *result from* the processes of spacing and synthesis[191]. This includes 'place' in the sense typically invoked in, for example, urban studies literature or environmental psychology, where places are uniquely meaningful in a biographical sense or as sites of collective memory (not necessarily in a positive way; Manzo, 2005[192]). 'Place' in this sense can be understood as a *type of* space (Fuller and Löw, 2017: 477). However, in the present thesis, the term is not limited to such 'special' places: if meaning-making is integral to spacing and synthesis, then spacing and synthesis *always* produce places that are (to some extent) meaningful. Generally speaking, place could then be understood as space that is bound to a *specific* location.

By distinguishing 'space' and 'place', Löw achieves several things. Firstly, it becomes possible to conceive of multiple spaces in the same location (also Christmann, 2016a). People can use and interpret the same 'place' differently, resulting in different spaces. This refers not only to different people: the same person can constitute different spaces at the same location (e.g., many different activities may take place in a person's living room over the course of a day).

Secondly, it highlights that a space need not be limited to one location. Consider, for example, the vast space constituted by an individual's life: what Albrow (1997: 51) refers to as a "sociosphere". It spans across many different places, including ones only accessed via communication media (i.e., technologically mediated), memory, or imagination.

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[191] Accordingly, Löw writes: "The constitution of space thus systematically generates places, just as places make the emergence of space possible" (2016: 167).
[192] Conceptualisations of place often focus on the 'good', 'meaningful', 'liveable', etc.; 'place' often has a normative or "romantic" connotation (Canter, 1988: 10, cit. in Gustafson, 2001: 6; also Lewicka, 2011; Graumann, 2002: 108). Manzo (2005) showed that places can be meaningful in negative ways (e.g., associated with painful memories).

Thirdly – and of most relevance to the present study –, if space is not defined primarily via place (whether as location or symbolically), it becomes possible to typify spaces according to other criteria. Spaces can then be conceived of as *primarily characterised by particular arrangements* rather than their locations. The opportunities for classification are then only limited by our imagination and research interests. Returning to the example of especially meaningful places discussed above, such places could be understood *as a type of space* by virtue of representing relational arrangements in which the location holds central meaning for individual or group identity[193, 194]. To give another example, the concept of 'settings' in substance use prevention (e.g., school, family, nightlife, community) could be understood to refer to institutionalised arrangements of living beings and things (e.g., school infrastructures) that bring forth various opportunities for intervention. The present argument suggests that space can be separated from place further, to conceive for example of 'alcohol spaces' or 'spaces of no substance use' as types of spaces representing substance use patterns without pre-empting what locations they might be associated with (i.e., *not* synonymous with formal drinking establishments or places where substance use is banned).

The above examples illustrate that Löw's approach is applicable to a range of spaces, including spaces at different *scales*[195]. As scale is not a focus of Löw's work, the present thesis draws on Läpple's (1991b: 43f.) distinction of *micro, meso and macro* spaces. Examples of macro-spaces include nation-states or global networks, while examples of meso-spaces include cities or regional networks. Of greatest interest to the present thesis are micro-spaces, which have the human body at their centre and refer to what can be directly experienced[196, 197].

While Läpple's three-level structure points to the nested nature of spaces (i.e., micro-spaces within meso-spaces within macro-spaces), Löw's 'synthesis', Albrow's (1997) 'sociosphere' and Knoblauch's (2020) work on technologically mediated spaces remind us that the lived-in

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[193] The importance of 'identity' in relation to places is also highlighted by Löw: "If we look from a sociological point of view at a formation as a place, which is often endowed with the unifying force of a name, strategies and structures (whether individual or collective) that are oriented on identity come into focus: traditions, memories, shared experiences, and so on" (2016: xvii).

[194] Similarly to 'place', other socio-spatial figurations such as 'borders', 'networks' or 'territories' can then also be conceived of specific types of spaces (Löw, 2016; Fuller and Löw, 2017).

[195] In the introductory words of her 2016 book, Löw speaks of "architectural spaces, urban spaces, regions, nation-states, bedrooms, recreation parks, river landscapes, etc." (2016: vii). She further proposes that "sociology of space […] can study the constitution of spaces on all scales, whether cities, regions, or small communities" (2016: 43). Knoblauch and Löw (2017: 6) also suggest that "the notion of [spatial] figuration makes it possible to address spatial relations of any order and across different scales".

[196] Hence, micro, meso and macro spaces in this context are not to be confused with, for example, micro, meso and macro systems as defined by Bronfenbrenner (1979).

[197] This understanding thus resembles that of 'micro-environments' in Hollands et al. (2017), defined as "settings that people use for specific purposes (for example, shops, restaurants and bars) and where they interact directly with objects and stimuli in those environments" (ibid.: 2) (see Chapter 2). A difference is, however, that Läpple's micro-spaces are not limited to those institutionalised settings highlighted in Hollands et al.'s definition.

micro-spaces of everyday life are also embedded in a broader mesh of imagined, remembered and technologically mediated spaces, which nowadays frequently take place at global macro levels. This 'networked' view invites additional research questions, especially if we consider substance use practices. Concepts such as Foucault's (1986) 'heterotopia' – the 'other place' which reinforces the normalcy of everyday life by showing what is *not* normal –, Goffman's (1990/1959) 'frontstage' and 'backstage', as well as Giddens' (1984: 110ff.) 'regionalization' point to how spaces define each other. They could thus help explore the role of substance use spaces (or spaces of situational abstinence) as situated within people's broader sociospheres. Although such concepts informed the present study[198], it was only feasible to explore networks cursorily in section 11.7, and so these concepts are not discussed here further.

3.2.3. 'Situation' – bridging everyday and relational vocabulary

The relational conceptualisation of space brought about challenges during the interviews in the present study. One such challenge was that everyday concepts of 'space' and 'place' do not correspond to the relational understanding outlined here. Interviews were conducted in German, and speaking of 'spaces' (*Räume*) could easily reinforce notions of 'container space' as well as conflate 'space' and 'place', considering that the word 'Raum' (space) can also refer to the rooms of a house. Similarly, speaking of 'places' (*Orte*) risked limiting spaces to those bound to singular locations, thereby excluding spaces spanning across locations. Further complications arose from the dynamic nature of relationally conceived spaces as well as the nested structure of spaces and places[199]: even at the micro-level, multiple spaces can co-exist (concurrently or over time) at the same location (e.g., a living room) and, together, form another space, such as a symbolic place (e.g., "*my* living room"); and locations can be delimited in different ways and differentiated further (e.g., a flat into rooms into areas within each room).

The concept of '*situation'* was therefore introduced in this study, initially to communicate to study participants in an understandable way that multiple spaces can be found in a single location, or that similar relational arrangements can be found in different locations. In other words, participants were better able to employ a relational understanding of space when thinking of 'situations'. Chapter 9 illustrates the situations that participants thought of during the interviews. Theoretically, 'situation' does not differ from the definition of 'space' above (i.e., it also refers to a relational arrangement of living beings and social goods). However, *'situation'*

[198] For example, it was with reference to the concept of 'heterotopia' that non-everyday spaces, in particular holidays, were included in the empirical part of the present study.
[199] Löw also highlights "that according to perspective a person or a social good is itself a space or an element of a construction of space" (2016: 133).

is suggested here as the 'smallest' possible relational arrangement, a coming-together of just the necessary minimum of living beings and things in a micro-space, held together just enough by materiality, time and relational meaning to be recognised[200] *as an ensemble.* This definition was not provided during the interviews, as the word 'situation' was sufficient to elicit relational arrangements as intended (further described in Chapter 6). This theoretical clarification of 'situation' made it possible, however, to continue using the term beyond the fieldwork and integrate it into the theoretical framework emerging from this study (in Chapters 12 and 13).

On this note, two further terms can be clarified here. In the present thesis, the term '*situated* substance use' emphasises substance use as it situated[201] in (i.e., forms part of) a specific socio-spatial arrangement[202] (cf. substance use as an abstract category independent of the specific use context), while '*situational* substance use' refers to the fact that substances are used in some situations but not others[203].

3.2.4. Socio-spatial structures as conditions and outcomes of actions

Returning now to Löw's conceptualisation of space, 'arrangement' also points to the interplay of *structure and action* in the constitution of space. This is especially evident in Löw's original German-language term of '(An)Ordnung', which refers to both action ('Anordnung'; *ordering*) and structure ('Ordnung'; *order*) (Löw, 2016: 141). The interplay of structure and action is central to Löw's work because she draws heavily on Giddens' (1984) theory of structuration. Löw extends Giddens' theory by applying it to spatial structures, understood as a type of social structures (Löw, 2016: 141). Drawing on Giddens, she suggests that "*we can speak of spatial structures when the constitution of space […] is inscribed into rules and secured by resources that are recursively incorporated in institutions independently of place and point in time*" (Löw, 2016: 145, original emphasis). Thus, 'spatial structures' are not material structures per se but rather the social structures (rules and resources) which support certain forms of spacing and synthesis (and thereby certain arrangements) whilst hindering others. Material structures can, however, be understood as the tangible manifestations of these structures (Löw, 2016: 143).

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[200] With Löw, we could say: "… to be *synthesised* as an ensemble."
[201] Similar to Papies' (2017) use of the term with reference to 'situated interventions' (see Chapter 2).
[202] The term 'socio-spatial arrangement' is used here synonymously with 'relational arrangement of living beings and social goods'.
[203] In a study on young people's alcohol use, Parder (2018: 189) defines 'situational abstinence' as "refusing alcohol in certain situations while consuming it in others". The terms 'situational substance use' and 'situational abstinence' in the present thesis are based on Parder's concept. However, Parder appears to limit the term to situations that involve a deliberate decision to abstain, while the present thesis uses a broader understanding of 'abstinence' as de facto absence of substance use (regardless of whether or not it involved a conscious decision to abstain).

The main point here is that actions (i.e., spacing and synthesis) create structures which in turn structure actions via processes of institutionalisation. It is beyond this thesis to go into depth here, but among the structuring aspects discussed by Löw are people's own everyday routines, the "external effectuality" of things on the basis of their smells or sounds (Löw, 2016: 164), and institutionalised forms of spacing and synthesis (e.g., what constitutes a drinking establishment, how products are arranged in supermarkets)[204]. While Löw uses Giddens' theory of structuration as an overall framework, the processes through which initially contingent actions become reified as structures can also be explained using other theories, such as Berger and Luckmann's (1971/1966) social constructionism[205, 206]. Drawing on the latter, Christmann (2016a) describes a hypothetical step-by-step process to show how initially contingent, individual ways of spacing and synthesis can over time become habitualised and shared by a group of people, so that eventually these products of human action can appear as naturally given, objective und unchangeable realities. In terms of institutionalisation (in this context as the process through which certain forms of spacing and synthesis become shared by a group of people), language plays a central role for all of these authors. Words such as 'shopping mall', 'school' or 'airport' thus refer to institutionalised socio-spatial arrangements. It is particularly with regard to institutionalised forms of spacing and synthesis that the double role of materiality becomes clear: on the one hand, as an opportunity for action, on the other hand, as a constraint that perpetuates the status quo. Materiality can thus become a resource for third parties to (purposefully) encourage or enforce certain spacings and operations of synthesis (Christmann, 2016a: 95). Power relations, social inequalities and processes of inclusion and exclusion are therefore commonly addressed in the literature on relational space, also by Löw (2016: 177)[207].

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[204] The recognition of 'situations', as suggested in section 3.2.3, also reflects such institutionalised and routinised forms of synthesis. Thanks to Cornelia Dlabaja for pointing this out during her review of this chapter.

[205] Berger and Luckmann (1971: 106, original emphasis), explain 'reification' as: "the apprehension of the products of human activity *as if* they were something other than human products […] Reification implies that man is capable of forgetting his own authorship of the human world […] as an extreme step in the process of objectivation, whereby the objectivated world loses its comprehensibility as a human enterprise and becomes fixated as a non-human, non-humanizable, inert facticity". While Giddens uses the term in a similar fashion, he adds "that reification is a discursive notion [...] it should be seen as referring *to forms of discourse* which treat such properties [of social systems] as 'objectively given' in the same way as are natural phenomena" (1984: 180, emphasis added). Christmann (2016a: 99) comments briefly on the parallels between Giddens' and Berger and Luckmann's work.

[206] Although Berger and Luckmann did not explore the "spatial structure" of everyday life in detail (1971/1966: 40), Luckmann clarified in a later interview that this was not to imply "that you can make houses without bricks […]. I [Luckmann] consider this total nonsense. The bricks are the human body, evolutionary givens and preconditions, et cetera" (Dreher and Vera, 2016: 32).

[207] In fact, this is a key focus of this literature (e.g., capitalism critique, feminist writings, 'right to the city'). Socio-spatial structures may be analysed to understand, for example, how they serve to (re)produce societal structures and thereby deepen social inequalities. Attention is paid to who shapes socio-spatial structures (and who does not) and using what techniques, and how change can be effected (e.g., this is a focus in Christmann's, 2016a, own extension of Löw). In the present context, this perspective might point to, for example, the power relations underlying environmental prevention (e.g., who has the power to define and enforce measures, who benefits and who does

Löw's approach appears to emphasise the ordering function of social structures, insofar that she addresses change in only one section explicitly (see below) but includes many aspects to explain how initially contingent forms of spacing and synthesis become stable over time and how action is shaped by existing material, spatial and broader social structures. However, this is not to imply a deterministic understanding of 'structure'. With his theory of structuration, Giddens (1984: 15) sought to reconcile two positions in sociology: those that emphasise individual agency versus those that emphasise the power that society holds over individuals. To overcome this dualism, structure and action are seen as intertwined, with the term '*duality*' used to highlight their interdependency. In this perspective, structures do not determine actions but offer opportunities, conditions and guidelines for action. In fact, Giddens can be seen to overemphasise the role of action, as in this view, structures can only survive if they are supported and reproduced by actions (Löw, 2018: 35ff.). Thus, while main theories underpinning environmental prevention (see section 2.2) tend to portray the (material) environment as having a relatively strong influence on human behaviour, such a viewpoint is considered controversial and outdated in spatial sociology, where people are seen much more as active agents in the constitution of space (Christmann, 2016b: 9; Löw, 2018: 35).

It was already outlined above that people actively constitute spaces through spacing and synthesis. Whilst these processes lose their plasticity over time, this does not mean that at some point people start to dispassionately follow established routines and passively accept invitations posed by external stimuli. Yet, as the basic premises of environmental prevention remind us (see Chapter 2), we should not assume that people go about their everyday routines fully conscious and ready or able to effect change at will. If we are to avoid this apparent dualism of fully conscious deliberate efforts ('reflective') versus a kind of nonconscious acceptance of environmental conditions ('automatic') (as argued in Chapter 2), it is important to ask what sources of *change* there may be between these two extremes. Löw discusses the role of "bodily–emotional desire", understood as "an unease [regarding the status quo] that cannot yet be articulated" (Löw, 2016: 157) as well as "curiosity, passion, and imagination" (ibid.: 156), while Christmann (2016a: 102) highlights the role of creativity. Christmann argues that the modern conditions of society (e.g., globalisation, increased diversity, media) expose people to a multiplicity of contexts, thereby increasing people's awareness of different options. This is turn expands their repertoire (whether consciously or not) for spacing and synthesis.

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not). While Chapter 2 touched upon these issues, this aspect had to be bracketed in the empirical study because it was not directly related to the research questions (similar to how 'gender' was not an analytical focus, see section 1.2.3). Löw's own exemplary analyses show that it is not necessary to address all aspects of space constitution in each study, but that certain aspects come into focus depending on the research questions.

These are some examples for how people can interact with their environment in novel or unexpected ways and thereby change existing structures outside of full consciousness.

Socio-spatial structures are not the only ones that shape action. Incorporating Bourdieu and Wacquant's (1992) concept of 'habitus', Löw (2016: 149) highlights gender and class as "structural principles" that shape spacing and synthesis. It is here – at the question of *what individuals 'bring' into a space constitution* – that Löw's approach, with its focus on everyday routines and habitus, seems somewhat limited. As noted earlier, the role of 'space knowledge' as a precondition for spacing and synthesis could be explored further. Kusenbach (2017: 1034) also suggests that "a firmer embrace of spatial ideas in relation to culture, identity, emotion and interaction could strengthen the 'action' side of Löw's theory". In the present context, for example, it might be useful to consider substance user identity to understand substance use related spacings and operations of synthesis. In any case, these examples highlight further that person-environment relations should not be viewed through a behaviourist stimulus-response lens (cf. Chapter 2) – not just because people are active (e.g., desiring, creative) agents, but because doing so would disregard the many other factors that shape action.

The references to social constructionism and the theory of structuration highlight how questions regarding person-environment relationships mirror central debates within sociology and science more generally (e.g., on agency or free will). The last paragraphs underlined, however, that the *'active/passive' dualism* in the discussion of person-environment relations, although at times reproduced in this thesis, is misleading because it assumes that active engagement and passive responding can be clearly distinguished. Indeed, the question of whether people are active or passive in relation to their environments makes sense only within the logic of the very same 'structure/action' dualism that Giddens and Löw sought to overcome. To conclude with Spain (1992: 6, original emphasis):

> "do spatial arrangements *cause* certain social outcomes or do social processes create spatial differentiation? […] it is fruitless to try to isolate space from social processes in order to say that one 'causes' the other. A more constructive approach is to acknowledge their interdependence, acknowledge how one tries to separate the two for analytic purposes, and then reintegrate the two".

3.2.5. Beyond the physical: living beings, symbolic meaning, and the 'social'

In the final part of her definition of 'space', Löw speaks of "living beings and social goods". This is relevant insofar that it includes *humans and other animals, plants as well as things*. As noted in section 1.2.2, Löw's approach is therefore in line with more-than-human thinking. But why

does Löw speak of '*social'* goods? As Löw clarifies (2016: 130–131), goods can be 'social' in the sense that they are products of human activity; however, the adjunct 'social' also highlights their symbolic aspect[208]. Thus, Löw includes "songs, values, and regulations" in her discussion of social goods (2016: 130). This means that while the materiality of bodies and things[209] is a basic condition for space constitution, things are relevant to the constitution of space primarily because of their *symbolic meaning*. Accordingly, Löw (2008: 34) writes:

> "Goods are thus ordered in their material aspect, but these orderings can be understood only if the symbolic properties of social goods are deciphered. […] Symbols in road transport, for instance, can be ordered only because they possess materiality, but the reason for ordering them is to display symbolism".

It is therefore recognised that the *physical* dimension alone (to which environments are often reduced, see section 2.4.1) cannot explain the *social* implications of space constitution. From this emerges also the importance of retaining a human-centred view (cf. some interpretations of posthuman approaches), given that it is people who assign meaning.

In this context, symbols are not understood only as explicit signs (Christmann, 2016b: 19), although these would also be included (e.g., 'no smoking' signs). Furthermore, the symbolic meaning does not have to be deeply meaningful (e.g., for individual or collective identity). Meaning can be as 'simple' as the connotation a certain material holds (e.g., 'cheap' plastic, 'elegant' glass). This is not to imply an essentialism, whereby meanings are somehow inherent to things, even if Löw (2016: 164) argues that social goods have "symbolic effects" or "external effectuality" (e.g., via smells, sounds, textures, colours) with which they actively shape how spaces are constituted[210]. In the specific moment of space constitution, meaning emerges from the overall spatial arrangement: "[the meanings of] things are dependent on the spatial arrangement in which we place them; and the other way round, in their spatial arrangement

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[208] Though Löw (2016: 130) distinguishes between things that have a primarily material function (e.g., chair, table) and those that have a primarily symbolic function (e.g., signs), this distinction is not used here because it may suggest that primarily material goods are relevant by virtue of their materiality. By contrast, the present thesis argues that it is principally the symbolic aspect that is relevant to the constitution of space. Even if this perspective is seen as too radical, it must be considered that the symbolic function of, for example, a chair may be more decisive for its role in the constitution of a space than its material function. Löw herself hastens to add that "social goods are never only material or symbolic, but rather exhibit both components" (2016: 130).

[209] 'Things' is the preferred term in the present thesis over Löw's 'goods'. The following terms could be used roughly interchangeably: goods, things, matter, objects, stuff, materials; however, each term has advantages and disadvantages. The term 'things', although it may imply something man-made, is considered here to offer the best option, being defined as "an inanimate material object as distinct from a living sentient being" (Oxford English Dictionary). Even if, for example, a song is more appropriately described as a 'social good' than a 'thing', 'goods' is not considered ideal here due to its commercial connotations (e.g., as "merchandise" or "things to be transported" according to the Oxford English Dictionary). 'Objects' is problematic because it can be seen to denote a subject/object relationship (i.e., objects as passive) which is not in line with more-than-human thinking.

[210] While Löw discusses the differential "symbolic effect" of wood versus marble (2016: 162f.) and describes "external effectuality [… to] emanate from social goods", she does not comment on the origins of such effects.

they have a specific effect on us" (Löw, 2016: xiv). Moreover, in the present interpretation of Löw's theory, meaning is understood to emerge from socially shared notions (e.g., forms of synthesis in line with one's culture)[211] and personal experience (further discussed in section 3.4.2). As noted earlier in relation to 'synthesis', meaning-making thus relies on perception but also memory and imagination of other spaces beyond the immediately perceptible.

Section 2.2 showed that theories underpinning environmental prevention tend to reduce environments to their physical dimension. However, the present perspective suggests it is misleading to assume that we can perceive things just in their physical state, or that their purely physical state is what influences behaviour. Instead, we perceive things *together with* the meaning they hold, and *act on this symbolic basis*. Löw (2018: 44, translation by AB) writes[212]:

> Placed objects, which are synthesised to form spaces, are material. However, it is not possible to recognise or sensorily experience this materiality in a 'pure', 'uninfluenced', much less a 'natural' form. Rather, as socialised beings, people also perceive materiality through an established system of meaning-making and therefore symbolic connotations.

This is partially recognised in the literature on choice architecture, as Dolan et al. (2012: 271) note with reference to Zajonc (1980): "It has been argued that all perceptions contain some emotion, so that 'we do not just see a house: we see a handsome house, an ugly house, or a pretentious house'". The continued focus on physical environments in those theories suggests, however, that the full implications of this insight have not yet been realised. This is not to imply that the physical dimension should be dismissed altogether, but to highlight that both aspects must be considered to understand how spaces are constituted (Löw, 2016: 163).

In light of the above, what are those 'relations' in the phrase 'relational arrangement'? Counter to what might be expected, the concept of 'relations' remains somewhat vague in Löw's (2016) text. Christmann (2016a: 104) suggests that Löw means mostly physical relations, which seems to be accurate. For one, Löw's discussion of absolutist versus relativist conceptions of space focusses on physical relations between bodies (e.g., 2016: 23). And while Löw expresses a need to move beyond the consideration of "(mobile) positional relationships" to capture their "social dimension" (Löw, 2016: 106), this social dimension refers to "who arranges

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[211] What, with Berger and Luckmann (1971/1966: 56), could be described as the "social stock of knowledge": the shared body of knowledge that is passed on between generations. The proposed study therefore takes a more sociological perspective than, for example, place meaning research, which focuses on personal meaning of place produced through repeated use of or significant experiences in a place (e.g., Gieryn, 2000: 481; Gustafson, 2001; Manzo, 2005: 81).

[212] German original: "Materiell sind platzierte Objekte, welche zu Räumen verknüpft werden. Diese Materialität ist jedoch nicht als 'reine', 'unbeeinflusste', gar 'natürliche' erkenn- oder erfühlbar, sondern als vergesellschaftete Wesen nehmen Menschen auch die Materialität durch ein tradiertes System von Sinngebungen und damit symbolischen Besetzungen wahr" (Löw, 2018: 44).

what objects in what way and with what body", "with what right, with what power?" (ibid.: 108, 127). By contrast, the present thesis assumes that the constitution of space emerges primarily from *symbolically meaningful* relations between living beings and things. Physical relations matter as well, but more often than not, it is suggested here, they matter *as carriers of* symbolic meaning rather than as physical relations per se. Löw alludes to this possibility only on very few occasions in her book[213], but an understanding of relations primarily in terms of symbolic meaning is more consistent with her overall conception of space (as well as the concept of 'synthesis') than one focussed on physical relations. This understanding of 'relationality' as referring to symbolic meaning is also supported by recent developments of Löw's approach within communicative constructivism[214].

On a final note, it is noteworthy that the aspect of 'meaning' is somewhat underdeveloped in Löw's original text. It appears rather as a transversal aspect: mentioned at various points but not considered separately[215] (which can lead to it being overlooked; Kurtev, 2008) and not a constituent element in the definition of 'synthesis'. Subsequent work has, however, explored meaning-making more, albeit in relation to specific formations such as cities (e.g., Löw, 2013, 2018: 132–133; Müller, 2018) or buildings (Löw and Steets, 2014; Steets, 2015). The importance of meaning-making in relation to synthesis has also been better articulated in recent publications (e.g., Fuller and Löw, 2017: 472).

3.3. Implications for substance use research

The above perspective implies a very different understanding of space than that evident in the theories currently underpinning environmental prevention (as outlined in section 2.2). Key differences include a greater consideration for social and symbolic dimensions of space (cf. a focus on the material-physical) and a different concept of the person-environment relationship, whereby the person is understood as more active (e.g., as a creative meaning-maker; cf. the

[213] For example, where Löw writes: "The arrangement of two people with respect to each other is equally constitutive of space, namely as a function of their *social* relationship. People who are socially close to each other leave less space between each other than do social strangers" (2016: 131, emphasis added); "relationships of opposition and competition" (2016: 133); or "The formation of relations is a primarily symbolic process" (2016: 192).
[214] For Knoblauch and Löw (2017: 4–5), spaces are 'social' not only because they are products of human activity or because they draw on social stocks of knowledge, but because spacing and synthesis are communicative acts that always have the person *in relation to other people* as their starting point, even when we are on our own (on the latter point, see Knoblauch, 2020: 207ff.). Knoblauch and Löw (2017: 5) thus state that "the active relation in space is always a social relation of communicative action […] Spatial relations, therefore, are always social relations". Accordingly, their definition of 'space' (2017: 5, emphasis added) differs from Löw's earlier writings: "Spatial assemblages consist of material *and symbolic* relations of interdependence between human beings and objects".
[215] While Löw includes a separate section on 'Symbolism and Materiality' (2016: 161ff.), this covers the structuring effects of symbolic/material aspects of things, rather than meaning and meaning-making as such.

'automaton' tendency noted in section 2.3) while also influenced by additional forces beyond immediate physical arrangements (e.g., gender and class as 'structural principles').

Table 3: A 'sociology of space' perspective

Key feature	Sociology of space
Related concepts (e.g.,)	Relational space, spatial turn, more-than-human
Key authors/publications (e.g.,)	Löw, 2001, 2008, 2016; Fuller and Löw, 2017
Disciplines (e.g.,)	Sociology
Purposes (e.g.,)	To facilitate research on the spatiality of social processes by offering a sociologically useful concept of 'space' which accounts for the material *as well as* the social and symbolic aspects of space constitution
Conceptualisation of environment as …	Meaningful relations between living beings and things
Relevance to environmental prevention of substance use (i.e., in publications by EMCDDA and related authors)	Not used
Specific to env. prevention?	No
Potential issues in relation to environmental prevention (e.g.,)	Unfamiliar concepts and vocabulary, may be perceived as too complex, draws on different paradigms, not geared toward explaining health behaviours and supporting related intervention

Note. This table uses the same format as Table 1 in Chapter 2 to allow direct comparisons with main theories used in environmental prevention.

Table 1 (p. 53) summarised main theories currently informing environmental prevention, and Table 3 above provides equivalent information for the 'sociology of space' perspective outlined earlier. While theories underpinning environmental prevention conceptualise the environment mostly as offering behavioural opportunities, a relational understanding of space produces a more complex account of the environment. Many aspects were mentioned in section 3.2, but above all, the environment is conceptualised as an array of *meaningful relations* between living beings and things. This perspective thus invites us to take a step back and consider first how a space is constituted (including its social and symbolic dimensions), before exploring how this is linked to specific behavioural choices or outcomes.

3.3.1. Potential limitations of a relational approach

Before we explore potential benefits of a 'sociology of space' lens in environmental prevention, let us first consider potential issues (last row in Table 3 above).

Firstly, although Löw's is one of the easier-to-understand theories, it is still relatively complex and draws on a completely different set of paradigms and concepts to the ones currently used in prevention. Section 3.1 already alluded to the difficulties of integrating theory in practice-oriented fields (see footnote 179). Moreover, the reduction of space to its physical dimension

may not be a coincidence. Instead, it may meet a need for simplicity as a precondition for intervention. Intervention is easiest if the aspects to be targeted are few, clearly identifiable, easy to modify, and linked to outcomes in predictable ways. In other words: simplified space is easier to control, while complexity and diversity make intervention more difficult[216]. The tendency toward reductionist or universalist models in environmental prevention (outlined in section 2.4) may be understood better against this background.

The second point highlighted in Table 3 is that the specific 'sociology of space' perspective outlined above, with its roots in urban studies, gender studies, and critical sociology (in the sense employed by Burawoy, 2005), is not geared toward explaining health behaviours and supporting related intervention. Where change is discussed, this is usually in relation to how people themselves may effect change (e.g., Löw, 2016: 155ff.). Efforts by others are discussed in the context of how spacing and synthesis are purposefully used to create certain atmospheres, with a focus on how this perpetuates social inequalities through processes of inclusion and exclusion (Löw, 2016: 174–175, 181–182). While clearly relevant, for example if we consider the "staging" (Löw, 2016: 174) of drinking establishments to produce certain atmospheres, it is not immediately obvious how this could inform preventive practice. A scenario in which people are deliberately presented with new arrangements (e.g., as in choice architecture interventions which present options differently to how they were before) is not discussed[217], particularly not with regard to potential impact on specific behavioural outcomes (e.g., choice of substances). Thus, practical implications for intervention are not offered, and the questions asked in Chapter 2 (e.g., under what circumstances an environmental invitation is accepted or declined), are not systematically addressed by Löw.

The challenge is thus how to translate the above theory of space into a framework that can be used in prevention practice and be seen to open up opportunities for better intervention[218]. This was one of the challenges that the present thesis sought to address. The conclusions formulated in the last chapters are therefore intended to help overcome the above limitations and complement similar efforts by other authors in this regard (noted in section 3.3.3 below).

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[216] Löw (2016: xi) similarly argues that concepts such as 'nation-state' or 'territory' produce reductionist accounts of "homogeneous" spaces, without complexity or diversity, in order to make these spaces manageable and amenable to intervention by governments.

[217] The closest scenario to this was found to be a brief instance where Löw (2016: xix) comments on an Israeli intervention to relocate nomadic people from tents to houses.

[218] The present thesis is framed within a 'prevention' perspective, as explained in section 1.2.1. The question of whether interventions are desirable is therefore not the focus here, but rather how interventions can be improved.

3.3.2. Potential gains of a relational approach

The above limitations suggest that further work is needed to facilitate the integration of a 'sociology of space' perspective in prevention research, and the present thesis hopes to make a useful contribution in this regard. But why undertake this effort? Fuller and Löw (2017: 478–479) propose that spatial sociology can help to explain "how space is produced and how processes of constituting meaningful space shape social reality. [...] Relational space can provide a lens through which to explain practices, social action and discourses [...]". The premise of the present thesis is therefore that a relational concept of space may facilitate greater understanding of the nexus between person, environment and substance use than theories based on absolutist notions of space. The following paragraphs suggest five potential gains from adding a 'sociology of space' perspective to environmental prevention. They formed the basis for the formulation of implications in section 2.4 and are reiterated here to highlight the specific contributions that the present study hopes to make.

Potential gain 1: Considering social and symbolic aspects within a broader concept of 'environment' may open up new intervention possibilities. The 'sociology of space' perspective invites us to understand spaces as multifaceted and to account for social and symbolic aspects in addition to physical ones. This may help identify aspects that could be targeted by intervention but have not been hitherto considered. This would be of particular interest if these aspects supported strengths-based approaches rather than restrictive or coercive ones.

Potential gain 2: Concepts such as 'synthesis' and the 'duality' of structure and action may help to better understand the mechanisms linking person, environment and substance use. Löw's concept of 'synthesis' invites us to consider how people interpret what they perceive, not so much in terms of visual attention, but based on the symbolic meanings that the living beings and things hold for them, in line with, for example, past experiences, aspirations and corporality. 'Synthesis' is the basis for action in ongoing interplay with structure. Particularly for complex practices such as substance use and abstinence, considering this variety of influences and their dynamic interrelationships is likely to be important. Although mechanisms linking environments, people and behavioural outcomes are not a focus of Löw's work, the concepts offered by her approach could inform the development of relevant models that take on at least some of this complexity.

Potential gain 3: A sociological concept of space may help to identify barriers and facilitators to intervention uptake and help avoid iatrogenic effects. Rather than assuming that structures produce action, a 'sociology of space' perspective suggests that structures need to be sustained by action. When are such actions most likely? The concept of 'institutionalised' forms

of spacing and synthesis (explained in section 3.2) implies that the interaction between a person and their environment draws on (implicit) knowledge of group conventions, of discourses in the broadest sense (Christmann, 2016a). Löw (2016: xix) suggests that:

> the conscious or unconscious recognition of spatial pattern has a structuring effect. Spaces take their full effect when actors have the impression that they are not influenced in their conventions by spatial structures. Accordingly, [… constitutions of space] take place effectively when they can rely on existing knowledge that is already established in conventions and routines.

A 'sociology of space' perspective thus invites us to consider the extent to which the space envisioned by an intervention corresponds with (or deviates from) existing understandings of the space. For example, to what extent does a smoke-free workplace correspond to the notion of 'workplace' held by the target population? Similarly, the notion of 'spatial structures' (as the rules and resources to support certain forms of spacing and synthesis) encourages us to consider the extent to which the newly envisioned space is supported by these[219]. While such implementation considerations are not uncommon, they lie outside the scope of theories that take a reductionist approach to space and person-environment relations. They are, however, easily embedded within sociological theories of space.

Potential gain 4: A relational perspective offers a theoretical foundation for the involvement of target populations in intervention design, which may increase the quality and acceptability of interventions. Christmann (2016a) describes concerted efforts to effect change in contexts of city planning and neighbourhood development. There is no doubt in her account that such change efforts would usually be implemented by consulting all relevant stakeholders, including 'users' (e.g., people living in the neighbourhood); there may even be a legal basis for such consultations (Christmann, 2016a: 107). Such a perspective seems to be largely missing from environmental prevention as reviewed in Chapter 2, even though target population involvement is recommended in relevant guidance (e.g., in the context of needs assessments) and is a key feature of related approaches, such as setting-based health promotion (e.g., Krajic et al., 2017). Because of its focus on meaning-making, a 'sociology of space' perspective makes us more inclined to involve substance users in the development of environmental interventions (or at least to refer to qualitative research on how relevant environments and interventions can be experienced).

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[219] Note that Giddens, upon whose theory of structuration the concept of 'spatial structures' is based, does not mean formalised rules, but rather "the rules of social life [..] as techniques or generalizable procedures applied in the enactment/reproduction of social practices" (1984: 21).

Potential gain 5: Concepts such as 'synthesis' and the 'duality' of structure and action may help to avoid unhelpful dualisms (e.g., 'reflective/automatic'). Chapter 2 identified a trend in environmental prevention to conceive of action either as 'reflective' or as 'automatic', with person-environment relationships framed almost exclusively as the latter. Issues that emerge from a focus on automatic processes were also noted (e.g., iatrogenic effects less likely to be identified). Löw also highlights that the constitution of space is mostly routinised and does not involve full consciousness. However, rather than concluding that it is automatic, she uses Giddens' (1984) notion of 'practical consciousness'. This sits outside the 'reflective/automatic' binary, as the "line between discursive and practical consciousness is fluctuating and permeable" (Giddens, 1984: 4)[220]. Thus, Löw is able to offer a concept of 'synthesis' for the constitution of spaces that includes mental processes (perception, memory and imagination[221]) without limiting these to either reflective or automatic processes. Moreover, although the role of unconscious motives for action is recognised (Löw, 2016: 161), Löw suggests that people are able to reflect on and put to words their constitutions of spaces: "on inquiry or in reflexive contexts, a part of the knowledge of spaces that is deployed in everyday life by practical consciousness *can be transformed into* a discursive consciousness" (2016: 137, emphasis added). In contrast with some of the approaches presented in section 2.2, a 'sociology of space' approach is not concerned a priori whether experiences are, for example, conscious or nonconscious, or reasoned or affective. Section 3.2 also outlined how Löw draws on Giddens specifically to overcome an opposition between structure and action, using the term 'duality' to emphasise their interdependency. A 'sociology of space' perspective invites us to think in intertwined dualities rather than dualisms, and along sliding scales (within complex relational arrangements) rather than binary extremes. We can better appreciate the role of meaning-making as a key mediator between 'stimulus' and 'response' and understand people as active agents of space constitution, even when they act routinely.

3.3.3. Relational approaches in the substance use field

The example gains outlined above highlight the value of a relational conceptualisation of space for research on substance use and intervention. While the present thesis utilises Löw's approach[222], other approaches to relational space are available. Thus, although dedicated

[220] The 'reflective/automatic' dualism is not a key concern for Löw, but it seemed to be for Giddens (e.g., 1984: 3ff.). He distinguishes between discursive consciousness and the unconscious, but also cautions (with reference to Freud's psychoanalytic theory) against "a reductive theory of consciousness which, wanting to show how much of social life is governed by dark currents outside the scope of actors' awareness, cannot adequately grasp the level of control which agents are characteristically able to sustain reflexively over their conduct" (ibid.: 5).
[221] Section 3.2 also highlighted the role of bodily desires, curiosity, passion and creativity.
[222] Sections 1.2.2 and 3.1 outline the reasons for this decision.

applications of Löw's approach could not be identified in relation to substance use[223], a 'spatial turn' is also evident in the substance use field. In this field, relational accounts of space and substance use appear to have emerged via the influence of more-than-human social theory (e.g., assemblages, actor-networks, social practices, affect; see section 1.2.2) rather than the 'urban studies' perspective which characterises Löw's approach[224]. It is not possible to review this literature here in detail (examples include Malins, 2004; Demant, 2009; Jayne et al., 2010; Tan, 2012; Bøhling, 2015; Supski et al., 2017 and many others); though a few studies are covered in section 4.1.6.

Duff's assemblages of health

Duff (e.g., 2007, 2012, 2014b, 2014a) must be mentioned as one of the key writers in this regard. In his book '*Assemblages of Health'* (2014a), Duff seeks to reframe concepts such as 'health' and 'subject' and thereby stimulate changes in how health interventions are thought of and devised. He suggests that overcoming "conventional ontological distinctions such as human/nonhuman, nature/culture and body/society" may afford "fresh insights", and that "Deleuze's philosophy provides the most coherent intellectual resources for this task" (Duff, 2014a: x). He thus offers an introduction to Deleuzian thinking, including concepts such as 'relation', 'affect' and 'event', to inspire further work in the health and social sciences. This is an explicitly posthuman approach (Duff, 2014a: ix), which in this case means that humans are not seen as the primary agents, so that outcomes cannot be explained with sole reference to individual intentions, decision-making and so on (ibid.: 142). Substances shape outcomes (ibid.: 137-139), but Duff (2014a: 147) highlights that substances do not cause outcomes (e.g., violence) by themselves but do so in an 'assemblage'. We should thus seek to understand the "assemblages of local and non-local bodies, spaces, affects, objects, technologies, signs, habits and forces" which effect certain outcomes relating to alcohol and other drug use (Duff, 2014a: 128). The implication is that neither humans nor substances are solely responsible for certain outcomes, and this supports a different approach to intervention vis-à-vis the foundations upon which health interventions are typically based (ibid.: 142-143)[225]. Examples of Duff's empirical work are summarised in section 4.1.6.

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[223] In the health field, Löw's approach seems to have been referred to mostly in relation to institutionalised health settings such as hospitals and health care centres (e.g., Saidi et al., 2017; Shamir, 2017; Corfee et al., 2020).
[224] Although Löw also draws on, for example, Bourdieu and refers to social practices, these are not her primary starting points and she does not frame hers as a 'social practice' approach. Löw's 'urban studies' lens is evident, for example, in the discussion of urban sociology in her opening chapters (2016: 32ff.).
[225] However, this point is less applicable to environmental prevention, which also decentres the individual and shifts our attention to environmental aspects, albeit from a different theoretical perspective (see Chapter 2).

Despite the different vocabularies (e.g., 'arrangement' versus 'assemblage'[226]), there are many similarities between Duff's and Löw's work. Both focus on socio-spatial arrangements (rather than individuals) as the primary units of analysis; and similarly to Löw, Duff (2014a: 130) argues that "the body can no longer be understood as separate, or prior to the spaces around it; rather, the two are mutually embedded one within the other". Thus, both seek to overcome existing dualisms, emphasising instead the role of relationality. Though the term 'relation' is not used exactly in the same way, both emphasise that relations are not inherent to the elements being arranged but emerge from the arrangement, and that "relations are always *made or invented* rather than discovered" (Duff, 2014a: 39, original emphasis). Both consider material as well as symbolic (Duff: "expressive"[227]) aspects of arrangements. Though substance use is not a focus in Löw's work, substance use would in both cases be understood as embedded within specific orderings of (not necessarily substance use related) bodies and meanings.

A key difference is that Duff's approach is specifically developed in relation to health (including substance use) and intervention. Thus, there is a much greater focus on what assemblages *do*, what specific health-related outcomes they enable or hinder (whereas Löw refers more generally to power relations and processes of inclusion and exclusion). Duff also places greater emphasis on bodies and affects[228]. In the present context, the role of 'space' in the two approaches is particularly interesting. In Duff's writings, 'spaces' are one component *within* assemblages, yet Duff's 'assemblages' also appear to be broadly equivalent to Löw's 'spaces'. This apparent oxymoron is easily resolved by considering the examples of 'spaces' that Duff provides, namely "chillout rooms, dance floors and bars, the private homes, parks, ski-slopes and street corners" (2014a: 135). Depending on what is invoked with reference to these spaces, Duff's 'space' may resemble Löw's concepts of 'place' (2016: 167ff.) or of 'institutionalized arrangement' (2016: 139). Thus the two vocabularies can be seen as broadly compatible. However, Löw's vocabulary, especially with the clarifications offered in section 3.2, could be considered to afford more possibilities for socio-spatial theorising. A final notable difference emerges from the concepts of 'spacing' and 'synthesis' in Löw's approach. These give Löw's approach a distinctively human-centred quality, emphasising the role of the person

[226] Though Löw has, in recent publications, also used the term 'assemblage' for her own concept (e.g., "assemblage (spaces as relational arrangements of social goods and living beings in places)", in Knoblauch and Löw, 2017: 4).
[227] Duff (2014a: 129) writes: "assemblages have *material* dimensions, forces or components (spaces, objects, technologies, bodies), and *expressive* ones (identities, signs, meaning, affects, desires)" (original emphasis).
[228] While 'bodies' is one of the aspects covered by Löw (2016: 130ff.), her emphasis is rather on how bodies are positioned or what symbolic meaning they carry; and affect is discussed primarily in relation to atmospheres (ibid.: 117, 174). By contrast, Duff discusses, for example, how substance use changes what "bodies can, or will do" (2014a: 138) and relates 'affect' more strongly to individual experience: "affects describe what bodies become in their encounters with other bodies, human and nonhuman" (ibid.: 131, 139-141).

in the constitution of space (materially and mentally), even if Löw accounts for spatial and other social structures that shape (and are reproduced in) the constitution of space.

Duff's texts are also referenced here because they highlight *further potential gains* from a relational approach to space. As noted above, in a relational perspective, 'responsibility' for an outcome (i.e., causality) lies not within substance users or substances but can only be understood by considering broader arrangements. In addition, Duff (e.g., 2014b: 634, 2014a: 126ff.) highlights that while conventional approaches to studying substance use have produced many insights regarding personal and structural factors related to substance use, these factors appear as relatively disconnected from one another as well as from actual experiences of substance use. By focussing on substance use experiences 'in context', it is possible to see how the various forces come together to shape substance use related outcomes: "The logic of the assemblage thus overcomes the fissure between 'macro' and 'micro', 'structure' and 'behaviour' not in some grand dialectical gesture, but rather in a simple empirical commitment to 'real experience'" (Duff, 2014a: 145). Therefore, 'context' is more usefully understood as the specific assemblage, not as "a kind of pan-spatial, structural hegemony, seemingly operating at all places, at all times with the same relentless mediating power" (ibid.: 129). Such a perspective is thought to allow a deeper understanding of why and how substance use occurs; thereby also going beyond traditional deficit models of use to highlighting functions of substance use and how spaces are implicated therein. Although Duff develops this argumentation assuming a Deleuzian approach, it is suggested here that these benefits can be achieved also with other relational approaches[229], including Löw's.

Recent developments within intervention research

While a 'spatial turn' may also be claimed in relation to prevention (e.g., due to the recent focus on environmental prevention), this would be somewhat misleading because the increased interest in spatial intervention has not yet been accompanied by more fully developed conceptualisations of 'space' (as shown in Chapter 2). Overall, it appears that relational perspectives have been integrated into social science research on substance use, but they have not yet become part of mainstream prevention science.

The latter may, however, be merely a matter of time. Indications for this can be found, for example, in recent efforts by scholars working *within* applied public health to introduce theories of social practice as a viable approach in epidemiology and intervention research (e.g., Meier

[229] For example, 'social practices' have also been suggested as a conceptual tool to overcome the 'structure/agency' divide (e.g., Giddens, 1984: 2; Blue et al., 2016: 39).

et al., 2018; Mykhalovskiy et al., 2019: 527). Moreover, Papies' work on 'situated conceptualisations' (featured in Chapter 2) is an instance of work within psychology and intervention research that proposes concepts resembling relational theory, even if socio-spatial theories are not referenced. This suggests that relational thinking may emerge within psychological research, not in response to a theoretical 'spatial turn' but because it reflects better how people interact with environments[230]. Papies' work may therefore also serve as a stepping stone from which to introduce socio-spatial theory into the prevention field. The present thesis can therefore be seen to extend Papies' perspective by connecting it with sociological theories of space (further explored in Chapter 13).

3.4. Advancing socio-spatial theory with 'personal constructs'

3.4.1. Limitations of researcher-defined frameworks

The previous sections outlined key concepts within contemporary sociological understandings of space[231], with a focus on those that informed the present study. Their relevance for substance use research and interventions was established. It became clear, however, that a relational conceptualisation of space can be approached differently. This was briefly illustrated by sketching out differences between Duff's (2014a) and Löw's (2001, 2016) approaches. This points to the role of specific *frameworks* for socio-spatial analysis that translate the broad and complex concept of relational space into distinct aspects which can be empirically studied and that may therefore guide study design, data collection and analysis. In essence, such frameworks answer questions such as: if we accept that space is not just physical-material but has a social dimension, what exactly does this social dimension consist of; or (from a methodological point of view) what are the essential constituents of space that a sociological analysis of space should consider? Not all conceptualisations of 'space' or 'place' offer detailed frameworks[232], but Löw's and Duff's approaches can be considered as such frameworks, and there are others, only some of which can be mentioned here. In the German-speaking context,

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[230] Of course, this is also one of the reasons for the emergence of the 'spatial turn' and more-than-human thinking. For example, Löw (2016: 55ff.) suggests that a relational concept of space is needed to better understand phenomena such as globalisation or digitalisation (also Knoblauch and Löw, 2017). Duff (2014a) argues among similar lines (summarised earlier).

[231] While the descriptions in section 3.2 drew primarily on Löw (2016), similar ideas are found in works by other authors, as theories on the processes through which people relate to their surroundings tend to converge (a review is beyond the current scope, but see e.g., Löw, 2008; Graumann, 2002; Gustafson, 2001; Gieryn, 2000).

[232] For example, Gieryn (2000: 464f.) defines 'place' along three aspects: geographic location; material form; and investment with meaning and value. While such an understanding is useful for a definition, it is likely too vague to support empirical analyses. For comparison, Reinprecht et al. (2009: 26) suggest five dimensions for the study of neighbourhoods: historical-structural, social capital, institutions, activity, and relational dimension.

a tradition of developing such frameworks included work by Läpple (1991b), Sturm (2000), Löw (2001), and Ruhne (2003). The present author's own efforts in this regard (Reinprecht et al., 2009, as well as the present thesis) may also be situated (albeit peripherally) in this tradition.

To the author's knowledge, there is no widely agreed framework for the analysis of spaces or their construal (also Müller, 2018: 142). A recent review by Hamzei et al. (2020) offered a noteworthy effort in this regard. The authors systematically extracted 'place facets'[233] from 72 publications and organised these using card sorts and hierarchical cluster analysis. This resulted in 116 facets in different categories, including 'anthropocentric facets' (with subcategories 'functional' and 'emotive'), 'geographic facets' (with subcategories 'physical' and 'spatial'), and 'derived facets' (e.g., meaning, place identity) which emerge from the interplay of anthropocentric and geographic facets (see Hamzei et al., 2020: 81, for an overview of all facets and categories). However, while the review offers a useful mapping of concepts found in the literature, a number of limitations diminish its value as a framework for the sociological analysis of spaces in the present sense (e.g., sociologically relevant aspects are missing)[234].

The fact that each proposed framework includes somewhat different aspects emphasises that spaces are complex phenomena which can be described in many ways. Any conceptualisation going beyond a simple dichotomy of physical and social aspects represents a *selection* of possible characteristics. Against this background, proposals which offer a greater number of aspects and which incorporate a range of existing socio-spatial frameworks can be considered preferable. Such frameworks also allow users to select and focus on those aspects which are most relevant to their specific research interest[235]. This points toward Löw's approach, as it is characterised by a strong theoretical basis and a comprehensive list of (sociologically relevant) aspects. As shown in section 3.2, Löw (2001, 2016) considers the role of[236]: people and social goods; processes of 'spacing' and 'synthesis'; routines; institutionalisation of arrangements; gender and class; deviation and change; symbolism and materiality; perception; the role of place; atmospheres; and the potential for spaces to produce social inequalities.

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[233] A 'facet of place' referred to "a particular type of information about (geographic) place that has been defined, described, or formalized in the literature and at the same time can be used to differentiate places from each other" (Hamzei et al., 2020: 34–35); also known as "properties", "attribute", "characteristics" or "aspects" (ibid.: 35).
[234] The publications reviewed by Hamzei et al. stem primarily from human geography, environmental psychology and geospatial sciences. While sociological works were included (namely Gieryn, 2000, and Gustafson, 2001), their number was limited and they were not extracted appropriately (e.g., important aspects of Gustafson's concept of 'environment' were omitted). The resulting framework therefore misses (or includes only implicitly) aspects that would be considered essential by sociologists (e.g., the history of a place, social norms, living beings).
[235] Löw's (2016) own exemplary analyses demonstrate that aspects can be selected based on research priorities.
[236] Löw herself views these aspects as a "*proposal* on how space can be systematically grasped as a sociological concept" (2016: 127, emphasis added).

However, a theoretically attractive framework is not guaranteed to be useful in practice. Such practical utility was the focus of the methodological master's thesis preceding the present study (Kurtev, 2008). There, the present author translated Löw's aspects into a detailed framework to facilitate empirical analysis[237] (Kurtev, 2008: 76-79). This framework was then used to analyse women's descriptions of their everyday way home (e.g., from work). The descriptions were *also* analysed using a more conventional open coding approach. Contrasting the findings obtained with these two different methods facilitated an assessment of Löw's overall approach as well as her proposed aspects (Kurtev, 2008: 125–139). The so identified limitations informed some of the clarifications made in the present section 3.2, and *they were the starting point for the present thesis*. Specifically, the master's thesis study found that open coding had brought forth socio-spatial insights which had *not* been identified with Löw. Therefore, the theoretical foundation of frameworks is a strength as well as a possible weakness, as frameworks may reflect rather how researchers – but not people more generally – conceive of space[238].

Empirical studies[239] which only apply existing frameworks offer limited opportunities to assess whether theoretically proposed aspects correspond to ones that would be identified empirically. The master's study (Kurtev, 2008) showed that such assessment becomes possible through purposeful comparison with results obtained using open methodological approaches. However, open coding of narrative data, as employed in the master's thesis, comes with its own limitations. The aspects are identified by the researcher during the data analysis stage, so that the researcher can have a great influence on the results. It also remains unclear to what extent the so-identified aspects were indeed *important* to the person[240] and whether *all* aspects that are key to a person's construal of space have been 'captured'. These limitations also apply to studies which propose *empirically* based frameworks based an open coding approach (e.g., Gustafson, 2001, summarised in section 4.1.3[241]). From this emerged an

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[237] A limitation of Löw's book is that, although she offers empirical examples to illustrate the usefulness of her approach, she does not offer a specific methodological framework with which the aspects could be readily identified in empirical studies. For example, she does not offer structured lists of possible indicators but refers to these in a narrative manner. For the master's thesis (Kurtev, 2008), such information was extracted from Löw's text and represented in a structured table format. In technical terms, an attempt was made to operationalise Löw's aspects.

[238] Existing frameworks are typically based on theoretical considerations or researcher observations rather than empirical studies of how people construe spaces. They thus tell us i) what aspects are suggested *theoretically* for the study of spaces; and ii) what aspects can be observed empirically by *researchers*, but it is less clear iii) what aspects *people* actually refer to when construing spaces (whether knowingly or unknowingly).

[239] Including Löw's own exemplary analyses (Löw, 2016: 197ff.).

[240] Spaces can be described in many different ways but not all of these need to be personally significant and affect how a space is interpreted or used. A focus on personally important aspects thus seems useful.

[241] Gustafson's study is also noteworthy in this context because, rather than using his own empirical findings to revisit existing socio-spatial theory, he draws on existing socio-spatial theory to revise his findings and establish their validity ("the themes and typologies derived from the empirical data were compared to earlier research; this inspired some minor conceptual revision and clarification [...] I will also try to validate the findings by relating them to earlier empirical and theoretical research"; Gustafson, 2001: 9). This is, of course, the conventional use of theory but it does mean that theoretical concepts are rather reproduced instead of developed further.

interest in what socio-spatial aspects[242] would emerge in a study specifically designed to *elicit* socio-spatial aspects that are personally important for the construal of everyday spaces.

In summary, while existing frameworks have provided powerful analytical tools for the study of spaces, they may not be as well suited to grasp people's actual construal of spaces. They may thus be of limited use for the development of the kind of mechanisms called for in section 2.4.3. To address this gap, the present study did not apply Löw's (or another) framework but instead sought to develop an original, empirically based framework with a bespoke methodology. The repertory grid and associated personal construct theory offered a way forward in this regard.

3.4.2. Personal construct theory as a way forward

'Spacing' and 'synthesis' (as the processes through which people interact with their material environment and interpret its symbolic meaning) are highly routinised activities that draw on 'practical consciousness' (Löw, 2016: 137, with reference to Giddens, 1984). The present author's own observations also suggest that, although our everyday vocabulary offers some concepts with which to conceive of space relationally (e.g., when we discuss the 'atmosphere' of a drinking establishment), possibilities for everyday talk and reflection about spaces are limited by the prevailing understanding of space as the material background to life. This means that people do not ordinarily have great awareness of how they construe spaces, which poses particular methodological challenges for this research field (Löw, 2016: 183ff., 2018: 71ff.). Löw (2018: 75, translation by AB) shares the following observation and advice:

> If you ask directly about the meaning of spaces, the speakers [e.g., study participants] mostly fall silent. […] The methodological conclusion is that the constitution of spaces can be investigated primarily by talking about seemingly other topics or by using methods other than speech, such as e.g. observational methods, the analysis of images and so on[243].

In the present study, this challenge was overcome by using repertory grids to elicit study participants' implicit knowledge regarding their everyday spaces. While the repertory grid technique helps study participants to verbalise implicit knowledge, it was associated with a

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[242] Alternatively, these may be called the "components", "elements" or "constituents" of space (Gustafson, 2001: 6) or "aspects of space constitution" (Löw, 2016: 225). In the present study, they are called 'socio-spatial aspects' in analogy to the concept of "socio-spatial" theory and research (e.g., as used by Fuller and Löw, 2017: 474).

[243] German original: "Fragt man gezielt nach der Bedeutung von Räumen, so eben verstummen die Sprecher weitgehend. [...] Methodologisch folgt daraus, dass man die Konstitution von Raum vorrangig im Sprechen über vermeintlich andere Themen oder nicht im Sprechen untersuchen kann, also z.B. in Beobachtungsverfahren, in der Analyse von Bildprodukten etc." (Löw, 2018: 75).

number of additional benefits that made it particularly attractive for the present study. These are briefly outlined in the following paragraphs before this chapter is concluded.

Using the repertory grid technique meant that it was not necessary to ask *directly* about socio-spatial aspects or the meaning of a space. The repertory grid technique works by asking participants to compare elements (in this case: different everyday spaces) and verbalise perceived differences and similarities. This brought about a number of methodological benefits (e.g., possibility to cover a relatively large number of spaces in a single interview, systematic comparisons between spaces), but most importantly, it was possible to tap into implicit stocks of knowledge without (in most instances) the awkward silences alluded to in Löw's quote above, and without to having to resort to her suggested alternative methodological approaches (e.g., speaking about other topics or relying on methods other than speech[244]).

Another methodological key advantage was that the repertory grid technique elicits implicit knowledge in a *structured* format. In the present case, by the end of each interview, a list of socio-spatial aspects had been produced by the study participant in collaboration with the researcher. The method thus fit perfectly with the research desideratum identified in section 3.4.1. Using repertory grids, the analytic 'coding' process (e.g., sorting data, identifying common themes) starts already during the interview in a dialogue between the researcher and the participant. As a result, the 'raw' data emerging from the interview are already pre-coded, so that it is not the researcher who primarily identifies and categorises socio-spatial aspects. Hence, the limitations noted earlier with regard to retrospective coding of narrative data were not as applicable (but see section 13.4 for a different, post-fieldwork perspective on this).

The repertory grid technique originated to support *behaviour change* (in psychotherapy, Fransella et al., 2004: 81) and is thus relevant to the prevention context chosen for the present thesis. The supporting theory, Kelly's (1963/1955) Personal Construct Theory (PCT), posits that, over time, people develop 'personal constructs' regarding the world. These can be thought of as "patterns or templets which [... a person] creates and then attempts to fit over the realities of which the world is composed" (Kelly, 1963/1955: 8–9). Personal constructs help a person predict (and thereby make sense of) events in their life (ibid.: 12-14); Raskin (2002: 6) describes them as "dimensions of meaning". Personal constructs guide how a person thinks, feels and acts; this is especially evident if a person's constructs are viewed as a system (Fransella et al., 2004: 3–4)[245]. Kelly (1963/1955: 43) went on to argue that some constructs

[244] Although visual aids were used in the present study, these supported the repertory grid interview rather than representing a separate methodological approach (further described in Chapter 6).
[245] A person's constructs are not necessarily independent of each other but can be related. When this is the case,

are more helpful to a person than others; and that people have a choice which personal constructs to work with and which ones to dismiss[246]. Kelly thus proposed the repertory grid technique as a tool to elicit personal constructs as a basis for psychotherapeutic work. Of interest to the present context, this suggests that insights into personal constructs could be useful to address substance use and related outcomes (Klion and Pfenninger, 1997; Burrell, 1999; Mallick and Watts, 2007). It also opens up the possibility for interventions to target (i.e., seek to modify) personal construing (or reframe existing interventions as targeting personal construing)[247].

The theoretical relevance of Kelly's approach in the present context emerges also in relation to the *critique of behaviourist approaches* offered in Chapter 2. Kelly developed his theory specifically as an alternative to the behaviourist stimulus-response theories dominant in the 1950s. He regarded stimulus-response theories as "particularly convenient at the focal point of animal learning" (Kelly, 1963/1955: 18) and suggested that "the psychologist can better understand his subjects if he inquires into the way in which they construe their stimuli than if he always takes his own construction of the stimuli for granted" (ibid.: 91). As noted in section 1.2.4, Kelly was inspired by pragmatism, and Butt and Warren (2016: 14) highlight how Dewey criticised psychology for assuming "a passive organism that is kicked into action by a stimulus". Instead, in this perspective, behaviour cannot be separated from how people think and feel, and thus to understand behaviour, it is necessary to understand how events are construed by a person (Butt and Warren, 2016: 14, 18). Therefore, some of the arguments in the present Chapter 2 resemble arguments found in the personal construct literature[248].

Returning now to socio-spatial theory, section 3.2 noted the role of *social constructionism* to explain how certain forms of spacing and synthesis may become institutionalised (i.e., shared by a group of people). Personal construct theory can help conceptualise how those 'social constructs' (or 'discourses', Pavlović, 2011: 398) are represented within the individuum. Personal constructs are developed in interaction with other people, and as such the process of forming personal constructs is a reciprocal act. Therefore, personal constructs, despite their name, need not be regarded as wholly idiosyncratic, as they also echo the personal constructs

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an element that is perceived in a certain way on one construct will generally be viewed in a certain way on another construct (i.e., the element's position on the first construct determines its position on the second construct).

[246] Kelly's conceptualisation of people as lay scientists who can review and change their personal constructs systems has been criticised as assuming too much agency and as being compatible with neoliberal notions emphasising individual responsibility (e.g., Pavlović, 2011: 399–402). The present author's interpretation of Kelly suggests, however, that his intended meaning of people's ability to change (outside of a psychotherapeutic context) is closer to Giddens' (1984: 3) suggestion that people continuously monitor their action without full consciousness.

[247] Studies that make such recommendations are presented in section 4.1.6.

[248] For example, Honikman's (1976: 171) critique of architecture (e.g., that there is no or little felt need to consult users about their needs and experiences) was similar to the present critique of choice architecture.

held by significant others as well as 'social constructs' (or 'public constructs', Scheer, 2003, cited in Pavlović, 2011: 399) held by broader reference groups, including society[249]. As Pavlović (2011: 398) notes, Kelly alluded to this possibility by referring to "public construction systems" (1963/1955: 9), although he did not develop this notion further. Other authors (e.g., Raskin, 2002; Efran et al., 2014; Butt and Warren, 2016[250]) also support the view that personal construct theory and social constructionism are compatible. Thus, personal construct theory is applied in the present study from a sociological, socio-spatial perspective[251].

The final points to be addressed concern the *relationship between personal construct theory and relational theories on space* as outlined above. Consider for example this excerpt:

> By construing we mean 'placing an interpretation': a person places an interpretation upon what is construed. He [sic] erects a structure [in the mind], within the framework of which the substance [i.e., the element that is being construed] takes shape or assumes meaning. The substance which he construes does not produce the structure; the person does. […] The substance that a person construes is itself a process – just as the living person is a process. (Kelly, 1963/1955: 50-52)

Kelly's suggestion that people construe the "world" (e.g., 1963/1955: 43) using personal constructs is highly reminiscent of Löw's notion that people constitute spaces through 'synthesis'. Moreover, just as synthesis is not to be reduced to a mental or cognitive exercise, also in PCT, "constructs are not in some cognitive domain 'behind' action, but, rather, are immersed in it: we construe in action" (Butt and Warren, 2016: 17). The emphasis on processuality in both accounts is also notable. These are few examples[252], but they illustrate that Kelly's theory is broadly compatible with Löw's approach to space[253].

Moreover, PCT can be used to extend Löw's theory. For example, in trying to explain why the same socio-spatial arrangement may be interpreted differently by different people, Löw (2016: 146ff.) refers primarily to sociological categories such as gender and class. By contrast, a PCT

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[249] To illustrate, when a parent asks their child if they had a 'good time at school', the child learns that a construct such as 'had a good time vs. had a bad time' 'exists' and is applicable to elements such as 'school'. This is not to imply that the child will take on their parent's personal construct as their own, but highlights how constructs may be broadly 'passed on' through social interaction.

[250] While the cited papers are theoretical, this is also evident in empirical applications. For example, Dick and Jankowicz (2001) applied the repertory grid technique in a study explicitly described as 'social constructionist'.

[251] The social nature of 'personal' constructs is also a prerequisite to the present study's methodological approach (e.g., aggregation of repertory grid data across study participants, identification of shared constructs), which could not have been applied within a constructivist view that emphasises the idiosyncrasy of individual construing.

[252] Further examples are found, for example, in Butt and Warren's (2016) account of PCT which highlights Kelly's commitment to pragmatism and PCT's links with phenomenology. It is likely because of such shared foundations (e.g., Löw also draws on phenomenology) that the two approaches resemble each other.

[253] Löw's approach does not prescribe the use of any particular paradigm beyond a broadly interpretative paradigm. This presented a challenge in the present project (see section 1.2.4) but also an opportunity to combine it with personal construct theory as outlined in the present section.

perspective suggests that a person's interpretation of a socio-spatial arrangement depends on their personal constructs. Personal constructs could thus be understood as mediators between 'structural principles' (e.g., gender and class) and specific acts of spacing and synthesis (see section 4.2.4 for a visualisation of this). While the present thesis will maintain a 'sociology of space' perspective (rather than switching between PCT and socio-spatial vocabulary), the PCT perspective invites us to conceptualise *'socio-spatial aspects' not only as features of spaces (the common view in socio-spatial theory) but also as personal constructs that people use to navigate activities of 'spacing' and 'synthesis'*.

3.5. A very brief summary of Chapters 2 and 3

To briefly summarise Chapters 2 and 3, the present research project started out with the aim of revisiting Löw's proposed aspects of space constitution through a bespoke empirical study that would elicit categories with which people actually construe spaces. As the project developed, it became clear that this also presented an opportunity to engage with environmental approaches to the prevention of substance use. Chapter 2 illustrated that how 'space' is understood has implications for theory, methods, policy, and practice. Specifically, a review of main theories underpinning environmental prevention suggested that their use of absolutist notions of space may limit opportunities for (strengths-based) intervention and related progress in prevention. This raised the question of what might be gained by applying a relational socio-spatial perspective to substance use. Löw's concept of 'synthesis' highlights that people act based on how they construe the world, which is also a basic premise of Kelly's personal construct theory. The associated repertory grid technique thus offered a tool to address the initial aim of the study (to revisit Löw's aspects) as well as the later aim of exploring how the interpretation (i.e., Löw: 'synthesis'; Kelly: 'construal') of socio-spatial arrangements may relate to situational substance use outcomes.

The potential of the repertory grid technique to study spaces has long been recognised, including in a doctoral research project supervised by Löw (Müller, 2018). However, such research is typically oriented toward places (e.g., countries, cities, neighbourhoods) rather than other socio-spatial arrangements. In this vein, the thesis now turns to discussing empirical research – including but not limited to repertory grid applications – exploring socio-spatial aspects, in general as well as specifically in relation to substance use.

4. Socio-spatial aspects of substance use: from prior research to the present study

Chapters 2 and 3 outlined theoretical perspectives that can inform our thinking on how people relate to their environments and how environmental aspects may relate to substance use. Chapter 4 now turns to considering empirical studies that have addressed such questions. Section 4.1 reviews existing research on socio-spatial aspects in general and specifically in relation to substance use, with section 4.1.7 summarising strengths and limitations of the current evidence base. This forms the basis for a specification of the present study in section 4.2, translating the basic questions from section 1.1 into specific questions to guide the empirical work. Section 4.2.4 presents the draft conceptual model which informed the study.

4.1. Prior research

4.1.1. Introduction

This section reviews current knowledge with regard to situated substance use and socio-spatial aspects (as any aspects related to the physical/material environment as well as its interpretation by humans, see Chapter 3). The main aim of this review was to answer the initial research questions (see section 1.1) based on the existing literature to establish what is already known and what the present study could contribute. A secondary aim was to identify studies with a similar purpose or scope as the present thesis, so as to inform and contextualise the present study design. The review thus sought to explore the following questions:

- what socio-spatial aspects are explored or proposed in the literature (also known as momentary, contextual, environmental, event-level or situational characteristics);
- what is known about their relationship with substance use;
- how is ‘space’ conceptualised theoretically;
- what methodological approaches are used; and
- what recommendations for prevention are made, if any?

Section 4.1.7 offers a summary of the literature, answers the review questions, and draws out implications for the present study.

The review was limited to studies exploring socio-spatial aspects at the micro-environmental level and, where their relationship with behaviours was considered, to substance use (especially alcohol and cigarettes). A systematic review was not required in the present context, but systematic review strategies (e.g., Petticrew and Roberts, 2006) were adapted to structure searches, inclusion criteria and data extraction.

Recent reviews in relation to alcohol have described research on micro-contexts as “emerging” (Mair et al., 2019: 415) and “fast-growing” (Stevely et al., 2020a: 310). As Duff (e.g., 2012, 2014b, 2014a) has argued (see also section 3.3.3), most substance use research does not consider context (focussing instead on personal characteristics) or does so in an abstract way, removed from the situated experiences of substance use at specific times and places. For example, such research might study ‘friends’ (as a potential contextual factor) by considering the number of substance-using friends a person has *in general* rather than the role of friends in a specific substance use event. Counter to what might be expected, substance use research on space and place is also typically abstracted from concrete experience, taking a macro-environmental perspective instead. As Mair et al. (2019: 413) note, “descriptive epidemiologic studies that assess one or two basic differences between neighborhoods or communities, most often rural vs. urban, fill out the bulk of the ‘place and health’ literature”. Quantitative research linking alcohol or tobacco outlet density to substance use patterns (a commonly studied factor in relation to alcohol, Mair et al., 2019: 413) may also be located in this tradition. Therefore, even within the literature on ‘contextual’ factors of substance use, and despite initial work dating back several decades (e.g., Strickler et al., 1979), research at the level of situated experiences in micro-environments can still be regarded as ‘emerging’.

In prevention, the operationalisation of ‘context’ as removed from situated substance use experiences likely has conceptual (e.g., orientation toward populations), methodological (e.g., greater role of quantitative approaches) and theoretical foundations (e.g., influence of Bronfenbrenner’s [1979] socio-ecological model which does not include micro-environments in the sense of the present thesis). Against this background, the rise of micro-environmental research can be linked, for example, to recent theoretical trends (see Chapter 3), technological developments (e.g., ecological momentary assessment, virtual reality) as well as renewed interest in environmental intervention (see Chapter 2).

Overall, this field has been described as “large, methodologically and conceptually diverse and distributed throughout a poorly connected set of research traditions” (Stevely et al., 2020b: 219). For this reason, this review can by no means aim to be exhaustive, but it can sketch out main points from which the present empirical work can proceed.

The review is structured as follows. To complement Chapter 2 on environmental prevention, the review starts with example evidence on socio-spatial interventions (section 4.1.2). Section 4.1.3 then complements the focus on socio-spatial and personal construct theory in Chapter 3 by considering what socio-spatial aspects have been identified empirically in research contexts *unrelated* to substance use, with a specific focus on repertory grid studies. Section 4.1.4 then summarises a preliminary review on substance use and space that was carried out in 2016 to inform the present fieldwork. Section 4.1.5 updates the preliminary review by summarising recent systematic reviews exploring socio-spatial aspects in relation to substance use (especially alcohol and cigarettes). To illustrate the evidence base, section 4.1.6 then provides examples of relevant primary studies. The focus is again on repertory grid studies, but other studies with a similar scope to the present research are also highlighted. Finally, section 4.1.7 summarises the review findings.

For the present purposes, we can broadly distinguish two types of studies on socio-spatial aspects of space. The first type comprises (typically quantitatively oriented) studies that *start* with ex-ante defined socio-spatial aspects to study substance use. The second type comprises (typically qualitatively oriented) studies that take substance use (or another phenomenon) as a starting point and *arrive* at socio-spatial aspects. Both types are represented in this section, with studies of the first type found primarily in section 4.1.5 and studies of the second type found in section 4.1.6. However, these are two ends of a spectrum. For example, Duff's work (reviewed in section 4.1.6) is located in-between, as it starts with theoretically informed socio-spatial categories which are then elaborated using empirical data.

4.1.2. Effectiveness of environmental interventions to prevent substance use

Although Chapter 2 addressed environmental interventions to prevent substance use, studies of intervention effectiveness are *not* the main focus of the present chapter. Environmental interventions are typically evaluated in terms of population-level outcomes, such as reduced rates of substance use prevalence, morbidity and mortality (e.g., for smoking bans: Frazer et al., 2016b; Frazer et al., 2016a). While this approach is paramount in terms of judging overall effectiveness, such studies were less relevant for the present thesis, which is concerned with how (construed) socio-spatial aspects and substance use interplay at the micro-environmental level. However, recent systematic reviews relating to interventions have examined outcomes at the micro-environmental level (see examples in Table 4 below).

Table 4: Micro-environmental interventions and outcomes in recent effectiveness reviews

Reference	Topic	Relevant findings
Hollands et al. (2015)	Effects of modifying the *size or shape of portions, packages or tableware* relating to food, alcohol or tobacco products on amount consumed	Of 72 included studies, 69 were food-related and 3 were cigarette-related; no alcohol-related study was included. With regard to size, there was limited, low quality evidence from three studies conducted in the 1970s and 1980s to suggest that offering shorter cigarettes did not reduce the amount of tobacco consumed overall. However, evidence from the food-related studies suggested that people eat and drink more non-alcoholic beverages when presented with larger options. Regarding shape, there was very limited evidence to suggest that shorter, wider (cf. taller, narrower) glasses or bottles may increase the quantities consumed or selected, but the evidence was not of sufficient quality to draw conclusions.
Robertson et al. (2015)	Effects of *point-of-sale tobacco promotion* (and bans thereof) on a range of outcomes	The reviewed evidence included a range of quantitative and qualitative study designs and suggested that (perceived) exposure to point-of-sale tobacco displays and advertisements (cf. no exposure) increased cravings and inclination to purchase cigarettes, including purchases that were not planned.
McNeill et al. (2017)	Effects of *standardised tobacco packaging* (cf. branded packaging) on a range of outcomes	Changes in tobacco use prevalence were measured in studies using macro-environmental approaches, whereas studies at the micro-environmental level measured other outcomes such as avoidance, craving, cigarette appeal, visual attention given to health warnings on the packs, or perceptions of tobacco quality. Evidence suggested that standardised packaging affects these outcomes in the desired direction; the "most consistent evidence" (McNeill et al., 2017: 2) was that standardised packs were experienced as less appealing than branded packs.
Carter et al. (2018)	Effects of *placing information-based cues* such as words or pictures near food, alcohol or tobacco products on selection and consumption of these products	Whilst the review authors found evidence regarding food-related interventions (with positive results), they identified no research relating to tobacco products and only one study relating to alcohol. This was a small-scale experiment rather than a study of intervention effectiveness, which found that playing music with alcohol references (cf. music without alcohol references) increases alcohol sales.
Hollands et al. (2019)	Effects of *changing the availability or proximity of food, alcohol or tobacco products* at the micro-environmental level (e.g., in shops or restaurants) on selection or consumption	All of the 24 included studies related to food products; none were included for alcohol or tobacco. The available evidence suggested that such interventions may work (e.g., placing food further away reduced its consumption), but the authors cautioned that the quality of evidence was low or very low and that more robust evidence was needed.
Clarke et al. (2020)	Effects of *health warning labels* (cf. no label or neutral label) on the selection of food and alcoholic beverages	The authors found that health warning labels (cf. no label or neutral label) could reduce the selection of food and alcoholic beverages, but they noted that studies had been carried out exclusively in laboratory or online settings. Also, only three out of 14 identified studies targeted alcoholic beverages (cf. food or non-alcoholic beverages).

Note. Reviews presented in chronological order.

Moreover, the present work aimed to offer insights that might inform innovations in environmental prevention, specifically by identifying socio-spatial aspects that may be related to substance use but have not been hitherto addressed in environmental prevention. The

appropriate strategy was therefore to broaden the scope and consider studies of socio-spatial aspects and substance use that were not limited to interventions. Having said that, the boundaries with regard to whether a study explores the relationship between a socio-spatial aspect and substance use (aetiological research) or the effectiveness of an intervention (effectiveness research) can be blurred. In particular, experimental studies which modify socio-spatial aspects to test how these affect study participants' substance use can be considered under either heading (see the review by Carter et al. in Table 4 for an example).

Against this background, Table 4 above exemplifies review-level evidence on interventions at the micro-environmental level. The presented evidence suggests that modifying socio-spatial aspects can affect behavioural and other outcomes at the micro-environmental level. However, the evidence in relation to some socio-spatial aspects is scant for alcohol and tobacco. The remainder of this chapter focusses on studies that have examined socio-spatial aspects outside of an intervention context.

4.1.3. Literature identifying socio-spatial aspects in general

Before focussing on relationships between socio-spatial aspects and substance use in more detail, it is worth considering what socio-spatial aspects have been discussed in the empirical literature *outside* of the substance use field. The aim here was to understand what (categories of) socio-spatial aspects have been previously 'found' to represent *how people think about their everyday spaces* (in line with the basic questions outlined in Chapter 1). The section thus complements Chapter 3, which focussed on how space can be conceptualised theoretically. There is a wealth of empirical work on socio-spatial aspects, but only few studies seek explicitly to develop conceptualisations of 'space' or 'place' based on their data. Reviews of such studies could not be identified[254]. This section thus starts with an example of a relevant sociological study, followed by a brief review of repertory grid studies that have explored situations, spaces or places from an urban studies, environmental psychology and similar perspective.

Gustafson's 'self-others-environment' triangle

Studies exploring place meaning can be thought of as researching construed socio-spatial aspects. A highly cited paper in this regard[255] is Gustafson's (2001) qualitative interview study

[254] Appendix D.2 shows search terms that were used. While searches identified the review on 'place facets' by Hamzei et al. (2020; summarised in section 3.4), this could not be used here, as the review authors did not distinguish between theoretically proposed facets and empirically derived facets (the focus of this section).
[255] Another highly cited paper on place meaning is Manzo (2005); however, Gustafson's study is chosen for discussion here because he develops a specific framework for the categorisation of place meanings.

with a purposefully diverse sample of Swedish participants (n=14) to understand "what places of various kinds may mean to people, and how people relate to places" (ibid.: 8). Places relevant to participants' lifecourse were elicited and discussed regarding their importance and meaning to participants, alongside a few places supplied by the researcher[256]. The analysis consisted of iteratively coding interview transcripts using open coding as well as prior literature (ibid.: 9). As noted in section 3.4, such an approach brings about certain difficulties and uncertainties for the researcher in this context (e.g., how to categorise aspects, which aspects were important to participants) that may be reduced using repertory grid methodology.

The place meanings emerging from Gustafson's research were varied and numerous, but the author managed to introduce structure by mapping them onto a triangle with the poles 'self', 'others', and 'environment'[257] (shown in Gustafson, 2001: 10). The advantage of the triangle is that meanings need not align with a single pole but can be situated between two poles (e.g., 'self-others') or all three poles (i.e., 'self-others-environment')[258]. Place meanings can hence be located in one of seven areas at or between the poles. In other words, Gustafson does not see the identified place meanings (e.g., "self-identification", "social relations", ibid: 10) as his article's main contribution but emphasises rather the triangular model: "the important point I want to make here is not about the specific items of meaning, or about their exact positions in the model, but concerns the usefulness of the self-others-environment scheme itself as an analytical model for mapping the meanings of place" (Gustafson, 2001: 11). Of interest to the present study, Gustafson (2001: 12) reports that, in his sample, the pole 'self' played a greater role in relation to smaller places (e.g., own residence), while the poles 'others' and 'environment' played a greater role in relation to larger places (e.g., nation). Still, from the current perspective, the three-pole framework is likely too general to inform empirical research or help understand how people think about their everyday spaces (see also section 3.4).

Gustafson further identifies four processes through which places take on meaning: meaning is understood to emerge from comparison with other places ('distinction'); it typically has a positive or negative connotation ('valuation'); it emerges over time ('continuity'); and places can take on (or be given) new meanings ('change') (Gustafson, 2001: 13). This offers interesting pointers for the present study, for example where Gustafson writes: "The attribution of meaning involves *distinction* – the definition of similarities and differences, and therefore

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[256] Gustafson's study thus has clear parallels with the present work and could have been carried out using repertory grid technique rather than the narrative approach used.
[257] 'Environment' includes the natural and built environment but also the "symbolic or historical" and "institutional" environment (Gustafson, 2001: 11).
[258] For example, place meanings relating to own's lifecourse were allocated to the pole 'self', meanings relating to friends and family were allocated to the axis 'self-others', and meanings referring to other people not personally known to the participant were allocated to the pole 'others' (Gustafson, 2001: 9–10).

often comparisons with other places" (2001: 14, original emphasis). Although Gustafson does not refer to repertory grid methodology, this highlights that repertory grids, with their focus on comparison between elements, may serve as a useful technique in this research area.

Repertory grid studies on everyday spaces

As the present study uses the repertory grid technique, it is useful to consider if socio-spatial aspects have been identified in previous repertory grid studies and how aspects have been categorised. The repertory grid technique works by asking participants to compare 'elements' (e.g., people, objects, situations) according to their similarities and differences (which are translated into 'constructs' by the interviewer). Elements can then be rated numerically on the constructs. Section 6.1 describes the technique further.

This section reviews repertory grid studies that used everyday spaces, places or situations as their elements. Only three studies (Harrison and Sarre, 1975; Wan and Shen, 2015; Müller, 2018) proposed categories of socio-spatial aspects. However, to help contextualise the present research, all identified studies are first described in terms of scope and methodological features before the socio-spatial categories proposed in the subset of three studies are outlined. Data extraction tables are available from Appendix D.4. Repertory grid studies with a substance use focus are reviewed in section 4.1.6.

Seven publications were found to be relevant[259]. Elements in these studies were living-rooms (Honikman, 1976), important places in the city where participants lived (Harrison and Sarre, 1975; Wysor, 1983), urban green spaces (Home et al., 2010; Wan and Shen, 2015), "any physical elements in their [participants'] neighborhood that had disappeared or arrived" (Aitken, 1990), or a diverse group of neighbourhoods, cities and city-related concepts (Müller, 2018). The number of elements was lowest in Aitken's study (1990) (9 elements on average) and highest in the study by Harrison and Sarre (1975) (at least 25 elements per person, up to 40). Two studies provided elements as pictures (Honikman, 1976; Home et al., 2010); the other studies supplied elements in writing or verbally (e.g., place names). Three studies included an ideal space (Home et al., 2010; Wan and Shen, 2015; Müller, 2018) (similar to the present study, see section 6.2.6). Sample sizes ranged between 17 (Home et al., 2010) and 38 (Aitken, 1990), though one study involved 352 participants (Müller, 2018) (median: 26).

[259] Appendix D.2 includes details of search terms. Studies were included if they explicitly referred to repertory grid methodology and used everyday spaces, places or situations as elements that had relevance to participants' lives (in line with the present study). Several studies were excluded because the scope of their elements was too narrow (e.g., only buildings; only shops; only holiday destinations) or too broad (e.g., countries) for the present purposes.

From a 'sociology of space' perspective, it is of interest whether elements were defined by participants (i.e., elicited) or by researchers (i.e., supplied). Of the reviewed studies, four studies (Harrison and Sarre, 1975; Wysor, 1983; Aitken, 1990; Wan and Shen, 2015) involved participants in the definition of elements, and three studies were more researcher-driven (Honikman, 1976; Home et al., 2010; Müller, 2018)[260]. Aitken (1990) and Honikman (1976) were the only ones to use *only* elicited or *only* supplied elements; the other studies combined elicited and supplied elements. Constructs were supplied in only one study, after construct elicitation (Harrison and Sarre, 1975). Of interest to the present research, none of these studies appeared to have used a 'qualifying phrase'[261] to guide participants in their comparisons of elements. While this may be viewed positively as participant-orientation, it also means that elicited constructs may not have been particularly important to participants or to the research questions (see also section 6.2.5).

In terms of research purposes, most studies sought to identify "constructs" (Honikman, 1976; Müller, 2018), "dimensions" (Aitken, 1990), "perceptions" (Wysor, 1983; Wan and Shen, 2015) or "determinants" (Home et al., 2010), while only Harrison and Sarre (1975) sought to understand how (groups of) elements were construed. Most studies had additional aims[262]; a recurring theme was to test or illustrate the usefulness of the repertory grid technique. Only three studies specifically categorised the elicited constructs (Harrison and Sarre, 1975; Wan and Shen, 2015; Müller, 2018). The others did not label groups of constructs (Honikman, 1976; Aitken, 1990), or they used ex-ante defined classification systems (Wysor, 1983; Home et al., 2010); in fact, Wysor (1983) used Harrison and Sarre's (1975) typology to classify constructs.

Table 5 below gives an overview of the categories proposed in the identified studies (Harrison and Sarre, 1975; Wan and Shen, 2015; Müller, 2018). All three studies carried out qualitative and quantitative analyses. In the case of Müller (2018) and Wan and Shen (2015), the original constructs were reduced first via qualitative content analysis, and the resulting categories were then grouped further using statistical techniques (principal component analysis or factor

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[260] Elements were freely elicited from participants only by Aitken (1990). Harrison and Sarre (1975) combined freely elicited elements with supplied elements which were partially based on a pilot study. Three studies let participants choose their own elements but within categories supplied by the researchers: Wan and Shen (2015) used only this approach and developed the categories based on pilot research; Home et al. (2010) and Müller (2018) combined such category-based elicitation with supplied elements – however, in contrast to Wan and Shen (2015), the elicitation categories were researcher-defined. Wysor's (1983) case was special because elements were supplied but study participants had themselves contributed to developing the list of supplied elements. Only Honikman (1976) used only supplied elements that were entirely researcher-defined.

[261] Jankowicz (2004: 35f.) recommends adding a "qualifying phrase" ("in terms of …") when asking participants to compare elements. This shall ensure that elicited constructs are relevant to the research topic; the qualifying phrase used in the *present* study was "… in terms of something that you like or dislike about the spaces" (section 6.2.5).

[262] For example, Honikman (1976) sought to understand how different constructs related to each other (i.e., aspects of the physical environment vs. meaning); Wan and Shen (2015) explored to what extent personal constructs could predict frequency of park visits; Wysor (1983) compared different participant groups.

analysis)[263]. The final solution thus uses two levels (43 categories in six groups for Müller and 26 categories in four groups for Wan and Shen, respectively). Considering the content of the construct categories (see Table 5), it is apparent that the constructs reflect the kinds of elements used: for example, constructs relating to 'convenient opening hours' make more sense for the green spaces studied by Wan and Shen (2015) than for the cities and neighbourhoods studied by Müller (2018), while the opposite is true for constructs relating to 'low vs. high unemployment'[264]. Nevertheless, there are common themes relating to visual appearance, cultural or educational features, physical accessibility, affordability, and so on.

In the case of Harrison and Sarre (1975), the results of the various analyses were not compared or integrated by the authors but were presented separately, hence the four categorisations included in the present Table 5. There were common themes; for example, all quantitative analyses (fourth to sixth main column, Table 5) suggested a component relating to whether a place was regarded as "ugly", "functional" or "beautiful", "aesthetic". The categories used for the qualitative analysis (third main column, Table 5) represented a higher level of abstraction compared with the labels for the statistically identified components[265]. They were also more detailed and numerous compared with the results of the quantitative analysis (2 to 3 components per quantitative analysis). However, the authors did not clarify whether the categories used for the qualitative analysis were based on an ex-ante defined classification system or derived from the data.

Considering the categories by Müller (2018) and Wan and Shen (2015) on the one hand and those by Harrison and Sarre (1975) on the other hand, it is noteworthy that the former construct categories appear mostly as objective descriptors of the places (e.g., 'characterised by green areas', 'natural environment'). By contrast, the components in Harrison and Sarre (1975) refer more strongly to relationships between study participants and places (e.g., personal level of involvement, familiarity). This was noteworthy, given that none of the studies reported the use of a qualifying phrase which would have steered participants in a particular direction. Also of note, the continuum between "subjective" and "objective" constructs is an explicit feature of the qualitative classification system used by Harrison and Sarre (1975: 14), with the "affective"

[263] It was not entirely clear from the descriptions whether statistical techniques were applied to the original constructs or the construct categories, but the latter seemed to be the case in both studies (in the *present* study, statistical analyses were applied to the original constructs, see Chapter 7).
[264] This is known as "range of convenience" in repertory grid terminology, i.e., a construct with a narrow range of convenience is applicable to only few types of elements (e.g., Jankowicz, 2004: 12).
[265] The labels for the quantitatively derived components (e.g., "Aesthetic vs. functional", fourth to sixth main column, Table 5) appeared to be closer to the content of the original constructs, whereas the qualitative construct categories described the type of construct at a more general level (e.g., "Evaluative", third main column in Table 5).

Table 5: Categories of socio-spatial constructs in prior repertory grid studies (space)

Source	Müller (2018: 149ff., 192-196, 225)	Wan and Shen (2015: 94–96)	Harrison and Sarre (1975)			
			pages 11, 14	pp. 15-16	p. 18	p. 20
Method	Qualitative content analysis, principal component analysis (PCA)	Qualitative content analysis, factor analysis	Construct classification [no details provided]	Principal component analysis (PCA)	Factor analysis of supergrid (25 supplied elements)	Factor analysis of supergrid (9 supplied constructs)
Number	43 categories in six areas	26 categories in four groups	Four classes, with six subclasses in class D	Two common components across sample	Three components with clear meaning	Three components
Categories	A: Culture, society and economic capability • Varied vs. neglected cultural offer[a] • Extroverted vs. introverted • Open to change vs. insistence on established models • Social mix vs. segregation and monocultures B: Local decision-making, financial and educational policies, and family-friendliness • Low vs. high unemployment • Good vs. poor school and educational system C: Social and economic circumstances and societal participation D: Ecological quality, personal relationships, psychological tension and affordability • Characterised by green areas vs. built areas E: Local amenities and mobility • Short vs. long journey times F: Townscape and identity • Positive vs. negative visual appearance/image	Features • Nice themed design[a] • Sufficient catering services • Educational features (e.g. tree labels, exhibition gallery) Naturalness • Natural environment • Sufficient spaces (not crowded) • Clear zoning for various activities Accessibility • Convenient opening hours • Free of charge facilities • Conveniently located (e.g. close to home) Variety of Facilities • Facilities for all weather conditions • Wide range of facilities • Sufficient ancillary facilities	A – Affective: emotions aroused in people by places E – Evaluative: person's opinions of the place R – Relational: how the person comes into contact with the place and what role each has in the interaction D – Descriptive: quasi-objective statements about various aspects of places • D1 – Form • D2 – Function • D3 – Position in space • D4 – Position in time • D5 – Origin • D6 – Class	• Aesthetic vs. functional • Identify or not [not further described]	• Ugly/functional/ used vs. beautiful/ aesthetic/typical Bath • Use/like/feel at home vs. feel strange/dislike move past • Uninvolved vs. involved	• Liked/beautiful vs. disliked/ugly • Places with which the subjects were involved and which they used vs. places where they felt out of place • Places which had been known for a long time and which were of wide significance vs. those which had been recently discovered and which were of local significance

Note. For improved readability, text is quoted in this table from stated sources without quotation marks. For details including quotation marks, see data extraction tables in Appendix D.4.
[a] Only examples are shown due to space constraints; for Müller (2018): 9 most frequently mentioned categories; for Wan and Shen (2015): highest loading categories per factor.

constructs viewed by the authors as “most *subjective*” and the “descriptive” constructs as the “most *objective*” (ibid., original emphasis).

The differences between category systems outlined above point to the different ways in which people may think about (different types of) everyday spaces, and they also hint at the different ways in which researchers may categorise research participants’ constructs related to such thinking. The content of the categories identified here will be discussed further in Part 4, when the constructs identified in the present study have been elaborated. This section now moves on to exploring the literature in relation to substance use.

4.1.4. Preliminary review on substance use and space

Prior to the fieldwork for the present study, a preliminary review was carried out to obtain an overview of the available research on substance use and space and gain insights regarding the review questions listed in section 4.1.1. Another aim was to identify similar research to the planned study that could inform its design and help avoid duplication of prior work. This preliminary review is summarised here, and section 4.1.5 presents systematic reviews that have been published since.

Therefore, while this review summarises existing findings, it also assesses the methods and theories in some detail, so as to highlight research gaps that are addressed in the present work. One observation was that qualitatively and quantitatively oriented studies often differed in terms of method and theory, and therefore differences between qualitative and quantitative approaches are noted where relevant.

Search strategy, screening and data extraction

Electronic database searches were conducted in January 2016 in Web of Science, ProQuest Sociological Abstracts and WISO SOLIS (largest German-speaking social science database) as well as the University of Vienna’s own library search engine. The aim of the review was to obtain a general overview of existing research on substance use and socio-spatial aspects. The review scope was purposefully broader than the scope of the planned study, and the search strategy combined terms related to space and a range of legal and illegal substances. This returned a great number of search results (e.g., over 24,000 in Web of Science). These were refined using limits (e.g., research field, publication year, relevance) to produce manageable samples of illustrative publications from which to gain useful insights. Appendix C documents search terms and limits.

Results from the refined database searches (WoS: 681; ProQuest: 400; WISO SOLIS: 87) were added to publications identified through other means (e.g., handsearching journals, checking publication lists of over 20 authors active in the field). After removing duplicates, the combined database had over 1,680 entries. Titles and abstracts were screened against inclusion criteria, with full-texts checked where a decision could not be made based on title or abstract. Reasons for exclusion were noted. The most common reason for exclusion was that the publication did not address space in the intended sense (frequently the case where publications referred to 'context'). The criteria were specified beforehand but refined during the screening process in light of the actual publications and screening decisions made.

According to the final criteria, journal articles, books, theses, conference presentations, and major reports were eligible if published from 2011 to 2016 in English or German. Primary studies with humans using qualitative, quantitative or mixed-method empirical designs, as well as reviews of such studies, were eligible. Publications had to explore how socio-spatial aspects at the micro-environmental level (e.g., location, people, objects, music, rules) related to substance use or associated cognitions and experiences (e.g., meaning of substance use) within the same micro-environment at the same time (i.e., situated). There had to be some variation or comparison in terms of socio-spatial aspects. Studies with a different research focus but reporting relevant data were eligible, as was research on socio-spatial interventions. Exclusion criteria helped ensure a more homogeneous sample of studies for data extraction[266]. Four studies could not be included because full texts could not be retrieved.

Before data extraction, each publication was checked for eligibility on the final criteria. Data from eligible publications were then extracted by the study author using a structured template. Data on socio-spatial aspects, settings and theories were extracted using an 'open coding' approach, adding categories to the data extraction template as needed and using preliminary labels which were open to revision. Extraction by a second coder would have been preferable (especially for the qualitative studies, as these typically addressed many aspects in a narrative format) but was not feasible. A formal quality assessment of studies was not undertaken due to the focus on mapping socio-spatial aspects.

[266] Excluded were: studies focussing on group differences (e.g., by gender) rather than socio-spatial differences; studies of how substance use leads to socio-spatial changes; studies reporting only on changes in availability of or access to substances; studies exploring consequences of substance use (e.g., violence); studies focussing on dependent users (exception: smokers), opioid and injecting users (though studies of broader populations who also used opioids were included), specifically HIV-positive, street-based and other vulnerable populations. Screening identified much research with vulnerable populations, but it was decided to focus the review on non-vulnerable populations in line with the present study's empirical focus on socially integrated users.

Included publications

The final sample consisted of 128 publications which met the criteria stated above: 115 primary studies and 13 reviews (reference list available from Appendix C.2). Of the 115 primary studies, 60 were quantitatively oriented[267] (including 22 experimental studies), 48 were qualitatively oriented, and seven studies included qualitative and quantitative components or self-labelled as 'mixed-methods' research. A variety of research approaches was utilised, including ethnography, interviews, focus groups, surveys, ecological momentary assessment, and experimental studies. The sample included no studies utilising the repertory grid technique. Of the 13 reviews, seven took a more systematic approach and six were traditional, narrative reviews. Eight reviews focussed on quantitative research, two on qualitative research, and three considered both qualitative and quantitative research.

In 97 publications (76%), the relationship between substance use and socio-spatial aspects was a key focus. This was especially so for the quantitatively oriented papers, whereas qualitatively oriented papers tended to have a broader thematic scope.

Substances and substance use

Two-thirds of the reviewed publications (85; 66% of 128) addressed alcohol use. Alcohol was a key focus in 78 publications, and it was the only substance considered in 54 publications (42%). About a third of publications (45; 35%) addressed tobacco or nicotine products. Cigarettes were addressed in 43 publications (34%), were a key focus in 39 publications, and were the only focus in 24 publications (19%). Medicines (e.g., cognitive enhancement drugs, painkillers) were addressed in only two studies. A quarter of publications (31; 24%) addressed illegal substances[268]. The most frequently addressed illegal substances were cannabis (20 publications) and amphetamines (e.g., 'ecstasy', 'speed'; 14 publications). Illegal substances were the sole focus in 10 publications, most of which were qualitatively oriented. In addition, 12 publications addressed food or non-alcoholic beverages, typically as comparators in experimental studies.

Over three-quarters of the papers (101; 79%) addressed substances from only one group (i.e., alcohol *or* tobacco/nicotine products *or* illegal drugs *or* medicines); 19 papers addressed substances from two groups (typically alcohol *and* illegal drugs); only 8 publications (6%)

[267] Ecological momentary assessments were counted as quantitatively oriented research for this overview.
[268] The review was carried out at a time when illegal substances were still within the planned scope of the project, and thus the review also considered publications focussed on illegal substances. Later reviews focussed on alcohol and cigarettes in line with the final project scope.

addressed substances from three groups; and no study addressed substances from all four groups. A qualitative study among music festival goers (Dilkes-Frayne, 2016) considered the greatest variety of legal and illegal substances (also e.g., ketamine, psychedelics, inhalants). If publications addressed multiple substances, these were not typically compared with each other in a structured way.

Regarding substance use measures, most publications (93; 73%) considered behavioural outcomes (e.g., quantity used, intoxication levels). In 51 publications (40%), this was the *only* type of outcome considered and these were mostly quantitatively oriented publications. There was also a large proportion of quantitatively oriented publications (19 papers) that considered *only* other measures (e.g., cravings, attitudes, outcome expectations). By contrast, qualitative studies typically explored substance use behaviours *and* related meanings and experiences. It is difficult to say how many publications addressed abstinence, which is typically an implicit reference point in substance use research. Three studies (Anamali, 2013; Stevenson et al., 2013; Parder and Vihalemm, 2015) had a notable focus on situational abstention or reductions in use.

Within the context of this preliminary review, it was not possible to synthesise study findings regarding the relationship between substance use and socio-spatial aspects: section 4.1.5 offers such insights on the basis of reviews that took a more targeted approach.

Settings, socio-spatial aspects and theories

The publications reported on over 40 different *settings* (see Appendix C.4 for details). The most frequently researched settings were pubs and bars (including naturalistic laboratories), nightclubs, study participants' own home (not in a party context), private parties and gatherings, and other homes (e.g., of friends or parents). Thirty-six publications (28%) focussed on a single setting only. Even though most studies considered multiple settings, only 28 publications (22% of 128) considered a *range* of settings (i.e., own home *and* nightlife settings *and* at least one other setting).

Overall, the reviewed publications reported on over 100 socio-spatial aspects (including over 25 aspects relating to people, e.g., role of parents, children, intimate partner, friends, other users, etc.). During data extraction, similar aspects were grouped together on an ad hoc basis. The final data extraction table distinguished socio-spatial aspects in eight categories (listed in order of frequency, examples illustrate most common aspects; see Appendix C.3 for full list):

- 'people' (e.g., types of people, number of people);
- 'activities' (e.g., partying, listening to music);

- ‘place and occasion’ (e.g., location, relational aspects of place, special occasions);
- ‘norms’ (e.g., formal or informal substance use rules, perceived gender norms);
- ‘atmospheres, safety and inclusion/exclusion’ (e.g., conflicts and other stressors, venue style, safety measures);
- ‘materialities’ (e.g., substances, related paraphernalia, other objects, human bodies);
- ‘natural’ environment (e.g., time of day, inside or outside); and
- ‘signs and symbols’ (e.g., substance use-related pictures).

The role of people was explicitly addressed in 84 papers (65%), with a focus on the presence and number of other people, and on friends/acquaintances and other substance users in particular. By contrast, signs and symbols were a focus in only 17 papers (13%). Most common here were pictures used in experimental studies on environmental cues. There were some differences according to study design; for example, norms were more frequently explored in qualitatively than in quantitatively oriented papers.

The relationship between the physical environment and construed meanings was a recurring theme in Chapters 2 and 3. It was noteworthy that most socio-spatial aspects in the reviewed literature referred to tangible and objectively perceptible elements of the environment, such as people and things. However, factors such as ‘close friends’ were clearly included in studies because of their (presumed) symbolic meaning, even if this was not made explicit. Nevertheless, less tangible aspects were also addressed. These included, for example, the relationality of place (e.g., in a pre-drinking context) and special occasions (e.g., celebrations). Activities mostly included directly observable behaviours but (especially in qualitative studies) also more subtle phenomena, such as ‘treating oneself’, ‘taking a break’ or ‘performing rituals’. The categories ‘norms’ and ‘atmospheres’ were particularly interesting in this regard. ‘Norms’ included laws as well as social expectations, which, despite being immaterial, can take on a thing-like character by virtue of being recognised by a group of people and appearing as naturally given (see also Chapter 3). By contrast, ‘atmospheres’ result from the physical environment but can be difficult to grasp (Löw, 2016: 171). The reviewed publications explored physical aspects (e.g., venue style, cleanliness, layout, surveillance) but also interpretations of arrangements (e.g., as ‘comfortable’, ‘friendly’, ‘anonymous’, ‘ordered’, ‘chaotic’, ‘rowdy’).

Given the wealth of aspects that could be considered under a ‘sociology of space’ perspective, it was interesting to know how many different types of socio-spatial aspects were addressed in the reviewed literature. Twenty-three papers (18%) focussed on only one category of aspects. This was about a third of the quantitatively oriented papers, whereas none of the qualitatively oriented papers addressed only one category of aspects. Conversely, almost a third of qualitatively oriented papers addressed aspects from six different categories or more

(of those listed above)[269], which was the case for only a few of the quantitative papers (e.g., Hughes et al., 2012). This suggested that the qualitative evidence base corresponded more strongly with 'sociology of space' thinking, whereas the quantitative evidence base referred to non-relational conceptualisations of environment.

In terms of how 'space' was conceptualised theoretically, some 30 theories or concepts were identified in the reviewed sample. Qualitatively oriented publications in this sample were most likely to refer to theories of embodiment, assemblages, actor-network theory, and, to a lesser extent, affect. Quantitatively oriented publications were most likely to refer to environmental cues. Some papers referred to several socio-spatial theories or concepts: these were almost all qualitative studies[270], largely because studies which refer to assemblage or actor-network theory also tend to relate to affect, embodiment, mobilities, new materialisms and/or non-representational theory. No study utilising Löw's 'sociology of space' (see Chapter 3) was identified, although some referred to 'relational space' (e.g., Demant and Landolt, 2014).

In almost half of the reviewed papers (57; 45% of 128), the underlying notion of 'space' was unclear. Although qualitatively oriented publications were most likely to draw upon socio-spatial concepts and theories, the socio-spatial theoretical background was unclear also in more than a third of qualitatively oriented papers. It was common for quantitative work to use the concept of 'context' without reference to particular authors or theories. Also studies utilising ecological momentary assessment did not typically conceptualise 'space' further; neither did publications with qualitative *and* quantitative components, and these studies were the least likely to use spatial theory.

Conclusions

The preliminary review was useful to obtain an overview of the field and to identify strengths and limitations of the evidence base (see section 4.1.7) from which the planned study could proceed. Outputs from the review included a list of settings considered in prior research, as well as a list of socio-spatial aspects (organised in eight categories) (shown in Appendices C.3 and C.4). The list of socio-spatial categories informed the grouping of elicited constructs during later data analyses (see section 7.2), and both lists may be informative for future research.

[269] However, this was also related to the structure of presentation, as qualitative publications rarely presented socio-spatial aspects in a structured format but typically referred to many different aspects in a narrative style.
[270] There were a few quantitative studies referring to multiple theories; for example, Gallupe and Bouchard (2013) referred to multiple theories from situational crime prevention.

The review found that existing research on socio-spatial aspects of substance use is extremely diverse. The reviewed studies represent only one segment of the available evidence base (as e.g., studies of vulnerable populations were excluded). Even within this segment, there was substantial methodological and theoretical variety, some of which reflects paradigmatic differences between qualitative and quantitative research. However, as was already noted in the introduction, this is not one coherent research area. The reviewed publications represented different strands of research emerging from different disciplines (e.g., psychology, geography, criminology, sociology, anthropology) and theoretical backgrounds. While this is beneficial insofar that the topic has been explored from a multitude of perspectives, the review suggested that the various strands of research stood in relative independence from each other.

The identified reviews perpetuated this silofication because they mostly focussed either on qualitative or (more often) on quantitative research, or only on one substance (mostly alcohol). This preliminary review was therefore also an important attempt to integrate perspectives across substances and methodologies. As the review was limited to an illustrative sample of publications from 2011 to January 2016 and did not summarise study findings, the next section turns to systematic reviews that have been published on this topic since 2015.

4.1.5. Recent reviews on contextual aspects and substance use

The previous section summarised a preliminary literature review that was carried out in 2016 to inform the fieldwork for the present study. This section draws on systematic reviews published since 2015 to supplement and update that preliminary review. The aim of this review of reviews was to gain insights regarding the questions outlined in section 4.1.1. It went beyond the preliminary review in that it also summarised findings regarding the relationship between socio-spatial aspects and substance use as well as preventive implications formulated by authors. Appendix D includes further details on the search strategy as well as data extraction tables with details on each included review.

Features of included reviews

Eight reviews were included in the final sample considered here: seven reviews published in 2015 or later (Serre et al., 2015; Veilleux and Skinner, 2015; Cox et al., 2019; Mair et al., 2019; Stanesby et al., 2019; Stevely et al., 2020a; Stevely et al., 2020b) and one review (Hughes et al., 2011) published earlier[271]. Except for the reviews by Mair et al. (2019) and Stevely et al.

[271] The review by Hughes et al. (2011) was included because it represents a seminal work (e.g., also identified as

(2020b)[272], all were described by the authors as systematic reviews. The two reviews by Stevely and colleagues were nested, in that a subset of the studies from Stevely et al.'s (2020b) mapping review was synthesised as a systematic review in Stevely et al. (2020a). Only two reviews reported formally assessing the quality of included studies (Stanesby et al., 2019; Stevely et al., 2020a)[273]. Though substance use and related harms were generally conceptualised as the outcomes of interest, some reviews spoke rather of 'associations' between context and substance use (e.g., Hughes et al., 2011; Stanesby et al., 2019), while others claimed to focus on studies where context and substance use were clearly defined as independent and dependent variable (e.g., Cox et al., 2019; Mair et al., 2019).

All eight reviews covered alcohol-related outcomes. Six were limited to alcohol[274], while two reviews (Serre et al., 2015; Veilleux and Skinner, 2015) considered additional domains including smoking[275, 276]. It was noteworthy that both of these reviews were older and not focussed on tobacco; the present search did not identify any eligible reviews focussed on tobacco or of a more recent date[277]. While relevant reviews may have been missed, the study of contextual factors has a stronger tradition in alcohol studies compared to smoking studies, which may explain differences in availability of relevant reviews.

Each included review offered a somewhat different perspective. In terms of outcomes, most reviews focussed on use, but one review (Stanesby et al., 2019) explicitly compared contextual factors for 'heavier' and 'lighter' drinking; two reviews (Hughes et al., 2011; Stevely et al., 2020a) explicitly considered harms (e.g., violence, injuries); and one review (Veilleux and Skinner, 2015) considered 'target-dystonic' behavioural outcomes (e.g., whether cigarette-

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such by Stevely et al., 2020b) and offered a reference point for the discussion of the recent reviews; it was also one of the publications that inspired the present study in its current form.

[272] Mair et al. (2019) described their paper as a "review of recent literature" (ibid.: 413) and used a very limited search strategy (< 5 years, only one database). The review by Stevely et al. (2020b) was a "mapping review": it did not synthesise findings but sought "to identify and describe the theoretical approaches to conceptualizing drinking occasions, study designs, predictors and outcome measures used in existing research" (ibid.: 218).

[273] These two reviews appeared to represent the two most rigorous reviews overall, while three reviews appeared to be of moderate quality (Hughes et al., 2011; Serre et al., 2015; Veilleux and Skinner, 2015), and two reviews appeared to represent moderate to poor quality (Cox et al., 2019; Mair et al., 2019) (based on an informal assessment considering e.g., search strategy and data presentation; see Appendix D.3).

[274] Some of the other reviews considered tobacco or illicit substances but only as socio-spatial aspects (i.e., not as outcomes) (Hughes et al., 2011; Stanesby et al., 2019; Stevely et al., 2020a, 2020b).

[275] These two reviews were initially excluded because they did not distinguish socio-spatial aspects: Veilleux and Skinner (2015) address 'cues' in general, while Serre et al. (2015) frame them as 'intra-personal moderators'. However, they were subsequently included because no other identified reviews used systematic review methods to explore micro-environmental aspects and smoking. Other identified systematic reviews related to, for example, broader socio-spatial aspects (e.g., tobacco outlet density: Finan et al., 2019) or methodological issues (e.g., use of virtual reality in cue-reactivity paradigm: Pericot-Valverde et al., 2016).

[276] In addition to alcohol and tobacco, Serre et al. (2015) included illicit substances, and Veilleux and Skinner (2015) included food (noting that they excluded illicit substances because "a cursory review of the papers on drug cues indicated that there were not enough papers consistent with the mission of this [their] review"; ibid.: 16).

[277] Relevant reviews were identified (e.g., Verplaetse and McKee, 2017; LeCocq et al., 2020) but did not meet the present inclusion criteria (e.g., they were not systematic reviews).

related cues increased subsequent alcohol use). Two reviews focussed on the role of craving as a mediator (Serre et al., 2015; Veilleux and Skinner, 2015). The extent to which situational abstinence and spaces of no substance use were considered was not clear, and several reviews (e.g., Hughes et al., 2011; Mair et al., 2019; Stanesby et al., 2019) appeared to have focussed on contexts associated with substance use.

The review by Stanesby et al. (2019) was the only one to focus on "combinations and sequences of context-related factors" (ibid.: 1) instead of considering contextual factors in relative isolation from each other. The mapping review by Stevely et al. (2020b) was the only one to examine theoretical underpinnings of included studies. Their mapping review was the most similar to the preliminary review carried out for the present study (see previous section).

Features of primary studies included within the reviews

In total, the eight reviews reported on 493 unique articles relevant to the present thesis[278], spanning several decades of research. The earliest included papers were published in 1975. The number of articles or studies relevant to the present thesis ranged from 6 (Mair et al., 2019) to 278 (Stevely et al., 2020b). The high number of studies in the mapping review by Stevely et al. (2020b) was noteworthy, especially as their search strategy included specific search terms to focus on 'event-level' research. The present review accounted for overlap of primary studies between reviews[279]. However, even where overlap was substantial, the different perspectives pursued by review authors meant that review findings were not duplicated. A comparison with the preliminary review (section 4.1.4) showed that only 12 papers were included in the preliminary review *and* at least one of the reviews included here; thus, the evidence base covered here adds to the one presented earlier[280].

The primary studies included in the reviews represented a variety of research designs, including retrospective recall (e.g., interviews, surveys), ecological momentary assessment (EMA), daily dairy, experiments, and observations; however, some reviews excluded certain study designs[281]. Most reviews were limited to quantitative study designs, while two reviews

[278] Three reviews with a broader remit (Serre et al., 2015; Veilleux and Skinner, 2015; Mair et al., 2019) included studies that were not relevant to the present thesis (see Appendix D.3 for details). The stated number (493 articles) already excludes the non-relevant primary studies.
[279] Specifically, 431 articles were included in only one review each; 61 articles (12% of 493) were included in two reviews; and one article was included in three reviews. The overlap was greatest between Stevely et al. (2020b) and Stanesby et al. (2019): these two reviews shared 41 articles. The overlap between the two tobacco reviews (Serre et al., 2015; Veilleux and Skinner, 2015) was very limited: they shared only two articles. The nested reviews by Stevely and colleagues were considered as one review for the purposes of determining overlap.
[280] This was likely due to different scopes and search strategies. Appendix C.2 highlights the 12 overlapping studies.
[281] For example, Serre et al. (2015) limited themselves to studies using ecological momentary assessment (EMA);

included also qualitative studies (Hughes et al., 2011; Cox et al., 2019). Outcomes were measured, for example, via researcher observations, study participant self-report, blood alcohol content (BAC) levels, or smoking topography devices. In terms of populations, Cox et al. (2019) focussed on adolescents (13-19 years old), while Mair et al. (2019) and Stevely et al. (2020a, 2020b) focussed on adults. Special populations (e.g., alcohol-dependent populations) were excluded by Stevely et al. (2020a, 2020b) and Stanesby et al. (2019). Primary studies originated mostly from the USA, Europe, Australia and Canada. The list of primary studies included in the reviews is available from the present author upon request.

The role of 'space' in the included reviews

Turning now to how space and socio-spatial aspects were conceptualised in these reviews, 'context' and 'environment' were the most common concepts (e.g., 'immediate drinking context' in Stanesby et al., 2019; 'environmental factors' in Hughes et al., 2011). Stanesby et al. (2019) and Stevely et al. (2020b) in particular also spoke of 'occasions' and 'events'[282]. The two reviews reporting on tobacco-related outcomes focussed rather on 'cues' (Serre et al., 2015; Veilleux and Skinner, 2015)[283]. 'Place' was a central concept only in two reviews (Mair et al., 2019; Stevely et al., 2020a); the term 'location' was otherwise more common. Of importance to the present thesis, 'space' was not generally used as a concept, although it was a central term in one review (Mair et al., 2019) and another review (Stanesby et al., 2019) was funded by a project on 'youth nightlife spaces'. Terms such as 'spatial' or 'geospatial' were used in two reviews (Cox et al., 2019; Mair et al., 2019), but no review referred to 'socio-spatial' aspects. Nevertheless, this term will be used here for consistency with the remaining thesis.

All reviews but one (Serre et al., 2015) categorised socio-spatial aspects further. Two reviews distinguished between 'social' and 'physical' aspects (Mair et al., 2019; Stanesby et al., 2019), while one review considered 'physical', 'social' as well as 'staffing' aspects (Hughes et al., 2011). Cox et al. (2019) distinguished 'situational', 'social' and 'location' factors. Stevely and colleagues used the most elaborate framework, comprising six categories. The category labels differed between the two reviews; the more recent review listed 'people', 'place', 'timing', 'psychological states', 'drink type' and 'other' (Stevely et al., 2020a: 311). By contrast, Veilleux

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Veilleux and Skinner (2015) appeared to include mostly experiments, while experiments were excluded by Stanesby et al. (2019). Some reviews (e.g., Hughes et al., 2011) included intervention studies, while others (e.g., Stevely et al., 2020b) excluded these.

[282] Stanesby et al. (2019: 2) offer the following definitions: "Event-level alcohol consumption refers to an individuals' drinking pattern during a given occasion. An occasion typically refers to a day or evening, but may be more specific (e.g., during a visit to a venue)".

[283] Overall, Serre et al. (2015) did not employ a socio-spatial approach, speaking instead of "intra-individual moderators" (ibid.: 16).

and Skinner (2015) took a more methodological approach, distinguishing between 'target' cues (i.e., directly related to substance use) and 'neutral' cues. It was thus noticeable that, compared with the alcohol-only reviews, the two reviews with tobacco-related outcomes did not attempt to conceptualise socio-spatial aspects and differentiate them further.

Several reviews referred to a specific framework to categorise socio-spatial aspects: Cox et al. (2019) drew on the 'social–ecological framework of drinking contexts and alcohol-related problems' proposed by Freisthler et al. (2014); Hughes et al. (2011) used categories from Graham and Homel (2008); and Stevely et al. (2020a, 2020b) referred to Shove et al.'s (2012) 'theories of practice' approach to conceptualise 'context' as referring to 'materials', 'competencies', and 'meanings'[284]. The other reviews did not refer to a specific framework to categorise socio-spatial aspects. It was noteworthy that those reviews which referred to specific conceptualisations went beyond a basic 'physical versus social' distinction and did not necessarily refer to 'physical' aspects.

In contrast to the preliminary review, several of the included reviews considered also internal/ psychological states (e.g., positive or negative mood). Stanesby et al. (2019) considered these in addition to socio-spatial aspects (i.e., distinguishing 'individual characteristics/state' from 'physical environment' and 'social environment'). A distinction between internal states and socio-spatial aspects was, however, not emphasised in Stevely et al.'s work (2020a, 2020b), where psychological states were one of six categories of 'contextual characteristics' (see above). Serre et al. (2015) considered socio-spatial aspects and internal/psychological states in one group of 'intra-individual moderators' (ibid.: 16).

The role of 'space' in the included primary studies

The socio-spatial aspects covered in the primary studies within those reviews were broad, echoing the findings of the preliminary review reported earlier. For example, similarly to the preliminary review, Stevely et al. (2020a: Table S3) identified over 60 contextual characteristics at the detailed level. Considering the primary studies across reviews, drinking location and timing (e.g., time of day, day of week) appeared to have been frequently studied, as well as people (e.g., number of people present, gender, friendliness, substance use, relationship), activities (e.g., other substance use, meals, dancing, work), materialities (e.g., substances, signs, 'venue style', ventilation) and norms (e.g., permissiveness, drinks promotions), although they were not always categorised in this way.

[284] It was not clear on what basis Stevely et al. developed their own six-category framework.

Stevely et al. (2020b) examined the theoretical approaches used within the studies. They found that most of the 278 studies included in their review did not state a theoretical approach; and if theoretical approaches were stated, they did not usually relate to conceptualisations of drinking spaces or occasions (but to e.g., the theory of planned behaviour, motivational models) (Stevely et al., 2020b: 221). The other reviews did not explicitly analyse the theoretical underpinnings of included studies, but several reviews noted limitations of primary studies' conceptualisation of spaces and socio-spatial aspects. Two reviews (Cox et al., 2019; Mair et al., 2019) commented that 'activity spaces' (i.e., locations visited as part of daily routines) have not yet been extensively researched in relation to alcohol use. Stanesby et al. (2019) commented that only few studies examined "factors related to the individual, the social environment and the physical environment" (ibid.: 19, original emphasis) and that only few studies explored sequences of aspects. In a similar vein, Stevely et al. (2020b) noted that "only 53 (19.1%) papers studied three or more occasion characteristics and most [n = 189; 68.0%] used methods that assume occasion characteristics do not change during an occasion" (ibid.: 224). Stevely and colleagues linked this explicitly to "the lack of theory-based conceptualization of drinking occasions" (p. 224), concluding:

> the literature to date offers a much-reduced view of occasions, with only a small number of occasion characteristics (or elements) included within each study and no clear rationale offered for decisions on which characteristics are or are not included (Stevely et al., 2020b: 226).

Stevely et al. (2020b: 226; 2020a: 317) thus considered that additional socio-spatial aspects may be relevant but have not yet been researched due to limited conceptualisations of drinking occasions or too specific research interests[285]. A related consideration emerging from the present review is that, while some review authors included and discussed contradictory findings, non-significant findings were generally *not* extracted from primary studies by review authors (though there were exceptions, e.g., Veilleux and Skinner, 2015). It thus remains unclear if or what additional socio-spatial aspects have been studied in primary research and found to be unrelated to substance use.

[285] Of note, Stanesby et al. (2019) suggested that more research on physical aspects is required, as they identified only few such studies (ibid.: 19). However, Stevely et al. (2020b: 226) found that "most papers used material elements (such as drinking in a loud environment [reference omitted]) as predictors for their outcome of interest". Furthermore, physical aspects (e.g., lighting, noise, crowding) were a focus in Hughes et al. (2011). There was no overlap of primary studies between the two reviews by Hughes et al. and Stanesby et al., suggesting that the search strategy by Stanesby and colleagues may not have identified relevant studies.

Insights regarding the relationship between socio-spatial aspects and substance use

The included reviews generally found a relationship between socio-spatial aspects and substance use. Socio-spatial aspects associated with substance use or related harms (in particular alcohol use) highlighted in multiple reviews were: location (e.g., certain settings); timing (e.g., weekends); availability (e.g., pricing, physical access); other people present (e.g., number of people, their characteristics and substance use); and whether other substances were used (e.g., illegal substances). However, as noted above, non-significant findings were typically not considered by review authors. The review by Veilleux and Skinner (2015) was an exception and reported, for example, that "none of the few studies that tested for cross-mode outcomes (e.g. the effect of food or alcohol cues on smoking topography, or the effect of smoking cues on alcohol consumption) found a significant cue exposure effect" (ibid.: 19).

Mediators (i.e., the intermediate variables connecting context to substance use) were hardly discussed in the reviews, being explicitly addressed only by Veilleux and Skinner (2015) and Stevely et al. (2020a, 2020b). Veilleux and Skinner (2015) found that craving increased the likelihood of subsequent use but argued (ibid.: 15) that cues may also influence behaviour without conscious craving, namely via automatic processes. Considering other mediators, and in line with the present Chapter 2, Stevely et al. (2020b: 226) observed that "most papers used material elements [...] as predictors for their outcome of interest. However, they did not explore the meanings the respondent associated with these materials [...] which could mediate or moderate the observed associations with outcome measures". Stevely et al. (2020a) also discussed the role of consumption as a mediator between context and harm (see below). In addition, Serre et al. (2015), drawing primarily on tobacco studies, found that contextual factors increased craving and that craving increased the likelihood of subsequent use[286]. Stanesby et al.'s (2019) work on 'sequences' of factors could also be understood as exploring mediators, but the available evidence (ibid: 18-19) in this regard was limited.

By contrast, moderators (i.e., additional variables that affect the strength or direction of the relationship between context and substance use) were discussed in all reviews but one (Mair et al., 2019). These were typically individual characteristics such as age, gender, substance use (e.g., type of drinker, level of use)[287], and personality. However, the review by Stanesby et al. (2019) – with its focus on sequences and combinations of multiple factors – showed that

[286] However, Serre et al. (2015) did not explicitly describe craving a mediator between context and substance use, instead conceptualising socio-spatial aspects as 'moderators of craving'.
[287] Counter to what might be expected, Veilleux and Skinner (2015: 22) found that motivation to quit was not frequently considered: "The role of quit motivation is the least explored motivational element in the cue-reactivity literature, which is ironic as an underlying motivation to restrict or restrain use is a central element in temptation scenarios and generally highlighted in the self-regulation literature".

socio-spatial aspects themselves interact and moderate each other's relationship with substance use. Contextual factors were also conceptualised as moderators in the relationship between individual characteristics (e.g., gender) and substance use (Stanesby et al., 2019: 2). Several reviews (e.g., Hughes et al., 2011; Serre et al., 2015; Veilleux and Skinner, 2015) did not explore moderators empirically but hypothesised regarding possible moderators as part of their discussion; and this was typically an area identified as requiring further research.

Stevely et al. (2020a) addressed the relationship between context, substance use, and harm. Most reviews used indicators such as substance use quantity as proxies for harm, based on the assumption that substance use related harms result from heavier use patterns. For example, Stanesby et al. (2019: 2) justified their focus on heavy drinking with reference to possible immediate or delayed harms. However, Stevely et al. (2020a: 310) questioned whether the relationship between context and harm could indeed be fully explained via consumption[288]. The review authors found that these questions had not been sufficiently addressed in the primary studies (Stevely et al., 2020a: 317–318). Their own review suggested that contextual factors can produce harms independently of consumption levels (ibid.: 309).

Implications for prevention identified in the reviews

Review authors often noted methodological implications[289]. Implications for prevention were formulated only in three reviews[290]. Stevely et al. (2020a: 318) suggested, for example, targeting the use of illegal substances, increasing food availability, or increasing staff numbers to reduce alcohol-related harms. Mair et al. (2019: 418) suggested, for example, restricting access to (or providing support in) specific locations, times and social interactions associated with alcohol use, or using such information to inform brief interventions and prevention messages. In relation to alcohol use by adolescents, Cox et al. (2019: 471–472) highlighted, for example, parent-based strategies (e.g., restricting access to alcohol in the home, active supervision during parties) and restricting access to bar environments. Cox et al. (2019: 472) also suggested legal measures to hold hosts responsible for underage drinking, though they had not examined laws in their review. There was thus some variety in the degree to which

[288] This is methodologically important: if there is a direct relationship between context and harms (independent of consumption level) or if context moderates the relationship between consumption and harm, then harms should be measured separately (i.e., not only consumption as a proxy measure) (Stevely et al., 2020a: 310).
[289] For example, the potential benefits of newer methodologies (e.g., EMA; Cox et al., 2019; Mair et al., 2019), need for more European research in different countries (Hughes et al., 2011), further research on interactions of different contextual factors, including temporal sequencing (Stanesby et al., 2019) and delayed outcomes (Veilleux and Skinner, 2015), considering other moderatos (e.g., motivation to quit; Veilleux and Skinner, 2015), measuring harms (Stevely et al., 2020a, 2020b), and clearer conceptualisation of drinking occasions (Stevely et al., 2020a).
[290] Two reviews (Veilleux and Skinner, 2015; Stevely et al., 2020b) made no reference to intervention possibilities. Two reviews (Hughes et al., 2011; Stanesby et al., 2019) noted that their research could inform interventions, without making specific suggestions. One review (Serre et al., 2015) considered treatment (e.g., craving control).

stated implications were directly linked to review findings; this link appeared to be strongest in the review by Stevely et al. (2020a) and weakest in the review by Cox et al. (2019). The reviews did not comment on any preventive recommendations made in the included primary studies.

4.1.6. Examples of primary studies on space and substance use

While the above reviews gave an overview of the field, there is value in taking a closer look at existing primary studies that resemble the present research. Also, the reviews identified in the previous section were more likely to include studies with quantitative research designs, so giving attention to more qualitatively (and theoretically) oriented work is important to gain a more complete picture of this research area. The aim here is to describe research that was similar to the present study and which can therefore serve as a reference point for the specification of the present research in section 4.2 and for the discussion in Part 4. Repertory grid studies are considered first, followed by studies using other theories and methods. Special attention is given to recommendations for prevention offered in these studies.

Repertory grid studies on substance use

Section 4.1.3 outlined repertory grid research examining everyday spaces, places or situations *without* a substance use focus. This section complements that earlier review by focussing on studies *with* a substance use focus. Repertory grids have been repeatedly used in the substance use field[291]. For the present context, the initial focus was on studies that had used spaces, places or situations as their elements with an analytical focus relating to substance use. As only two such studies were identified (Lynch, 1995; Schmidt and Sapsford, 1995), the scope was broadened to include studies that had used substances as elements. Three such studies were identified (Scriven et al., 1989; Gains and Thomson, 1990; Shek, 2012), so that this subsection reports on five studies[292, 293]. Data extraction tables are shown in Appendix D.5.

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[291] Fransella et al. (2004: 211) include a short section on repertory grid applications relating to "the use and abuse of drugs", and searches conducted for the present thesis identified further examples. Studies have typically focussed on substance users' construal of themselves, hypothetical selves and other people (e.g., Deubner, 1999; Weiss et al., 2003), including in therapeutic contexts (e.g., Bailey and Sims, 1991; Faccio and Costa, 2013), but they have also explored, for example, staff views of clients with dual diagnosis (Ralley et al., 2009), smokers' construal of intervention effectiveness (Vogt et al., 2010), substance users' construal of HIV and other diseases (Walton and Eves, 2001) or the usefulness of repertory grids for the evaluation of substance use prevention programmes (Shek and Lam, 2011).

[292] Appendix D.2 illustrates the search strategy. In addition, members of the mailing list PCP@JISCMAIL.AC.UK recommended studies for the present section, but this led to no additional studies being identified for inclusion.

[293] Examples of excluded studies: one study on consumer perceptions of wine packaging (Rocchi and Stefani, 2006) was excluded because it focussed too narrowly on the appearance of wine bottles and labels. The repertory grid study by Deubner (1999) considered smoking situations but as an add-on using a structured questionnaire (i.e., not as part of the repertory grid interview itself). Voss (2015) used a 'laddering' technique but not in a formal repertory grid context; the study is therefore covered separately in the next subsection.

Of the five studies, two studies focussed on alcohol (Scriven et al., 1989; Gains and Thomson, 1990), one focussed on tobacco (Lynch, 1995), one covered a range of substances (Shek, 2012), and one had no specific substance use focus (Schmidt and Sapsford, 1995). The two alcohol studies were related (i.e., undertaken by the same research group, applying the same approach to different elements). Accordingly, elements were canned lager beers (Gains and Thomson, 1990), a broad range of alcoholic beverages (Scriven et al., 1989), smoking situations (Lynch, 1995), a range of legal and illegal substances including heroin, cough medicine, alcohol, cigarettes and food items (Shek, 2012), and English pubs (Schmidt and Sapsford, 1995). The number of elements was lowest in the study by Schmidt and Sapsford (1995) (6 elements) and highest in the study by Scriven et al. (1989) (22 elements). Ideal or other fictional elements, although conceivable (e.g., 'my ideal drug', 'my ideal pub'), were not used in the reviewed studies.

The elements were entirely researcher-determined in four studies. Lynch (1995: 99) presented situations showing "people smoking in different circumstances and in various situations" which had been "selected from health education resource materials". Thus, the smokers and non-smokers participating in Lynch's study were commenting on pictures showing *other* people smoke. The other studies also appeared to have asked participants to comment on elements regardless of whether participants had personal experience relating to the elements or not. The exception was Schmidt and Sapsford (1995) who appeared to have supplied categories (e.g., 'most frequently visited' pub, 'disliked' pub) for which participants could use personal elements. This sample of studies thus differed clearly from the studies reviewed in section 4.1.3 which had involved participants in the selection of elements more strongly.

Another noteworthy difference vis-à-vis the repertory grid studies in section 4.1.3 related to the use of a qualifying phrase. While none of those studies had indicated the use of such a phrase, most studies here (all except Schmidt and Sapsford, 1995) used a prompt to steer participants in a particular direction. Lynch (1995) asked about reasons for smoking, while Shek (2012) asked about 'most important' similarities and differences. The studies by Gains and Thomson (1990) and Scriven et al. (1989) deviated from standard repertory grid technique: they used a qualifying phrase to elicit situations associated with the use of various alcoholic beverages and then asked participants to rate the alcoholic beverages with regard to their 'appropriateness' for each elicited situation. Thus, they used one focus for construct elicitation and another for the ratings. A similar approach was evident in Schmidt and Sapsford (1995) who seemed to have been non-prescriptive during construct elicitation but then asked participants to rate constructs in terms of 'importance'. Shek (2012) was the only who explicitly used supplied constructs, namely "addictive versus nonaddictive and lethal versus nonlethal" (ibid.: 3).

Table 6: Categories of constructs in prior repertory grid studies (substance use contexts)

Source	Scriven et al.[a] (1989: 173–178)	Gains and Thomson[a] (1990: 699–703)	Lynch (1995: 101)	Shek (2012: 4)	Schmidt and Sapsford (1995: 19–20)
Method	Principal component analysis (PCA)	Principal component analysis (PCA)	Hierarchical cluster analysis	Qualitative content analysis	Qualitative content analysis
Number	Five components	Three components	Nine categories	Four categories	Five categories
Categories	• Thirst-quenching vs. not • Formal meal vs. social drinking environment • Before meals vs. after meals • In a pub vs. home or outdoors activities • Consumed neat vs. mixed	• Treat/indulgence/special occasion/to get drunk vs. with meals/outdoor activities/for refreshment/thirst quenching • For refreshment/thirst quenching/party/away from home [opposite pole not stated] • Away from home vs. at home/friends round	• Worried • Individual • Image • Rebel • Enjoyment • Calming • Habit • Experiment • Exciting	• Psychological consequences • Addictive nature • Harmful effects • Other aspects	• Environment • Customers • Staff • Entertainment • Product

Note. For improved readability, text is quoted from stated sources without quotation marks. For details including quotation marks, see data extraction tables in Appendix D.5.
[a] The two studies by Scriven et al. and Gains and Thomson were undertaken by the same research group.

While only three of the seven repertory grid studies in section 4.1.3 categorised elicited constructs, this was the case for all studies reviewed here. Categories were derived using principal component analysis (Scriven et al., 1989; Gains and Thomson, 1990), hierarchical cluster analysis (Lynch, 1995) or qualitative content analysis (Schmidt and Sapsford, 1995; Shek, 2012). Analyses involved fewer steps and resulted in fewer categories than the analyses covered in section 4.1.3. This is evident from Table 6 above. The number of categories ranged from three (Scriven et al., 1989) to nine (Lynch, 1995), and all used a simple one-level structure (cf. the nested two-level structures in Table 5, p. 131). This is likely a methodological artefact[294], but it may also point to a greater breadth and complexity of constructs applicable to the everyday spaces, places and situations in section 4.1.3, compared with substances and specific substance use contexts covered in this section[295]. None of the studies included here referred to socio-spatial theory. Gains and Thomson (1990) and Scriven et al. (1989) offered their own conceptualisation of 'context', "operationally defined as being a time, manner, place or circumstance in which a food product is consumed" (Scriven et al., 1989: 174).

Considering Table 6 in terms of content, the different methodological approaches are reflected in the results, but common themes are evident. The studies with a specific substance use focus (i.e., all except Schmidt and Sapsford, 1995) all included categories describing substance use *effects* (e.g., 'thirst-quenching', 'indulgence', 'enjoyment', 'calming', or 'psychological consequences'). Construct categories thus referred to a relationship between a substance and (potential) users of the substance. The studies by Gains and Thomson (1990) and Scriven et al. (1989) identified specific use contexts (e.g., 'before meals vs. after meals'), whereas the study by Lynch (1995) identified various affects associated with use. However, it is important to recall that the extent to which these studies considered participants' own substance use practices was limited[296]. The exception was Schmidt and Sapsford (1995) who asked participants to consider pubs they were familiar with. This study also differed in terms of the results: the construct categories referred to objective/physical features of the pubs studied, and they were therefore more similar to the constructs relating to green spaces and neighbourhoods shown in the earlier Table 5.

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[294] For example, it may reflect the smaller sample sizes (see below) and thus lower number of constructs to categorise, as well as the use of qualifying phrases and thus narrower range of elicited constructs.
[295] In other words, people may use a greater range of constructs, with a more complex structure, when thinking about everyday spaces, places and situations, and use fewer, simpler constructs when thinking about substances and substance use contexts. However, as noted above, methodological features of the studies may have limited the breadth and complexity of constructs elicited in relation to substances and substance use contexts.
[296] Even though Scriven et al. and Gains and Thomson elicited study participants' own use contexts, they then asked about 'appropriateness' of situations in relation to alcoholic beverages; the study by Lynch showed other people smoking (and included non-smokers in the sample); and Shek only required that study participants be current abusers of cough medicine.

All but one study reported on differences between participants groups; the remaining study (Schmidt and Sapsford, 1995) reported differences between individuals. However, the sample sizes overall and at the level of participant groups were extremely small in some cases. Overall sample sizes ranged from 5 (Schmidt and Sapsford, 1995) to 20 (Scriven et al., 1989; Gains and Thomson, 1990) (median: 19); they were notably smaller than in the studies in section 4.1.3. It is worth noting that three of the five studies were described as pilot studies (Scriven et al., 1989; Lynch, 1995; Schmidt and Sapsford, 1995).

Differences between elements were explored in detail in the two related alcohol studies. Gains and Thomson (1990) found, for example, that different types of beer were considered appropriate for different situations (e.g., special occasions, being at home or away from home). Scriven et al. (1989) identified three major groups of alcoholic beverages: spirits and fortified wines; wine and champagne; and beers. Within these groups, study participants made further distinctions, for example based on whether beverages were appropriate for before or after meals, at home or at pubs, at formal or less formal occasions, after exercise, in hot weather, and so on. Shek (2012) explored differences primarily with regard to how similarly or differently substances were construed, offering a detailed description only for his substance of interest (cough medicine). He also found that different substances were construed differently; however, elicited constructs referred mostly to drug effects. Schmidt and Sapsford (1995) and Lynch (1995) did not report systematically on element differences.

In terms of implications for prevention, three studies were situated in a ‘market research’ context (Scriven et al., 1989; Gains and Thomson, 1990; Schmidt and Sapsford, 1995), with two studies funded by industry. Consequently, if specific recommendations were made, these described, for example, how advertising could be improved to present products in line with customer expectations (Scriven et al., 1989). The other two studies (Lynch, 1995; Shek, 2012) were situated in a prevention context. However, in both cases, preventive recommendations were only partially based on the empirical data. A preventive recommendation that related more closely to the data was to target the overly positive construal of cough medicine and raise awareness regarding its potential harms (Shek, 2012: 11).

In summary, and considering section 4.1.3, only few repertory grid studies have addressed the topics of interest to the present thesis, and even fewer have done so in a context of substance use prevention. This section highlighted the potential diversity of constructs and construct categories, suggesting that researcher interests and decisions on study design have a substantial impact on the ‘identified’ construct categories. The most similar studies to the present one were Scriven et al. (1989) and Lynch (1995), and the strengths and limitations of these studies can help to contextualise the present research.

Primary studies using other theories and methods

The following paragraphs give examples of relevant research beyond repertory grids. Studies using methods related to repertory grids are followed by illustrations of different theoretical approaches, namely affordances, situated conceptualisations, situational action theory, assemblages, actor network theory, and social practices.

Some identified studies were very similar to repertory grid studies. For example, Marinelli et al. (2014) (n=430, Italy) explored how five beverage types (wine, beer, spirits, alcopops, soft drinks) were perceived differently. They asked about occasion characteristics (e.g., time of week, meals, indoors/outdoors), purchase locations, reasons for use, and – of interest to the present study – they also included a semantic differential containing 17 bipolar attributes[297], which allowed them to visually represent differences between beverages (ibid.: 123). The authors showed not only that the beverages were construed differently (e.g., beer and spirits as more similar, cf. wine), but that construals differed between groups representing different types of drinkers. However, all socio-spatial aspects were supplied, developed based on literature reviews and consultations with researchers and industry representatives.

Another study (Voss, 2015) used laddering[298]. This technique can help elicit constructs in repertory grid studies but was presented here outside a repertory grid context. Seeking to "expose the primary benefits that clubbers seek" (Voss, 2015: 59), the author distinguishes "attributes" as "the tangible and intangible features of a club", from "consequences" (in this case with a focus on benefits) and "abstract values" that are of personal importance to clubbers' self (ibid.). Attributes identified by this sample (43 Swiss clubbers preferring RnB or hip-hop music) referred to other patrons' characteristics, music, drinks offer, furniture, and accessibility. Consequences were "good mood, having fun, financial independence, flexibility, no trouble, socializing, relaxation, and dancing"; identified values were "well-being, hedonism, and safety" (Voss, 2015: 59). A "hierarchical value map" of "laddering-chains" (Voss, 2015: 60) shows how attributes lead to consequences and thus contribute to the achievement of values. Thus, Voss points to the meanings that physical/material aspects can hold, but also how such physical/material aspects enable certain activities and (bodily) states.

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[297] The 17 attributes were: "cheap-expensive, happy-sad, young-old, comfortable-uncomfortable, intimate-collective; sophisticated-ordinary, pleasant-unpleasant; usual-occasional, classic-modern, relaxing-exciting, not-socializing-socializing, sacred-profane; euphoric-depressing; quality-poor quality, status symbol-not status symbol; appealing-not appealing, trendy-not trendy" (Marinelli et al., 2014: 119).

[298] In the laddering technique as applied in the study by Voss (2015), "the questioner frequently queries why an attribute, consequence or value is essential to the clubber [as part of in-depth interviews]" (ibid.: 59).

Like some repertory grid studies reviewed earlier (Scriven et al., 1989; Gains and Thomson, 1990; Schmidt and Sapsford, 1995), Voss (2015) and Marinelli et al. (2014) point out that their research can support industry with marketing activities, although Marinelli et al. (2014) also note the potential for their research to inform social marketing activities by government. The present review identified further work exploring 'customer' perceptions, for example, of nightlife environments (e.g., Kubacki et al., 2007; Bujisic, 2014). This work was similar to the present study in that it explored how experiences related to features of such environments, but it was situated in a very different paradigm. Future work could review this research and translate author conclusions targeted at industry (aimed at increasing profit rather than prevention or harm reduction) into possible insights for public health intervention.

Turning now to work that has sought to inform public health, Hill's research (2014, 2018a, 2018b) on 'affordances' relating to alcohol use was already mentioned in Chapter 2. This work also focussed on nightlife settings, this time in England. In one study, Hill et al. (2018b) conducted observations, while in another study (Hill et al., 2018a), participants (n=12) viewed images showing different nightlife venues to comment on how features of these venues might affect their alcohol use. Alcohol-related affordances identified through the observations related to: "Alcohol access, regulations, furnishing, alternative opportunities for action, décor and lighting, drink and accessory availability, and action opportunities provided by others" (Hill et al., 2018b: 747)[299]. On this basis, specific recommendations for prevention and harm reduction were offered (e.g., "incorporating drinks holders and safe shelving to put drinks down safely", "stocking sufficient numbers of smaller drinks containers", "restricting alcohol on the dance floor and by the bar"; Hill et al., 2018b: 753). Strengths of Hill et al.'s approach included their consideration for a greater range of environmental aspects, and that affordances were identified empirically rather than having been specified in advance. A limitation of the observation-based approach was that authors had to rely on speculation to explain observed relationships between physical/material aspects and alcohol use. The interviews helped to bridge this gap by eliciting meanings associated with the environment. However, meanings and explanations offered by participants were not analysed further. Another potential limitation of their research was the use of supplied images.

Chapter 2 also referred to Papies' work on 'situated conceptualisations' (Box 2, p. 64). Whilst Papies' empirical work has focussed on food, a recent study (Keesman et al., 2018) explored how alcoholic beverages are "represented" (i.e., construed) by users in the Netherlands. A

[299] Alcohol-related affordances identified in the interviews differed slightly: "accessibility, communicating with others, consuming food, grasping items, furniture availability, watching or listening to entertainment, advertisement placement, premise décor and alternative action opportunities" (Hill et al., 2018a: 457).

property generation task was used in a laboratory (n=110) and in a bar (n=56) to elicit 'typical'[300] properties relating to alcoholic beverages, soft drinks and water. Beverages were shown as images and were partially chosen by participants in the lab but fully supplied by researchers in the bar. Participants' answers were categorised according to an existing scheme. The authors found that "alcoholic beverages were more strongly represented in terms of the social context of consumption (e.g., 'with friends') than the other beverages" (Keesman et al., 2018: 654). In the laboratory, participants who associated alcohol with social context were more likely to report regular alcohol use. In the bar, the authors found no association with drinking patterns on that evening, but it was hypothesised that participants had likely decided to drink before entering the bar (Keesman et al., 2018: 664). This study was thus similar to the present research but focussed on the substances (products) themselves and could explain individual- rather than situation-level consumption. The authors suggested that knowledge of 'content representations' can inform interventions (Keesman et al., 2018: 664): for example, interventions could be tailored to address the most salient representations (e.g., social context) or the least salient representations (i.e., representations did not generally refer to negative consequences and so awareness of such consequences could be increased; Shek, 2012, in the previous subsection, made a similar recommendation). The authors also suggested that the property generation task could be used to assess representations prior to intervention.

Chapter 2 also referred to Wikström's (2010) situational action theory. To mention one example of criminological work drawing on this theory, Anamali (2013) explored whether acceptance or refusal of a first-time cannabis offer was related to "social proximity" (i.e., how close the relationship was with the person making the offer) and "proximity to home" (i.e., own house > other house > school grounds > public spaces) (ibid.: 28-29). These factors were chosen based on situational theories of crime, including Wikström's, and they were explored quantitatively using a school-based questionnaire (n=831, Canada). Results confirmed that offers by best friends and in the adolescent's own home (i.e., the most proximal sources and locations) were most likely to be accepted straight away. Analyses exploring subgroup differences (e.g., delinquency, low self-control) suggested that situational factors were of greater relevance for first-time acceptance of cannabis than individual factors. Implications for preventive work were, for example, to address the possibility of drug offers and refusal strategies with children starting from a young age, and to encourage parental supervision in the own home (Anamali, 2013: 64–65). The author acknowledged that the range of included situational and individual factors

[300] Specifically, "participants [...] were asked to write down the typical properties of each object that spontaneously came to mind [...], and to name at least 5 properties" (Keesman et al., 2018: 656–657).

was limited; for example, attitudes toward substance use were not assessed (Anamali, 2013: 61). While this study shows that 'proximity' matters, the reasons for this were not explored.

Chapter 3 introduced Duff's work on 'assemblages'. In his empirical work, which has explored the use of alcohol and illegal substances through interviews in Canada and Australia, one focus has been on how drug assemblages affect users – not in terms of physiological changes but especially in terms of how users are enabled to feel more connected with people and places (Duff, 2014a: 136–137, 140-141). Duff organises his findings using the categories 'spaces', 'bodies' and 'affects', derived from Deleuzian thinking. Objects such as mobile phones, clothing and music are discussed in relation to how they shape substance use experiences. In this perspective, phenomena such as alcohol-related violence emerge not from the substance or user but the entire assemblage, and Duff suggests that future research consider which specific assemblages contribute to negative outcomes (2014a: 147–148). He also argues that interventions have focussed too much on the individual, while "other forces, other spaces, bodies and affects, are also potentially modifiable in the work of reducing harmful encounters with drugs" (Duff, 2014a: 143); this work thus supports environmental interventions to reduce harms (ibid.: 146-147). The focus on harms offers a different perspective vis-à-vis the research shown earlier, which was primarily concerned with whether substance use takes place or not.

A similar perspective is offered by Dilkes-Frayne (2014), who draws on Latour's Actor Network Theory (ANT) to explore how drug use events are (co)produced by a range of human and nonhuman actors. Dilkes-Frayne (2014: 446ff.) suggests that the term "event" (rather than "context") invites us to retrace how specific substance use outcomes come into being over time and across places. As part of a broader ethnographic study, participants wrote diary entries following a substance use event, which were then explored during follow-up interviews. The article cited here (Dilkes-Frayne, 2014) traces the consumption event of a young man using MDMA at a music festival in Australia, from when the festival ticket is bought until the event is completed from the participant's point of view. Dilkes-Frayne's analysis highlights the many factors (e.g., experience of past festivals, music, people, layout, the absence of sniffer dogs) which, in this case, produced a pleasurable MDMA experience, also noting how a different arrangement could have produced other outcomes. The elaboration of factors in chronological order offers a novel approach; however, factors and their interplay were not systematised further. The article concludes by suggesting that interventions should account for the dynamic nature of settings (e.g., how a venue space may change during an evening) and the limited agency of individuals in affecting substance use outcomes; interventions may thus benefit from considering how events can be shaped to be less harmful (Dilkes-Frayne, 2014: 473–476).

Chapter 3 also pointed to social practices as a theory of increasing relevance in the substance use field. In the present context, Supski et al.'s (2017) qualitative interview research (n=50, Australia) of university students' drinking as social practice is interesting. The analytical unit is the practice, which is explored using Shove et al.'s (2012) framework of 'materials', 'meanings', and 'competences'. Orientation week was identified as a key point at which students were recruited into the practice. The authors identified college spaces, free or cheap alcohol, mobile phones and social media as key materials. For meanings, "drinking was understood to be liberating, pleasurable and a fun activity central to belonging at university" (Supski et al., 2017: 232). Key competences referred to managing intoxication, social relationships, and risk. The authors noted the gendered nature of these competences (e.g., threat of sexual violence for women versus physical violence for men required different competences; ibid.: 234). Specific prevention recommendations were, for example, to reduce availability of free or cheap alcohol (materials) and to offer non-alcohol related opportunities to socialise and establish a sense of belonging (meanings) (ibid.: 235). The former would serve to make the drinking practice more difficult and the latter would strengthen alternative practices, and the authors suggest that future research could explore practices that do not involve alcohol use (ibid.: 236). This points to a study limitation (i.e., other practices were not considered); another potential limitation concerns the sample (self-selected undergraduate students).

Research by Ally et al. (2016) provides further insights on differences *within* drinking practices, also using practice theory. The authors used a large commercial dataset (n=60,215, Great Britain) including retrospective 1-week drinking diaries to identify different types of drinking practices using latent class analysis. Eight types were identified: "Mixed location heavy drinking"; "Heavy drinking at home with a partner"; "Going out with friends"; "Get together at someone's house"; "Going out for a meal"; "Drinking at home alone"; "Light drinking at home with family"; and "Light drinking at home with a partner" (Ally et al., 2016: 1573). The methodology allowed the authors to systematically describe each type in detail, including beverage type, use quantity, location, people present, day of the week, timings, reason and motivation for use (using supplied categories; ibid.: 1573-4). The proportion of occasions representing each type was reported in relation to all drinking occasions and in relation to all study participants. This led the authors to conclude that high-risk drinking practices are less common than is often assumed (ibid.: 1577). The authors draw interesting conclusions, for example that interventions could specify which type of practice they are targeting and that different practices may present different challenges for intervention (ibid.: 1576-77); they also ask decision-makers to consider what combination of types "would represent a culture requiring no further intervention?" (Ally et al., 2016: 1577).

In a follow-up study, Stevely et al. (2021) sought to predict quantity of use (in alcohol units) based on occasion characteristics. Occasion duration emerged as the strongest predictor. Drinking in on- and off-trade locations at the same occasion, starting earlier in the day, and drinking with friends predicted longer drinking occasions. This led the authors to suggest that occasion duration may be a more important factor than day of the week (the more commonly researched variable). Prevention recommendations on this basis were to encourage shorter occasions and to limit access to on-trade venues for intoxicated persons. The authors also identify the need for future work to study causal mechanisms. While the datasets used in these two studies contained many characteristics, both author groups note that this was a market research database and questionnaire items did not correspond to practice theory or the substance use literature (e.g., important variables missing, not using validated questionnaires).

These examples show that different theories support different methodological approaches but mutually enriching insights. The next section summarises strengths and limitations of the reviewed evidence base to provide a frame of reference for the present study.

4.1.7. Research gaps and implications for the present study

Empirically derived frameworks for socio-spatial analysis

Chapter 3 suggested that empirically derived frameworks should be considered alongside theoretically derived frameworks. One such empirically derived framework (Gustafson, 2001) was presented in section 4.13. However, the proposed poles of 'self', 'others' and 'environment' were rather broad. Though Gustafson's analysis of interview transcripts also produced specific categories of elicited place meanings, these were many and were not recommended by the author as potential framework aspects. An additional consideration from a substance use point of view is that the study focussed on important places, whereas substance use may also occur in personally unimportant places.

Implications arising from discussion of Gustafson's triangular model:

- Open coding of interview transcripts can result in factors that are too numerous and too specific for use in a framework for socio-spatial analysis
- Do not limit present study to personally important places only

Repertory grid studies

The review identified 12 relevant repertory grid studies. Seven studies explored everyday spaces *without* a substance use focus (see section 4.1.3). Of these, only three categorised

elicited aspects, and the resulting categorisations were complex, unclear or not widely applicable to micro-environments. Nevertheless, they highlighted a range of socio-spatial aspects, including some common themes (e.g., visual appearance). It also became clear that socio-spatial categories can be formulated in different ways, for example, at different levels of abstraction and along a continuum from factual/objective to personal/subjective.

Regarding substance use, the review identified two repertory grid studies exploring everyday spaces and three studies exploring substances or related products (see section 4.1.6). All five studies categorised the elicited aspects, but the scope of categories was narrow (e.g., reasons for smoking, tangible features of pubs) or only indirectly related to socio-spatial aspects (e.g., physiological effects of substances). The elements (spaces or substances) were typically researcher-defined, and *none of the studies related elicited constructs to participants' own substance use*. Also, socio-spatial theories were not used. Together, the 12 repertory grid studies illustrated a range of methodological options (e.g., formulation of qualifying phrase, element choice) and highlighted benefits of the repertory grid technique (e.g., possibility to compare many different substances). It also became clear that identified socio-spatial aspects are largely determined by researcher choices (e.g., choice of elements, qualifying phrase).

Implications arising from discussion of repertory grid studies:

- Socio-spatial aspects of substance use have not yet been extensively researched using repertory grid technique; in particular, relationships between personal constructs and actual substance use have not yet been explored
- The present study should use a carefully chosen qualifying phrase
- Elements in the present study should reflect range of situations from participants' own life

Given the limitations of the repertory grid studies identified above, the remaining section will answer the review questions based on a broader evidence base relating to substance use and space. Sections 4.1.4 to 4.1.6 summarised recent reviews and primary studies representing different methods and theoretical approaches. A high number of studies has researched socio-spatial aspects of substance use: this is not one coherent research area but comprises different strands of research emerging from different disciplines. The present review focussed mostly on studies with socially integrated, non-dependent users (exception: cigarettes).

What socio-spatial aspects are explored or proposed in the literature?

A broad range of settings has been explored overall, though many studies focussed on particular settings (e.g., nightlife settings; also noted by Wilkinson, 2015). Similarly, a broad range of socio-spatial aspects has been explored overall, including characteristics of people, locations,

timing, activities, materialities, and norms. However, individual studies differed in terms of how many aspects were considered. The range was not usually broad, and quantitatively oriented research typically included only a few aspects (also noted by Stevely et al., 2020b)[301]. Factors were usually addressed in isolation from each other (but see e.g., Stanesby et al., 2019, and Stevely et al., 2021, for exceptions). By contrast, qualitatively oriented research typically addressed a greater range of interrelated aspects but not in a structured way. Though in some cases socio-spatial aspects were derived from the data, they were often defined in advance by researchers. Stevely et al. (2020b) observed that it was not always clear how socio-spatial aspects were chosen. Another finding of the present review was that existing reviews are biased toward reporting socio-spatial aspects associated with substance use[302].

Implications arising from discussion of socio-spatial aspects:

- Consider a broad range of settings and socio-spatial aspects
- Consider interplay among socio-spatial aspects and with individual characteristics
- Report on all analysed socio-spatial aspects (not only those related to substance use)

What is known about the relationship between socio-spatial aspects and substance use?

Socio-spatial aspects of alcohol use appeared to be well researched, whereas reviews and primary studies relating to tobacco and illegal substances appeared to be less common[303]. Most studies appear to focus on a single substance, and other substance use is occasionally included *as a contextual aspect* (not an outcome). A range of outcomes has been considered, including any use, use quantity and (to a lesser extent) harms, as well as 'target-dystonic' outcomes (for these, see Veilleux and Skinner, 2015, in Appendix D.3). The literature offered insights into how socio-spatial aspects relate to these outcomes, sometimes in complex ways (e.g., friends can increase substance use but reduce related harms; Supski et al., 2017). Socio-spatial aspects highlighted in multiple reviews as related to substance use or harms were: location; timing; availability; presence of other people; and other substances use. Few studies seem to have explicitly explored spaces associated with no or rare substance use. The consideration of practices *not* associated with alcohol use was highlighted as a research desideratum by Supski et al. (2017).

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[301] In addition, Stanesby et al. (2019) noted that studies rarely considered individual, physical *and* social aspects.
[302] Though it is most interesting to know which socio-spatial aspects are associated with substance use, it is also useful to know what socio-spatial aspects have been researched and found to be *not* associated with use.
[303] This may be due to several factors. Research on socio-spatial aspects of alcohol use has a tradition in relation to preventing alcohol-related violence in bars (see Hughes et al., 2011). Also, smoking may be seen as an individual characteristic instead of being context-dependent (Veilleux and Skinner, 2015: 19).

The original review questions did not ask about mechanisms, but this emerged as an additional topic of interest during the review. The literature considers moderators (e.g., gender, age) which affect the relationship between socio-spatial aspects and substance use. However, mediators – understood here as the steps in-between physical environment and substance use outcomes – are hardly considered (also noted by Stevely et al., 2020b)[304]. This can result in rather descriptive studies which report frequent or typical drinking contexts without offering any explanations. Intangible socio-spatial aspects, such as atmospheres and meanings, have been studied, but they are often not analysed in detail. Also, they are not usually considered as emerging from the interplay of physical aspects and human interpretation. Though the review found examples of empirically derived pathways (e.g., narrated: Dilkes-Frayne, 2014; visualised: Voss, 2015), these were sketches rather than fully developed models. Another issue identified in this review was assumed causality and associated language (e.g., that context 'increases risk' for alcohol use) on the basis of correlational data. Even if data are temporally sequenced, causality should not be assumed, but texts often implied causality[305]. It was frequently unclear to what extent alternative explanations had been considered. A further discussion of these issues is not possible here (but see Stevens, 2020); a recent article (Stevely et al., 2021) also noted the need for research into causal mechanisms.

Implications arising from discussion of substance use findings:

- Consider multiple substances, including as outcomes
- Include spaces of no or rare substance use
- Explore – don't assume – causal mechanisms

How is 'space' conceptualised theoretically?

Though no study referred to Löw's 'sociology of space' (presented in Chapter 3) as its primary approach, other relational and more-than-human theories (e.g., assemblage, actor-network, affect, social practice) seem to be relatively established in qualitatively oriented research in this field (e.g., used by about half of the qualitatively oriented studies included in the preliminary review, see section 4.1.4). However, also in qualitative work, the underlying concept of 'space' was often unclear, and this was especially so for quantitatively oriented studies (also noted by Stevely et al., 2020b). Lack of reference to socio-spatial theory may mean that analyses and

[304] Craving appeared to be the main mediator considered in the literature (especially in relation to smoking).
[305] For example, Stanesby et al. (2019: 18) write: "older college students are particularly likely to drink heavily on weekend days if they are in a positive mood that day". It is also possible that these students were in a good mood because they were looking forward to getting drunk later. It must be noted that Stanesby and colleagues generally spoke of associations and avoided causal language, so the cited passage highlights the difficulties of writing about relationships without implying causality.

conclusions are not as well developed as they could be. While quantitatively oriented studies often refer to environmental cues, cues are not usually conceptualised further. Attempts at integrating different theoretical perspectives were rare; studies did not usually refer to work outside their own theoretical niche.

The reviews in section 4.1.5 categorised socio-spatial aspects in different ways. It was often unclear on what basis the categories had been developed and how socio-spatial aspects were allocated to categories; categories were rarely defined. This resulted in inconsistencies within and between reviews. While this can be read positively as availability of different proposals of socio-spatial frameworks for the substance use field, it raised the question whether a harmonised and theoretically informed framework may benefit the field more.

Implications arising from discussion of theoretical underpinnings:

- Referring to Löw's 'sociology of space' approach may add a novel perspective, especially if it is discussed in relation to existing theories
- Be clear on how socio-spatial categories are developed
- (Consider proposing a ‘master’ framework of socio-spatial aspects or integrating available frameworks – could not be pursued in this thesis)

What methodological approaches are used?

Socio-spatial aspects of substance have been researched using a very broad range of methodologies, though, as noted earlier, repertory grid applications are practically non-existent. Methodological approaches have developed over time; for example, Stevely et al. (2020a: 310) notes that alcohol research has developed from focussing on bar environments to considering a broader range of contextual factors. Further developments include the use of ecological momentary assessments and virtual reality. Ecological momentary assessment appeared to be mostly quantitatively oriented. Socio-spatial aspects were often chosen by researchers rather than derived from empirical data, and if they were empirically derived, they were not always presented in a structured form. This may also explain why the identified systematic reviews typically chose to include only quantitative designs. Section 4.1.6 identified studies in which socio-spatial aspects were derived empirically *and* presented clearly. A consideration here was that the chosen approach (e.g., observation, use of visual stimuli) likely affects what socio-spatial aspects are identified. Another issue was that, due to the focus on single substances, different substances were not usually systematically compared.

Implications arising from discussion of methods:

- Derive socio-spatial aspects empirically and present them in a structured form
- Consider that the study design affects what socio-spatial aspects are identified
- Compare multiple substances systematically

What recommendations for prevention are made, if any?

The systematic reviews in section 4.1.5 did not summarise recommendations made in the primary studies and rarely made their own specific recommendations. By contrast, the primary studies reviewed in sections 4.1.6 frequently made such recommendations (or suggestions), and the diversity of those recommendations was noteworthy. Overall, recommendations supported environmental prevention, though authors also discussed how their work might inform informational or developmental approaches to prevention. However, some suggestions appeared to reflect authors' general beliefs or were targeted at increasing industry profits (though these could still inform preventive work); this was also an issue of the reviewed repertory grid studies. In relation to this, some authors appeared to suggest preventive actions independently of available evidence of effectiveness or ethical considerations.

Implications arising from discussion of prevention recommendations:

- It is common practice to propose specific preventive actions, but these should be based on the data and take into account ethics and evidence of effectiveness

4.2. The present study

4.2.1. Problem summary and significance

In recent years, increased attention has been given to environmental measures to prevent substance use. In Chapter 2, a review of the EMCDDA's key report on the topic (Oncioiu et al., 2018) as well as underlying theories highlighted two main problems:

- a conceptualisation of the environment in mostly physical terms (section 2.4.1);
- a tendency toward viewing the person-environment relationship in a deterministic way, with substance use as an automatic response to environmental stimuli (section 2.4.2).

These points are problematic because they limit our creativity in terms of what environmental prevention may look like (e.g., focus on physical cues directly related to substance use) and

predispose us toward restrictive and coercive interventions that are questionable in terms of ethics and effectiveness (section 2.4.3). The chapter identified the reliance on a behaviourist-psychological paradigm and dual-process theories as potential sources of these issues.

To offer a different perspective, Chapter 3 outlined how the environment can be conceptualised from a sociological point of view, drawing on relational socio-spatial theory (with a focus on Löw, 2001, 2016). This perspective emphasises the role of humans as those who interpret physical environments and who act based on the meanings that emerge from such interpretation. Section 3.3.2 described five ways in which such a theoretical perspective may enrich research relating to environmental substance use prevention. Briefly, these referred to:

- potential for new ideas regarding intervention strategies;
- better understanding of mechanisms linking person, environment and substance use;
- identification of barriers and facilitators to intervention uptake;
- involvement of target populations in intervention design; and
- avoiding unhelpful conceptual dualisms.

However, it is unknown to what extent current frameworks for socio-spatial analysis correspond with how people actually think about space. Section 3.4 suggested that an approach drawing on personal construct theory (Kelly, 1963/1955) may allow relevant insights into how people interpret environments. These insights could help develop socio-spatial theory further, and they could also help address the issues identified with regard to environmental prevention. Specifically, they may support the development of interventions that are less coercive or restrictive, which highlights the scientific and social significance of the present research.

Research regarding socio-spatial aspects of substance use should inform the development of environmental interventions. To this end, Chapter 4 reviewed existing research to understand what socio-spatial aspects have been analysed, how environments have been conceptualised theoretically, and what conclusions have been drawn so far with regard to substance use and possible implications for preventive work. The appraisal of this evidence in section 4.1.7 found that the literature often focussed on:

- spaces of *substance use* (cf. spaces associated with no or rare substance use);
- *single* substances, especially alcohol (cf. situated substance use patterns involving multiple substances);
- *tangible* aspects, with their symbolic meaning only implied (e.g., ‘close friends’) (cf. trying to understand *why* and *how* physical aspects affect substance use);

- *researcher-determined* spaces and socio-spatial aspects (cf. spaces and socio-spatial aspects of relevance to study participants);
- *individual* socio-spatial aspects (cf. relational arrangements of aspects).

While some qualitative studies overcame these limitations, they did not elicit and present socio-spatial aspects in a structured way. Current approaches may thus limit our understanding on the relationship between substance use and space. Also, the existing literature has limited potential to inform new directions in environmental prevention: if existing research gives little attention to the mediating steps between environment and substance use, this supports deterministic understandings of the person-environment relationship; and if existing research focusses on individual physical aspects within spaces of substance use, this supports an intervention focus on removing those aspects.

Against this background, the present study seeks to understand which socio-spatial aspects matter to people, in general and specifically in relation to *their own* substance use. To overcome limitations of prior research, the study uses a 'sociology of space' approach combined with repertory grid technique to systematically elicit socio-spatial aspects and consider multiple substances and a range of settings (including spaces of no or rare substance use). The study also explores potential causal mechanisms and the interplay of various factors in producing specific patterns of situated substance use. Section 4.2.3 delimits the practical scope of this work in terms of populations, spaces, substances and outcomes.

The review in Chapter 4 also considered methodological aspects of the current evidence base, and these provided useful pointers to inform the design of the present study (see Part 2).

4.2.2. Specific research questions

The overarching research question informing the present study was: *How do construed socio-spatial aspects relate to situated substance use?*

For the introduction, section 1.1 broke this question up as follows:

- *How do people think about their everyday spaces?*
- *How does this relate to their substance use in those spaces?*

These two questions are now specified further in preparation for the empirical study. The below lists also indicate the chapters in which each question is answered. For the first question, we need to understand:

- What settings and situations can be part of everyday life? (Chapter 9)
- What socio-spatial aspects might people refer to when interpreting their everyday spaces? (Chapter 10)

To elicit socio-spatial aspects in a structured way, the repertory grid technique is used; the socio-spatial aspects are operationalised as 'personal constructs'. Chapter 10 provides data to support a discussion of existing socio-spatial theory, and a question of interest is the extent to which the empirical data mirror Löw's (2001, 2016) aspects of space constitution.

Chapters 9 and 10 provide the basis from which the relationship between construed socio-spatial aspects and situated substance use can be explored. Main questions are:

- What situated substance use patterns could be distinguished in relation to alcohol and cigarettes? (Chapter 11)
- How might these situated substance use patterns differ in terms of the identified socio-spatial aspects? (Chapter 11)
- Which construed socio-spatial aspects could be relevant to distinguish between situated substance use patterns? (Chapter 12)
- How can socio-spatial aspects produce specific instances of situated substance use or abstinence? (Chapter 12)

The relationship between construed socio-spatial aspects and situated substance use is thus explored from multiple perspectives. Chapter 11 takes a more 'static' and quantitatively oriented perspective by systematically comparing all identified patterns of situated substance use in terms of *how* they differ. A special focus is placed on *spaces of no or rare substance use*, as abstinence is often negatively connotated (e.g., as 'boring' or something to be mocked about, e.g., Supski et al., 2017: 233; Parder, 2018: 194), yet insights into these spaces might facilitate innovation in prevention. In relation to this, the study considers how different situated substance use patterns compare with hypothetical, subjectively *ideal* spaces.

Chapter 12 takes a more 'dynamic' and qualitatively oriented perspective by exploring example pathways linking socio-spatial aspects and situated substance use, thus allowing insights into *why* situated substance use patterns are construed differently and how they *come into being*. Chapter 12 therefore also supports insights regarding possible causal mechanisms, interplay between different types of factors, and, consequently, potential mediators and moderators.

Section 1.1 also listed a third question, namely: *How can the answers to these questions inform prevention interventions?* Section 13.5.2 offers some considerations in this regard.

Overall, the *aim of this thesis* in relation to environmental substance use prevention and studies on socio-spatial aspects of substance use is to show that there is added value in considering:

- construed socio-spatial aspects in addition to basic descriptors or tangible features;
- spaces of no or rare substance use in addition to spaces of substance use; and
- sociological theories on space in addition to the theories currently used.

In doing so, the thesis should help advance research on contextual factors of substance use, environmental substance use prevention, and socio-spatial theory (see section 13.5).

4.2.3. Scope

For the purposes of the empirical study, the broad scope of the research questions formulated above was limited as follows.

Substances

The study focussed on alcohol and cigarettes. Initially, the study sought to compare alcohol, cigarettes and cannabis as the most commonly used substances in Europe, which are also regulated differently socio-spatially. Cannabis was also of interest because the literature review found that socio-spatial aspects relating to the use of illegal substances have not yet been extensively researched. The Ethics Committee of the University of Vienna requested that the study be limited to legal substances only (see Chapter 8). Use of medicines for non-medical purposes was also covered during data collection for completeness, but it was not a focus in the data analysis, as only one study participant reported current use.

Population

The study focussed on non-vulnerable, socially integrated populations, and within that group, on female university students. Participants had used alcohol or cigarettes at least once in the three months prior to signing up for the study. Individuals who reported experiencing weekly or daily health, financial, legal or social problems due to alcohol or cigarette use were *not* eligible to take part. The participants and selection criteria are further described in Chapter 5. Section 13.4.4 reflects on how the choice of study population related to the research findings.

Socio-spatial aspects

The study focussed on construed socio-spatial aspects, which is to say that socio-spatial aspects were perceived by study participants and were not necessarily objective or tangible or

related to substance use. Socio-spatial aspects were operationalised as ‘personal constructs’ elicited during a repertory grid interview. The study sought to elicit personally important aspects, and a qualifying phrase (“… in terms of something that you like or dislike”) was used during the interview for this purpose (see section 6.2.5). It was considered to extract further socio-spatial aspects from the interview transcripts, but finally this was not deemed feasible (see section 7.5.3). Additional socio-spatial aspects are nevertheless presented when elaborating situational components in Chapter 9 and pathways in Chapter 12.

Spaces

The study included situations, places and other spaces that occurred or were visited by study participants in a typical week, as well as spaces that were personally important to participants or relevant to their substance use (e.g., representing subjectively typical or heavier substance use). All spaces had occurred or been visited in the six months prior to interview. The overall focus on ‘everyday’ spaces and ‘typical’ substance use emerged from numerous perspectives, including a focus on routines in the ‘sociology of space’ (see Chapter 3) but also a desire to understand the role of substance use in participants’ everyday life.

Outcomes

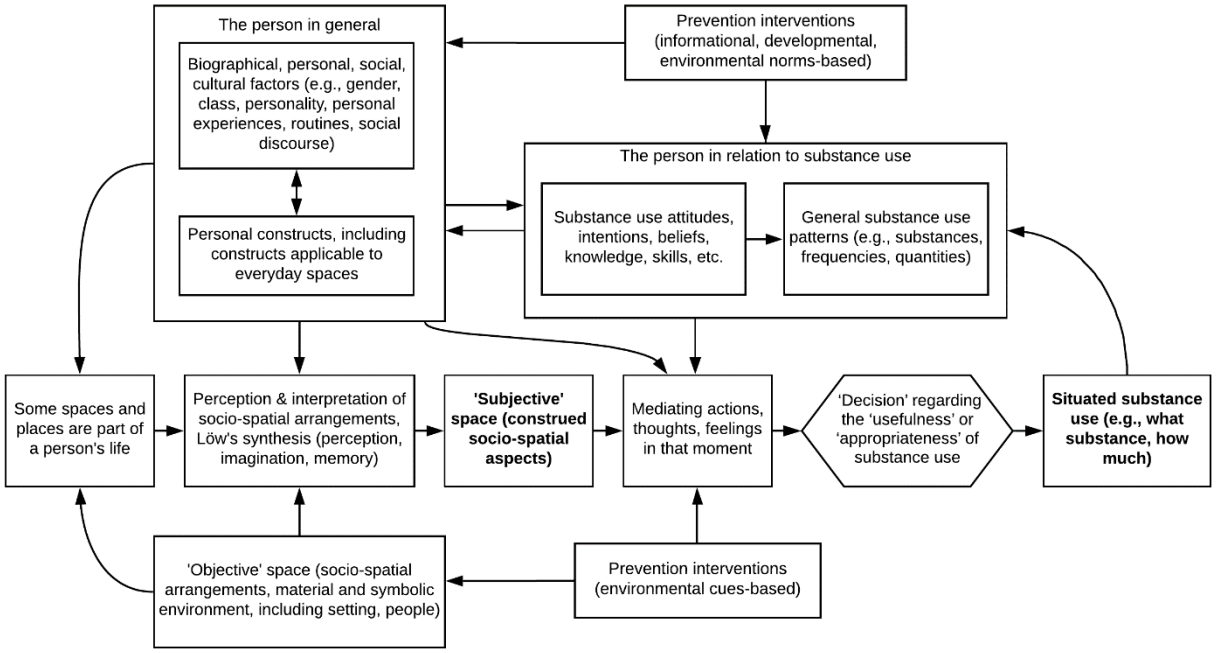
The study focussed on situated substance use, and within that, on self-reported frequency of use. Patterns of situated substance use were formulated in terms of how frequent a particular substance or product was reportedly used in that space (from ‘never’ to ‘always’). Considering research desiderata identified in the literature (e.g., Duff, 2014a; Stanesby et al., 2019; Stevely et al., 2020a; see sections 4.1.5 and 4.1.6), situated patterns could have also been formulated in terms of other outcomes such as harm, so that comparisons would have been made between spaces representing different types or levels of harm. The focus on substance use frequency was appropriate for the present study (e.g., due to its focus on substance use prevention and the chosen population of users reporting few adverse consequences of use). Positive and negative consequences of use are considered in the pathways in Chapter 12.

4.2.4. Conceptual model to guide the empirical study

To think through the relationships between environment, construed socio-spatial aspects, the person, personal constructs, substance use, prevention interventions, and other factors or variables, a draft conceptual model was drawn up that could help visualise these relationships and combine different concepts into a coherent whole. The development and use of such a conceptual model is recommended by Gläser and Laudel (2010: 77–90) and Miles et al. (2014:

20ff.) (which were key reference works during the present data analysis), and early drafts were refined based on their guidance. The draft model prior to fieldwork is shown in Figure 2 below.

Figure 2: Draft conceptual model on socio-spatial aspects of substance use



Source: Author's own, created in Lucidchart.

The draft model summarised the assumed relationships based on the insights gleaned from the literature review and the author's own considerations. In Figure 2, the construed socio-spatial aspects and situated substance use outcomes are highlighted in bold as the key elements of interest (in line with the research questions outlined earlier). The upper half of the model shows elements that vary less from situation to situation, while the lower half of the model outlines those aspects more specific to a given situation. In line with recommendations in the literature (Gläser and Laudel, 2010; Miles et al., 2014), the draft model informed the research design and helped, for example, to clarify which elements would be a focus of the empirical study – and which ones not (e.g., 'objective' space). It also served as a template during the elaboration of pathways for Chapter 12.

The draft model was thus a heuristic developed for a specific purpose rather than an attempt to provide a comprehensive model of situated substance use. Ideally, section 4.1 would have included a review of existing models to explain (situated) substance use (or other relevant behaviours), but this would have extended the scope of the literature review too far. A cursory comparison with visual models in relevant publications (e.g., Franken, 2003; Strack and Deutsch, 2004; Kavanagh et al., 2005; Lorenc et al., 2012; Freisthler et al., 2014; Wiers et al., 2016; Papies, 2017; Dacremont and Sester, 2019; Betancur et al., 2020; Pechey et al., 2020) suggested that the draft model does not contradict these but that it could usefully complement

them through a greater ‘socio-spatial’ emphasis. The reviewed (mostly psychological) models highlight additional elements, such as the substances themselves and their characteristics, what happened before the specific situation (e.g., as ‘affect’), or outcomes of use (e.g., harms). They typically focus on the box shown in Figure 2 as ‘Mediating actions, thoughts, feelings in that moment’ and provide details in that regard. In the present context, it was not a priority to conceptualise these mediators further, and greater emphasis was placed on how objective socio-spatial arrangements may translate into subjectively construed spaces. Certain ‘sociology of space’ aspects (Chapter 3) were also left out, such as Löw’s concept of ‘spacing’ (relevant at multiple points in the model but not a focus of the present study). For simplicity, societal influences (e.g., spatial structures) were not shown separately but included as social and cultural influences on the individual person. Models visualising Löw’s ‘sociology of space’ approach could not be identified.

The model was revisited at the end of this project, and Chapter 13 presents and discusses the revised version. The draft model is shown here for transparency, so that the basis for the pathways in Chapter 12 is clear, and so that changes between the draft and the revised version in Chapter 13 may be better appreciated.

PART 2: METHODS

The methods are presented in four chapters:

- Chapter 5, “Study participants”, describes the 24 female university students who participated in this research and documents the strategies used to define, engage and select participants. Recruitment generated a list of interested individuals from which study participants could be selected using criterion sampling. A challenge was that the criteria defined prior to the fieldwork were found to be too strict to be practically useful. The last section shows how recruitment, including in-person contact with over 280 individuals, resulted in the final sample of 24 individuals.

- Chapter 6, “Data collection”, focuses on the repertory grid interview as the main data collection method in the present study. Repertory grid methodology comprises many different design aspects which allow researchers a great amount of flexibility. The chapter describes the various interview parts, showing how the technique was tailored to the needs of this study. The final section outlines additional data collection that informed the present study but was not formally analysed.

- Chapter 7, “Data analysis”, presents the techniques used to analyse the constructs, elements and ratings elicited during the repertory grid interviews, as well as the interview transcripts. Given this diversity of data, it was not appropriate to use a single analytic approach. Techniques were tailored to data types and research questions and included qualitative approaches (e.g., content analysis, causation coding) as well as quantitative approaches (e.g., cluster analysis, calculation of effect sizes). Challenges at this stage included a heterogeneous dataset as well as lack of established analytical strategies suited to address the research questions.

- Chapter 8, “Ethical considerations”, outlines the measures to protect study participants and to ensure an overall ethical approach. Unique to this study was the use of a linking system to separate potentially identifying data from other potentially sensitive information already at the point of online data collection. Institutional ethics approval was received from the University of Vienna. Conditions placed upon this project by the ethics committee included limiting the study to legal substances.

5. Study participants

The empirical study was based on interviews with 24 female university students in Vienna who were current users of alcohol or cigarettes but not illegal substances. They were recruited in person, via social media or referral and selected using defined criteria. This chapter starts by describing the socio-demographic and substance use profile of this sample. This is followed by details regarding the eligibility criteria and recruitment. Section 5.6 provides an overview flowchart which shows how recruitment strategies and the application of eligibility criteria resulted in the final sample.

5.1. Description of the study sample

This section characterises the study sample to facilitate an understanding of the basis for analysis and possible generalisation, where appropriate. Although a fairly homogeneous study sample was envisaged, this was not feasible in practice, as explained below. Appendix M discusses the heterogeneity of the sample and how this was mirrored in the data.

Table 7: Final eligibility criteria for study participants

Inclusion criteria	• Interested in a face-to-face interview • Sufficient German skills to participate in interview • Enrolled at the University of Vienna at least 12 months prior to interview • Studies at one of three faculties at the University of Vienna: Business, Economics and Statistics; Mathematics; or Law • 18-26 years old • Female • Never been married or entered a civil partnership • Lives in Austria (any region) • Living at current address for at least six months; three months if previously lived in the same region • Any alcohol or cigarette use in past three months
Exclusion criteria	• Pregnant or trying to conceive • Has one or more children • Works full-time • Never has enough money to meet needs • Poor or very poor physical or mental health • Health, financial, legal or social problems due to alcohol or cigarette use on a weekly or (almost) daily basis in past three months • Failed to do what was normally expected due to alcohol or cigarette use on a weekly or (almost) daily basis in past three months • Used cannabis or other illegal substances in past 12 months (non-medical use only) • Ever injected a substance (non-medical use only) • Ever been in treatment for substance use • Was based on the street or in homeless shelter for at least two nights in past 12 months

The main sampling strategy in the present study was criterion sampling, as will be explained in section 5.2.1. The sample was not intended to be representative of the entire student population. The criteria – which addressed a wide range of characteristics – are described and justified in detail in section 5.3, while section 5.5 describes how information on these criteria was collected. Table 7 above shows the final eligibility criteria. These criteria defined the participant group to a large extent, as individuals were *only invited to interview if they met all of the inclusion criteria and none of the exclusion criteria*. For example, all study participants were female students at one of three faculties at the University of Vienna, lived in Austria, and were 18 to 26 years old, and *none* of them worked full-time, had children or reported poor physical or mental health or very frequent substance use related problems. Also, none of them reported use of illegal substances for the 12 months prior to sign-up. Variety within the study sample could therefore only occur within the parameters set by these eligibility criteria. Nevertheless, especially for some of the broader criteria (section 5.3 describes how criteria were narrow to start with but had to be broadened during the fieldwork), there was still considerable variety within the sample. Relevant data are provided in Appendix M.

5.1.1. Considering all study participants as a group

Of the 24 study participants, 18 were recruited in person (11 by a research assistant and seven by the study author), five were recruited online via Facebook, and one person was recruited through referral by a friend of the study author. None of the participants were personally known to the study author prior to the interviews. Some participants indicated that they knew each other, which was addressed, for example, through additional measures regarding anonymity (described in section 8.3.4). Section 5.4 provides further details on recruitment procedures, while section 8.3.6 comments on participants' motivation to take part.

Socio-demographic and other details about participants were collected through online questionnaires and at the beginning of the face-to-face interviews (described in sections 5.5 and 6.2.1). All questions and answer options can be viewed in Appendices G.2, G.3 and H.5. Clarifications and corrections were obtained during the interviews[306]. Appendix M.1 shows an overview table of participants' responses. The following paragraphs describe these data and include additional details from the transcripts.

[306] While this led to some corrections in the dataset with regard to general background and living circumstances, the data relating to substance use and health in this section are generally those entered by participants on the screening questionnaire. They were not amended by the study author for this overview, even if participants provided information during the interviews that suggested a different substance use pattern or health status.

General background

Appendix M.1 shows that half of participants (12; 50%) studied law at the time of fieldwork, while almost a third (7; 29%) studied business, economics or statistics, and just over a fifth (5; 21%) studied mathematics. No participant studied two or more of these subjects. However, almost a third (7; 29%) studied additional subjects (e.g., languages) or trained to become a teacher. All studied at bachelor's or master's level (i.e., no doctoral students). The average age of participants was 21,7 years. Most (20; 83%) were born in Austria or had lived in Austria between the ages of 6 and 18 years, though a large proportion (10; 42%) reported that both parents had been born outside Austria. Just over half (14; 58%) reported having at least one parent with a university degree or an equivalent tertiary education (Austrian *Fachhochschule*). Though no participant worked full-time (in line with eligibility criteria), most (19; 79%) were employed part-time or occasionally. Participants with regular part-time employment generally worked as office assistants (e.g., related to their field of study), though some also worked in call centres or the catering industry. Several of those who reported occasional work were babysitters. Those studying statistics or mathematics also worked as private tutors. Most participants (17; 71%) reported having enough money to meet their own needs.

Living circumstances

All study participants lived in Austria, and almost all participants (21; 88%) lived in Vienna at least some of the week. The remaining three participants lived in small towns or rural areas within an hour's commuting distance to Vienna. Over a third of participants (9; 38%) lived with their parents at least some of the week[307]. Participants had never been married (in line with the eligibility criteria), but about two thirds (15; 63%) reported having a partner. Half of these (8; 33% of 24) reported living with their partner at least some of the week. Six participants (25% of 24) lived with flat/roommates, while only four participants lived alone (at least some of the week). Other constellations included living with friends or siblings. All participants had lived at their main address for at least six months prior to sign-up, and over a third of participants (9; 38%) reported living at that address for ten years or more.

[307] The phrase "at least some of the week" reflects that five participants (21%) moved back and forth between different homes on a weekly basis, for example between their parents' and their partner's home, or between their parents' home outside Vienna and student residences in Vienna.

Use of alcohol and cigarettes

In line with eligibility criteria, all participants reported using alcohol or cigarettes in the three months prior to sign-up[308]. All participants had used *alcohol* in their lifetime, with an estimated average age of 14,3 years for the first full drink (range from 9 to 17 years, SD=1,8). Only one participant (4%) had not used alcohol in the three months prior to sign-up. By contrast, a third (8; 33%) reported weekly or daily alcohol use for the three months prior to sign-up. Those who had used any alcohol in the three months prior to sign-up reported drinking an average of 2 to 3 standard drinks (e.g., small glasses of wine or beer) per typical drinking day (see Appendix M.1 for details on calculation).

With regard to *cigarettes*, almost a third of participants (7; 29%) had never used cigarettes in their lifetime, and one additional participant reported never having smoked a *full* cigarette. For those who had, the average age for the first full cigarette was estimated at 15,5 years (range from 12 to 20 years, SD=2,0). Thirteen participants (54% of all 24; 76% of 17 who had ever smoked) reported using cigarettes in the three months prior to sign-up, of which six (25% of all 24; 35% of 17 who had ever smoked) reported weekly or daily cigarette use for that time frame. Those who had used cigarettes in the three months prior to sign-up reported smoking an average of approximately seven cigarettes per typical smoking day (see Appendix M.1 for details on calculation). However, there were considerable variety on this indicator.

Specific alcoholic beverages and nicotine products

Appendix M.1 includes a detailed overview of products used by participants *at least once* in the six months prior to interview[309]. *Beer* was the most common product overall, mentioned by almost all participants (22; 92%). Use of *wine* was also common (20 participants; 83%), as was the use of spirits or mixed drinks (20 participants; 83%). *Cider* was the least commonly reported alcoholic beverage (10 participants; 42%). Follow-up questions at the interview found that beer and wine were also the most frequently used alcoholic beverages and were frequently also participants' preferred products. Participants liked the taste and perceived wine or beer as easily available, affordable, and appropriate for everyday use (e.g., with meals). Several participants also commented that they could avoid (or control the level of) intoxication and other physical effects more easily with wine or beer than with spirits or mixed drinks.

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[308] Although the original eligibility criteria had foreseen narrower criteria in this regard (e.g., alcohol *and* cigarette use), broader criteria had to be applied in practice (to be explained later in this chapter).
[309] While eligibility for an interview was determined based on substance use patterns for the last 12 months and the last 3 months, the timeframe referred to *during* the interview was the last six months prior to interview.

Outside of alcoholic beverages, *cigarettes* were most commonly reported (14 participants; 58%). Use of *waterpipe* was also common (nine participants; 38%), though especially for this product, some participants highlighted that they did not use it frequently. Use of other nicotine products was not commonly reported, with only two participants reporting the use of *cigars or similar products* in the context of holidays or birthdays. Only one participant reported the use of *electronic cigarettes*.

Other substances

Two participants reported non-medical use of *medicines*, with alcohol and/or for cognitive enhancement, though one of them had recently stopped such use due to adverse health effects. Four additional participants reported lifetime non-medical use of medicines but no use for the six months prior to interview. *Volatile substances (inhalants), sedatives, sleeping pills or new psychoactive substances* were not used: no participant reported use in the six months prior to interview, and only one participant reported lifetime use of volatile substances. In line with eligibility criteria, all participants reported only the use of legal substances in the 12 months prior to sign-up. Screening data suggested that about half of study participants had used *illegal substances* (e.g., cannabis) before this 12-month period[310].

Recent changes in substance use frequency or quantity

Study participants were also asked to comment if their substance use had *changed in the six months prior to interview*. With regard to alcohol, most reported that their use had fluctuated and described exceptional periods of drinking more (e.g., Christmas period, on holiday, at the beginning of the university term) or drinking less (e.g., prior to exams). Any sustained changes within the six-month period were typically reductions in alcohol use as part of a healthier lifestyle or to improve study performance. With regard to cigarettes, changes were also frequently reported and included sustained reductions (e.g., as part of a healthier lifestyle) as well as increases (e.g., related to exam periods).

Substance use related problems and attempts to quit or reduce use

Almost half of participants (11; 46%) rated their current *physical health* as very good, and a similar proportion (10; 42%) rated their *mental health* as very good[311]. Items from the World

[310] To protect participants, the screening questionnaire did not ask direct questions about use of illegal substances (further explained in section 8.3.1). The stated proportion was estimated based on the number of participants who indicated that “Liste 1” applied to them (a list of items which, inter alia, referred to lifetime use of illegal substances).
[311] Individuals with ‘poor’ or ‘very poor’ physical or mental health were not eligible for interview (see Table 7 above); the eligible answer options referred to ‘very good’, ‘good’ and ‘fair’ health.

Health Organization's 'Alcohol, Smoking & Substance Involvement Screening Test' (ASSIST) questionnaire (WHO ASSIST Working Group, 2002; Schütz et al., 2005; Humeniuk et al., 2008) were combined with additional questions to understand how participants viewed their own substance use, as follows.

A fifth of participants (5; 21%) viewed their own alcohol or cigarette use as (rather) problematic. One participant (4% of 23 current drinkers) viewed her *alcohol* use as rather problematic, explaining that drinking had become too ingrained in everyday life and that she had therefore made a conscious effort to reduce her use in recent months. The other participants viewed their alcohol use as rather unproblematic, for example, because they felt they did not drink much or only within the limits they set for themselves, perceived others to drink more, or restricted use to contexts they saw as appropriate (e.g. only when going out, only in company). Four participants (31% of 13 current smokers) viewed their *cigarette* use as rather problematic, either because of the long-term health risks associated with smoking or acute negative experiences (e.g., withdrawal symptoms, smoking beyond personal limit, having to conceal smoking from others).

Additional comments suggested that participants may have been reluctant to describe their use as 'rather problematic'. Hence, if a participant chose the option 'rather unproblematic', it did not necessarily mean that they saw their use only positively[312]. This is exemplified by the following interview excerpt:

> *I feel bad when I smoke a cigarette, or two.. […] somehow you don't even have a benefit from it. I like the taste of .. a glass of wine […] I don't even like the taste of a cigarette. Therefore.. so there .. "problem" ((referring to questionnaire))..not a problem but… I feel… I could definitely do without and I would also prefer if I… could do without. (IP15)*[313]

A third of participants (8; 33%) had attempted to reduce or quit their use of alcohol or cigarettes in the three months prior to interview[314]. More than half of participants who had smoked in the three months prior to sign-up (7; 54% of 13) reported a recent attempt to quit or reduce their cigarette use, while under a fifth of participants who had used alcohol in the three months prior

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[312] The qualitative analyses also suggested that participants were often ambivalent or conflicted about their substance use (to be described in Chapter 12).

[313] German original: "Ich fühl mich schlecht, wenn ich eine Zigarette rauch, oder zwei.. [...] du hast irgendwie nicht mal einen Nutzen davon. Mir schmeckt ...ein Glas Wein [...]. Eine Zigarette schmeckt mir ja nicht mal. Deswegen.. also da .. "Problem".. kein Problem, aber... ich hab das Gefühl ...ich könnt auf jeden Fall ohne auskommen und es wär mir auch lieber, wenn ich ...da ohne auskommen würde."

[314] Although it is possible that knowledge of the upcoming interview had prompted participant attempts to quit or reduce, participants' descriptions of their quit attempts did not suggest this to have been the case (e.g., recent attempts appeared rather as part of ongoing efforts to reduce/quit use). However, this possibility was not discussed with participants and thus cannot be commented upon further. Thanks to Emilie Brotherhood for pointing this out.

to sign-up (4; 17% of 23) reported a recent attempt to quit or reduce their alcohol use. Such attempts were also reported by participants who did not view their use as rather problematic[315]. In a few cases, a participant had very recently quit using a substance (or temporarily suspended use, e.g. for acute health reasons). To facilitate these interviews, it was agreed to refer to the substance use pattern as it had been *before* the recent change.

Considering the *WHO ASSIST items*, individuals who reported weekly or (almost) daily problems or failure to meet expectations due to their substance use were not eligible for interview (see Table 7). Referring to the three months prior to sign-up, only few participants (2; 8%) indicated failing to meet expectations due to their substance use. A fifth (5; 21%) experienced health, social, legal or financial problems due to their substance use. Follow-up questions during the face-to-face interview suggested that this referred, for example, to feeling physically unwell or spending too much money. Participants also thought of being unable to study as intended due to feeling unwell after drinking too much the previous night. Over half of participants (13; 54%) reported a strong desire or urge to use substances in the three months prior to sign-up, with three participants (13%) experiencing such a desire or urge on a daily or almost daily basis.

5.1.2. Participant subgroups

The previous section showed that study participants shared some characteristics (e.g., age, gender, occupation) but differed notably on others, including their substance use[316]. To reflect these differences, the overall sample was characterised further as follows:

- *'Lighter' users* (Group 1) (n=10) were all non-smokers (including two de facto non-smokers, see below) who reported drinking alcohol in relatively small quantities (i.e., up to two standard drinks per typical drinking day) (blue shading in Table 8 below).

- *'Heavier' users* (Group 2) (n=14) in this sample were occasional and daily smokers (only de facto smokers, see below) as well as participants who reported drinking larger quantities (i.e., three or more standard drinks per typical drinking day) (pink shades in Table 8)[317].

[315] This happened, for example, when participants reduced their alcohol use in preparation for an exam period or where they strived for a healthier lifestyle more generally.
[316] Although the original study protocol foresaw a more homogeneous sample in terms of substance use, finally this could not be achieved in practice (to be described in subsequent sections). This posed a challenge for the present study insofar that even though the study design was not intended to differentiate between participant groups, such differences existed and had to be accounted for.
[317] A possible criticism is that this threshold for being considered a 'heavier' user was fairly low in the present study.

Table 8: Retrospective allocation of participants to subgroups by substance use frequency/quantity

Alcohol use	'Non-smokers'		Smokers		
	No cigarette use	No cigarette use 'de facto'[a]	*Occasional (less than daily) (Gr. A)*	*Daily cigarette use (Group B)*	**Total**
No alcohol use	n/a	0	0	1	1
1-2 standard drinks per typical drinking day	9	1	1	1	12
≥3 standard drinks per typical drinking day	3	1	4	3	11
Total	12	2	5	5	24

Note. Colours: blue for Group 1 ('lighter' users), pink for Group 2 ('heavier' users). Different shades of pink are used to distinguish heavier users further by smoking status (non-smokers, occasional smokers [Group A], daily smokers [Group B]). [a] Indicated smoking in past six months but elicited no space associated with at least occasional cigarette use.

These subgroups were more homogeneous than the participant sample as a whole. However, the subgroups were still fairly heterogeneous. Within the 'lighter' user group, reported alcohol use ranged from 'less than one drink every few months' to '1-2 standard drinks on a weekly basis', and cigarette use ranged from 'never smoked' to '1-5 cigs on a monthly basis' (data not shown). The 'heavier' user group was also heterogeneous, as alcohol use ranged from complete abstention to '10 drinks or more on a weekly basis' (data not shown), and it included non-smokers, occasional smokers and daily smokers.

To account for the differences in smoking status, a further categorisation of the overall study sample was undertaken based on participants' cigarette use:

- *'Non-smokers'* (n=14) were those 12 participants who reported *no cigarette use* for the three months prior to sign-up. For methodological reasons, two occasional smokers[318] who elicited *no space associated with at least occasional cigarette use* were also included (labelled here as 'de facto non-smokers'). As Table 8 shows, this group encompassed all participants from Group 1 ('lighter users') plus four from Group 2 ('heavier' users).

However, this reflected the overall sample (i.e., 'heavier' use was defined relative to the sample rather than an external benchmark). In a different context, most individuals labelled here as 'heavier' users may be considered 'light' users. As a heuristic tool to discuss participant differences in a research project where such differences had not been anticipated and where sample sizes were small, the broad distinctions outlined above were considered appropriate. The groups were similarly sized, made conceptual sense and reflected the extent to which substance use appeared to play a role in participants' lives (objectively and subjectively, see Appendix M.2 for details).

[318] Methodologically, these two participants could not be considered as 'smokers' because subsequent quantitative analyses focussed on smoking required at least one space associated with at least occasional cigarette use. Neither of the two participants elicited an everyday space associated with at least occasional smoking. Classifying these two occasional smokers as 'non-smokers' was also justifiable because both participants described themselves as non-smokers and explained that they did not have their own cigarettes. One participant indicated smoking 1-5 cigarettes every few months, while the other participant reported smoking 1-5 cigarettes on a monthly basis.

- *Smokers* (n=10) were all those *occasional and daily smokers* who elicited at least one space associated with at least occasional cigarette use (i.e., de facto smokers). As Table 8 shows, this group was a subgroup of Group 2 ('heavier' users).

- *Occasional smokers* (Group A) (n=5) were those 'de facto' smokers who reported less than daily cigarette use for the three months prior to sign-up (regardless of use quantity; no occasional smoker reported smoking more than five cigarettes per typical smoking day).

- *Daily smokers* (Group B) (n=5) were those 'de facto' smokers who reported daily cigarette use for the three months prior to sign-up (all daily smokers reported smoking more than five cigarettes per typical smoking day).

To support the contextualisation of results in Part 3, Table 9 below shows the allocation of individual participants to groups. The remainder of this chapter describes how the study sample as a whole was defined and recruited.

Table 9: Allocation of individual study participants to subgroups

Group label	Study participants (as codified in the results)	n
'Lighter' users (Group 1)	IP1, IP2, IP3, IP7, IP9, IP17, IP19, IP20, IP21, IP23	10
'Heavier' users (Group 2)	IP4, IP5, IP6, IP8, IP10, IP11, IP12, IP13, IP14, IP15, IP16, IP18, IP22, IP24	14
'Non-smokers'	IP1, IP2, IP3, IP4, IP5, IP7, IP9, IP17, IP18, IP19, IP20, IP21, IP22, IP23	14
Smokers	IP6, IP8, IP10, IP11, IP12, IP13, IP14, IP15, IP16, IP24	10
Occasional smokers (Group A)	IP10, IP11, IP15, IP16, IP24	5
Daily smokers (Group B)	IP6, IP8, IP12, IP13, IP14	5

Note. IP = Interview participant.

Appendix M presents notable differences between the groups in terms of socio-demographic data, substance use characteristics and situated substance use patterns, and the construal of everyday spaces. Section 13.4 discusses how these differences may have affected the study's findings. Appendix M.2 provides further methodological details on how participant subgroups were identified and defined.

5.2. Basic considerations and conditions regarding fieldwork

5.2.1. Sampling strategy ('who')

The main sampling strategy in the present study was criterion sampling. This meant including "all cases that meet some predetermined criterion of importance" (Patton, 1990: 176). As the

present study's aim was to compare different kinds of spaces (*not* groups of people), a homogeneous group of study participants was preferable. It was considered that a heterogenous group of participants would divert the focus of the study as well as pose undue challenges during analysis. A set of criteria was therefore developed to ensure homogeneity among participants regarding key characteristics such as age, gender, occupation, health and substance use. Although this decision meant that any conclusions drawn from the present study would be derived from a narrow segment of the general population, it can be advisable to answer research questions regarding one group of people first before considering the possibility of studying another group (Rubin and Rubin, 1995: 73–76). The eligibility criteria used in the present study are described further in section 5.3. The following paragraphs provide details on what other sampling strategies were applied or considered.

The literature lists many possible sampling strategies and highlights that different strategies may be appropriate at different stages of a research project (Patton, 1990; Rubin and Rubin, 1995; Wengraf, 2001; Kemper et al., 2003; Onwuegbuzie and Collins, 2007; Kakinami and Conner, 2010: 37; Northcote and Moore, 2010). A challenge for the present study (and much research in the substance use field) was that there was no prior way of knowing who would meet the eligibility criteria and who would not; the target population was a "hidden population" (Rhodes, 2000: 23; Kakinami and Conner, 2010: 28). It was therefore necessary to establish contact with a larger group of individuals first and create a list of potential participants. This was done primarily through a combination of time-space sampling and convenience sampling (recruitment strategies are detailed in section 5.4):

- 'Time-space sampling' means mapping locations where the target population is likely to be present and selecting multiple sites and times/days at random, to then approach all individuals who are "at the site at the specified time" (Kakinami and Conner, 2010: 34). While the present approach was not as systematic, fieldwork sites were mapped during structured site visits (further described in section 6.5) and an effort was made to visit sites at different times of day and cover different areas within the sites.

- 'Convenience sampling' means choosing "settings, groups, and/or individuals that are conveniently available and willing to participate in the study" (Onwuegbuzie and Collins, 2007: 286). In the present study, convenience played a role during recruitment, as approaching all individuals at the site (as foreseen in time-space sampling) would not have been feasible. It is likely that those who appeared "available and willing to participate in the study" were oversampled during the recruitment stage, even if recruiters (i.e., the study author and one research assistant) also sought to approach people who did not look likely to engage (e.g., avoiding eye contact). Due to the combination with time-space sampling

and the use of specified criteria to select participants, limitations of convenience sampling (e.g., no scientific justification for participant selection; Patton, 1990: 181; Kakinami and Conner, 2010: 33) are less applicable to the present study.

Chain-referral or snowball sampling (e.g., participants invite their friends to the study) was also used in the present study. It was, however, not the primary sampling strategy. The main reason for this was lack of access to initial 'seeds' to start the chains. In addition, previous studies have found that it can take several months to recruit a sufficient number of people using chain-referral (Hathaway et al., 2010; Bryant, 2014). Finally, chain-referral is recommended for situations in which respondents cannot be accessed through other means (e.g., no shared location or institution; Hathaway et al., 2010), which was not the case in the present study.

In principle, it would have been possible to draw a random sample or even to engage the entire basic population, given that: i) eligibility criteria specified that only university students attending specific faculties would be eligible; and ii) universities hold lists of enrolled students. However, in this scenario the university would have had to send out study invitations. This was deemed neither feasible nor desirable in practice (e.g., possibility of decreased trust and openness among participants). It was also not considered essential, as the present study did not aim to provide population estimates.

5.2.2. Sample size ('how many')

The present study involved 24 participants, reporting on 296 everyday spaces and 108 personal constructs relating to everyday spaces. The original study protocol included ex-ante considerations regarding a desired sample size, which are revisited below.

Sample size is often determined by what is considered usual practice in a given research context (Baker and Edwards, 2012). For example, in quantitative research, a common (although contested) rule of thumb is that one should aim for at least 30 participants per comparison group (Onwuegbuzie and Collins, 2007: 288). The chosen technique (repertory grid interview, focus of Chapter 6) did not prescribe any particular sample size or sampling strategy, not least because repertory grid data can be approached in a more qualitatively or in a more quantitatively oriented manner. Jankowicz (2004) does not recommend any specific sample size, while Dick and Jankowicz (2001: 188) state 50 participants as a typical sample size for repertory grid studies. In practice, repertory grid studies draw upon considerably smaller (e.g., n=12, Naoi et al., 2006) and larger samples (e.g., n=410, Feixas et al., 2008).

In a personal communication (25.02.2016), Prof. Jankowicz suggested applying the principle of data saturation. In much qualitatively oriented research, saturation (first introduced by Glaser and Strauss, 1967) is an important criterion for determining sample size. Rubin and Rubin (1995: 72) summarise it as follows: “When each additional interviewee adds little to what you have already learned, you stop adding new interviewees”. Consequently, the sample size is not defined in advance but emerges from the research. In practice, if a structured interview approach with consistent questions and a homogeneous participant group is used (as was intended in the present study), recurrence of major themes can be expected after six interviews and data saturation after 12 interviews (Guest et al., 2006).

In repertory grid studies, the level of data saturation can be judged more easily than in regular qualitative research. During the repertory grid interview, personal constructs are elicited, which can be summarised into broader categories using content analysis (Jankowicz, 2004; see also section 7.2). Saturation can be assumed when constructs elicited in additional interviews can be subsumed under already formulated categories. Prof. Jankowicz (personal communication, 25.02.2016) advised that a one-hour repertory grid interview usually elicits 10-12 constructs, with data saturation usually reached after about 300-350 constructs. On this basis, he recommended a minimum of 20 participants per comparison group, or 30 participants in case of no comparisons, in the context of a doctoral dissertation project.

In the present study, preliminary content analyses of constructs were carried out during the fieldwork to identify recurring themes and judge the level of data saturation. This was done for the first 11 interviews, with the intention that interviews would be discontinued when two consecutive interviews did not lead to any new categories. In practice, the final sample size was determined by who was actually eligible for interview, as described below.

Besides saturation, Rubin and Rubin (1995: 72–73) suggest “completeness” as another principle. Completeness refers to “adding interviewees until you are satisfied that you understand the complex cultural arena or multistep process” (Rubin and Rubin, 1995: 73). Hence, the research is “complete” when the research questions have been answered. Completeness is distinguished from saturation because it may be possible to answer research questions before saturation has been reached, but research questions may remain unanswered even after data saturation. In the present study, it was intended to refer to the concept of completeness if saturation had not been reached within 20 interviews. In preparation for this, preliminary answers to the research questions were noted after each interview as part of the post-interview protocol.

While the above considerations applied more to qualitatively oriented research, the mixed-methods nature of the present study called also for the consideration of quantitatively oriented sample size recommendations. In quantitatively oriented research, the sample size is often determined by technical considerations. For example, certain calculations or analytical techniques are only advisable or possible if there is a minimum number of participants representing each value of interest. In survey research aiming to provide population estimates, sample sizes are calculated based on the size of the total population as well as the desired level of confidence and accuracy (Kühnel and Krebs, 2001: 249). When testing hypotheses, power calculations are made depending on the expected effect size and level of significance (Onwuegbuzie and Collins, 2007: 288; Kakinami and Conner, 2010: 39). In the present study, comparisons were to be made between spaces, not participants. Consequently, 'sample size' was understood to refer to the number of *spaces* included in the analyses rather than the number of participants. Power calculations with the *G*Power 3.1* tool for statistical power analysis (Faul et al., 2007) suggested that even a small number of participants would allow significant results using nonparametric tests if the differences were large and if at least two spaces were considered per participant.

Across paradigms, sample size is also determined by other factors, including the resources available to researchers and participants (Baker and Edwards, 2012). For example, in qualitatively oriented research, a too large sample size may preclude in-depth analyses; therefore, the sample size should be large enough to support data saturation but small enough to allow the desired level of detail in the analysis (Onwuegbuzie and Collins, 2007: 289). In the present study, one such consideration was that interviews would be partially transcribed and transcripts subjected to qualitative content analysis, meaning that each interview considerably increased resource requirements. The typical sample sizes of 30 or more participants for repertory grid studies cited earlier were re-evaluated in this context. In typical repertory grid research, interviews are *not* transcribed or analysed, and qualitative analysis is limited to the elicited constructs (D. Jankowicz, personal communication, 25.02.2016). It was therefore questionable whether the cited typical sample sizes applied to the present study, which had a broader analytical scope than typical repertory grid research.

Based on these ex-ante considerations, the present study aimed for a sample of 12 to 20 participants, justified by the structured interview technique, the planned homogeneity of the sample, and the additional resources required for the mixed-methods approach.

In practice, *all* individuals who met eligibility criteria were invited to interview, and the desired sample size was exceeded. Although it was assumed that the ex-ante considerations regarding sample size would be used to decide how many individuals to select from a larger

pool of eligible individuals, actual eligibility rates were so low that sample size considerations informed recruitment and the revision of eligibility criteria instead (further documented in section 5.3). Due to the low eligibility rates resulting from an initially too restrictive set of criteria for participants, only ten individuals had been interviewed by April 2018. As recruitment and interviews had to end by June 2018, the criteria were revised to increase eligibility rates and ensure that the desired sample size could be reached. All individuals who were eligible after the finalisation of criteria were invited to interview. Hence, the final sample size of 24 participants emerged from the application and revision of eligibility criteria.

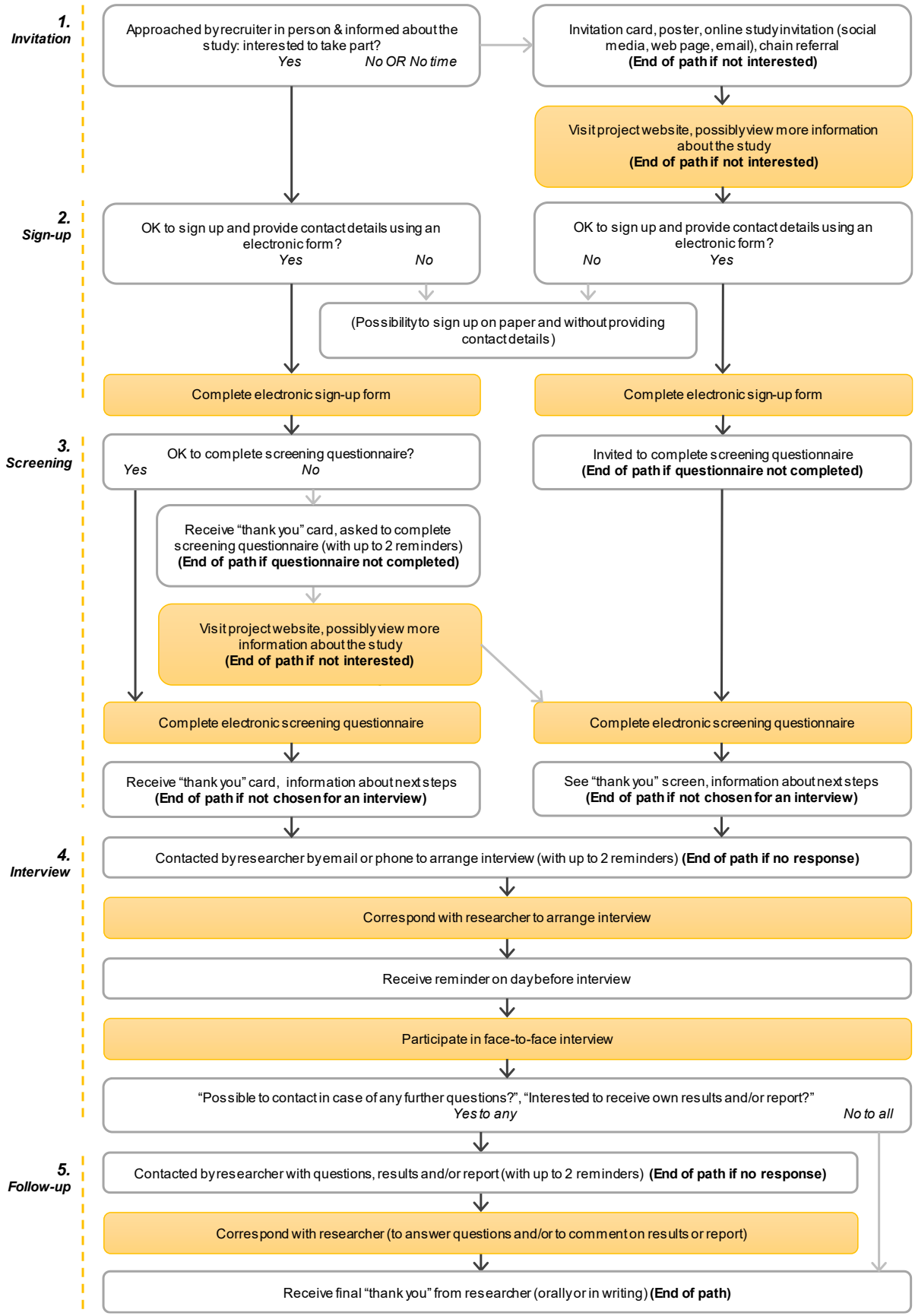
5.2.3. Study participation as a series of steps ('how')

When designing the study, consideration was given to how participants would experience their involvement from the initial invitation through to the final "thank you". This approach was inspired by the Total Design Method (TDM) (Dillman, 1978, 2007; Leeuw and Hox, 2008b), which suggests taking the participant's point of view to judge the suitability of the study design and materials. To facilitate this change in perspective, a flow diagram was prepared to illustrate the different steps involved in study participation. An earlier version of the flow diagram helped design the study; the updated version included below summarises what happened in practice.

The flow diagram (Figure 3 below) illustrates the steps involved in study participation. Boxes represent points at which potential participants were asked a question, received information, or took an action. Shaded boxes highlight when participants had to take an action (e.g. visit the project website) in order to continue. Options such as "Yes" and "No" represent the basic choices that participants had when asked a question. Arrows point to what happened next, depending on the response given. Black arrows represent default paths, while grey arrows show alternative paths. The timeline on the left distinguishes five phases of study participation, from the initial invitation through to follow-up. Two boxes at the top, resulting in two different default paths which merge after the screening phase, distinguish face-to-face recruitment (left path) from other modes of recruitment (right path). Points at which study participation might end are marked as ends of paths.

The flow diagram provides a frame of reference for the remainder of the chapter. To summarise, participants were invited to the study either in person or through other means. People who were unable to sign up at that moment or not interested were given an invitation card and encouraged to consider participating later or to pass the card on to an interested friend (hence the grey arrow connecting the top left box to the top right box in Figure 3). Interested individuals signed up for the study by completing a short sign-up form and a longer screening questionnaire (immediately after the sign-up form or later). Physical and electronic

Figure 3: Steps involved in study participation from the participant's point of view



reminders were used as appropriate. Persons eligible for interview were contacted by phone or email to make interview arrangements. On the day before the face-to-face interview, participants received a reminder. At the end of the interview, preferences for future follow-up were discussed and follow-up was undertaken accordingly.

The flow diagram is schematic and cannot depict the realities of study participation in their entirety. For example, unplanned loops, such as asking people to complete the screening questionnaire a second time (described in section 5.4.2), are omitted. Conversely, the possibility to sign up on paper and without providing contact details is included in Figure 3 in parentheses because, although it was offered and was an important aspect of planning the study, it was not used in practice because it was not requested by potential participants.

Although participation involved numerous steps, many of these followed quickly after each other and so participants likely did not perceive the process as being as complex as the flow diagram may suggest. For example, receiving the invitation, consenting to sign up, and completing the sign-up form and screening questionnaire is represented by six or seven boxes in Figure 3 (left or right path, respectively), but these steps were likely perceived as one coherent event (i.e., as 'signing up to a study').

A simpler approach would have been to determine eligibility and make interview arrangements *at the same time* as recruiting individuals. However, this was neither desirable nor feasible in the present study. Firstly, using a multi-step process was considered important to successfully engage participants. When conducting ethnographic research with young people, Mayock (2000: 276–277) found it was important to let potential participants become acquainted with the researcher and develop trust before formally inviting them to interview. The present study did not afford the same opportunities for relationship-building as ethnographic fieldwork, but the present approach gave participants more opportunity to familiarise themselves with the study and the researcher (cf. attempting to arrange an interview during recruitment). Secondly, the eligibility criteria had purposefully not been finalised prior to recruitment and so it was not possible to determine eligibility during recruitment. Finally, the screening questionnaire was longer than a regular screening instrument, and exclusion criteria referred to illegal and stigmatised behaviours. It was therefore not deemed appropriate to determine eligibility in front of participants.

5.2.4. Timing of recruitment and interviews ('when')

The recruitment phase lasted from January 2017 until May 2018. Interviews were carried out in three waves from March 2017 to June 2018, with most interviews in May and June 2018.

The main recruitment strategy in all three waves was cold canvassing in person, although other strategies were also used (see section 5.4). Initially it was intended to complete recruitment over an intense two-month period, but this was not possible in practice due to personal circumstances, as outlined in section 1.2.6, and the addition of a second fieldwork site. Consequently, recruitment was carried out in three waves:

- *Wave 1* took place at the "OMP" fieldwork site (described below) in January 2017. Participants were recruited until personal circumstances meant that in-person recruitment was no longer possible. Interviews with participants identified as eligible at this wave were carried out in March 2017. The entire project was then suspended until recruitment could recommence in September 2017 with the help of a research assistant (see section 5.4.3).

- *Wave 2* took place in November and December 2017, when the research assistant continued recruitment at the OMP. Interviews with participants identified as eligible at this wave were carried out by the study author in December 2017 and January 2018.

- *Wave 3* took place mainly in April and May 2018, when the research assistant recruited at the second fieldwork site, the "Juridicum". In addition, the study author undertook a preparatory recruitment session at the Juridicum in February 2018 and concluded recruitment with a final session at each fieldwork site in May 2018. Interviews with participants identified as eligible at this wave were carried out from March to June 2018.

As recruitment took place in several waves, interviews were also carried out in waves concurrently with or shortly after recruitment. A short time frame between sign-up and interview reduced the likelihood of changes occurring in participants' personal circumstances that would affect their eligibility (e.g., changes in substance use). A positive effect of this unforeseen change to the study design was that the research was conducted in a circular manner, whereby insights gained at earlier waves could inform the later waves (e.g., revision of eligibility criteria).

5.2.5. Fieldwork sites ('where')

Fieldwork was carried out at two sites representing three faculties of the University of Vienna:

- the Faculty of Business, Economics and Statistics (located in a building known as the "OMP", a nickname derived from its address at Oskar Morgenstern Platz);
- the Faculty of Mathematics (also at the OMP); and
- the Faculty of Law (located in a building known as the "Juridicum").

In line with the sampling strategy outlined earlier, ensuring homogeneity among participants was a key methodological consideration in the selection of fieldwork sites. A further, practical consideration was the availability of support from local gatekeepers. Gatekeepers can open up access to a certain field that would otherwise remain hidden or closed, help to identify and recruit participants, or increase participants' trust in the researcher; conversely, it can be very difficult to undertake fieldwork if one fails to secure the support of relevant gatekeepers (Hughes, 2000; Mayock, 2000; Froschauer and Lueger, 2003).

Initially it was intended to conduct the research at the Vienna University of Economics and Business. This university was chosen out of the nine public universities in Vienna for several reasons. Students specialising in economics and business were considered to correspond well with the notion of a socially integrated, mainstream population. This would have not been the case as much for students of academic subjects associated more strongly with countercultural movements, such as sociology or art. From a methodological perspective, it was also beneficial if participants did not have 'expert' knowledge on issues relating to health and space, as such knowledge might have led them to answer interview questions in a 'professional' rather than a personal capacity. Again, economics and business students were considered to meet this condition better than students of subjects such as medicine or architecture. In addition, with its single thematic focus, its large student population and its location on a single campus, this university offer good conditions to efficiently recruit a relatively homogeneous study sample. Permission was formally sought from the rectorate with the support of the project's academic supervisor. However, the university could not offer support to students other than its own. This also precluded recruitment of participants via posters, websites, social media, student representatives or staff. As conducting the study under these circumstances was not a desirable option, an alternative study site had to be identified.

The Faculty of Business, Economics and Statistics at the University of Vienna was found to be most similar to the originally intended study site and was therefore chosen as a suitable alternative. In addition, local support was available from a fellow doctoral student who was prepared to assist with site visits, recruitment and interview logistics and had links with local student representatives. Furthermore, the academic supervisor was able to secure a meeting room at this faculty as an interview location.

Two further faculties were added during the fieldwork. The Faculty of Mathematics was housed in the same building as the already chosen faculty. Consequently, recruitment efforts also reached mathematics students, unintentionally at first. When selecting participants at the end

of recruitment wave 1, it was decided not to exclude these[319]. The Faculty of Law, located in another building about 10 minutes walking distance from the other site, was added due to the difficulties encountered in recruitment wave 1 (to be described below). Out of the faculties at the University of Vienna, its student population was considered to be most similar to that of the Faculty of Business, Economics and Statistics in terms of academic discipline and assumed lifeworlds. Despite these similarities, it was hoped that, as students of law, fewer individuals recruited at this site would be ineligible due to reporting use of illegal substances[320]. Although local support was not directly available, the study author's personal network included individuals who could assist with recruitment and interview logistics regarding this faculty.

A detailed description of the sites is beyond the scope of this thesis, but site visits in person and virtually (e.g., social media pages of student union representatives) found, for example, numerous materialities and spaces referring to alcohol and cigarettes[321].

5.3. Definition of the study population

The empirical study focused on female university students aged 18 to 26 years who reported using alcohol or cigarettes in the previous three months (but no illegal substances in the previous 12 months). This group was chosen using a stepwise process which is described in the following sections.

5.3.1. Selection of eligibility criteria

At the very beginning of this project, it was intended to research a heterogeneous sample to explore commonalities in socio-spatial construing across different populations. However, as the scope of the study was broadened to encompass multiple substances and types of

[319] Both faculties were located within the same building, which ensured a certain level of homogeneity among students in terms of socio-spatial routines despite differences in study subjects. Also, the Faculty of Business, Economics and Statistics offered a statistics course, and conversations with statistics students suggested that some self-identified more with the Faculty of Mathematics than their actual faculty. For example, one statistics student recruited during wave 1 indicated on the sign-up form (wrongly) that she studied at the Faculty of Mathematics rather than the Faculty of Business, Economics and Statistics.

[320] Data collected during recruitment seem to support this assumption (38% of recruited individuals studying at the OMP but only 28% of recruited individuals studying at the Juridicum did not meet the respective criterion).

[321] To give some examples, these included invitations to parties (including drinks promotions), designated and informal smoking areas, but also 'no smoking' signs, stickers and banners. At the student cafeteria, alcoholic beverages were available (though generally placed in bottom shelves) and were consumed by students; cigarettes were available and prominently displayed on some occasions but not on others (but were only used outside the buildings). At both locations, stands outside the main entrance served alcoholic beverages at certain times of year (e.g., punch in winter, white wine spritzer in summer). According to a student representative interviewed for this study (see section 6.5.2), these stands were organised by the student union primarily to enter into dialogue with the students, with a view to identifying their study-related needs and offering support where required.

everyday spaces, there was a risk that choosing a purposefully heterogeneous sample would make data collection and analysis too complex to be practically feasible. The scope was therefore limited to a more homogeneous sample.

To ensure sufficient homogeneity, the study population was defined with reference to key characteristics. In sociological studies, these typically include age, gender, socio-economic status, ethnicity, place of residence and migration background. Characteristics such as age, gender, socio-economic status, ethnicity and mobility are also known to affect people's relationships with their everyday spaces (Manzo, 2005; Lewicka, 2011). In drugs research, characteristics relating to substance use, health and social marginalisation are also essential when defining study populations. The research questions did not call for any specific study population other than that participants should use a range of substances on an occasional basis, so as to allow a comparison of spaces representing different situated substance use patterns. Therefore, additional considerations informed the decision-making; these included (see also section 1.2):

- The *methodological* need to reduce heterogeneity meant selecting characteristics that were narrow enough to ensure similarities among participants but broad enough to be practically feasible.

- The chosen *prevention* lens suggested a population that might be targeted by or benefit from prevention efforts (as opposed to treatment or harm reduction activities) to allow insights for future prevention activities.

- The chosen emphasis on *research ethics* meant that if possible populations differed according to their vulnerability and the research questions could be answered with either population, the less vulnerable population would be chosen.

- The need to conduct research *efficiently and effectively* meant giving preference to populations that could be engaged more readily (while maintaining scientific rigour).

The follow paragraphs document the rationale underpinning the selection of eligibility criteria further. Indicators refer to items used in the sign-up form and screening questionnaire that were used to screen participants in practice.

Research location

To reduce heterogeneity in the sample, the research was limited to a single location. Practical considerations suggested Vienna, Austria, as this was the study author's base at the time, and this was found to be a suitable research location also from a scientific point of view.

At the time of the fieldwork, in a comparison of 35 countries, Austria was among the countries with the highest alcohol consumption per capita and the highest percentage of daily smokers, as well as the country with the highest percentage of smoking women (OECD, 2017: 71–73). Due to its liberal tobacco policies, Austria has been described as "Europe's dirty ashtray" (Hefler, 2015; Muttarak et al., 2015), and from 2007 to 2016, the country ranked in last place of the "Tobacco Control Scale" which compares 35 European countries regarding their implementation of recommended tobacco policy measures (Joossens and Raw, 2017). Finally, the literature review (see Chapter 4) identified no studies from Austria on socio-spatial aspects of substance use.

Initially it was planned that participants should have their main residence in Vienna. However, this criterion was later broadened to include all of Austria. The focus on Vienna was maintained by requiring that the workplace or educational establishment be located there.

(Possible) Indicators:

- Place of residence
- Location of workplace or educational establishment

Social integration or exclusion

The present study focussed on mainstream socially integrated substance users, as opposed to marginalised users. As the lifeworlds of these two groups differ (Eisenbach-Stangl et al., 2009), a focus on one of them was necessary to ensure homogeneity in the sample. The chosen prevention lens and prioritisation of less vulnerable groups suggested a focus on socially integrated substance users. In addition, as socially integrated substance users are often overlooked in public discourse, researching them could help to understand mainstream patterns of use and critique public images of substance users, including those underpinning screening and diagnostic tools (e.g., Hathaway et al., 2010; Asbridge et al., 2014; Duff and Erickson, 2014).

In a previous study, Duff and Erickson (2014: 214) operationalised being "mainstream" and "socially integrated" as meaning that "participants had to be either employed (including work

inside the home) or a student full time and to have had stable housing for at least six months in the past year". Referring to this operationalisation in the present study required a choice between employed individuals and students, as including both groups would have precluded homogeneity. A focus on university students was methodologically preferable, as the shared experience of being a student was going to ensure a more homogeneous sample (particularly if focussing on a specific university or faculty). Moreover, although university students are a common target of prevention measures (e.g., Kuntsche et al., 2017), at the time of planning the present study, prevention measures targeting university students were not common in the chosen research location. Hence, a focus on this group was of interest also with a view to informing possible future prevention activities in this setting.

Considering other key characteristics (socio-economic status, ethnicity, migration background), limitations were initially imposed that were congruent with the notion of a socially integrated population (i.e., well-educated parents, good financial situation, grown up in Austria)[322, 323, 324]. This was done to ensure homogeneity within the sample; however, these criteria were later amended or removed because they were found to be too restrictive in practice.

(Possible) Indicators:

- Student/employment status
- Field of studies
- Housing situation
- Parental level of education
- Financial situation
- Primary socialisation in same country

Age, gender and relationships

Although prevention is relevant at all stages of life, it commonly focuses on young people, and hence this focus was also chosen for the present study. In European policy and research, definitions of 'young people' vary, but common age ranges are 15 to 24 years (e.g., Eurobarometer on young people and drugs, TNS Political & Social, 2014) or 15 to 34 years

[322] This is not to imply that participants who met the stated eligibility criteria were socially integrated in all respects, or that people with a different education or migration background should not be considered as socially integrated.
[323] It was intended to include a further item from an International Social Survey Programme (ISSP) module, asking participants to assign themselves to one of ten population groups based on socio-economic status. However, this item repeatedly caused irritation among pilot study participants, and was therefore not used in practice.
[324] Limitations were not imposed with regard to participants' ethnicity, nationality or country of birth because it was assumed that if participants met the other criteria, these aspects would not significantly affect substance use and socio-spatial routines.

(definition of “young adults” in the European Drug Report, EMCDDA, 2018). Although school pupils could have been a population of interest, opting for a less vulnerable age group (18 years and older) was preferable from an ethical point of view. An upper age limit was set to reduce heterogeneity. An initial upper age limit of 24 years was later increased to 26 years to account for the older average age of Austrian university students (approximately 26 years, one of the highest in Europe according to Zaussinger et al., 2016: 27–30).

Gender differences have been found in terms of socio-spatial construing (e.g., Löw, 2001, 2016) and substance use experiences (e.g., Haines et al., 2009; Alexander et al., 2010). Including multiple genders would have required comparative analyses which were beyond the scope of the present study. Given that the study author’s master’s thesis explored women’s socio-spatial construing of their everyday way home (Kurtev, 2008), choosing to study women also in the doctoral thesis allowed to build upon an earlier piece of work. In addition, it was assumed that correspondence of participants’ gender with the study author’s own would facilitate rapport-building during the recruitment[325] and interviews. Taking a wider perspective, studying women was also of interest in the light of findings suggesting that smoking is particularly prevalent among females in Austria (OECD, 2017: 71–73). Section 1.2.3 further comments on the empirical focus on women in the present study.

Participants’ personal relationships were also considered. Students who were or had been married or in a formal civil partnership were excluded, as their lifeworlds (and hence substance use and socio-spatial routines) were assumed to differ from those of their unmarried peers. Women with children were also excluded, as previous research has found that parenthood substantially affects the socio-spatial dimension of substance use (e.g., Robinson and Holdsworth, 2013). Similarly, pregnant women (or those trying to conceive) were excluded.

(Possible) Indicators:

- Age
- Gender (self-report or as observed by recruiter)
- Relationship status
- Parenthood (actual or expected in near future)

[325] For example, Hughes (2000: 282) reported difficulties when attempting to recruit women for his study and reasoned that differences in gender between himself as the recruiter and the women as potential study participants precluded the rapport-building required for successful engagement.

Substance use

The literature review found that existing studies on socio-spatial construing typically focussed on a single substance. In practice, people may use multiple substances and construe their everyday spaces differently depending on what substances are used and how. The present study sought to address this research gap by considering multiple substances. The original study protocol focussed on individuals who used alcohol, tobacco *and* cannabis but no other illegal substances. These substances were the most commonly used substances in Europe, and they were also regulated very differently socio-spatially, which would have allowed a thorough investigation of the research questions. However, to obtain institutional ethics approval (to be described in Chapter 8), users of illegal substances (including cannabis) had to be excluded. The criterion was revised again during the fieldwork when it became clear that few students used alcohol and cigarettes but not illegal substances: finally, in addition to users of alcohol *and* tobacco, individuals who used *only* alcohol or *only* tobacco were also eligible as participants. In keeping with the new focus on alcohol and cigarettes and to avoid methodological difficulties, initially it was intended to exclude individuals with lifetime use of illegal substances or who had used legal substances other than alcohol or nicotine in the past 12 months. However, this criterion was subsequently removed to increase the number of eligible individuals.

Regarding the pattern of use, the present study sought to focus on relatively low-risk users to test the study procedures and establish a reference point before considering the possibility of studying socio-spatial construing among high-risk users (e.g., in a potential follow-up project). For the purposes of defining the study population, the present study referred to the definitions and indicators concerning “high-risk drug use” recommended by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). These characterise high-risk drug use by referring to aspects such as frequent use (e.g., daily or almost daily for cannabis), high-risk routes of administration (e.g., injection) and medical diagnosis (approximated by psychometric scales in the context of survey research) (Thanki and Vicente, 2013: 3–5). These aspects thus informed the formulation of exclusion criteria.

The research questions appeared to call for occasional substance users. Pilot research conducted for the present study also suggested that it would be methodologically difficult to explore the research questions with individuals who used substances very frequently, as their everyday spaces were likely to be less varied in terms of substance use and would thus allow fewer comparisons. These individuals were therefore initially excluded from study participation. However, this was later revised because including this group was actually found to allow greater insights from a prevention perspective. Individuals who used substances seldomly

were also initially excluded but were included in practice to increase the number of people eligible for interview. Consequently, the final sample comprised individuals who used substances seldomly (once in three months) up to very frequently (daily or almost daily).

In line with the earlier considerations, it was preferable that participants report no significant health or social problems related to their substance use. This was approximated using the WHO ASSIST questionnaire (see section 5.5) and a separate item about receiving substance use related treatment. Individuals reporting poor physical or mental health were also excluded to ensure a non-vulnerable study population.

(Possible) Indicators:

- Types of substances used (lifetime, past 12 months, past 3 months)
- Frequency of substance use (past 3 months)
- Average quantity on a typical use day
- Routes of administration (intravenous as exclusion criterion)
- Substance use related problems (self-report using WHO ASSIST)
- Receiving treatment
- Health status (physical, mental)

Socio-spatial routines

To talk about everyday substance use and spaces, participants had to have established socio-spatial and substance-use related routines. Initially it was intended that participants should have been living at the same address and studying at the same university for at least 12 months prior to the interview. In practice, requiring 12 months residence at the current address was too restrictive, and the criterion was revised to state that participants should have been living at the same address for at least six months (or three months if they had previously lived in the same region). It could still be ensured that participants would have established everyday routines by requiring enrolment at the same university for at least 12 months prior to interview.

(Possible) Indicators:

- Living arrangements
- Length of residence in the same region
- Length of residence at current address
- Length of enrolment at the same university

Language skills and willingness to participate

Additional criteria referred to the German language skills of potential participants and their willingness to take part in a face-to-face interview. Basic conversational language skills were necessary, as the interviews were only offered in German. This was determined by whether potential participants were able to complete the sign-up process in German and, in the case of in-person recruitment, converse with recruiters. Furthermore, it was essential both methodologically and ethically that participants were explicitly interested to talk about and reflect on their substance use (on the importance of participant willingness to take part, e.g., Rubin and Rubin, 1995: 66). The indicator for this was their response to the study invitation in person or to a relevant question on the sign-up form.

(Possible) Indicators:

- Willingness to take part (self-report on sign-up form or in dialogue with recruiter)
- Ability to understand and answer questions in German (assessed by participant or recruiter)

5.3.2. Revision of eligibility criteria during the fieldwork

The previous sections noted that originally envisioned criteria were changed during the fieldwork. This section summarises the reasons for these changes and then outlines the procedures used to make changes. Appendix E provides further details and illustrates how keeping the originally envisioned criteria would have affected the final sample size.

Reasons for changes

After the first recruitment wave, *none* of the successfully recruited individuals qualified as participants according to the initially formulated eligibility criteria. In addition, many individuals were excluded from participation *before* sign-up[326]. The choice was to either revise the recruitment approach or to revise the criteria. Recruitment and eligibility data suggested that the recruitment strategies were effective at engaging people, but that the desired criteria were too restrictive. The original study protocol foresaw a revision of criteria in this case, and criteria were revised accordingly in wave 1. Despite this revision, eligibility rates continued to be very

[326] In recruitment wave 1, 13 (29%) out of 45 individuals approached in person declined the study invitation, but a further 12 (27%) individuals were deemed ineligible and excluded before sign-up based on additional sign-up criteria such as age, gender or enrolment at the University of Vienna (stated in Appendix E.5). Across the entire recruitment period, 103 (36%) out of 283 individuals approached in person declined the study invitation, but a further 113 (40%) were excluded before sign-up based on the additional sign-up criteria.

low. Further recruitment was therefore accompanied by further revisions (documented in Appendix E), leading to a final set of criteria used at the end of wave 3 (as shown in section 5.1). The final criteria accommodated the realities encountered in the field whilst maintaining a commitment to the original criteria as far as possible.

While it was essential to revise the originally envisioned criteria in order to make the study practically feasible, revisions were also made based on other considerations. The following list outlines the main reasons for revising criteria:

- Certain criteria were desirable but not essential, and some of these excluded so many individuals that the study was no longer practically feasible. Consequently, these were amended or removed (e.g., requirement that participants use alcohol *and* cigarettes; requirement that participants have never used illegal substances or not used legal substances other than alcohol and nicotine in the past 12 months).

- Certain criteria had been included merely to increase homogeneity within the sample. Given that eligibility rates were very low, if it was found that participants met all criteria except for such criteria, then a revision was considered. Examples include the requirements of living in Vienna, growing up in Austria, or a high parental educational level.

- Some criteria were found to be inappropriate for the chosen population of university students, especially in combination with other criteria. For example, requiring participants to have enough money to meet their needs 'most of the time' was found to be too restrictive, given that other criteria (excluding those who were in full-time employment or married or in a civil partnership) ruled out major potential sources of income. Another such criterion was length of residence at current address, as students (especially those based in shared housing or student dormitories) frequently change accommodation.

- Some criteria (especially those relating to substance use) were found to be at odds with the chosen prevention lens. Although the initial intention was to study individuals who used alcohol, cigarettes and cannabis on a monthly or weekly basis, institutional ethics requirements meant that cannabis users could not be included, hence shifting the focus to those who used alcohol and cigarettes on a monthly or weekly basis but not cannabis. At the end of recruitment wave 1, however, there was only one individual who reported alcohol and cigarette use on a weekly or monthly basis but no use of illegal substances in the past 12 months. The criteria were consequently broadened to also include individuals who used alcohol less frequently as well as non-smokers. This led to interviews with individuals who had used alcohol only once or twice in the past three months and who had never smoked

in their life. While these interviews were interesting in their own right, participants did not represent populations who would benefit from prevention activities, and the insights gained had limited prevention implications. Subsequently, the criteria were amended to include individuals with heavier use patterns. Similarly, although initially it was intended to exclude individuals who reported unsuccessful quit attempts in the past three months, during the fieldwork it became apparent that including individuals who were trying to quit actually allowed better insights from a prevention point of view.

- Some criteria were revised because people understood or answered the associated questions differently than expected. This information was gleaned during the interviews or by contacting potential participants to ask for clarification. For example, individuals who reported that their living circumstances changed frequently were to be excluded to ensure that participants had established socio-spatial routines. However, one person chose this answer because sometimes her partner stayed overnight. This was different to what had been intended and therefore this criterion was revised. Another example concerned the criteria on residential address and region. It emerged that some individuals referred to their officially registered main residence in another region, even though in practice they spent most of their time in Vienna. Consequently, the original criterion was widened to include all of Austria.

- In some cases, changing one criterion meant that other criteria had to be changed as well. For example, once the criterion regarding frequency of cigarette smoking had been amended to include daily smokers, it was no longer reasonable to exclude individuals who reported daily craving, as daily smokers typically also reported daily craving[327].

Procedure for changing eligibility criteria

Revisions of the originally envisioned criteria were not desirable, as they could defeat the point of having defined criteria in the first place and give the wrong impression of opportunistic and arbitrary changes to the study design. Consequently, attention was given to which criteria were essential or merely desirable, what had been the intention behind the selection of criteria, and what scope of amendments was acceptable.

The possibility that specified criteria might be too restrictive had been considered already before recruitment. The study protocol foresaw that if the first six weeks of recruitment had

[327] Out of all successfully recruited individuals, 84% of daily smokers reported daily craving, but 0% of non-smokers or smokers with less frequent use patterns.

resulted in too few eligible sign-ups, then the criteria would be broadened to allow the selection of participants from those who had signed up. Criteria were thus not finalised in advance, but finalisation of criteria was deferred until after the first recruitment wave, when it would be clearer who signed up in practice. This avoided a situation whereby criteria might be pre-emptively revised in advance even though they would have been feasible in practice.

Possible amendments (i.e., which criteria might be amended in what way) were also foreseen in the original study protocol. To do so, all answer options to the questions in the sign-up form and screening questionnaire were categorised based on whether they would *definitely* lead to participants being included or excluded, or whether they *could* lead to inclusion or exclusion, depending on who signed up to the study. For example, for age, it was intended that participants who were 18 to 24 years old would definitely be included, while those who were under 18 or over 26 years old would definitely be excluded. For those who were 25 or 26 years old, the intention was that they would be excluded if there was a sufficient number of eligible participants aged 18-24 but that they could be included if there was not. Consequently, when the upper age limit was indeed raised to 26 years, this was within the scope of changes foreseen in the original study protocol. Even though some changes went further than what had been foreseen in advance, these ex-ante considerations were helpful to guide and limit the scope of changes.

During the fieldwork, criteria were revised by inspecting the sign-up and screening questionnaire datasets and noting how many persons became eligible as participants if certain criteria were removed or amended. Different variants of amendments were considered. This step-by-step procedure using real participant data allowed limiting the scope of changes to the necessary minimum. Potential changes and their implications were repeatedly discussed with the project's academic supervisor, fellow doctoral students and other peers. Revisions were such that criteria were only broadened but never narrowed, thereby ensuring that all individuals who were deemed eligible using the earlier criteria were also eligible using the final criteria. Appendix E provides further details on the feasibility and revision of criteria.

Some criteria remained unchanged throughout the fieldwork period, either because they did not affect eligibility rates or because they were essential from a methodological or other point of view. For example, even though a third of all successfully recruited individuals was not eligible because of the criterion precluding the use of illegal substances, homelessness in the past 12 months, lifetime substance use through injection or use of treatment services, this criterion was maintained because including individuals to whom these circumstances applied would have led to a breach of institutional ethics requirements and been at odds with the considerations underpinning the selection of criteria.

Despite efforts to minimise changes and remain within the logic of selecting eligibility criteria, some of the changes were not desirable from the point of view of answering the research questions (e.g., excluding cannabis users, including individuals who used only one substance) and/or from the point of view of ensuring a homogeneous study sample (e.g., diversity in terms of substance use patterns). These are discussed further as study limitations in section 13.4.

5.4. Recruitment of study participants

5.4.1. Creating a brand identity for the study

Guidance on target population engagement during recruitment and data collection (Leeuw and Hox, 2008b; Lozar Manfreda and Vehovar, 2008; Gläser and Laudel, 2010; Temple and Brown, 2011) highlights that research should be presented in a consistent and professional-looking manner that is tailored to the target population, in order to increase its recognisability, perceived importance and legitimacy. In practice, this can be achieved through the use of official logos, high-quality letter paper, inclusion of full contact details, a hand-written signature and so on (Leeuw and Hox, 2008b: 246). The approach in the present study was particularly informed by the Total Design Method (Dillman, 1978, 2007; Leeuw and Hox, 2008b).

Figure 4: Project logo for present study

Source: Commissioned from www.mariedesigns.xyz for the present project.

A professional graphic designer designed a project logo (see Figure 4). The concept for the logo was jointly developed. The image of a young woman represented the target population, so that potential study participants could identify and connect with the study. A bottle was intended to represent substance use without overemphasising it or implying problematic use. Cubes sought to represent everyday spaces in an abstract way. Finally, dashed lines and the overall composition of the image gave the impression that the young woman is thinking about everyday spaces and substances, with the viewer 'looking' into her mind. Colour contrasts made the logo eye-catching. The logo appeared on all major recruitment and interview materials (e.g., poster, invitation cards, sign-up form, handouts during the interview).

As the working title of the present study was not suitable for use on recruitment materials, an alternative title – "Mapping substance use in everyday spaces" – was used. The specific phrasing and use of the English language in a German-speaking context were intended to make the research appear contemporary and intriguing. It also allowed forming a memorable acronym ("MASPA", from the words "mapping" and "spaces").

A project website (www.maspa-studie.at) was also set up[328], hosted at www.easyname.at. Its purposes were: i) to provide a place from which sign-up form and screening questionnaire could be easily accessed; and ii) to offer a source of information about the research and the study author, which would help interested individuals decide whether to participate and guide them through the sign-up and interview process. The website contained six pages during recruitment[329]. Each page showed the project logo, title, a navigational menu and hyperlinks to the sign-up form and the screening questionnaire. A short text clarified on each page that this was a doctoral research project at the University of Vienna; the study author's name and an email address were given, as well as the names of the academic supervisor and the research assistant. The University of Vienna logo was shown on the welcome page. The overall tone was intentionally personable (e.g., using the informal "Du" instead of the formal "Sie" to address visitors), as this appeared most appropriate for the target population.

The website was tested alongside the sign-up form and screening questionnaire (described in Appendix G.1). It was especially helpful to observe during a pretest interview at the first fieldwork site how potential participants might navigate through the site. The website was revised accordingly and finalised during the institutional ethics review process. The website was then updated at the start of each recruitment wave.

Further recruitment materials (i.e., branded tote bags, posters, invitation cards) are described in the subsequent sections. These served specific purposes during recruitment but were also important in terms of branding and to increase the perceived legitimacy of the research.

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[328] An archived version of the website as presented in the final weeks of recruitment was still available to view at www.maspa-studie.at at the time of submitting this thesis (in German only).

[329] 1. A *welcome page* introduced the site and provided hyperlinks to sign-up form and screening questionnaire as well as to the other pages on the site. 2. A *blog* containing occasional updates regarding the project (e.g., start of a new recruitment wave) made the website more dynamic and current. 3. *Information about the project* was provided in the style of Frequently Asked Questions (FAQ). This page was effectively a detailed participant information: topics included general information about the study, how to sign up, what study participation entailed, and how participant data would be protected. 4. An *About me* page described the study author's academic background and interest in the study and included a photograph and a hyperlink to the author's personal Twitter page (a link to Facebook was not included on the site, but the author's personal Facebook profile was publicly accessible during the entire recruitment period). This page was intended to help develop participant's trust in the study author. 5. *About the study* described the research similar to an academic abstract. 6. The final page gave *contact* details of study author and academic supervisor. A contact form allowed website visitors to send the author a message via the site.

5.4.2. Strategies for establishing contact

Study participants were recruited through a combination of strategies. They were either approached in person or they could find out about the study through posters, leaflets, social media or referral. The original study protocol foresaw a staggered approach whereby additional approaches, such as in-person recruitment in nightlife settings, other forms of online recruitment, or further referral routes (e.g., via faculty staff), would be used if the initial approaches proved to be ineffective. However, as the main strategies were found to work well, additional approaches were not employed. This section focusses on how strategies were implemented in the present study, while Appendix F.5 details their effectiveness (e.g., how many individuals signed up to the study as a result of each recruitment strategy) and practical challenges during implementation.

Recruitment in person

Between January 2017 and May 2018, two recruiters (the study author and a research assistant) personally approached 283 persons with an oral invitation to take part in the study. In ethnographies with substance users, “cold canvassing” (or “cold calling”) means visiting places frequented by members of the target population and inviting them to take part in the research (Northcote and Moore, 2010: 290–291). Although not an ethnography, the present study still used this approach, in line with the choice of time-space sampling as outlined in section 5.2.

The literature emphasises the need to design the initial contact with participants in a way that fosters trust and rapport-building, in ethnographies (e.g., Mayock, 2000; Northcote and Moore, 2010) but also in interview-based research (e.g., Froschauer and Lueger, 2003: 63–67; Scheibelhofer, 2008: 413). The present study asked for the participation in face-to-face interviews on sensitive topics. Therefore, face-to-face recruitment was most appropriate, as it allowed potential participants to meet members of the research team in person and to develop trust in the study prior to being invited to interview. It also offered other benefits, such as reduced bias due to self-selection. The main strategy was therefore to approach students face-to-face on university premises at the two fieldwork sites. This strategy was also found to work best in practice (see Appendix F.5).

Site visits conducted prior to recruitment served to map fieldwork sites and identify possible locations for recruitment. Recruitment paths were defined which outlined in what order locations could be visited to ensure an efficient and comprehensive coverage of each site. At the OMP, the recruitment path covered the entrance areas (inside and outside), a social area

in the library, and the corridors of the first three floors, which featured lecture theatres, designated areas for studying and breaks as well as the cafeteria. At the Juridicum, the recruitment path covered three floors featuring lecture theatres, a large sitting area and the cafeteria, two staircases with seated areas on each floor, as well as sitting and smoking areas located outside the building. In practice, recruitment meant walking repeatedly through sites along those paths and looking out for potential study participants.

In preparation for recruitment in person, consideration was given to self-presentation and what it meant to perform the role of a recruiter. Several strategies were used to assume this role, including: site visits and observations; piloting recruitment strategies and anticipating possible issues; preparing responses to possible reactions by approached persons (e.g., questions, reasons to decline the study invitation); choosing clothing and makeup to blend in with the target population; starting recruitment sessions with certain routines to transition into the recruiter's role; and carrying a tote bag branded with the project logo. The research assistant tasked with recruiting participants also received relevant guidance and materials and took part in site visits. This stage benefitted from texts such as Shaffir's "tactics of self-presentation" (1991: 77–80), Burgess' (1991) guidance on gaining access in ethnographic research, and other researchers' reflexive accounts (e.g., Wilkinson, 2014). Although not a research guide, Goffman's (1990/1959: 203–230) writings on "impression management" also offered valuable insights into what was required to perform a particular role and what "performance disruptions" might occur (e.g., due to the presence of people who are not the intended audience).

For the purposes of recruitment, potential study participants were defined as females who looked to be between 18 and 24 years old. Different strategies were combined to reach a diverse range of people and thereby reduce selection bias[330]. At the same time, measures were taken to avoid being perceived by the approached persons as intrusive or disruptive[331]. Strategies that were found to be ineffective were discontinued[332]. Recruitment strategies differed between the two fieldwork sites due to differences in how the sites were set up[333].

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[330] For example, although it was found that students in the study areas could be engaged relatively easily, it was important not to limit recruitment to these locations as it was reasonable to assume that students who extensively use university study areas differ from other students (e.g., living arrangements).
[331] Recruitment therefore focussed on individual students who were waiting (e.g., outside a lecture theatre, outside the cafeteria) or taking a break (e.g., eating, smoking, looking at their phone). Students working on laptop computers who did not appear deeply focussed were also approached. Students in small groups (e.g., smoking or drinking coffee and chatting leisurely) were approached unless they were engaged in a lively conversation.
[332] Students who were walking (e.g., exiting buildings or lecture theatres) were initially approached, but they often did not have time to engage with the study invitation. Also, students visiting a temporary outdoor stall selling punch and other hot drinks were approached during Advent, but the study invitation was not taken seriously in this setting.
[333] For example, at the OMP, study areas were located along the corridors, whereas at the Juridicum these were only located in the libraries and thus not accessible for recruitment. Furthermore, at the OMP, posters advertising

As recruitment took place over a 17-month period, it covered starts and ends of term, exam and holiday periods, warm and cold seasons, all of which influenced recruitment (e.g., who was present at the fieldwork sites and how easy it was to engage them). Recruitment took place on different days of the week, generally in the afternoon[334]. Timings were sometimes purposefully chosen to coincide with lecture start or end times, so as to engage students waiting for or departing from a lecture.

Selected persons were asked if they had a moment of time to spare. Following the recommendations in the literature (e.g., Witzel, 2000; Froschauer and Lueger, 2003: 66–67), the recruiter introduced herself and then presented the study as a doctoral research project on situations of alcohol or cigarette use. The recruiter explained that she was looking for individuals who might be interested to take part in a qualitative interview, but that this interview would take place at a later date. The term "qualitative interview" was used to distinguish the present study from the surveys that the students were used to. Recruiters also clarified that all data would be treated confidentially. Additional information was then provided depending on the interaction and questions asked. Common questions addressed: timing, duration and location of the interview; aims and hypotheses of the research; number of participants needed; questions asked during the interview; participation of non-substance users; benefits of study participation; data protection; availability of further information about the project online. Printed example results were sometimes shown. Where necessary, basic eligibility criteria (e.g., age, enrolment details) were checked before sign-up. Once sign-up had been agreed, the sign-up form was handed over (further described in section 5.5).

If a person initially declined the invitation, recruiters could try and persuade them *somewhat*, for example by emphasising the importance of their participation, telling them more about the study or mentioning the EUR 10 voucher. Some students initially declined the invitation because they did not smoke or drink regularly but agreed to sign up once they had been informed that the study targeted different types of users[335]. Other students were initially unsure but agreed to sign up on the condition that they could decide later whether to attend the interview (e.g., depending on their workload). Nevertheless, recruiters were under strict instructions to respect people's autonomy and to not be coercive. Where appropriate, persons

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the study were located in well-frequented areas and it was possible to initiate recruitment by approaching students at the notice boards and drawing their attention to the study posters, whereas at the Juridicum the posters were located in less frequented locations. The Juridicum, however, featured a large casual sitting area which was well-frequented and highly suitable for recruitment.

[334] This avoided the more hectic morning and lunch-time hours when students were more likely to be preoccupied with other activities. In the afternoon, students welcomed the recruitment interaction as a break from studying.

[335] This was done to avoid marginalisation of non-users but also because people who state that they do not drink or smoke may still do so on an occasional basis (this was confirmed by the data).

who did not sign up to the study received an invitation card (explained further below) so that they could sign up to the study later or forward the invitation to a peer. This latter option was welcomed by interested individuals who were not eligible to take part themselves.

The EUR 10 voucher (see section 8.3.6 for details) was *not* mentioned during the introduction by default but was mentioned if individuals appeared unsure about (but not decidedly against) study participation, such as when they asked about benefits of participation or when they indicated that the time commitment was too great. The voucher was mentioned at the end of the interaction *after* the person had already completed the sign-up form or taken an invitation card, but there were many instances in which the voucher was not mentioned at all. To avoid recruiting individuals who were exclusively motivated by the financial incentive, recruiters were instructed *not* to mention the voucher if a person showed no interest at all in the study.

Recruitment typically targeted one to three people at a time. A seemingly more efficient approach would have been to address many students at the same time, for example in the context of a lecture. This approach was trialled in the first recruitment week. The study was presented at the beginning of a seminar to approximately 15 students and students were invited to ask questions; invitation cards were offered and students were encouraged to sign up to the study if interested. The experience from this trial suggested that one-on-one or small group recruitment were the more appropriate routes to engage participants, despite being more time-consuming. Simply presenting the study and offering invitation cards led to no sign-ups at the trial. To increase the effectiveness of this approach, students could have been asked to complete the sign-up form and screening questionnaire during the seminar; however, this did not seem appropriate[336]. In addition, basic criteria for sign-up referred to aspects such as gender and age (see Appendix E.5), so that most students present at lectures and seminars would have been ineligible. Indeed, many students at the trial seminar did not meet basic eligibility criteria, and so the discussion focussed on the eligibility criteria rather than sign-up or interview procedures[337]. Therefore, even though it is common research practice to distribute survey questionnaires for completion in school classes and similar settings, one-on-one and small group recruitment were preferable in the present study to avoid addressing ineligible persons and offer more opportunity for information and discussion prior to sign-up.

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[336] Not only would this have required taking time out of the seminar, but it would have meant asking students to sign up to an interview on sensitive topics even if they did not feel fully informed. Although students had the chance to ask questions, the opportunities for information and discussion were limited due to the large group setting and the associated time constraints. Asking students to sign up during the seminar could have felt coercive and hindered rapport-building with potential study participants.

[337] Whilst it would have been possible to stop such discussions, this would have led to an undesirable double exclusion of ineligible students (i.e., from the study itself and from discussions about it).

Posters and invitation cards

Recruitment in person was the main strategy because it gave potential participants the chance to meet members of the research team in person (and vice versa). However, different strategies may reach different kinds of people and combining strategies is considered to yield the best recruitment results (Temple and Brown, 2011: 15). Moreover, using multiple strategies can have a reinforcing effect. For example, Hughes (2000: 281–282) found that using posters was not in itself an effective strategy, but posters provided a useful reference point when recruiting in person because people remembered seeing them. In the present study, in-person recruitment was therefore supported by further strategies, described in the following sections.

Posters were hung up at fieldwork sites at the beginning of each wave. In addition, 583 invitation cards were distributed over the course of the fieldwork. Invitation cards and posters were developed incorporating recommendations from the literature (e.g., Gläser & Laudel, 2010; Leeuw & Hox, 2008b) as well as feedback from the academic supervisor, peers, and participants in a pretest phase (see Appendix G.1). They were ordered from a printing company specialising in business cards and stationery.

Posters were A4-sized. They featured the project logo, University of Vienna logo, and the words “Looking for female students” (in German) at the top (see Appendix F.3). The main text stated the basic eligibility criteria (formulated as questions to make the poster engaging) and invited interested persons to visit the project website to sign up and find out more. The text also clarified that substance use was not a condition for sign-up, and that all data would be treated confidentially and anonymised. The study author’s contact details were provided at the bottom. In some instances, a QR code was attached to posters which provided a direct link to the project website. The EUR 10 voucher was not mentioned.

Posters were displayed at the fieldwork sites on public notice boards. At the OMP, notice boards were located in areas where students would study and take breaks. On several occasions, it was possible to use the posters as a conversation starter when recruiting in person. At the Juridicum, notice boards were located outside the student representatives’ office and in corridors and were therefore less likely to attract attention than at the OMP.

Invitation cards were the size of business cards and printed on thick paper. The front side featured the project logo and title, as well as an invitational text (see Appendix F.1). The text briefly introduced the study and called for female students to take part in an interview regarding their everyday spaces. Basic eligibility criteria (e.g., age) were stated, and the project website URL was provided for further details and sign-up. The text also clarified that substance use was not a condition for sign-up. The back side showed the University of Vienna logo and

contained a hand-written unique identifier consisting of an ID code and a PIN number to be entered on the sign-up form and screening questionnaire (to be explained further below). The EUR 10 voucher was not mentioned.

Mostly, invitation cards were distributed at the fieldwork sites[338]. When recruiting in person, invitation cards were handed out to individuals who did not sign up on the spot. Invitation cards were also offered to students at the trial seminar described earlier, and they were given to contacts for referral. Although it was planned to also hand out cards to passers-by, this strategy was not used much in practice because it made more sense to use the face-to-face contact to start a conversation about the study than to simply hand out an invitation card. Appendix F.5 describes further the practicalities of using posters and invitation cards for recruitment.

Social media

Online recruitment was conducted via the social media platform Facebook[339]. Study invitations were posted on Facebook 24 times over the recruitment period. Posts targeted five pages of official student representatives and nine discussion groups for students of specific subjects.

Recruitment through Facebook was a supplementary recruitment strategy in the present study, as it could only be used sparingly (see below) and was considered to bear a greater risk of bias (e.g., due to self-selection) than recruitment in person. Nevertheless, recruiting online was essential to reach students who did not frequent the university buildings and who could therefore not be recruited through the means described earlier.

Relevant Facebook 'groups' (e.g., informal groups organised by students, typically according to study subject) and 'pages' (e.g., official pages of student representatives) were identified through own research as well as in conversation with student representatives. Invitations to the study were posted in wave 1 (groups and pages relating to the Faculties of Business, Economics and Statistics and of Mathematics) and wave 3 (all three faculties). The invitation text used on Facebook was adapted from the poster and invitation card using a more personal tone. Although the EUR 10 voucher was not mentioned on the poster or invitation card, it was

[338] For example, invitation cards were placed on tables in sitting and study areas, next to cash machines, at the student representatives' offices, at the university bookshop and in designated leaflet areas. They were also attached to the posters using bespoke boxes. Following suggestions from fellow doctoral students, cards were also left in unusual locations such as lockers or bathrooms.

[339] Several considerations led to the choice of Facebook: preliminary research as well as conversations with student representatives suggested that this was the most widely used social media platform at the target faculties; there were groups and pages specific to the faculties of interest, which allowed targeted recruitment; it was accessible without substantial third-party involvement; and it offered a way to reach students without having to contact them individually, which was desirable in terms of efficiency and ethicality. On this basis, other possible routes for online recruitment, such as email, discussion boards, mailing lists, WhatsApp or Twitter, were ruled out.

mentioned in this context because other study invitations posted on these sites also mentioned material or monetary rewards. Where possible, the poster was attached as an image.

As study invitations constitute a form of spam in such contexts, this strategy was used very sparingly. Posts were typically limited to one or two per 'group' or 'page' over the entire recruitment period (e.g., one post in wave 1 and one post in wave 3). To avoid causing a nuisance, posts that had been removed by administrators were not reposted. Students were *not* contacted individually through Facebook (i.e., no direct messaging), unless this was in a reply to a message they had sent.

Referral

The final supplementary strategy consisted of asking people to support recruitment. Three types of 'seed'[340] were used: student representatives, personal contacts, and participants, as described below. People who were approached during recruitment but did not sign up were also asked (or offered themselves) to forward the invitation to others, where appropriate.

Student representatives at the Faculties of Business, Economics and Statistics and of Mathematics were visited in person during their office hours to introduce the project and ask for their assistance (e.g., to help distribute invitation cards or advertise the study online)[341]. A follow-up email providing further details was sent where requested.

As the study author did not personally know any current students at the target faculties, personal contacts included friends and acquaintances who had previously studied at the faculties, who currently worked there, or who might otherwise know current students. These personal contacts were approached through various means (e.g., email, social media, in person) and handed invitation cards or given details of the project website as appropriate. They were informed that any interested person could sign up to the study directly via the project website or contact the study author in case of questions. The voucher was typically mentioned in these contexts, as seeds felt that this was necessary.

Thirteen of the 24 study participants were also asked for help. This was done at the end of their interview. They were not asked to provide contact details but were given invitation cards

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[340] In snowball sampling or chain-referral, the term 'seed' refers to the individuals initially contacted by the research team to recruit participants from their own networks (e.g., Kakinami and Conner, 2010).
[341] While, in wave 1, student representatives at the OMP were asked directly to support recruitment, in wave 3, the interaction with student representatives at the Juridicum focused on securing an expert interview, with the intention that this interviewee might also help with recruitment. However, an expert interview could not be secured in time and, having already identified a sufficient number of eligible individuals at that point, the student representatives for law were not approached separately to discuss possibilities for referral.

to pass on to peers in their own networks who might be interested in study participation. An incentive or reward for recruiting additional participants was not offered. Eleven participants agreed and took a total of 25 invitation cards. The other participants were not asked for referrals because these interviews took place in the last weeks of the fieldwork, when a sufficient number of participants had already been identified.

Contacting individuals initially deemed ineligible

Through the revision of the eligibility criteria, individuals who were initially deemed ineligible became eligible at a later point in the recruitment period. This was not an issue if the change in eligibility occurred shortly after the person had signed up (i.e., within the same wave), as the person could still be invited regularly for interview. However, some persons were deemed eligible as participants several months or over a year after they had signed up to the study. In these cases, it was necessary to confirm that they were still interested in study participation and that their personal circumstances had not changed in a way that affected their eligibility.

In November 2017 (at the beginning of wave 2), messages were sent to those individuals recruited in wave 1 who had previously been deemed ineligible but met the revised criteria. In May 2018 (at the end of wave 3), messages were sent to previously ineligible individuals recruited up until the start of wave 3 (February 2018) to confirm their eligibility using the final criteria. In total, 25 students who had signed up to the study but were initially deemed ineligible as participants were asked at a later date if they were still interested in study participation[342]. Messages were personalised (e.g., referring to individual time and location of recruitment) and sent using the preferred mode of contact as stated on the sign-up form. Participants were informed that personal circumstances had delayed the project and that if they were still interested to take part, they could confirm their interest and update their personal details by signing up again. A reminder was sent after one to two weeks to those who had not yet responded, clarifying that no further reminder would be sent.

Documentation

In-person recruitment was documented by hand during each session using prepared tables. The information was later transferred into Microsoft Excel spreadsheets. In wave 1, a very

[342] Those who were contacted in November 2017 were asked to complete the regular sign-up form and screening questionnaire again. Those who were contacted in May 2018 were asked to complete only a separate, adapted version of the screening questionnaire, with questions added to confirm eligibility in terms of age and study programme. This approach was taken to reduce the burden on participants as well as to allow better distinction from the regular sign-ups.

detailed documentation system was used[343] to allow insights into how details of recruitment impacted on its effectiveness. This system proved to be overly time-consuming and was therefore simplified for waves 2 and 3, so that general information was recorded per recruitment session across all approached persons[344]. This documentation still allowed ongoing review and the improvement of recruitment procedures.

Individuals who signed up to the study were listed in a separate spreadsheet. This included: their ID code; date of sign-up; whether they had also completed the screening questionnaire in front of the recruiter; and additional notes about the person (e.g., preferred interview dates, apparent interest in study participation). This information was recorded to aid follow-up of missing screening questionnaires (see section 5.5.4) and to help prepare for the interviews.

Documentation on the use of invitation cards was also detailed to begin with and simplified in waves 2 and 3. It focussed on how each individual card was distributed (e.g., given to people who did not sign up during recruitment in person, distributed on tables, placed with posters, given to participants for referral)[345]. In addition, the post-interview documentation recorded whether participants had agreed to recruit participants from their own networks, and if not, what was the reason given.

Regarding the other strategies, online recruitment was documented with the following information: the name of the Facebook group or page in which the study invitation was posted; the date of the post; the number of group members or page followers at the time of the post; and the invitation text. Screenshots were saved. Efforts to contact individuals initially deemed ineligible were recorded in the research diary, with further documentation available through the submitted forms and questionnaires. In some instances, it was not feasible or desirable to ensure a complete documentation[346]. Where the documentation was incomplete, realistic estimates were used in Appendix F.5 as appropriate.

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[343] This included recording specific details concerning each approached individual, such as when and where they were approached, if and when the voucher was mentioned, whether the example results were shown and so on.
[344] Documentation covered the following aspects: recruitment session number; date, time and locations covered; general characteristics of people approached (e.g., what were they doing); number of people approached, number of complete sign-ups, and number of people who also completed the screening questionnaire in front of the recruiter; number of instances where hard-copy versions of the forms were used, if any; number of people who declined the invitation, reasons given (12 prepared reasons by wave 3, such as “no time now”, plus an “other” category), and further notes on those who did not sign up; what questions were asked; use of additional recruitment strategies, if any (e.g., distributing cards); what worked well and how recruitment procedures could be improved; and any other comments or observations. For those who declined the invitation, the reason stated by the approached person was documented (e.g., “no time for an interview”), even if the recruiter suspected another reason (e.g., “lack of interest”).
[345] This was possible because each individual card bore a unique identifier (‘ID code’). A spreadsheet showing all ID codes was prepared prior to recruitment. During recruitment, this spreadsheet was updated to reflect how cards were distributed, including in which fieldwork site and by which recruiter.
[346] For example, if it became apparent that Facebook posts had been removed by administrators, this was noted, but there were no systematic checks to establish if or when posts were removed.

5.4.3. Partial outsourcing of recruitment

Parts of recruitment were outsourced to a research assistant who was specifically hired for this purpose. Eleven of the 24 participants were recruited by this research assistant. While it is unusual for doctoral students to privately hire research assistants, this was necessary due to personal circumstances, as outlined in section 1.2.6. The tasks of the research assistant at this stage were strictly limited to i) going to the fieldwork sites, inviting individuals to join the study and guiding them through the sign-up process, and ii) distributing invitation cards. The development of the recruitment strategies and materials was not outsourced, and at both fieldwork sites the study author always carried out the first recruitment sessions. This ensured that the recruitment strategies and materials were known to work in practice, and that the research assistant could receive information about possible pitfalls and how to avoid them.

The first contact with participants is crucial, and therefore careful consideration was given to who would represent the study during recruitment. To evidence this, this section documents how the research assistant was selected, supervised, and supported. Appendix F.5 shows how many individuals were recruited by the study author or research assistant, respectively.

To identify a suitable individual, a job advertisement was prepared and posted on relevant email listservs and websites[347]. The approach to hiring a research assistant was explicitly formal to encourage a high level of professionalism also on the part of the research assistant. The advertisement called for a research assistant to support a doctoral research project with various tasks (see Appendix F.4). Eight people applied; of these, two indicated that they were available to transcribe interviews but not to recruit participants. The remaining six were rated against a set of criteria (e.g., did they have relevant academic training, would they be able to build rapport with the target population?). Three applicants were invited for interview. Prepared questions helped judge the suitability of candidates (e.g., “in your opinion, what is important to consider when recruiting study participants?”).

A female sociology master’s student with a background in youth work and experience of raising funds for charity as a street recruiter was chosen for the role. Besides having relevant training and experience, she was well positioned to effectively engage target populations, as her appearance was similar to that of the target population and she came across as very interested in the study, credible, and approachable. The interaction during the interview suggested the possibility of a good working relationship, which was another deciding factor.

[347] Websites specialised in student jobs: https://schwarzesbrett.oeh.ac.at and http://jobwohnen.unijobs.at

A contract specifying rights and responsibilities of the research assistant was set up and signed. This covered the scope of work, obligations regarding data protection, ownership of the data, payment, tax and insurance, and the deadline for delivering documentation. The contract was based on similar contracts found online. A length of two pages was considered appropriate for a document governing a professional relationship between two students.

To train the research assistant, a face-to-face meeting was set up. The research assistant received a branded tote bag which contained recruitment materials identical to the ones used by the study author. Topics covered during the two-hour meeting included:

- who, where and when to recruit (e.g., different people, at different times and locations);
- how to present oneself (e.g., in terms of body language and clothing);
- what to say during recruitment (e.g., how to introduce the project);
- ethics (e.g., no coercion[348]);
- when and how to mention the EUR 10 voucher;
- how to respond to possible questions from participants;
- how to use the recruitment materials (e.g., invitation cards); and
- how to document recruitment using the provided templates.

The same information was provided in writing. Supplying the research assistant with written guidance, electronic templates and ready-to-use materials was intended to ensure a consistent high-quality approach across recruiters. The sign-up form and the screening questionnaire were also completed using her smartphone (i.e., the device later used for recruitment), which allowed further clarifications. The meeting concluded with a walk through the OMP fieldwork site to discuss potential recruitment paths and other important aspects of the site.

After the first two recruitment sessions, a further meeting took place over the phone. This included providing feedback on how the documentation had been completed and addressing questions and issues that had arisen in those first sessions. Two more meetings took place in person. One meeting served to review and improve the recruitment procedures based on the insights gained up until that point. The purpose of the other meeting was to visit the Juridicum fieldwork site in preparation for the final recruitment wave. Outside of these formal meetings, updates were generally provided on a weekly or biweekly basis by email, and phone calls took place as and when needed. After the recruitment stage, the research assistant continued working on the project as a transcriber.

[348] This was emphasised given the research assistant's previous experience of working as a street fundraiser.

5.5. Sign-up and screening

5.5.1. Purpose, contents and appearance of sign-up questionnaires

Through the strategies described in the previous sections, it was possible to establish contact with many individuals and to identify those who were interested in study participation. To process these contacts, certain data were required for each interested individual:

- data to help decide if eligibility criteria were met;
- contact details, so that eligible individuals could be invited to interview;
- data to help prepare for the individual interviews; and
- data to support a description of the study sample[349].

Therefore, interested individuals were asked to complete a sign-up form and a screening questionnaire prior to the interview. The instruments were accessible from the project website as well as the survey URLs. To link the two datasets, a linking system with identifiers was used (described in section 8.3.3).

Copies of the sign-up form and screening questionnaire are available in Appendices G.2 and G.3 in German. The following paragraphs summarise the contents in English. Subsequent sections describe how the two instruments were developed and how they were administered, how completion of the screening questionnaire was ensured, and how the resulting data were used to identify study participants.

The *sign-up form* consisted of five pages:

1. The first page contained a brief participant information, stating the expected completion time, the purpose of the study and basic eligibility criteria, and clarifying that substance use was not a condition for sign-up. Information concerning data protection was also included, highlighting the possibility to sign up offline or without providing contact details. Weblinks were provided to the project website and to a PDF copy of the sign-up form, allowing participants to view the questions beforehand. The final text on this page sought to provide an adequate level of detail while avoiding lengthy descriptions that would be ignored or lead to dropout (based on feedback obtained during pretesting). Consent to complete the

[349] Collecting these data prior to the interview freed up valuable interview time.

sign-up form was obtained by informing participants that their participation was voluntary and that by pressing the “Continue” button they were confirming their wish to continue.

2. The second page asked participants to confirm that they were interested to take part in a face-to-face interview and collected basic information about them (i.e., age, gender, basic details concerning their university studies). They were also asked to indicate a preferred mode of contact (i.e., phone call, text or WhatsApp[350] message, email, face-to-face[351]), whether they had an invitation card to hand, and how they had found out about the study. If participants did not meet basic eligibility criteria (e.g., no interest in a face-to-face interview, male gender), they were redirected to an exit screen.

3. The third page asked participants to provide a telephone number or email address. Participants were reassured that their contact details would only be used in the present study to arrange an interview. They were advised to provide an email address that did not contain direct identifiers (e.g., name, student number) and to give details only for phones and email accounts not accessed by others. Participants were informed that signing up without contact details was possible if done in person.

4. The fourth page asked participants to enter their ID code (as shown on the back of their invitation card). This was necessary to allow data linkage between the sign-up form and the screening questionnaire. Participants were informed that the ID code served as their personal pseudonym for the study duration. If they had previously indicated that they did not have an invitation card, then this page displayed three questions to help generate a custom user-generated identifier (see section 8.3.3).

5. The fifth page thanked participants for signing up and invited them to immediately complete the screening questionnaire. A prominent weblink directed them to the questionnaire.

The *screening questionnaire* consisted of nine pages:

1. The first page included a participant information similar to the one used on the sign-up form. Participants were informed that the questionnaire would ask about their personal background and their experiences with substances such as alcohol and cigarettes, but that everyday spaces would only be discussed at the face-to-face interview.

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[350] WhatsApp is an encrypted messaging service for Internet-enabled mobile phones that was widely used by the target population at the time of carrying out the fieldwork.
[351] Participants indicating “face-to-face” as their preferred mode of contact received a message saying that they would need to sign up in person (including instructions) but that they could continue with the online registration if they agreed to being contacted by phone or email.

2. The second page asked participants if they had already completed the sign-up form. If they did not answer in the positive, they were invited to complete the sign-up form before continuing with the screening questionnaire.

3. The third page asked participants if they had an invitation card to hand. This question allowed for branching at the next page.

4. The fourth page differed depending on the answer on the previous page. If participants had previously indicated availability of an invitation card, they were asked to enter the PIN number stated on the card. Participants were encouraged at this point to cross out the ID/PIN details from their card and to dispose of it. If they had previously indicated that they did not have an invitation card, they were asked to enter the custom identifier generated in the sign-up form or to answer the same three questions again (see also section 8.3.3).

5. The fifth page asked about participants' personal background (i.e., marital/partnership status, living arrangements, current and previous residence, where they grew up, highest level of education for them and their parents, employment status, financial situation). The information on this and the following two pages was required to decide on participants' eligibility, to prepare for the interviews and to describe the participant sample.

6. The sixth page asked participants to rate their physical and mental health and to provide basic information regarding their alcohol and cigarette use (i.e., time period since last use, age at first use, frequency of use over past three months, average daily quantity when using). For alcohol, example beverages were listed and a 'standard drink' was defined. To encourage honest responses, the introduction to this page explained why this information was necessary and reminded participants that all responses were treated confidentially.

7. The seventh page asked about craving and negative experiences related to alcohol or cigarette use (i.e., health/social/financial/legal problems, failure to attend to one's duties, having other people worry about one's substance use, unsuccessful attempts to quit or reduce use). Questions on this page were adapted from the WHO ASSIST V3.0 instrument (see Appendix G.1). A statement at the top of this page sought to reduce social desirability effects by stating that some people experience negative consequences from use, while others do not.

8. The eighth page displayed three lists of statements. Participants were asked to indicate for each list whether none or at least one statement applied to them. They were informed that different topics were presented concurrently to keep the questionnaire short. The statements in the three lists represented essential and desired exclusion criteria; however,

participants were not informed of this. They were shown last due to their sensitive nature. This page also contained a comments box and a prompt to submit the responses by clicking the “send” button.

9. The final page thanked participants for completing the sign-up form and screening questionnaire and informed them of next steps (e.g., when they would be contacted).

Completion time was stated as 3 minutes for the sign-up form and as 5 to 8 minutes for the screening questionnaire. For both instruments, simple visual designs were chosen. Each page included the project logo and the study author’s contact details.

Considering the potential burden resulting from a separate sign-up form and screening questionnaire, a more practical approach might have been to use one questionnaire only to collect all data. However, there were several reasons for using a two-part solution[352]. Firstly, ethical considerations suggested that a two-part approach separating basic data that could identify participants (e.g., contact details) from other sensitive data (e.g., health and substance use) offered the best protection for study participants. Secondly, separating these data increased participants’ perceived privacy and trust in the study. This was important to prevent problems such as low response rates, incomplete questionnaires and poor-quality responses (e.g., due to social desirability effects). Thirdly, it provided a different frame of reference for participants. A single questionnaire might have been perceived as a survey that had to be completed to help another student. Using a separate sign-up form was intended to put participants in a position of expressing their interest in study participation and *wanting* to be selected for interview. The reward for completing the sign-up form was therefore the chance to be selected for interview. This approach was developed inspired by the Total Design Method which considers under what circumstances people find study participation rewarding (Dillman, 1978, 2007; Leeuw and Hox, 2008b). Fourthly, offering the questionnaire in two parts reduced the immediate burden placed on interested individuals as they could complete the first part but leave the second part for completion at a more convenient time or in a more convenient setting. Finally, this approach was partially necessary because eligibility criteria were finalised during (rather than before) the recruitment phase. When eligibility criteria are fixed prior to recruitment, it is possible to ask the screening questions first and to collect contact details only of eligible individuals. However, in the present study, eligibility criteria evolved during the fieldwork and so the above approach was more appropriate.

[352] The study author is grateful to the European Society for Social Drug Research (ESSD) for providing an opportunity to present and discuss this methodological aspect at their annual conference (Brotherhood, 2018b). The discussions following the presentation were extremely helpful and informed this paragraph in particular.

5.5.2. Development of the sign-up questionnaires

To develop the sign-up form and screening questionnaire, a review of existing instruments was carried out. Compared with developing instruments anew, adapting existing instruments was considered to be more efficient and to increase the likelihood of producing high quality results (e.g., by referring to question items with proven validity and reliability). Appendix G.1 describes in detail how existing instruments were identified, reviewed, adapted and supplemented with custom questions, and how the resulting draft instruments were converted into online questionnaires and finalised through pretests. This section highlights key points.

For questions specifically related to substance use, the study used, for example, questions from the WHO's Alcohol, Smoking and Substance Involvement Screening Test (WHO ASSIST Working Group, 2002; Schütz et al., 2005; Humeniuk et al., 2008), the European Addiction Severity Index (EuropASI) (Kokkevi and Hartgers, 1995; Gsellhofer et al., 1997; Scheurich et al., 2000) and regional or national surveys conducted in Austria (e.g., Feistritzer et al., 2015; Seyer et al., 2016; Strizek and Uhl, 2016), either in their original or in an adapted form. Appendix G.4 lists source instruments, original wordings and changes for all questions in the sign-up form and screening questionnaire that were adapted from other instruments. Where no suitable question was identified in existing instruments, questions were newly developed.

The draft instruments were then converted into online questionnaires and finalised through pretesting. To best protect study participants (in line with the ethical considerations outlined in Chapter 8), two different providers were used: the sign-up form was set up with German provider "SoSci Survey" at www.soscisurvey.de (Leiner, 2016), while the screening questionnaire was set up with British provider "Online Surveys" at www.onlinesurveys.ac.uk (Jisc, 2016). Pretesting using a three-wave design (Campanelli, 2008) served to identify technical errors, assess completion time, and to understand how the sign-up process was experienced. The instruments represented an intermediary step toward study participation: it was thus important to ensure a positive experience in order to increase the quality of responses and future participants' commitment to the study. Appendix G.1 describes the pretesting further, but briefly, feedback was received from nine persons and helped, for example, to improve questionnaire instructions or remove questions that were consistently perceived as upsetting. The final instruments are shown in Appendices G.2 and G.3.

5.5.3. Administering the sign-up questionnaires

As noted in section 5.2.3, the sign-up and screening procedures differed slightly depending on whether people were recruited in person or through other means. Where participants were

recruited in person at the fieldwork sites, once they had expressed an interest in the study, they were handed a mobile device (tablet or smartphone) with the sign-up form opened on its second page[353]. Participants were shown their card with the personal identifier when necessary. At the end of the sign-up form, recruiters asked participants if they could also complete the screening questionnaire to help with the selection of participants. In some cases, this was not necessary, as participants went on to completing the screening questionnaire without any prompt by the recruiter.

If participants agreed to completing the screening questionnaire, they were handed the mobile device again, starting with the questions about participants' personal background (i.e., the fifth page of the screening questionnaire). The earlier pages were completed by the recruiter (e.g., confirming completion of the sign-up form and entering the PIN number on behalf of the participant). Other than that, the form and questionnaire were completed by participants, as self-administration reduces social desirability effects when collecting sensitive information (Leeuw and Hox, 2008a: 300–308; Lensvelt-Mulders, 2008: 471). Recruiters were instructed to respect participants' privacy during completion of the instruments but provided guidance if requested or deemed necessary (e.g., how to enter ID code). Upon completion of the screening questionnaire, participants received their card and information about next steps. The entire interaction usually lasted around 10 to 15 minutes. If participants were unable to complete the screening questionnaire immediately, they received their card and were encouraged to complete the questionnaire at a later time.

Hard copies of the sign-up form and screening questionnaire were brought along in case an interested individual preferred pen-and-paper completion or participation without contact details, or in case technical difficulties precluded the use of the online instruments. The original study protocol foresaw separate procedures for such cases, but in practice, no participant expressed such preferences and it was never necessary from a technical point of view.

Those who found out about the study through others means were directed to the project website from where they could access the sign-up form and the screening questionnaire as well as more information about the study. In this case, the form and questionnaire were entirely self-administered on participants' own devices, without any additional guidance or prompts.

[353] The first page was skipped because participants had already been informed about the study and consented orally.

5.5.4. Physical and electronic reminders

A challenge resulting from the use of a separate sign-up form and screening questionnaire was that participants could complete only the sign-up form but not the screening questionnaire and still believe that they had completed the sign-up process. However, participants who had only filled in the sign-up form could not be considered for study participation, as data from the screening questionnaire were required to determine their eligibility. As described earlier, immediate completion of the screening questionnaire was encouraged by including a prominent link to the screening questionnaire on the last page of the sign-up form. Those who signed up in person were also asked by recruiters to complete the screening questionnaire immediately. Nevertheless, not all participants were able to do so. Physical and electronic reminders were therefore used to encourage completion of the screening questionnaire (on the importance of reminders, see e.g., Leeuw and Hox, 2008b).

Those who signed up in person received a thank-you card (see Appendix F.2). This card was similar to the invitation card described earlier, but instead of a general invitational text, it thanked participants for signing up to the study and encouraged them to complete the sign-up process by filling out the screening questionnaire. They were also invited to visit the project website or to contact the study author in case of questions. Participants who had already completed the screening questionnaire in front of the recruiter also received this card but with hand-written amendments (i.e., a tick indicating no need for further action, the German word for “thanks” and a drawing of a smiley face, ID code and PIN number crossed out). For the others, the intention was that they would find the card in their purse or pocket at a later point and remember to complete the questionnaire. Posters at the fieldwork sites, general invitation cards on display, as well as recruiters walking around with bags bearing the project logo were also potential physical reminders, including for those who had signed up online.

Electronic reminders were sent only to those who had signed up in person. In total, electronic reminders were sent to 31 individuals. They received up to two messages using their preferred mode of contact as indicated on the sign-up form. The first reminder was usually sent one to six days after sign-up, and if necessary, a second reminder was sent four to 11 days after the first reminder. Reminders were formulated in a way to encourage completion (e.g., asking participants to complete the questionnaire “today”, mentioning the voucher when describing the next steps [not explicitly as an incentive]). The second reminder clarified that in order to be considered for interview, completion of the screening questionnaire was required. Appendix F.5 documents the effectiveness of reminders.

5.5.5. Application of the criteria and invitation to interview

Using data from the sign-up form and screening questionnaire, it was possible to identify and contact potential study participants. First, data from the screening questionnaire were checked to identify those individuals who met the eligibility criteria valid at that time. PIN numbers of eligible individuals were noted, and corresponding ID codes were retrieved from an allocation table[354]. Data from the sign-up form were then inspected to check if these individuals also met the criteria covered there, and if so, to view the contact details provided during sign-up.

This procedure was carried out repeatedly throughout the recruitment phase, at times daily, thereby ensuring that eligible individuals could be invited to interview soon after they had completed the screening questionnaire. On several occasions, applying the criteria excluded too many individuals, which led to the revision of eligibility criteria as described earlier. The above procedure was then repeated with the revised criteria, and these criteria used thereafter.

Eligible individuals were invited to interview using their preferred mode of contact. If no response was received, up to two reminders were sent within the following two to three weeks. Participants were provided with potential interview dates and time slots from which they could choose the most convenient one for them. One day before the agreed interview date, participants received a reminder for the interview, including directions to the interview location.

5.6. Summary: from study invitation to study participation

Figure 5 below summarises how the recruitment efforts and application of eligibility criteria resulted in the final study sample of 24 participants. After removing test and pretest responses as well as incomplete[355] and duplicate[356] responses, the sign-up dataset contained 85 cases and the screening dataset contained 73 cases. As Figure 5 indicates, most people who signed up (n=66; 78% of 85) were recruited in person, with fewer people recruited online (n=15; 18%)

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[354] The allocation table showed which ID codes corresponded to which PIN numbers. The original study protocol foresaw that no allocation table would be kept, but that PIN numbers would always have to be converted to ID codes using an encryption key. This was intended to protect current users of illegal substances. In practice, this additional security measure was not required, as current users of illegal substances were not interviewed and it was not possible to infer current use of illegal substances from the sign-up or screening data.

[355] Incomplete responses were discounted and are not shown in Figure 5. Incomplete sign-up forms were all due to sign-up attempts by individuals who did not meet the basic eligibility criteria and who were therefore redirected to an exit screen after the first page.

[356] Duplicate responses occurred because some interested individuals (who were initially ineligible but became eligible later on due to the revision of criteria) were contacted at a later stage and asked to sign-up again if they were still interested in study participation. In addition, two individuals signed up a second time when completing the screening questionnaire, and one person signed up two times to correct a mistake made during the initial sign-up. Duplicate responses were individually reviewed to retain the more appropriate entry.

or through other means (n=4; 5%). Hence, recruitment in person and via social media were found to be most effective (further detailed in Appendix F.5).

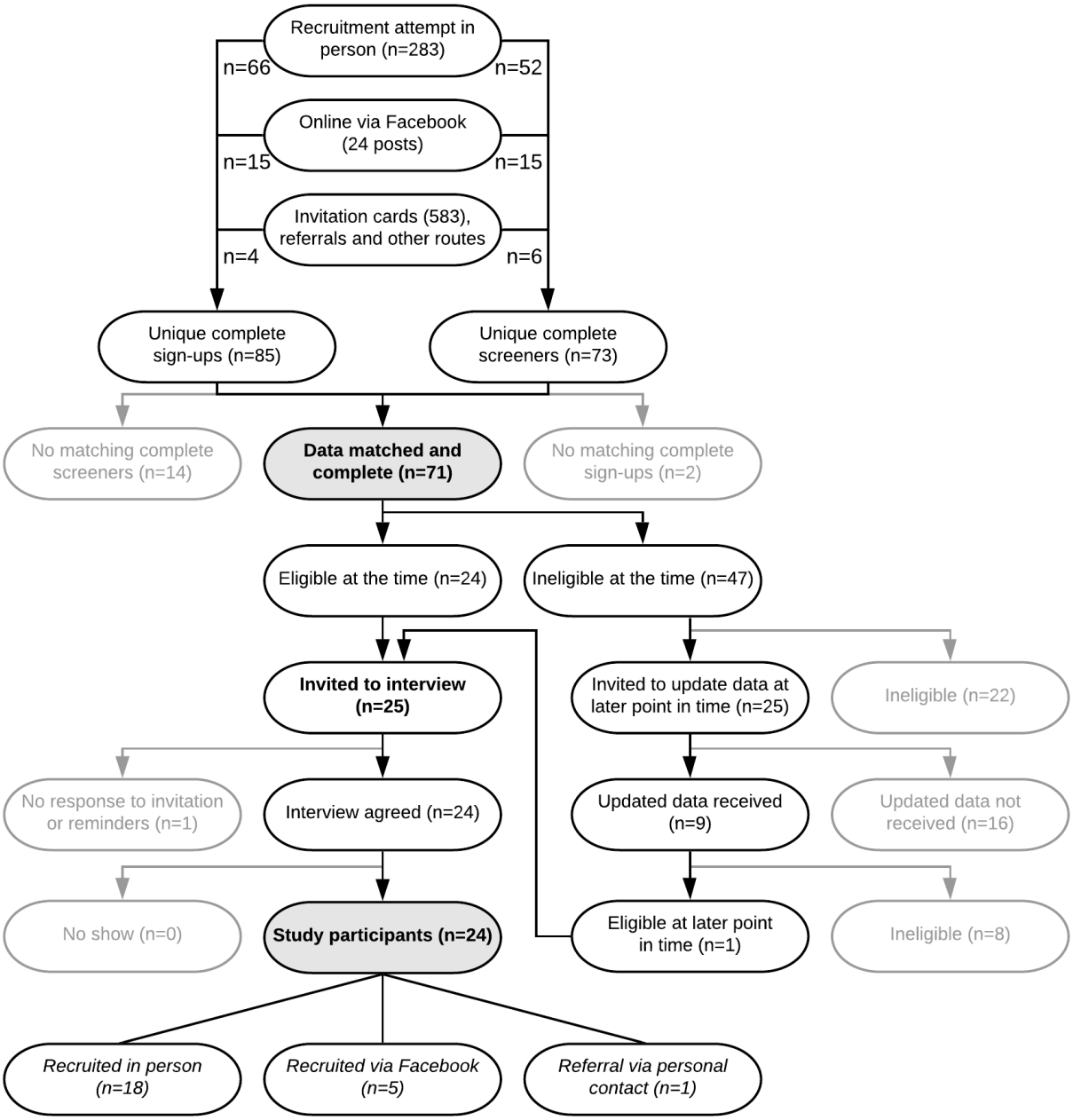
Sign-up and screening datasets were matched by referring to the supplied ID codes and PIN numbers or the user-generated ID codes. In total, 87 people completed the sign-up form and/or the screening questionnaire, and of these, data for 71 cases (82%) could be matched[357]. These were considered as having been successfully recruited into the study.

Eligibility of successfully recruited individuals was determined on an individual basis shortly after sign-up. In November 2017 and in May 2018, all prior sign-ups were also reviewed to identify any additional cases that were potentially eligible using the updated eligibility criteria. When determining eligibility shortly after sign-up, 24 individuals met the eligibility criteria valid at the time and were invited to interview. Of the 47 individuals deemed ineligible shortly after initial sign-up, 22 were still deemed ineligible when checking their eligibility several months later. Of the other 25, nine confirmed their interest in study participation and updated their data. Of these, one individual met the updated eligibility criteria and was invited to interview. Consequently, 25 (35%) out of 71 successfully recruited individuals were invited to interview.

Of the 25 people invited to interview, one person did not respond despite reminders; the other 24 (96%) responded positively to the invitation. Of these, all showed up to the interview, which was likely due to a combination of factors including personalised contact, a reminder sent on the day before the interview, and perceived rewards (to be described in section 8.3.6).

[357] Regarding the cases that could not be matched, there were 14 sign-ups without a corresponding screening questionnaire. These 14 individuals had all completed the sign-up form in person but did not complete the screening questionnaire, despite reminders. Furthermore, there were two cases in which a screening questionnaire had been completed without a matching complete sign-up form. In one case, it appeared that the person completed the screening questionnaire first and then attempted completion of the sign-up form but indicated no interest in a face-to-face interview, which led to them being redirected to an exit screen. In the other case, a matching sign-up form could not be identified. It is possible that these two persons believed the research to be a survey where the screening questionnaire constituted the main data collection instrument.

Figure 5: Flowchart – from recruitment to the final sample of study participants



6. Data collection

6.1. Introduction

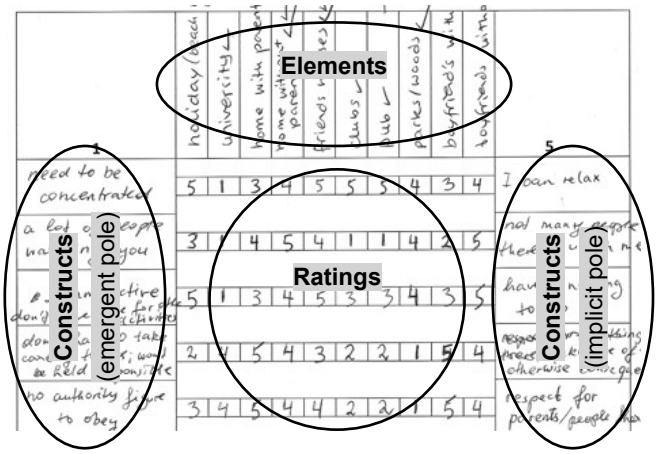
In the present study, data were generated through semi-structured face-to-face interviews which combined visual methods with repertory grid technique and a topic guide approach[358]. The 24 study participants (described in Chapter 5) were interviewed individually between March 2017 and June 2018 at the University of Vienna or at a law firm. Interviews lasted between 1,5 and 3 hours (approx. 2 hours on average). All interviews were carried out by the study author. Interview procedures and materials were developed in several stages between 2009 and 2016, considering relevant theoretical and methodological literature and the insights gained from pilot interviews and discussion with academic colleagues. In addition, materials were continuously updated during the fieldwork (see Appendix H.1).

As noted in Part 1, the idea for this research emerged from the possibilities offered by the repertory grid: hence the choice of main data collection method was clear from the outset. The overall approach to data collection sought to explore the main research question ("*how do construed socio-spatial aspects relate to situated substance use*?") from various theoretical and methodological vantage points in order to balance researcher interests with openness to participants' own perspectives, and to make the interview rewarding for participants. This translated into a relatively complex research design, in which the standard repertory grid technique (Jankowicz, 2004) was tailored and enhanced to meet these goals, as described below. The data collection procedures were developed over the course of two pilot studies and refined further during the fieldwork. This introduction outlines the technique in general, while later sections describe its application in the present study.

The repertory grid interview is founded on Kelly's (1963/1955) *Psychology of Personal Constructs*, also known as personal construct theory (PCT) (see sections 1.2.4 and 3.4.2). PCT posits that people develop personal constructs regarding the world, which guide how they think and act. Kelly suggested that "a person's construction system is composed of a finite number of dichotomous constructs" (Kelly, 1963/1955: 59). The purpose of the interview is to elicit the personal constructs that a person holds concerning a particular topic.

[358] At various points in this study, additional methodological approaches were considered with a view to triangulating different data types, addressing potential limitations of the repertory grid method and exploring further research foci. Even if these ideas could not be pursued fully due to resource limitations, some were implemented in part (e.g., observations on campus, key informant interviews, see section 6.5).

Figure 6: Example of a completed repertory grid



Source: Author's own illustration using pilot study data.

In practice, the repertory grid interview is a semi-structured interview typically lasting 40-60 minutes (Jankowicz, 2004: 15–16). To elicit constructs, participants are asked to systematically compare *elements* (e.g., persons, objects, pictures, concepts) and describe similarities and differences between elements in their own words. These descriptions are thought to represent *constructs* held by participants regarding the elements and interview *topic*. A key strengths of this technique is thus that it focuses on participants' own concepts (i.e., not those of the interviewer) and that it taps into participants' implicit knowledge which they may otherwise struggle to verbalise. The technique was therefore well suited to the present study.

The descriptions are entered into a repertory grid (a special form of table, see Appendix H.9 for an empty grid and Figure 6 above for a completed example), which allows for the subsequent *rating* or ranking of the elements on the elicited constructs. Figure 6 uses an example from a pilot to the present study to illustrate the positioning of elements, constructs and ratings on the repertory grid. Each repertory grid interview thus consists of four components (Jankowicz, 2004: 10–14):

- The *topic* provides a focus for the grid. It is typically defined by the researcher (i.e., derived from the research question), but may also be developed with the participant, depending on the rationale for conducting the interview.

- *Elements* are specific examples relevant to the topic, typically agreed at the start of the interview. They can be supplied by the researcher or elicited by asking participants to think of examples (e.g., persons they know) for general categories (e.g., 'someone I dislike', 'someone good at their job') (Jankowicz, 2004: 31). Six to 12 elements per interview are recommended for most applications (Jankowicz, 2004: 42).

- In the practical context of the repertory grid interview, *constructs* refer to the qualitative data that are generated and entered in the grid[359]. In the triad-based variant of the repertory grid interview, they are elicited iteratively by asking participants to consider and discuss three elements (a *triad*) at a time. In line with Kelly's theory, constructs are conceptualised as dichotomous pairs of opposing words or phrases (e.g., "Usually comes in late for work – Always comes to work on time", Jankowicz, 2004: 11). The *emergent* pole is that which participants think of first, while the *implicit* pole is elicited through follow-up questions. Jankowicz (2004: 45) recommends aiming for 7-10 constructs within one interview. In addition to elicited constructs, constructs may also be supplied; for example, if a researcher has a specific hypothesis or research interest or if it is methodologically important to have shared constructs across all participants (Jankowicz, 2004: 56, 113-14, 170).

- *Ratings* refer to the quantitative data generated in the interview. There are different variants but one common approach (Jankowicz, 2004: 26) is, once a construct has been elicited, to ask participants to rate each element along this construct. For research purposes, ratings are typically conducted on a 5-point scale to enable quantitative data analyses. When all elements have been rated on a given construct, another triad of elements is presented to elicit a new construct.

In the present study, the topic was 'socio-spatial construal of everyday spaces', elements were participants' own everyday spaces, supplied constructs referred to importance, valence, frequency of visitation and substance use in the elicited everyday spaces, and elicited constructs related to liked and disliked aspects of the spaces (further described below). Given the study's focus, it was important that elements related meaningfully to participants' *own* substance use practices (thus supplying elements, such as names of popular nightclubs or bars, was not desirable). Furthermore, it is important to highlight that the two main 'variables' in the research question (situated substance use, socio-spatial aspects) were operationalised as *supplied constructs* relating to substance use on the one hand and *elicited constructs* relating to socio-spatial construing on the other hand, with a view to combining these data during data analysis (see Chapter 6).

There are different ways of carrying out repertory grid interviews; as Fransella et al. (2004: 80) put it: "The grid is truly a technique, and one which is only limited by the user's imagination".

[359] For all practical purposes, the researcher treats the participant's answers as the personal constructs, recognising, however, that the spoken words can only represent, but are not equivalent to, the underlying (non-verbal) constructs (Jankowicz, 2004: 27, 61).

Indeed, it is their flexibility and the many possible design decisions which make them both attractive and burdensome (Fransella et al., 2004: 154). The present study generally applied the technique according to Jankowicz (2004) but enhanced it in several regards (e.g., use of multiple supplied constructs, content-oriented triad formation, qualifying phrase not a direct translation of the research question). Also, the present approach was in some respects more qualitatively oriented than might be expected from a standard repertory grid application in a research context.

The next sections describe the interview and post-interview procedures as well as the interview locations. To conclude, section 6.5 outlines further data collection that informed this research but was not included in the final analysis. Appendix H.1 details the development of interview procedures and materials further. The sign-up form and screening questionnaire used to collect background information about participants are described in section 5.5.

6.2. Repertory grid interview

Table 10: Interview structure and approximate duration of different parts

Parts in the interview		**Typical duration**
1.	Introductory part (including participant information, informed consent, additional questions about participants)	15-20 min
2.	Mapping task to elicit everyday spaces as elements	15-20 min
3.	Classification of mapped spaces based on supplied construct ratings, followed by triad formation	30-40 min
4.	Construct elicitation (including element ratings and construct rankings)	30-45 min
5.	Debriefing and conclusion	15-20 min
Total interview		1 hr 50 min – 2 hr 25 min

Table 10 above shows the interview structure used in the present study, including the typical duration (excluding exceptionally short or long interviews). An interview guide (shown in Appendix H.2) was developed to structure the interview and offer reminders for points that might otherwise be forgotten. It was used flexibly and adapted to participants' needs (e.g., explaining certain points in more detail, rephrasing questions if needed). General recommendations on how to conduct interviews were followed (e.g., Froschauer and Lueger, 2003: 59–74; Gläser and Laudel, 2010: 172–192; McCrady et al., 2010). Interviewer performance was evaluated after the first interviews (further described in Appendix H.1). Interview procedures were developed further during the fieldwork; the following descriptions reflect the final procedures, with changes summarised in Appendix H.1.

6.2.1. Introductory part within the interview

The first part served to prepare participants for the interview, to meet ethical requirements and to obtain additional information required for the interview and later analyses. At the start of the interview, participants received a EUR 10 voucher of their choice as a token of appreciation for coming to interview (see section 8.3.6). This was followed by introductions and oral information about the project (e.g., study aims), the interview contents (e.g., duration, overview of parts) and data protection (e.g., anonymisation procedures). Participants were informed that the interview referred only to the past six months and that future activities would not be discussed. Participants were then invited to read a written participant information and ask any questions before completing a modular consent form (see Appendix H.4 and Chapter 8). Questions by participants typically addressed general project aspects (e.g., required number of participants) or sought clarifications regarding the consent form (e.g., who could access their data). Participants were shown the audio-recording device; all participants agreed to being audio-recorded. Due to the multi-part nature of the interview, an interview guide and a time-sheet were used throughout the interview to track and inform participants of the interview's progress. Figure 7 (p. 240) shows the interview room setup at the 'OMP' fieldwork site.

Key socio-demographic data and information on participants' health and substance use had already been collected prior to interview (see section 5.5). Additional questions asked at the interview therefore referred mostly to sensitive items which participants might have been reluctant to answer online (e.g., type of occupation, country of birth) and open-ended items that asked for an explanation (e.g., substance use preferences, recent changes in substance use practices). This was also an opportunity to clarify questions regarding the data collected online (e.g., in case of apparent discrepancies) and to identify potential discussion points for the interview. In addition, participants were presented with a list of substances and products and asked to indicate when they had last used each item (if ever). The interview then *focussed on those listed substances and products that had been used in the last six months prior to interview*. The in-person questionnaire was developed similarly to the sign-up form and screening questionnaire and is available in German from Appendix H.5.

6.2.2. Element elicitation through a mapping task

In the present study, elements were typical situations in spaces featuring in study participants' everyday lives, including spaces that were visited frequently or that were personally important to participants or to their substance use (referred to as 'everyday spaces' in this thesis). While the focus on 'everyday spaces' emerged from the importance assigned to habits and routines

in the substance use literature (Chapter 2), non-everyday spaces (e.g., holidays) were also included based on concepts such as Foucault's 'heterotopia' (see section 3.2). The elements were partially elicited by participants and partially supplied by the interviewer. Although repertory grid researchers may send elements to participants (or ask participants to prepare their elements) in advance of the interview (D. Jankowicz, personal communication, 13.12.2017), for the present study, preparing the elements together with participants *during the interview* was important due to the complexity of the element elicitation task.

To elicit an initial list of elements, a mapping task was used which incorporated aspects from participatory mapping approaches (e.g., Emmel, 2008) as well as selected questions from the Ecological Interview developed by Mason et al. (2004). Fransella et al. (2004: 35–38) describe the use of non-verbal methods to elicit elements in repertory grid work primarily with reference to children and people with disabilities, but as Chapter 4 showed, the use of images is common in space-related studies. In the present study, participants were asked to think about what they do, who they meet and where they go (e.g., for work, study, leisure) on a *typical week* and to record relevant spaces, places or situations on a sheet of paper, *regardless of whether these were related to substance use or not*. The task thus captured participants' routine 'activity spaces' (e.g., Mason and Korpela, 2009). Participants could also add other spaces or places that were *important* to them if they had featured in the last six months. Participants were free to represent the spaces as they wished, either via drawing (e.g., as a kind of mental map) or as a simple list. Many participants commented that they preferred to write down the spaces because they did not feel confident to draw. Finally, 16 participants (67% of 24) relied primarily on writing (of which ten used no visual elements other than a list format), and eight participants (33% of 24) relied primarily on drawing, representing spaces using symbols or pictures. Consequently, the term 'map' in this thesis refers to the *output* from the mapping task and includes those 'maps' which were merely lists of spaces. Participants were also given the option to work on their map in silence or to think aloud whilst preparing it: 13 participants (54% of 24) worked in silence, seven (29%) spoke continuously, and four participants (17%) switched between think-aloud and silent phases as they prepared their map.

When participants indicated that they had finished their map, they were asked to consider if there were any other places that should be added. To this end, the interviewer offered various settings and categories *for consideration*: first, a list of general everyday settings (e.g., home, workplace, friends' place); and second, a list of substance use situations[360]. Participants were

[360] Prompts included: situation where participant typically uses substances, situation where participant uses substances most frequently, situation associated with heavier-than-usual use, most recent substance use occasion; all with reference to the substances used in the last six months as indicated on the questionnaire completed earlier.

not obliged to include spaces corresponding to those settings or situations if they were not applicable or if they did not consider them relevant for inclusion; this represented a departure from standard repertory grid technique (see below). Rather than standardisation of maps, the aim was to ensure that each map included a range of spaces relevant to participants' everyday life and to their own substance use practices. Participants were informed that maps were not intended to represent all their everyday spaces, but to offer a representative sample (meaning a variety of spaces) that could serve as a basis for discussion. In some cases, these prompts did not lead to the addition of any further spaces, as relevant spaces had already been included during the initial mapping task.

Finally, participants were asked to go through each space in their mind and to briefly visualise (without describing) a typical situation for each space which would serve as the reference point for the remainder of the interview. If a space appeared to 'contain' several such situations, participants were encouraged to either choose one situation or to 'split up' spaces so that the same place would be represented on the map several times but with different typical situations (e.g., 'university–studying', 'university–breaks'). The interviewer then asked about any aspects of the map that required clarification (e.g., visual elements). The maps were complete when both the participant and the interviewer were satisfied that relevant spaces had been mapped and that there was sufficient clarity on what each space represented.

Consequently, considering standard repertory grid techniques as well as mapping approaches, the study departed from those in two important ways. Firstly, especially in repertory grid studies aimed at conducting analyses across participants, the same elements are usually supplied to all participants to ensure a consistent basis for comparison. This can even mean that participants are asked to imagine an element if they do not have such an element in their life[361]. In the present study, an earlier draft of the study design envisioned that a standard list of settings would be developed and supplied to all participants. Another option would have been to supply different types of substance use situations (e.g., similar to those in Box 4 below). However, given the plethora of possible settings and differences between participants, it was decided that a standardised set of elements (whether by setting or by situated substance use pattern) would not reflect participants' lives appropriately. By contrast, focussing on personally relevant spaces and allowing idiosyncratic maps was more in line with the study's theoretical underpinnings and was deemed to also provide a more meaningful and engaging reference

[361] For example, in a study by Hodgkinson et al. (2017: 395, original emphasis), "[o]nly two [out of ten] participants were able to identify elements for every [supplied] role title, with the remaining nine participants creating [... up to four] hypothetical elements. Hypothetical elements were used if the participant was not able to identify a specific person to match the role title; for example, if they had never met a midwife with a BMI>18kg/m^2 they were asked: '*Could you imagine what a midwife with this BMI might be like and how you might feel to be with them?*'".

point for participants, thereby increasing the quality of interviews. This meant that the number and types of spaces differed between participants; elements were therefore standardised *after* data collection (see section 7.3). Nevertheless, *one element was supplied* during the interviews (hypothetical ideal space; described below).

Secondly, although mapping can be used for data collection (Emmel, 2008), in the present study, it served primarily to generate the elements for the repertory grid interview. Participants were therefore *not* instructed to draw a map in any representative or meaningful way, and information about the geographical locations of places was not collected. In principle, a list of spaces would have been sufficient to conduct the interview. However, it was considered that inviting participants to draw their spaces could have methodological advantages: for example, the map could serve as a visual aid during the interview, help with the visualisation of typical situations, and make the interview more engaging and enjoyable for participants. Therefore, although maps were not submitted to further analysis, their use was justified.

6.2.3. Supplied constructs

Once the map of everyday spaces was complete, the spaces were transferred onto a repertory grid with supplied constructs (see Appendix H.6). The interviewer presented these supplied constructs as a series of questions, namely:

- how important the spaces on the map were to participants (very important–not at all important);
- what feelings participants had when thinking about the spaces (positive–negative feelings) (referred to as 'valence' in this thesis);
- how frequently they visited the spaces or how frequently the typical situation occurred (daily or almost daily–1-2 times per year or less); and
- how frequently they used substances when they were there (always–never; asked separately for each substance/product used by participants in the six months prior to interview and for all substances together).

Answers were given on a five-point scale, and participants received cards with all answer options as a visual aid (see Appendix H.7). Participants were instructed to think of the typical situation, but in practice it was found that ratings sometimes referred to the overall space (noted as a limitation in section 13.4). If a rating seemed unusual (e.g., because it appeared to contradict something the participant had said earlier), the interviewer asked for clarification. The answers were entered into the grid and this information (besides being used for later data analysis) helped decide which spaces should be presented to participants during the construct

elicitation, as described below. At this point, the supplied element (a hypothetical ideal space, see section 6.2.6) was also introduced for the first time and rated on the supplied constructs.

It should be noted that the use of multiple supplied constructs is not the standard repertory grid approach. In the examples provided by Jankowicz (2004: 56), only *one* construct is supplied which addresses the grid's overall topic. In the present study, multiple supplied constructs were required to allow the intended data analyses and to account for the complexity of the research topic (e.g., not limited to a single substance). Considering the discussion of supplied constructs by Fransella et al. (2004: 46–48), it is also noteworthy that the supplied constructs in this study served primarily to classify spaces for later analyses and did not replace construct elicitation.

6.2.4. Triad formation

After approximately one hour interview time, participants had mapped relevant everyday spaces, chosen typical situations within those spaces, and provided ratings on the supplied constructs for the elicited spaces as well as for their hypothetical ideal space (described below). At this point in the interview, participants were given a break and offered snacks. They could leave the room during the break or stay in the room as they wished.

During this break, the second half of the interview was prepared. In the triad-biased variant of the repertory grid interview, elements are presented in groups of three (i.e., triads) to participants to elicit constructs. Time constraints mean that it is not feasible to present all possible triads in an interview; thus, only a subset of all possible triads can be covered. While handbooks on grid methodology address most procedural aspects in detail, the question of how to form triads (i.e., which elements to include in a given triad, order of triads, number of triads) tends to be covered more cursorily. The main recommendation is to vary elements across triads, usually at random (Jankowicz, 2004: 24-26, 42). The present study sought to elicit constructs which people generally use to make sense of their everyday spaces, as well as constructs which could be relevant to distinguish between situated substance use patterns. Triads were therefore formed based on the content of elicited spaces. The present approach was similar to that used by Wysor (1983)[362].

To this end, spaces were first classified according to setting and substance use pattern, using a separate classification grid (see Appendix H.8) and a priori defined criteria. The mapped

[362] Wysor (1983: 624) created "'similar elements' triads" which contained either "natural places" only or "man-made places" only, as well as "'dissimilar elements' triads" which each contained natural and man-made places. Elements were thus combined to elicit a range of constructs relevant to the research aims.

spaces were inspected to identify those spaces which appeared to be similar in terms of setting or situation (e.g., several spaces at home; several spaces referring to leisure activities). Then, spaces of infrequent and frequent alcohol, cigarette or medicine use were highlighted (e.g., infrequent: participant reported 'rare' or 'occasional' use; frequent: participant reported using substances 'often' or 'always'; with thresholds tailored to the individual user profile). Through this, spaces could be classified as representing: no substance use at all; infrequent substance use; frequent use of a single substance; or frequent use of multiple substances (e.g., alcohol *and* cigarettes)[363]. Where none or only one space met the criteria for a certain category, other spaces that almost met the criteria were highlighted.

If a participant had elicited more than 12 spaces, the next step was to check if that number could be reduced. This was preferable because the length and difficulty of the interview increased with the number of spaces. Therefore, all spaces that were essential to maintain were highlighted (e.g., if a participant had only one space for a category), and the remaining spaces were reviewed to identify any whose exclusion was unlikely to significantly reduce the value of the interview. To aid decision-making, the interview guide contained a list of criteria[364]. In practice, this meant that out of 296 spaces elicited from 24 participants, 23 spaces (8%) were dropped at this point. Most 'dropped' spaces (15 of 23; 65%) were spaces associated with no or rare substance use, and where spaces of frequent substance use were excluded, participants had a greater number of such spaces on their maps. This intermediary step concerned 11 participants who had elicited between 13 and 18 spaces (see also Chapter 9). However, in case of any doubt, spaces were *not* excluded, so that in several cases, more than 12 spaces were retained. Spaces were thus dropped in eight interviews, with three interviews accounting for 70% of the dropped spaces.

Finally, the triads were specified. For this purpose, a list of 12 triads had been prepared in advance (see Box 4 below). Triads 1, 2 and 12 included spaces that, although similar in setting/context, differed with regard to the substance use pattern. The remaining triads compared various categories of situated substance use, namely spaces representing different use frequencies (triads 3-5), different substances (triads 6, 7, 10) and nuances *within* the same substance (triads 8, 9, 11). The order (and thus prioritisation) of triads was important, as only few triads could actually be covered in an interview. A greater number of triads was specified

[363] These categories were used for the triad formation with the anticipation that they may also be used during data analyses. The final types presented in Chapter 11 differ somewhat, as they were developed based on the empirical data (further described in section 7.3.3).
[364] If more than 12 spaces were elicited, spaces were *considered* for exclusion if: they were among the last ones to have been elicited during the mapping task; participants had rated them as rather unimportant or not at all important; there were multiple spaces with the same situated substance use pattern; the situated substance use pattern was consistent with the social norms of that particular setting (e.g., no substance use in the supermarket).

in advance because, at the level of individual interviews, triads could refer to the same three elements (e.g., triads 1 and 3 could include identical elements) or were not always applicable (e.g., only triads 1-3, 8 and 12 applied to participants who used only alcohol). During the interview, spaces could be allocated relatively quickly to the prepared triads using the completed classification grid. To complete the triad formation, the triad numbers for each elicited space were noted at the top of the supplied constructs grid (see Appendix H.6).

Box 4: Definition and prioritisation of triads for the repertory grid interview

1. 'Similar settings 1' as per classification grid (3 spaces **with at least two different use patterns**)
2. 'Similar settings 2' as per classification grid (3 spaces **with at least two different use patterns**)
3. No substance use (2 spaces) – infrequent substance use (1 space)
4. Infrequent substance use (2 spaces) – frequent poly substance use (1 space)
5. Frequent poly substance use (2 spaces) – infrequent substance use (1 space)
6. Frequent alcohol use (2 spaces) – cigarettes used frequently *but not alcohol* (1 space)
7. Frequent cigarette use (2 spaces) – alcohol used frequently *but not cigarettes* (1 space)
8. Frequent alcohol use (3 spaces)
9. Frequent cigarette use (3 spaces)
10. Frequent medicines use (2 spaces) – alcohol/cigarettes used frequently *but not* medicines (1 space)
11. Frequent medicines use (3 spaces)
12. 'Similar settings 3' (3 spaces **with at least two different use patterns**)

The above design was not ideal, as it required many decisions in a short space of time and took place *during* the interview. The completion of the three tasks (classification of spaces, reduction of spaces, allocation to triads) took 10 minutes on average, but in the case of many elicited spaces, it took 20 minutes to prepare the triads. Nevertheless, this approach was deemed preferable over the alternatives (i.e., supplied elements, random selection of triads[365]). The break was generally viewed positively by participants and it allowed the interviewer to become familiar with the elicited spaces before moving on to construct elicitation.

[365] Random selection of triads can mean following a pattern based on the element number (e.g., combining the first, second and third element for the first triad, then the fourth, fifth and sixth element for the second triad) (e.g., Stewart et al., 1981, cit. in Stone, 2003: 105) or drawing a random sample from all possible triads (e.g., Bell, 1990, and Leach et al., 2001, cit. in Fransella et al., 2004: 27). Such approaches purposefully disregard the content of elements to avoid researcher bias during triad selection (Yorke, 1983: 173). However, they are more appropriate when a study seeks to elicit constructs generally related to the interview topic or has no prior assumptions about differences between elements. The present study sought to identify constructs that could distinguish between spaces representing different situated substance use patterns. Using a random approach to triad formation would have risked producing triads containing only one type of pattern (e.g., three spaces associated with no substance use). Given that the present study also used a neutral qualifying phrase (see section 6.2.5), constructs relevant to a range of situated substance use patterns might then not have been identified.

6.2.5. Construct elicitation, qualifying phrase and element ratings

After the triad formation break, the repertory grid interview's main part followed: the elicitation of constructs. The spaces retained at the previous stage were transferred onto a blank repertory grid (see Appendix H.9). Participants were informed which spaces had been dropped (if any) and were given an opportunity to express their views; all affected participants agreed that the dropped spaces were not essential to retain. Then, the general procedure for the construct elicitation was explained and the qualifying phrase was introduced (see below). Participants were reminded to always think of the *typical situation* chosen during the mapping task for each space. Additional instructions sought to make participants feel at ease[366] and to explain the interviewer's role in the construct elicitation process[367].

Overall, the present study followed the procedure for construct elicitation and element rating as outlined by Jankowicz (2004: 24–26), although, as noted earlier, triads were chosen based on content. Triads were generally presented in line with the triad formation plan (see above); if a triad was not applicable or did not make sense to an individual, it was skipped and the next triad used. It is worth highlighting that participants were *not* informed how triads were formed and why a specific triad was being offered, so as not to prejudice their answers. To start, participants were asked to consider the three elicited spaces allocated to triad 1 (as per Box 4, p. 232) and to answer the following question: "Which two of these spaces are more similar to each other *in terms of something that you like or dislike about them*?"[368, 369].

The words highlighted above in italics indicate the *qualifying phrase* used in the present study. To ensure that elicited constructs relate to the interview topic and that participants focus on the same aspect, Jankowicz (2004: 28–29, 35-36) suggests adding a qualifying phrase ("in terms of …") when asking participants to compare elements. Ideally, only one qualifying phrase should be used per project, as constructs elicited with different qualifying phrases must be analysed separately (D. Jankowicz, personal communication, 25.02.2016). A key decision for the present study was therefore which qualifying phrase to use – in particular, whether it should relate specifically to substance use or not. Considering the overall research question, an

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[366] e.g., "please remember there are no right or wrong answers", "this will be similar to the previous grid but now we'll be using your own categories".
[367] e.g., "I'm trying to understand your subjective point of view, I will rephrase what you said and ask follow-up questions to ensure I've understood everything, please correct me if I seem to have misunderstood you".
[368] German original: "Welche zwei dieser Räume sind sich ähnlicher in Bezug auf etwas, das du an ihnen magst oder nicht magst?".
[369] The question wording in the present study differed slightly from the wordings suggested by Jankowicz (2004: 24, 36, original emphasis) (e.g., "Which two of these are *the same* in some way, and *different* from the third?", "In what way are two of them the same, and one different, in terms of …") to adapt it to the German language and ensure that the question would be easily understood by participants.

obvious qualifying phrase might have been "… in terms of what determines whether you use substances or not". However, considering the available literature and the pilot study results (testing different qualifying phrases), it was decided to focus instead on socio-spatial aspects that were important to participants but *not* specifically related to substance use (further explained in Appendix H.1). Focussing on "liked" and "disliked" aspects was thus meant to ensure that participants would think of socio-spatial aspects that were personally important to them. When introducing the procedures, participants were informed that the qualifying phrase (cf. a general question without a qualifying phrase) would help them think of constructs that were more specific and personally meaningful.

Once participants had identified which two spaces were similar, they were asked to explain *what* these two elements had in common and then how the third one differed (known as difference method; Fransella et al., 2004: 28). As suggested by Jankowicz (2004: 24), this was followed by a negotiation over meaning, during which the interviewer asked follow-up questions to help clarify the construct's meaning and summarised the construct in her own words to check if it had been understood.

The interviewer noted key words summarising the elicited construct in the repertory grid table as the negotiation went on, with one grid row corresponding to one construct. As noted in the introduction, in repertory grids, constructs are operationalised as *pairs of opposing words or phrases*. The part of the construct that emerged first (what did the two similar elements in the triad have in common?) was written in the left-hand column ('emergent pole'), while the part of the construct that emerged later (how did the third element differ?) was written in the right-hand column ('implicit pole') (Jankowicz, 2004: 48). If the reference to the third element did not produce a clear contrast to the emergent pole, then the implicit pole was elicited by asking participants to describe the opposite of the emergent pole in general terms ('opposite method', Fransella et al., 2004: 28). Negotiating construct meaning was an interesting experience from a methodological point of view, but a detailed reflection is beyond the scope of this thesis[370].

When the participant and the interviewer were satisfied that the construct was sufficiently well represented on the grid, the construct was used to rate the elements on a 5-point scale. The emergent pole was assigned the value '1' and the implicit pole was assigned the value '5'. The three elements considered during the triad were rated first. If participants seemed unsure what to do, the interviewer pointed out which pole each element had been associated with during

[370] To give one example, the initial triad occasionally elicited several aspects. In these cases, the interviewer and participant clarified whether these were several *separate constructs* (hence to be written on separate rows in the grid) or related *aspects within* the same construct (hence to be written on the same row in the grid).

the construct elicitation and what the corresponding values were (e.g., “you described this space using the words in the left column of the table, so you would probably want to rate this with a 1 or 2, for example”; a similar approach is reported by Stone, 2003: 108). Once the three triadic elements had been rated, all remaining elements were also rated[371]. Ratings were entered by the interviewer (Fransella et al., 2004: 65). Participants could indicate if a construct was ‘not applicable’ to a particular space, in which case this was noted instead of a rating[372]. Throughout the rating task, the interviewer sought to anticipate ratings (based on what was already known about participants or what made sense in general) and asked for clarification if a rating differed notably from what was expected (e.g., “can you tell me more about why you gave a ‘2’ here?”). This approach aimed to ensure that the interviewer understood what the ratings meant to participants (and therefore, how they construed the spaces)[373]. Though such follow-up questions are not highlighted in the literature, they can be part of repertory grid practice (D. Jankowicz, personal communication, 25.02.2016).

Once all elements had been rated, the next triad was presented and the above procedure repeated to elicit a new construct. The construct elicitation phase ended when the participant could no longer think of any major constructs or became visibly tired, when the time allocated to this interview part was over, or when all prepared triads had been addressed. At this point, the hypothetical ideal space was presented again (see next subsection).

Although Jankowicz (2004: 44) suggests that 7-12 constructs can be obtained within a 1-hour interview, this was not achieved in the present study which generated only 2-6 constructs per interview (see Chapter 10). There were two main reasons for this[374]. Compared with a standard repertory grid interview, the present study allocated more time to other interview parts (e.g., element elicitation, supplied constructs). The time available for actual construct elicitation was therefore shorter, namely typically 30 to 45 minutes (although in two instances it was a full hour). More important, however, was the length of time needed to elicit and negotiate a construct and rate all elements on it. This took 7-10 minutes on average per construct, which was longer than the time implied in Jankowicz’s suggestion above. The longer duration was due to a combination of factors, such as the relatively high number of elements in the present

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[371] Some repertory grid studies elicit *all* constructs first and then rate each element on all constructs (i.e., construct elicitation and elements ratings are separate interview parts). This study followed the procedure as used by Kelly and advocated by Jankowicz (2004) and Fransella et al. (2004: 64) (i.e., elicitation of one construct followed by rating of all elements, following by elicitation of new construct). This was thought to be more manageable for participants and reduced the risk that ratings could not be collected due to lack of time at the end of the interview.
[372] This could happen, for example, where a construct was relevant to outdoor spaces only (but not indoor spaces), or only to situations involving other people (and thus not to spaces where the participant was alone).
[373] This was also communicated to participants so they would not feel doubted by the interviewer.
[374] In one case, only two constructs were elicited; the participant could not think of any other constructs regardless of the triad presented.

study (over 11 elements per interview on average) but in particular the complexity and un/familiarity of the interview topic for participants. Höft et al. (2019: 352–353) highlight that constructs do not "reside fully formed, 'inside' the individual". The authors go on as follows (Höft et al., 2019: 353):

> The interviewee may not have thought about the issue before. He or she may, for example, have an intuitive notion that he or she may not have put into words before or be so familiar with the issue that the need for verbal labels has been abandoned. In both cases, the search for an appropriate term becomes a matter of careful interaction between interviewer and interviewee. The goal is to find the exact verbal labels that express the particular contrast, with which the interviewee feels comfortable now that his or her attention has been directed to it.

This was certainly the case for the present study, as participants did not seem used to talking about their everyday spaces, which resulted in a longer elicitation and negotiation process. Also, the complexity of the topic (e.g., especially if participants tried to describe the atmosphere of a space rather than its material arrangement) frequently resulted in multi-dimensional constructs which required further elaboration. Especially in the later interviews, the interviewer frequently used probing questions to clarify a construct's meaning and the element ratings (see section 6.2.8). Similarly, Höft et al. (2019: 364) suggest that the interviewer plays an important role when participants are confronted with topics they have not previously considered.

6.2.6. Hypothetical ideal space as supplied element

In addition to the elicited elements, one element was supplied: participants were asked to imagine a hypothetical ideal space that represented total well-being to them. The inclusion of hypothetical ideal elements is common in repertory grid studies (e.g., 'ideal self': Fransella et al., 2004: 124; Jankowicz, 2004: 57; 'ideal urban green space': Home et al., 2010; Wan and Shen, 2015). In the present study, it served as a reference point to understand participants' position on substance use as well as their actual everyday spaces. Its inclusion was not foreseen in the original study protocol, but it was added from the third interview onwards, as preliminary analyses of the first interviews highlighted the usefulness of such a reference point. This supplied element was therefore not included in any triad[375].

The hypothetical ideal space featured two times in the interviews. First, after all elements had been elicited and rated on the supplied constructs, the idea of a hypothetical ideal space was

[375] Elicited constructs were thus developed based on actual everyday spaces only, which was commensurate with the overall research question.

introduced, and participants were asked to rate that ideal space on the supplied constructs. The second time was at the end of construct elicitation, after the grid had been completed. Participants were reminded of the ideal space and asked to characterise it using their own, elicited constructs. Ratings for the ideal space were recorded on a separate sheet of paper.

6.2.7. Construct ranking with qualitative follow-up

To conclude the work with the constructs, when all elements had been rated, participants were asked to *rank* the elicited constructs in order of importance: firstly, in relation to their hypothetical ideal space, and secondly, in relation to their own substance use. Specifically, they were asked to consider which of the elicited constructs was most important for their ideal space, which was second most important, which was least important, and so on, until all constructs had been placed in a rank order. The exercise was then repeated for substance use, by asking participants to consider which constructs were most crucial in relation to their use of alcohol or cigarettes. The ranks were noted on a separate sheet of paper.

This task was initially included merely to collect data for another project[376], but finally supported the current study as well. The resulting numeric data had to be used with caution, as participants frequently struggled to understand the task and rank the constructs, particularly in relation to substance use[377]. However, during later interviews, a more beneficial approach to the rankings was developed: participants were invited to elaborate on their rankings ("what were you thinking of when you ranked the constructs?") or, if they struggled with the ranking task, they were encouraged to discuss first how the constructs might relate to their own substance use before attempting to rank them. Thus, the ranking task became an effective prompt for participant narration. Participants who had discussed the question first seemed to complete the ranking more easily. This task was the last quantitative step of the interview, while the remaining interview took a more qualitative approach.

6.2.8. Follow-up questions, debriefing and conclusion of interview

Although this was not emphasised in the previous sections, narrations were elicited throughout the interview. In particular, narrations were possible or actively encouraged at the following points: during the introductory part, when participants described their general substance use

[376] This was a project led by Mark Heckmann to explore the validity of a key premise of repertory grid methodology, namely that personally important constructs are elicited first (see e.g., Heckmann et al., 2019, on this topic).
[377] It was probably easier to rank the constructs with regard to importance for the ideal space because this corresponded to the qualifying phrase used in the interview ("like or dislike"). By contrast, substance use was not a focus during the construct elicitation, so that participants had to first 'return' (mentally) to that focus.

preferences, experiences and views; during the mapping, when participants thought aloud whilst preparing their map or when they explained certain aspects of their map; during construct elicitation and the ensuing negotiation over meaning; during the rating of elements on supplied or elicited constructs, when participants commented on noteworthy ratings; and during the construct ranking, when participants gave context to the rank order as described above. In addition, the interviewer asked ad hoc questions whenever anything required clarification. Participants were reassured at the interview start that any questions were merely intended to improve the interviewer's understanding of their point of view.

The actual extent of narrations varied depending on, for example, participants' personality and prior engagement with the topic (e.g., quit attempts). Some participants gave brief answers and ignored opportunities for elaboration, while others gave detailed accounts whenever possible. Consequently, the tasks related to written outputs (e.g., questionnaires, mapping, construct elicitation, element ratings, construct ranking) emerged as a shared basis across all interviews, while the nature and extent of additional verbal information differed. This applied also to the final interview part, which was more qualitative in nature and varied in length, depending on participants' time availability and level of engagement.

Narrations served four basic purposes in this study: firstly, to obtain contextual information that would help make sense of participant responses (e.g., an answer might take on a different meaning depending on whether it comes from a non-smoker or a daily smoker); secondly, to ensure that the interviewer interpreted the answers as intended by the participant (e.g., regarding the meaning of a particular construct or rating); thirdly, to gauge the validity of the methodology (e.g., whether important constructs had been elicited); and lastly, to generate data to explore those research questions which could not be addressed through the repertory grid data alone, especially those relating to *how* situated substance use or abstinence come into being. The final interview part addressed these points more formally, especially in the later interviews (as explained in Appendix H.1). In addition, it was designed as a space for joint reflection as suggested by Jankowicz, 2004: 135–137).

This final part assumed a conversational style, which distinguished it from the prior interview parts (highly structured and focussed on written outputs) and thus signalled the conclusion of the interview. This part was tailored to each interview but generally covered the following aspects (taking on board guidance in Jankowicz, 2004)[378]:

[378] The interview guide included additional questions but these were only used if participants could think of just a few constructs or if they were interested to continue the interview beyond the standard set of questions.

- did participants feel there was anything missing (e.g., additional constructs that should have been elicited, any other aspects relevant to their substance use not mentioned thus far) or was there any other information that they felt the interviewer should know;

- the interviewer returned to the map to check if each space had been appropriately covered and to address any outstanding questions;

- the interviewer summarised the interview, first highlighting general points of interest (e.g., unique perspectives offered by the participant) and then repeating key differences (as reported by the participant) between spaces associated with (frequent) substance use and those associated with abstinence or rare use – participants then commented if the summary was accurate and expanded or clarified additional points as necessary;

- what insights did participants gain from the interview, if any.

As noted earlier, in some cases, these prompts generated little additional data, while in others, they effectively added a brief qualitative interview to the repertory grid interview. Compared with a conventional qualitative interview, the design in the present study had the advantage that, by this point, participants were already engaged with the topic, so that they were better able to speak freely without the need for substantial interviewer prompts.

Interviews ended by thanking participants for their contribution and inviting them to ask their own questions about the study. The interviewer checked if there was anything that should be retracted or that was especially sensitive (e.g., on the map). Participants were asked for feedback on interview procedures (e.g., suggestions for improvements, which parts were difficult) and how they experienced the interview overall. Final points concerned next steps, such as if, how and when additional communication would take place (e.g., in case of questions during the analysis or to share results) and whether participants could assist with recruitment (see 'referral' in section 5.4.2). All participants received the study author's and academic supervisor's contact details for any questions or comments emerging after the interview.

6.3. Post-interview reflection and documentation

A reflection was conducted after each interview[379] and specifics of each interview documented, first as hand-written notes immediately after the interview and later electronically using a structured template. In line with recommendations in the literature (e.g., Witzel, 2000;

[379] In addition, interviewer performance was evaluated after the first interviews (see Appendix H.1).

Froschauer and Lueger, 2003: 74–75, 222-223; Jankowicz, 2004: 77–80; Gläser and Laudel, 2010: 192, 317-8; Lamnek and Krell, 2016), this included key data and reflections on:

- the interview (e.g., date, place, duration);
- the study participant (e.g., how identified, level of engagement during the interview);
- procedural aspects (e.g., successes, difficulties, unexpected events, researcher-participant interaction[380]);
- possible insights for analysis and preliminary conclusions, potential strengths and weaknesses of the data, ideas for future interviews (e.g., emerging questions).

This information was recorded not only for documentation purposes. Several of the 'procedural aspects' fields in the template (e.g., participant feedback on interview; deviations from interview protocol; interviewer mistakes; limitations) sought to identify potential weaknesses of the interview procedures. These were summarised and translated into recommended changes which then supported the revision of procedures during the fieldwork (as per Appendix H.1).

6.4. Interview locations

Figure 7: Interview room at the 'OMP' fieldwork site

Source: Author's own.

Interviews were held at two locations corresponding to the two fieldwork sites (described in section 5.2.5). Business/economics, statistics and mathematics students were interviewed at the "OMP" (Oskar Morgenstern Platz) site where they were also based. The setting was neutral

[380] Section 1.2.5 highlighted the role of 'reflexivity' in the present research. A recurrent theme in the 'reflexivity' literature concerns the relationship between researcher and participant (e.g., Watt, 2007; Grant, 2014; Wilkinson, 2014). In the present study, the nature of this relationship was considered in preparation for the fieldwork as well as during the fieldwork. The ensuing insights informed the research (e.g., revision of interview guide). Due to space constraints, only little of this reflexive engagement could be documented in this thesis.

(see Figure 7) and there were only rare interruptions from outside. There was no issue if interviews ran over time, as the room was not in high demand. Its location within the same building as the lecture rooms and library meant a high degree of convenience for the students.

The law students were based at the "Juridicum" site, but it was not possible to secure a room there due to the general lack of meeting spaces in that building. Through personal contacts, an office space in a nearby law firm was secured. Holding the interviews in a lawyer's office had advantages and disadvantages. It likely increased the project's perceived importance and credibility, and being able to visit a law firm was an additional incentive for law students. However, interruptions were more frequent and although the office was extremely tidy, it could not provide as neutral an environment as the meeting space at the OMP. Interviews were allowed to run overtime (the lawyer did not enter the room until after the participant had left), which was beneficial for the research but disrupted the lawyer's working day: for this reason, one of the last law students was interviewed at the OMP. Finally, potential conflict of interest on part of the participants was a concern in this setting; for example, whether they would regard the law firm as a potential employer and therefore give more socially desirable responses or choose not to disclose certain information. Indeed, some participants asked at the end of the interview whether they could intern at the firm, and two participants applied to the law firm following the interview. However, participants in this setting answered the questions similarly to the participants at the OMP. Therefore, whilst social desirability might have played a greater role in this setting, it did not interfere with the interviews in an obvious way.

6.5. Additional data collection

The repertory grid interviews described in the previous sections generated the key data for the present study. The data analysis methods described in Chapter 7 as well as the findings presented in Part 3 refer to those data only. However, further data collection methods[381] were used to inform the study design (e.g., recruitment of participants) and to help contextualise the data obtained during the interviews. This section provides a brief overview of these.

[381] The choice of additional methods was inspired by feedback on the present study obtained from academic peers as well as talks on ethnographic approaches (e.g., Becker and Back, 2009; Hitzler, 2016; Scheibelhofer, 2016). While an ethnography was not within the scope of the present study, borrowing from the ethnographic research methods toolbox enabled a better understanding of the research context. Ethnographic tools of interest included participant observation, the use of field notes and research diaries, and key informant interviews (for a brief overview of data collection techniques in ethnographic research, see e.g., Northcote and Moore, 2010: 292).

6.5.1. Structured site visits and observations on campus and online

Recruitment was preceded by a preparatory phase during which the fieldwork sites were visited repeatedly. Structured site visits, alone and with gatekeepers, were used to map out the sites (as well as the surrounding areas) and to identify those locations where students could be recruited most effectively (e.g., areas where students took breaks or had to wait). These were then translated into recruitment paths which were followed during recruitment sessions. Locations where posters and invitation cards could be displayed were also noted. During this preparatory phase, options for potential interview locations were also assessed.

Site visits were also used for observations. Students on site were observed with regard to their behaviour and their appearance; during recruitment, this information helped to develop a good rapport with participants by adjusting the interviewer appearance to that of the target population (whilst remaining authentic) (see also e.g., Burgess, 1991; Shaffir, 1991; Wilkinson, 2014). In addition, aspects of the fieldwork sites directly related to alcohol and cigarette use were noted (e.g., availability of substances, signs and objects relating to substance use, visibility of substance use). Observations on campus were supplemented with observations online. For example, relevant student groups on Facebook were identified to support recruitment. The websites and social media pages of the student union representatives were also reviewed for substance use related content (e.g., partying, alcohol and intoxication). Site visits and observations were documented through pictures or screenshots of notable aspects (e.g., posters) and fieldnotes in a research diary.

As suggested by Shaffir (1991: 75), these repeated visits also served as a familiarisation with the fieldwork site and the target population, which helped the study author develop a more confident and relaxed approach during the later recruitment phase.

6.5.2. Expert interview with a student union representative

As part of the above efforts to support recruitment and view the repertory grid interviews in context, the study author considered undertaking expert or key informant interviews (e.g., Tremblay, 1957; Marshall, 1996; Bogner et al., 2009; Gläser and Laudel, 2010). A 1-hour interview with a local student union representative (*Österreichische Hochschülerschaft*) active at one of the fieldwork sites was consequently realised at the start of the fieldwork in January 2017. This person was recruited through personal contacts and, besides being a student at the faculty and a former smoker, had several years' experience of serving at the student union, which included organising leisure activities for students (e.g., parties).

Prior to the interview, the student union representative received a participant information sheet and a granular consent form (similar to the ones used for the repertory grid interviews) as well the interview guide with questions. The interview was not audio-recorded but documented using hand-written notes. The student union representative received an electronic summary of the interview for review and approval.

The interview served to improve the study author's understanding regarding the activities of the student union (with a special focus on policies or other measures to address substance use and health among the students) as well as the local student culture with regard to alcohol and cigarettes (as perceived by the interviewee). Practical feedback and ideas regarding participant recruitment were also discussed. The interview thus helped to prepare the study author for the recruitment and interview phase by providing relevant background information.

6.5.3. Follow-up interview with a study participant

The original study protocol foresaw follow-up interviews with the repertory grid interviewees. These were to be optional and to be offered to those participants who were interested in discussing their results from the repertory grid interview. The methodology for the follow-up interviews built upon ideas developed during the pilot studies, as described in Appendix H.1. In addition, it sought to address limitations of the repertory grid interviews as identified in discussion with academic peers. Follow-up interviews were to take place 2-4 weeks after the respective repertory grid interviews and to have three main parts:

- '*Collaborative interpretation of repertory grid data'*: a presentation and discussion of preliminary findings from the repertory grid interview to obtain participants' perspectives on their data and to assess the validity of the researcher's preliminary interpretations, thereby increasing the credibility of results (e.g., as suggested by Jankowicz, 2004: 82–137 and implemented by Ralley et al., 2009; on 'member checking' techniques in general, see e.g., Lincoln and Guba, 1985; Kemper et al., 2003: 276; Northcote and Moore, 2010: 294).

- '*Socio-spatial transformations'* – two options were considered: recounting and discussing the last substance use event to obtain a detailed account of how a substance use space is produced step-by-step through the interplay of various factors (version 1); or describing one of the mapped spaces in detail, considering different substance use scenarios (version 2). Relevant questions and follow-up prompts were developed based on examples of questions for narrative or problem-centred interviews in the literature (e.g., Witzel, 2000; Flick, 2006; Scheibelhofer, 2008).

- '*Everyday spaces and prevention'* – Jankowicz (2004: 131–136) shows how repertory grid data can be used to explore what would need to change in order for one element to become more similar to another element. Following on from this, questions in this part were going to explore how spaces of substance use could transform into spaces of no substance use, what supporting or hindering factors participants anticipated, and whether the repertory grid interview offered any insights that could support such changes if desired. Though pilot studies showed that such conversations could emerge naturally during the repertory grid interview, this part was intended to explore possibilities for prevention and behaviour change and address the initial research questions relating to prevention in a more structured manner.

Placing these parts outside of the initial repertory grid interview meant that individual meetings would not last too long and that the above discussions could be informed by a preliminary analysis conducted by the study author in-between the two meetings.

In practice, only one such follow-up interview was carried out, with one of the first participants. As the follow-up interview protocol had not been piloted up until that point, this interview also served to test the usefulness and feasibility of follow-up interviews. Based on the experience of this test interview (as well as the repertory grid interviews already carried out by that point), it was decided – in agreement with the academic supervisor – not to conduct further follow-up interviews. There were several reasons for this. A key consideration was that follow-up interviews would require separate transcription and analysis, and this demand on resources would have to be offset by the added value of the follow-up interviews. Such added value was limited because the follow-up interview mostly expanded on themes already addressed in the repertory grid interview. A more efficient approach was therefore to incorporate some of the questions and strategies intended for the follow-up interview in the repertory grid interview and to extract relevant data from the repertory grid interview transcripts.

7. Data analysis

7.1. Overview and rationale

At the end of the fieldwork, a range of materials and data types were available, including completed repertory grids, interview audio recordings, and maps produced by participants. The final analysis focussed on the repertory grids and interview transcripts, with separate analyses carried out for each data type and research question, as shown in Table 11 below[382, 383].

The overall data analytic approach was characterised by several features (italicised below) which defined the unique strengths and challenges of this project and also translated into a higher-than-usual page count, especially in this chapter. The *wealth of analytic perspectives and techniques* evident from Table 11 below was one such feature, as was the *combination of quantitative and qualitative approaches* which emerged from the research questions, as described in Part 1. A further feature was *methodological innovation*. This was necessitated: i) by the specific nature of research questions, which meant that traditional approaches (e.g., for the analysis of repertory grids) could not be applied; and ii) by the lack of data in the quantitative dataset, which required frequent workarounds (described in this chapter). Related to this was also the *gradual unfolding* of the analytic approach to account for unexpected developments (cf. strict adherence to the ex-ante defined study protocol). This was the case also for the qualitative analyses, as follow-up interviews were not realised as planned, and qualitative data were instead extracted from the repertory grid interviews (as explained in section 6.5.3).

[382] The focus for the data analysis was determined in several steps. The initial study protocol, relevant literature and preliminary analyses of pilot study data and of the first interviews were used to prepare an overview of all available data types, their correspondence with the research questions and possible avenues for analysis. This draft data analysis plan was reviewed together with the academic supervisor to determine priority areas for analysis. This then led to a revision and narrowing of the originally intended research questions to select those most essential to the overall research question (i.e., *how do construed socio-spatial aspects relate to situated substance use*; see section 4.2). On this basis, potential foci not deemed essential to the overall research question were excluded, for example, those that related only to theorising space (e.g., how participants represented spaces visually or verbally, where they experienced difficulties describing spaces or imagining typical situations and why).

[383] Part 3 also presents findings from smaller exploratory analyses relating to the research questions "What could be key components of everyday situations, beyond setting?" (section 9.3) and "How might patterns of situated substance use co-occur at the level of individual substance users?" (section 11.7). However, this chapter focusses on the main analyses, defined as priorities in the data analysis plan.

Table 11: Data types and main analyses in the present study

Data type	Research question	Objective	Method		Results
Elicited constructs, grid ratings on elicited constructs	What socio-spatial aspects might people refer to when interpreting their everyday spaces?	• Develop master constructs based on elicited constructs, to be conceptualised as socio-spatial aspects	Content and cluster analyses	Section 7.2	Chapter 10
Elicited elements, grid ratings on supplied constructs	What settings and situations can be part of everyday life?	• Group elicited spaces according to setting to facilitate a description of the everyday spaces underpinning the study • Develop a general typology of everyday situations as a possible alternative to an exclusively setting-based approach	Content analysis	Section 7.3.2	Chapter 9
	What situated substance use patterns could be distinguished in relation to alcohol and cigarettes?	• Develop a typology of situated substance use patterns to support subsequent analyses	Cluster analysis	Section 7.3.3	Chapter 11
	How might situated substance use patterns be associated with everyday settings or situations?	• Examine the relationship between situated substance use patterns and general classifications of settings and situations as developed earlier	Descriptive and nonparametric statistics	Section 7.3.4	Section 12.2
All grid ratings, including on 'ideal' element	How might these situated substance use patterns differ in terms of the identified socio-spatial aspects?	• Characterise different patterns of situated substance use in relation to each other (based on identified socio-spatial aspects)	Descriptive and nonparametric statistics, comparisons between multiple types and effect sizes	Section 7.4	Chapter 11
	Which construed socio-spatial aspects could be relevant to distinguish between situated substance use patterns?	• Identify socio-spatial aspects most relevant to situated substance use to answer overall research question		Section 7.4.4	Section 12.3
Interview transcripts	How can socio-spatial aspects produce specific instances of situated substance use or abstinence?	• Examine pathways to situated substance use or abstinence to answer overall research question and revise theoretical model • Contextualise earlier quantitative findings	Qualitative content analysis, causation coding, network displays	Section 7.5	Sections 12.4 to 12.5

In line with Table 11, the following sections present in turn the analytical techniques applied to the elicited constructs, elicited elements and grid ratings (i.e., the three key elements of the repertory grid, as described in Chapter 6) as well as the interview transcripts.

7.2. Elicited constructs

7.2.1. Introduction

The data collection resulted in 108 personal constructs, elicited from the 24 study participants. In line with repertory grid methodology, the elicited personal constructs took the form of dichotomous pairs of opposing words or phrases. In the present study, these words or phrases referred to perceived characteristics of everyday spaces, conceptualised as socio-spatial aspects. To limit data collection to personally important constructs, participants were asked to focus on aspects which they "liked or disliked" about the spaces (as described in Chapter 6).

The purpose of generating these data was to develop an understanding of the socio-spatial aspects utilised by study participants, in order to:

i) contrast the everyday spaces along these aspects during the quantitative analyses (see the later sections in this chapter); and

ii) compare these aspects with the socio-spatial aspects described in the literature (as outlined in Chapters 3 and 4).

The raw data obtained during the interviews could not be used for these purposes. Some constructs elicited by participants were similar to each other, and it was therefore advisable to consolidate similar items before further analyses. Also, each participant had provided ratings only in relation to their own constructs during the interview, so that quantitative analyses using raw data could have been carried out only at the individual level. It was preferable to carry out analyses across individuals (see section 7.4), and so the data were consolidated further into broad categories to include as many participants as possible in each quantitative analysis[384].

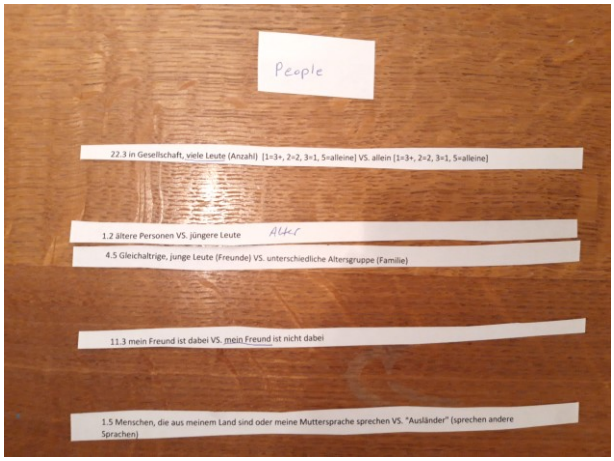
The following sections describe how the original list of 108 constructs was first streamlined into 29 categories through content analysis, and then consolidated further using cluster analysis to result in 12 distinct master constructs.

[384] Individual-level analyses of the constructs (as suggested by Jankowicz, 2004: 82–89) were therefore not carried out, except in the earlier project stages to inform the development of instruments and the data analysis plan.

7.2.2. Content analysis: from 108 constructs to 29 categories

The content analysis of constructs followed the procedures outlined by Jankowicz (2004: 148–169). Content analysis requires an ex-ante definition of the unit of analysis. In repertory grids, this is the written construct (Jankowicz, 2004: 148–149). The analysis can therefore be done by hand, for example by photocopying the grids, writing identifying numbers next to each construct (e.g., '5.3' refers to the third construct mentioned by the fifth participant) and cutting the grids up into strips (one construct per paper strip) which are then arranged on a table (Jankowicz, 2004: 151, 175). A similar approach was used in the present study (see Figure 8).

Figure 8: Content analysis by hand with constructs printed onto paper strips



Source: Author's own.

The study combined "bootstrapping" and "theory-based" approaches to content analysis. "Bootstrapping" refers to those content analytic approaches where units of analysis are compared to each other and grouped into categories depending on how similar or dissimilar they are (Jankowicz, 2004: 149). Conversely, "theory-based" approaches are those where constructs are allocated to a pre-defined category system which was developed using prior research, theory, hypotheses or the like (Jankowicz, 2004: 166–168). In the present study, the study author's prior knowledge of the literature (as described in Part 1) was going to influence the analysis; hence it made sense to make this knowledge explicit and utilise it. A draft framework was therefore developed, incorporating socio-spatial aspects from Löw's (2001) theory as well as the substance use literature (shown in Table 12 below).

Jankowicz (2004: 168–169) suggests that "bootstrapping" and "theory-based" approaches can be combined in that an initial attempt is made to allocate constructs to the pre-defined category system, followed by bootstrapping to develop additional categories for those constructs which could not be allocated. Other authors have combined the two approaches differently. For example, Naoi et al. (2006) first allocated constructs to pre-defined broad categories, and then

coded openly *within* those categories to produce subcategories. The present study utilised both of these approaches. The framework served as a guide to group constructs and label categories. Bootstrapping was used to develop further categories for constructs that could not be easily allocated, as well as to develop subcategories within categories.

Table 12: Draft framework used as a guide during content analysis of constructs

Category	Example aspects
Materialities	e.g., substances, ash trays, furniture, built environment
Signs and symbols	e.g., advertisements, warning messages
Location, place and occasion	e.g., settings, day of the week
Rules/Institutions	e.g., social norms around gender or substance use
People	e.g., number of people, age, relationship
Activities/Routines	e.g., eating, dancing, routine of a typical 'night out'
Atmosphere	e.g., 'upscale', 'shabby', 'friendly'
Inclusion/exclusion	e.g., surveillance, conflicts
Natural environment	e.g., temperature, noise, light

Note. Draft framework based on literature reviewed in Chapter 3 and section 4.1.4. The draft framework listed over 100 example aspects. This table shows a selection for illustrative purposes.

The allocation of constructs deviated from that outlined by Jankowicz (2004) in two aspects:

- Although there is agreement in the literature that the underlying constructs (i.e., used by people to make sense of their world) are more important than the construct labels (i.e., how people verbalise constructs during an interview), content analysis in repertory grid contexts typically considers only the written construct (i.e., words recorded on grid). Consequently, as similar constructs may be described by participants using different labels, they may be wrongly allocated to different categories, and vice versa (e.g., Shaw, 1994; Jankowicz, 2004; Höft et al., 2019). In the present study, the interview transcripts were also considered (in full by the study author and in part by the research assistant). This meant that the content analysis drew upon a deeper understanding of the constructs. The present content analysis sought to determine not only if two written constructs were worded in a similar way, but whether participants were likely to have referred to similar underlying constructs.

- Jankowicz (2004: 149) suggests placing any "unclassifiable" items (i.e., that cannot be allocated to any category and would thus form a category on their own) into a single category labelled "miscellaneous". In the present study, categories were to represent socio-spatial aspects, and so this approach was not used. Instead, categories containing only one item were also admissible in the first instance.

Jankowicz (2004: 155–163) strongly emphasises the need to involve a collaborator in the content analysis of constructs to ensure inter-rater reliability. This collaborator categorises the constructs independently of the main investigator. The two then meet to compare and discuss their categories and negotiate a revised, jointly agreed category system. Each of them then repeats the categorisation of constructs using the jointly agreed system. This methodology was also used in the present study, and a research assistant was hired for this purpose[385]. The research assistant also received a copy of the draft framework shown above.

Table 13 below gives an overview of the four resulting categorisations (two researchers with two rounds of categorisation each). The last column shows the final category system (obtained after additional cluster analysis, see next section) for reference. The detailed categories are shown in Appendix I.1.

During the first round of categorisation, both researchers had to: i) develop a category system (taking into account the draft framework and the constructs); and ii) allocate the constructs to the categories. They then met in person to compare and discuss the two category systems (AB-1 and TA-1 in Table 13). The two independently developed category systems were similarly structured, though the research assistant had consolidated the data more strongly. There were 24 shared categories (i.e., categories that had been labelled similarly by both researchers) and 15 non-shared categories[386].

During the second round, the two researchers used the revised category system (now comprising 29 categories), so the task consisted solely of allocating the constructs anew (AB-2 and TA-2 in Table 13).

To identify potential areas for revision, each categorisation attempt was examined qualitatively (e.g., wording of category labels, allocation of constructs to categories) as well as quantitatively (see Table 13 for example indicators). A detailed discussion of this process is beyond the scope of this thesis. To give an example, participant's written constructs represented, in their

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[385] Section 5.4.3 described how a research assistant was hired to recruit study participants. Similar procedures were applied in this case (e.g., written contract, dedicated meetings), although this time it was possible to select a suitable individual from among the transcribers (described further in section 7.5.2).

[386] Three categories used only by research assistant, and 12 categories used only by study author. The high number of non-shared categories was largely due to how constructs relating to closeness, intimacy and familiarity (e.g., *"people who are important to me and who I know well vs. unknown and less important people"*) had been dealt with. While the research assistant had allocated almost all of these to a single category, the study author had allocated them to 11 different categories to account for different nuances. Some of these distinctions were important from a theoretical point of view. For example, whilst most intimacy constructs referred to interpersonal relationships, one construct referred to the person's relationship with place ("*grown up [here], a lot of history, memories vs. new, recent addition to my life, not yet associated with memories"*). Given the study topic, it seemed important to (at least initially) separate this place-related construct from the others. Thus, some of the study author's non-shared categories were introduced as new categories to be used in the next round of categorisation. Other non-shared categories were subsumed within the shared categories.

view, different socio-spatial aspects. Hence, instances where different constructs from the same person had been allocated to the *same* category (Row F in Table 13) were seen as an indication that the category could be revised (e.g., split up further).

Table 13: Key indicators on draft and final category systems for elicited constructs

	Indicator	Category systems				
		AB-1[a, c]	TA-1[b, c]	AB-2[a, d]	TA-2[b, d]	Final[e]
A	Nr superordinate categories	8	7		7	-
B	Nr categories	36	27		29	12
C	Nr categories with 1 or 2 constructs (% of all categories)	21 (58%)	12 (44%)	15 (52%)	15 (52%)	0 (0%)
D	Nr constructs in largest category (% of all constructs)	10 (9%)	21 (19%)	11 (10%)	14 (13%)	20 (19%)
E	Nr constructs allocated to more than one category (% of all constructs)	6 (6%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
F	Nr instances of multiple constructs from same person allocated to same category	5	8	9	6	14

[a] AB = Study author. [b] TA = Research assistant. [c] 1 = First round of categorisation. [d] 2 = Second round of categorisation using a jointly agreed system. [e] Final category system after additional cluster analysis (described in next section).

Jankowicz (2004: 157–163) suggests that agreement between two raters can be expressed quantitatively, as a simple percentage agreement or using measures which account for the possibility of agreement by chance (e.g., Cohen's Kappa). In the first round of categorisation, 61 constructs were allocated to the same category by both researchers (54% of all constructs[387]; 74% of constructs in shared categories). In the second round, 95 constructs were allocated to the same category by both researchers (88% of 108 constructs; Cohen's κ=0,87).

Although these figures were slightly below the 90% benchmark recommended by Jankowicz, inter-rater reliability was considered satisfactory in the present study. A large number of constructs were multidimensional, which meant that they could justifiably be allocated to more than one category (e.g., the construct "*many unknown people, being aware of or thinking about what I do or how I dress vs. cosy atmosphere, few people, I feel safe and relaxed*" refers to several different aspects). The study author and research assistant selected the category which seemed to fit best, and they could indicate if additional categories were relevant. In the first round of categorisation, the study author indicated that 20 constructs could be allocated to more than one category, and there were six constructs where two categories were equally fitting (Row E in Table 13). In the second round of categorisation, the study author indicated

[387] Note that the system AB-1 included six constructs that had been allocated twice. These calculations were therefore based on a total number of 114 constructs (108 original constructs plus 6 duplicates).

that there were 31 constructs which could be allocated to more than one category (data not shown). This issue was also acknowledged by the second rater. Taking the multidimensionality of constructs into account (i.e., by considering not only which category fit best but which other categories were also considered relevant), the percentage agreement among the two raters was 94% (Cohen's κ=0,93). The problem of multidimensionality is not discussed in Jankowicz (2004), but it is addressed in Höft et al. (2019) as well as the next section.

At the end of such a content analysis, the question arises which allocation of constructs to use for further analysis and reporting: the principal investigator's or the collaborator's? Jankowicz (2004: 163) suggests to use the principal investigator's version rather than the collaborator's. In the present study, instead of choosing one version over another, the two versions were merged. The collaborator's allocation of constructs was reviewed and compared with the study author's version (TA-2 and AB-2 in Table 13) to identify possible improvements. The study author's version was amended accordingly, resulting in a revised allocation of the 108 constructs to the 29 categories.

7.2.3. Cluster analysis: from 29 categories to 12 'dimensions for space construal'

The content analysis described in the previous section addressed similarities among study participants and constructs and significantly reduced the number of aspects for consideration. However, two issues precluded the use of the resulting framework for the planned quantitative analyses, whereby different types of everyday spaces would be compared with each other on a variety of socio-spatial aspects. Firstly, more than half of the categories contained only one or two constructs (see Table 13 above). As a consequence, many comparisons would not have been possible due to missing data (further discussed in section 7.4). Secondly, the multidimensionality of constructs meant that constructs could not be allocated to categories in a clear-cut manner (a prerequisite for the quantitative analyses). Other authors (e.g., Stone, 2003) resolve similar issues by removing ambiguous constructs and categories with fewer than five constructs before subsequent analysis. The present study sought to avoid such data loss. The best way forward was thus to broaden and collapse categories. Keeping in mind the intended use of the resulting framework (e.g., planning of prevention activities), it was also considered that a framework comprising fewer socio-spatial aspects might be more attractive to potential end-users than a more complex one.

As the content analytical approach suggested a minimum of 24 categories (i.e., shared categories in the first round of categorisation) and the superordinate categories developed

through content analysis were not suitable as broader categories, a different method was required to consolidate the categories further. Höft et al. (2019) describe a novel approach for revising the results of a content analysis which incorporates the numerical ratings provided by study participants. In their approach, called “colour space mapping”, the results of a principal component analysis are projected onto a two-dimensional map, whereby each point on the map represents a construct and colours represent the loadings of the constructs on the first three components (Höft et al., 2019: 356–359). The map can help to revise categories derived from prior content analysis (i.e., splitting up or merging categories) as well as to allocate ambiguous constructs (by considering the colour and positioning of constructs relative to each other). As a result, the numerical similarity of constructs can be considered alongside their semantic similarity (Höft et al., 2019: 359–362).

At the time of conducting the present analysis, there was not yet any software available that could readily produce colour space maps for repertory grid data (M. Heckmann, personal communication, 29.10.2019). However, Höft et al. (2019: 353–354, 363-364) note that principal component analysis or hierarchical cluster analysis may also be used for the above purposes, with the drawback that the visual outputs are not as easy to interpret. Indeed, Tomico et al. (2009: 60–61) used cluster analysis[388] to identify constructs which were semantically but not numerically similar, and vice versa. As in Höft’s article, they grouped constructs if they were both semantically and numerically similar. This approach was adapted for the present study.

Two intermediary steps were required to prepare the present data for cluster analysis. Firstly, cluster analysis required common elements across participants (usually achieved by supplying the same elements to all participants). In the present study, each participant had developed their own list of everyday spaces. Consequently, the data were prepared as if elements had been supplied, by classifying spaces retrospectively. To do so, the results from the content analysis of elements (described in section 7.3) were used to identify the most common types of spaces. Then, prompts for hypothetical supplied elements were developed (i.e., what elements might have been supplied). On this basis, six element types were defined which represented a variety of everyday spaces and situations as well as a range of substance use

[388] Cluster analysis (also referred to as hierarchical cluster analysis) is one of two commonly used quantitative approaches to analyse repertory grid data (Jankowicz, 2004: 118–127; Höft et al., 2019: 349). Instead of grouping participants, elements and constructs within a grid are rearranged according to their numerical similarity. In addition to the rearranged grids, the results are also visualised using dendrograms (from Greek *dendro* for ‘tree’), with separate dendrograms shown for elements and constructs. The branches of the tree indicate which elements or constructs are most similar to each other, and relationships are described quantitatively using similarity scores. A limitation of the dendrogram is that it does not provide a complete picture of relationships but focuses on adjacent elements and constructs. However, all similarity scores are available from separate data output tables.

experiences[389]. Attention was given to match spaces across participants as closely as possible, so that differences in the cluster analysis would reflect differences between the constructs rather than differences between the elements. The spaces of each participant were then individually reviewed to select one space for each category. Where multiple spaces were eligible (e.g., several spaces relating to study and work), rules were defined to ensure a consistent approach across participants. Finally, a new database was constructed which consisted of 108 constructs, six common elements, and participants' ratings.

The second issue concerned missing data. Missing data occurred, for example, because participants had deemed a construct to be 'not applicable' to a particular space. However, cluster analyses could not be carried out with missing data. In repertory grid studies, constructs or elements with missing data are typically removed before analysis or missing data are imputed with mid-scale values. In the present study, a more nuanced approach was possible thanks to the relatively small sample size and available interview transcripts. Missing data were therefore imputed by hand on a case-by-case basis, with values estimated based on information available about the construct, space or person (e.g., obtained from transcripts or other ratings in the grid). If there was no information available or there were doubts concerning the estimate, the mid-scale value (3) was used. In total, 81 values were imputed (12,5% of 648 cells in the 108x6 matrix). This approach was deemed acceptable because the output of the cluster analysis was merely used to revise the findings of the content analysis.

After those two intermediary steps, it was possible to conduct the cluster analyses. The results of cluster analysis can vary greatly depending on the clustering methods used (Heckmann and Bell, 2016). The cluster analyses were therefore carried out using two software applications with different default parameters, namely OpenRepGrid (Heckmann, 2014) and Rep Plus RepGrid (Gaines and Shaw, 2018)[390]. Accordingly, the cluster analysis results differed somewhat; still, certain patterns were found in both outputs.

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[389] The six element types were (hypothesised key distinguishing characteristics are shown in parentheses): 1. *the own home* (everyday activities, social interaction not a focus of the activity, little or no substance use); 2. *study or work* (indoor situations in which concentration is required, typically no substance use due to formal rules against substance use, ambivalent or negative feelings more likely); 3. *outdoor leisure activities* such as going for a walk (outdoors, voluntary abstention from substance use is typical); 4. *meeting up with friends in a relaxed atmosphere* (focus on social interaction, no or limited substance use); 5. *meeting up with friends in a party atmosphere* (more likely to be a special occasion, frequent substance use); and 6. the *hypothetical ideal space* (positive feelings more likely, substance use in line with personal preferences) (supplied element).

[390] By default, OpenRepGrid used Euclidean distances and Ward's (1963) clustering method, whereas RepPlus used the standard city block metric and Shaw's (1980) Focus algorithm for clustering. It has been argued that use of Euclidean distances is preferable over use of city-block distances, as clustering using Euclidean distances produces fewer cases of equivalent data values ('ties') (Caputi et al., 2012a: 166–168).

The results of the cluster analyses were used to review the results of the content analysis (e.g., merge categories, reallocate constructs). The first aim was to ensure that each final category would contain at least five constructs to reduce the impact of missing data during later quantitative analyses (though finally this was a desirable rather than an essential criterion, as thematic coherence of categories was considered more important). The second aim was to finalise the allocation of multidimensional constructs.

To do so, the outputs from each software were first examined to identify and label possible clusters of constructs. Many of the clusters emerging from the cluster analysis were found to correspond to categories identified through the content analysis, adding credibility to the findings. Next, the 41 constructs that had been allocated (during the content analysis) to categories containing fewer than five constructs were inspected one by one in the outputs. For each construct, it was noted how it clustered on the OpenRepGrid output (i.e., what other constructs it was closest to, what cluster it belonged to), how it clustered on the Rep Plus output (if different from OpenRepGrid), whether the numerical clustering made conceptual sense, and what the implications for revision might be. On this basis, constructs were reallocated and categories merged. This procedure was then repeated for the constructs that had emerged as multidimensional during the content analysis. In addition, information was used from those clusters which corresponded to the content analysis categories. Specifically, it was checked whether the constructs contained within those clusters had also been allocated to the corresponding categories during the content analysis. At the end of this process, the study author reviewed the category system as a whole (e.g., category labels) and ensured that the constructs within each category had a common conceptual basis.

It must be noted that in the present case, numerical similarity was not considered a prerequisite for grouping constructs (cf. the study by Tomico et al. mentioned earlier). There were two reasons for this. Firstly, it was found that constructs that were conceptually different could still cluster together because they were logically related (e.g., constructs on sense of time correlated with constructs on relaxation). Although this helped to understand potential causal mechanisms and relationships among constructs, it highlighted that numeric similarity was not a sufficient criterion for grouping (also noted in the literature, e.g., Fromm, 1995; Jankowicz, 2004: 112–113; Höft et al., 2019). Secondly, it was found that differences between constructs could reflect differences in how participants had described elements, rather than conceptual differences between constructs. For example, if one participant described her home as harmonic but another described her home as prone to conflict, then the two corresponding constructs did not cluster together even though they addressed similar topics. These issues were accounted for when making the decisions outlined above.

The so revised categorisation was finalised during a face-to-face meeting with the project's academic supervisor, acting as an independent reviewer in this context. The supervisor received a copy of the revised categorisation (categories as well as constructs allocated to categories). He was asked to consider each category and to identify any constructs that did not seem to belong to the other constructs in a certain category, as well as to comment on the category system in general (e.g., were categories distinct, were labels easy to understand). This procedure for involving an additional reviewer to finalise the construct categorisation was similar to that used in other repertory grid studies (e.g., Stone, 2003). The feedback was discussed and agreement reached on how to address it. Any remaining questions were also resolved at this meeting[391]. The supervisor's feedback led to final adjustments, resulting in the final category system comprising 12 categories.

To summarise, the 108 constructs elicited with participants were first categorised by the study author. This categorisation was then reviewed on the basis of how another researcher had grouped the constructs. Next, the results of this (semantic) content analysis were compared with the results of a (numeric) cluster analysis to merge categories and allocate standalone and ambiguous constructs. The resulting categorisation was discussed with the project's academic supervisor and finalised on the basis of his feedback. Although the data could justifiably be structured in several different ways, the final categorisation was considered to adequately represent the socio-spatial aspects discussed during the interviews and to provide the best solution for the intended uses. Appendix I.1 provides an overview of how categories changed throughout this process.

7.3. Elicited elements

7.3.1. Introduction

In the present project, elicited elements consisted of spaces (including places and situations) that were part of study participants' weekly routines, personally important, and/or relevant to their substance use (referred to as 'everyday spaces' in this thesis). These spaces were elicited during the interviews by asking participants to write or draw relevant spaces on paper and to

[391] For example, the proposed system still contained categories with fewer than five constructs. It was thus discussed whether to maintain these categories or subsume constructs elsewhere. The supervisor agreed that the proposed system was the most appropriate solution, even if this meant that some categories would contain few constructs.

imagine a typical situation to represent each space (as described in Chapter 6). Across the 24 participants in this study, data collection resulted in 296 elicited everyday spaces.

These spaces were analysed using content analysis and cluster analysis. However, contrary to the analysis of constructs (described in the previous section), these two analyses served different purposes and were independent of each other:

- The content analysis sought to classify spaces according to setting. This was done to allow a general description of the elicited spaces in Chapter 9, to support other analyses (e.g., cluster analysis of constructs as noted earlier, classification of spaces during qualitative analysis of transcripts), as well as to support a discussion of the existing literature. Consequently, this analysis did not specifically consider substance use related aspects.

- The cluster analysis classified spaces according to substance use. This was a prerequisite for the quantitative analyses which sought to compare spaces representing different substance use patterns (further described in section 7.4).

The methodology for both analyses was adapted from the analyses of constructs (see previous section). To avoid confusion with the analysis of constructs, 'typology' and 'classification system' are used in relation to spaces, whereas 'category system' was used for the constructs.

7.3.2. Developing a general typology of everyday settings and situations

The content analysis of elements was conducted after the content analysis of constructs, using a similar methodology. To avoid repetition, the procedures for the analysis of elements are only summarised, highlighting differences between the analysis of constructs and of spaces.

As in the analysis of constructs, the study author and a research assistant (the same person as for the constructs) grouped the elicited spaces independently of each other. As before, both researchers had to: i) develop a classification system; and ii) allocate the spaces to this system. The two researchers then discussed and compared their findings. However, the analysis of elements differed from the analysis of constructs as follows:

- a theoretical framework was not used because it was not considered necessary;
- spaces were classified by both researchers only once[392];

[392] Although constructs had been categorised *twice* by each researcher (once using their own draft system and once using a jointly agreed system), this was not done for the elements. Instead, the study author developed a suggestion for a final classification system based on the two draft systems, which was discussed with and approved

- information from the interview transcripts was used in addition to the labels;
- the resulting classification system was more complex.

The following paragraphs justify and explain the latter differences further.

The elicited space labels (representing the units of analysis in this context) were much shorter and less well developed than the elicited construct labels[393]. On the one hand, this made the classification easier (e.g., if several labels referred simply to 'University"); on the other hand, it made the classification more difficult because labels could be vague or misleading. Also, spaces could be described in relation to different aspects (e.g., by setting, activity, people). This had implications for the results (described in Chapter 9), but it also affected the analysis, as space labels could refer to different kinds of information and lack important details (e.g., one space label referring only to a setting, another referring only to an activity).

To avoid misclassifications, relevant information about the spaces was obtained from the interview transcripts and added to the labels in brackets (paraphrased or as a direct quote). This was done only for selected spaces, partly due to resource limitations and partly because it was not possible for all spaces (i.e., some spaces were not discussed in detail during the interviews). The following examples illustrate how and what information was added:

> *4.4 Children [spending time with children of friends and family]*
> *8.9 At a friend's house ["actually we just sit there and watch [TV] and discuss [the programme] and eat a lot"]*
> *14.5 Mariahilferstraße [walking with her best friend down to the Museumsquartier centre for contemporary art and culture]*
> *14.9 In front of the [University] [sitting in front of it with fellow students]*
> *16.8 Work [breaks with work colleagues]*
> *22.9 Donaukanal ["just walking along [the canal] or sitting also in the bars there"]*
> *X.6 Tuition [she works as a tutor]*[394]

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by the research assistant. The study author then allocated spaces to the final classification system without consulting the research assistant further. The simplified approach was justified because the classification of spaces by setting was neither a key project output nor a prerequisite for subsequent analyses. Moreover, while it had been desirable (not only as a methodological requirement but also conceptually) to allocate each elicited construct to only *one* master construct, the complex nature of spaces meant that this was not the case for the spaces. Instead, it was acknowledged that allocation of spaces to multiple categories was inevitable, as one space could refer to several different people, activities and settings. The advantage of this in terms of the analysis was that there was no need to find the 'best' category for a given space, further justifying the simplified approach.

[393] Spaces were labelled by participants at the very beginning of each interview (with ad hoc clarifications added during the initial interview stages) but not elaborated in a systematic way. By contrast, construct labels were jointly developed summaries of what participants had said during the interview, and were thus richer in content.

[394] The numbers in front of each space refer to participants and elicited spaces. An 'X' is used to protect study participants where they shared specific details.

Adding this information facilitated the analysis by allowing greater insights into the elicited spaces, but it also raised some questions during later steps of the analysis, as noted below.

Table 14 gives an overview of the draft classifications by the study author (AB) and the research assistant (TA). Detailed categories are shown in Appendix J.1. The two independently developed systems were similarly structured in terms of the number of categories and their content. There were 28 shared categories (i.e., categories that had been labelled identically or very similarly by both researchers) and 39 non-shared categories[395]. However, an inspection of the non-shared categories showed that these were also very similar (see Appendix J.1). Differences arose, for example, where one researcher chose broader categories while the other chose more detailed ones[396], or where spaces referred to multiple aspects and the two researchers used different aspects for the classification[397].

Table 14: Key indicators on draft classification systems for elicited spaces

	Indicator	Draft system	
		AB[a]	TA[b]
A	Nr superordinate categories	8	7
B	Nr categories	51	44
C	Nr categories with 1 or 2 spaces (% of all categories)	11 (22%)	6 (14%)
D	Nr spaces in largest category (% of all spaces)	28 (9%)	20 (7%)
E	Nr spaces allocated to more than one category (% of all spaces)	32 (11%)	4 (1%)

[a] AB = Study author. [b] TA = Research assistant.

The superordinate categories were very similar. Table 15 below shows superordinate categories as suggested by the study author (first column) and by the research assistant (second column). Similar items are arranged side by side, and the few blank cells indicate areas of discrepancy. The last column shows the final typology for reference.

The *final classification system* was developed by comparing and merging the two draft systems. Although the original plan had been to distinguish settings only (as in most of the reviewed literature), participants referred to different aspects when labelling spaces, and this prompted the development of a more complex system. By reviewing the original labels and the draft categories, the following components were identified as the main ones: setting; activity; people; and time (described further in section 9.3). The draft categories developed earlier were then matched onto these components. A general typology of everyday situations was also

[395] 16 categories used only by research assistant, and 23 categories used only by study author.
[396] E.g., study author used one category for 'pauses', while research assistant distinguished two kinds of pause.
[397] E.g., study author distinguished situations with male from situations with female friends (regardless of time of day), research assistant distinguished daytime and evening situations with friends (regardless of friends' gender).

developed. It was possible to do so based on the superordinate category labels (see Table 15), hence no numeric cluster analysis was necessary (cf. the analysis of constructs).

Table 15: Superordinate categories in classification systems for elicited spaces

Draft typologies		Final typology
AB[a]	TA[b]	
At home	At home	At home
Uni/work/studying	Uni	Study/work
-	Work	-
-	-	Pauses
Friends and family	Company	In company
Food/eating	Gastronomy	Eating/food-related
Going out	-	Going out/party
Hobbies	Leisure	Hobbies/leisure
Holiday/travel	-	Holiday/travel
Transport	On the move	In transit

[a] AB = Study author. [b] TA = Research assistant.

The study author then allocated spaces to the final classification system in two different ways, once by setting and once by everyday situation.

The allocation by setting used the 'setting' categories from the newly developed classification system, albeit in a summarised form drawing on the literature reviewed for Chapter 4. Interview transcripts were checked again as necessary. Challenges encountered during the allocation included relationality (in which case spaces were allocated to the setting they related to; e.g., 'in front of the university' was allocated to 'university', not 'urban spaces'); vagueness (in which case spaces were allocated to the most probable setting; e.g., 'birthday parties' was allocated to 'home of friends/acquaintances' and 'café/bar/restaurant'); and potential overlap (in which case spaces were allocated to the most relevant setting or to multiple settings, depending on whichever option seemed to reflect participants' construal best; e.g., a pub in London was allocated to 'café/bar/restaurant' and 'holiday/work trip').

For the allocation by everyday situation, the subcategories from the two draft systems were first allocated to the nine types (shown in Appendix J.1). The allocations of spaces to draft categories by both researchers were then compared: this showed that 268 spaces (91%) had been allocated to the same general type (regardless of whether they had been allocated to the same subcategory). The remaining spaces were reviewed and allocations corrected as

necessary (e.g., where the research assistant had misunderstood a label). The resulting joint allocation was then revised to arrive at the final allocation of spaces to types[398].

In summary, the content analysis of spaces proceeded similarly to the content analysis of constructs, accounting for the different nature of the elicited elements. Independent classification of the 296 spaces by two researchers served as a basis to develop a multicomponent classification system (including a general typology of everyday situations) and to allocate spaces accordingly.

7.3.3. Developing a typology of situated substance use patterns

The main quantitative analysis (described in section 7.4) required a classification of the elicited spaces by substance use pattern. Thus emerged the following two questions:

1. *Which situated substance use patterns should be included in the quantitative analysis?* For example, was it sufficient to compare 'alcohol' spaces versus 'cigarette' spaces, or were further distinctions suggested by the empirical data? Should all or only some substances be considered during the quantitative analysis? And how could substances be meaningfully grouped (e.g., were spaces of beer, wine and cider use sufficiently similar to be integrated into one 'alcohol' space)? A practical consideration in this regard was to keep the total number of patterns low, so as to avoid an overly complex and resource intensive analysis.

2. *How should these patterns be defined in practical terms (operationalised) for the purposes of the quantitative analysis?* For example, should alcoholic beverages be used at least 'occasionally' or at least 'often' in an 'alcohol' space? Could cigarettes be used in 'alcohol' spaces and if so, to what extent? Answers to these questions were necessary to match elicited spaces to situated substance use patterns. A practical consideration was that definitions should allow the inclusion of as many spaces as possible to avoid issues resulting from missing data.

Several strategies were combined to answer these questions. First, preliminary answers to the two questions were developed *without* considering the empirical data (e.g., based on the study

[398] The two major challenges during this allocation were: i) overlap between general types; and ii) what information to base the allocation on. In terms of overlap, for example, almost all spaces could have been classed as being 'in company', but this was not considered useful. In terms of information base, the question was whether to allocate spaces based on the label only or using additional information from the transcripts. It was decided to refer only to the label where possible, as this allowed a consistent approach across all spaces. This also helped to address overlap, as the label typically highlighted only one aspect. Spaces allocated to more than one type were therefore limited to those where the label addressed several aspects (e.g., "lunchbreaks" was allocated to 'pauses' and 'eating/food-related').

protocol developed prior to the fieldwork). The research aims were considered to identify essential comparisons and patterns of situated substance use. For example, it became clear that one type would be 'positively perceived spaces of no or rare substance use' in order to provide an 'ideal' space from a prevention perspective (referred to in this thesis as 'NSU pos'). Prior knowledge of substance use practices among the study population and the pilot study data also informed this phase. For example, it was considered that in this population, an overly strict definition of 'spaces of no substance use' (not allowing for any substance use) would likely overemphasise contexts where substance use is forbidden, whereas the research sought to also include spaces of voluntary abstention. Finally, one type (hypothetical ideal space as defined by study participant) was included by design. This resulted in the following preliminary patterns: 'alcohol', 'cigarettes', 'alcohol and cigarettes', 'NSU pos', 'Ideal'. This exercise also helped to identify questions that would need to be answered using the empirical data (e.g., whether and how to distinguish lower and higher percentage alcoholic beverages).

The next step considered how well these draft patterns and definitions corresponded to the available data. Principal component analyses (PCA)[399] and hierarchical cluster analysis of the elicited elements were undertaken to identify i) how *substances* grouped together; and ii) how elicited *spaces* grouped together in terms of the reported substance use patterns. The analyses used different software applications to benefit from different default parameters and display options. PCA were carried out with Idiogrid (Grice, 2002, 2008) and OpenRepGrid (Heckmann, 2014), while cluster analyses were carried out with OpenRepGrid (Heckmann, 2014) and Rep Plus RepGrid (Gaines and Shaw, 2018).

The analyses were thus not based on the semantic content of the labels (cf. the content analysis described in the previous section) but drew upon substance use and other information obtained during the interview using *supplied* constructs (e.g., were specific substances used never, rarely, occasionally, often or always in the typical situation, asked for each elicited space as described in Chapter 6). Hypothetical ideal spaces and spaces without elicited constructs ('dropped' spaces as per section 6.2.4) were excluded prior to these analyses. The dataset therefore comprised 273 elicited spaces. The analyses were repeated using different combinations of supplied constructs to see how this affected the results.

[399] Principal component analysis (PCA) is commonly used in repertory grid studies. PCA differs from cluster analysis (described in section 7.2.3) in that it analyses the variance in the data matrix to identify distinct patterns. It then represents as much of the variance as possible using the fewest possible number of components (Jankowicz, 2004: 128). The results are visualised in a graph (biplot or 3D-plot), whereby constructs are represented as lines and elements are represented by dots. Small angles between construct lines show that the constructs are correlated, and small distances between elements indicate that the elements were rated similarly (Jankowicz, 2004: 130).

In addition to the PCA and cluster analyses, collated grid data were inspected separately to determine how many elicited spaces would be available for certain patterns of situated substance use or if using certain operational definitions.

While a detailed presentation of each of these analyses is beyond the scope of this thesis, the findings and implications for the later quantitative analysis can be summarised as follows.

Selecting and grouping substances

In terms of deciding which substances should be the focus of the later quantitative analysis, it was found that products that had been included in the empirical study only for completeness (i.e., cigars/cigarillos, pipes, waterpipe, electronic cigarettes, medicines, volatile substances, new psychoactive substances) were also not frequently reported by participants[400]. Alcoholic beverages and cigarettes (as the main substances of interest) were reported more frequently, with the exception of cider, which was reported only for 12 spaces (4%) and mostly as 'rare' use. Consequently, even if results from PCA suggested that the respective spaces would have merited separate analysis (e.g., to explore why 'cider' spaces differed from 'wine or beer' spaces), this dearth of data precluded the development of separate patterns focussing on cider or the other products mentioned above. In addition, PCA and cluster analysis suggested that these products could not be meaningfully grouped with more frequently reported products at the most detailed level of the typology.

The remaining products were therefore beer, wine, sparkling wine, spirits, mixed drinks and cigarettes, and the next question was how to group these products. Grouping was necessary because – even though it would have been interesting to compare, for example, 'beer' and 'wine' spaces – there were only very few spaces corresponding to such pure types. Outputs from PCA and hierarchical cluster analysis were inspected to identify how substances related to each other. Key findings included:

- *Beer and wine* use were correlated and could be grouped together.
- Use of *sparkling wine* was reported for 42 spaces (15%), with at least occasional use reported for 14 spaces (5%). Depending on the analysis parameters, use of sparkling wine correlated with the use of beer or wine, or it correlated with the use of cider and waterpipe.

[400] Recent use of pipes, volatile substances or new psychoactive substances was not at all reported, while cigars were reported for one space and e-cigarettes for two spaces (< 1% of 273 elicited spaces), all with 'rare' frequency of use. Recent non-medical use of medicines (e.g., in combination with alcohol) was reported by two participants, for a total of seven spaces (< 3%). While waterpipe use was reported for 17 spaces (6%), at least occasional use was reported only in nine spaces (3%).

The latter was in line with how participants typically described sparkling wine, cider and waterpipe, namely as products used mostly under exceptional circumstances. Sparkling wine was therefore disregarded at the detailed level.

- For *spirits and mixed drinks*, the PCA confirmed that lower and higher percentage alcoholic beverages should be considered separately. As participants did not distinguish clearly between the two categories during the interviews, it was planned to refer to spirits and mixed drinks in a single category. This decision was supported by the PCA, which showed that data on spirits and mixed drinks were correlated.

- Finally, *cigarette* use was not correlated with alcohol use, suggesting that cigarettes should form a separate pattern.

This resulted in the following preliminary types: 'beer and/or wine', 'spirits and/or mixed drinks', and 'cigarettes' (to complement those developed theoretically).

Identifying clusters of elicited spaces

The preliminary typology was then refined by inspecting the cluster analysis outputs to identify how elicited spaces grouped together in terms of substance use patterns. In addition to the substance use data, this analysis also included supplied construct data on valence (i.e., whether participants had positive or negative feelings when thinking of a space, as described in Chapter 6).

Visual inspection of a RepPlus output with 273 elicited spaces and six supplied constructs (beer, wine, spirits, mixed drinks, cigarettes[401], valence) helped to identify 28 distinct clusters of spaces. However, 15 of these clusters represented fewer than five spaces. Table 16 below shows how the 13 main clusters representing at least five spaces each (middle column) mapped onto the preliminary patterns developed earlier (last column). The final typology used in the subsequent quantitative analysis is also shown for reference (first column).

[401] This analysis included only key products to help identify main substance use patterns. The analysis was then repeated with the previously excluded products (i.e., sparkling wine, cider, cigar/cigarillo, pipe, electronic cigarettes, waterpipe, medicines) to see how these mapped onto the typology and to help with the operational definitions.

Table 16: Final and draft typologies of spaces representing different substance use patterns

Final typology			**Main clusters identified through cluster analysis (number of spaces)**	**Preliminary typology**
• Subjectively ideal space (Ideal)			-	• Subjectively ideal space
No or rare substance use (NSU)		• NSU – positive (NSU pos) • NSU – negative (NSU neg)	• Positively perceived NSU (85, largest cluster) • NSU associated with ambivalent or negative feelings (38, second largest cluster) • Rare use of wine (12)	• NSU (positively/ negatively perceived)
Alcohol or cigarettes (Alc/Cig)	Alcohol as primary substance (Alc)	• Wine or beer at least occasionally (Wine/beer)	• Wine occasionally (9) • Beer and wine both used occasionally (18)	• Beer or wine
		• Spirits or mixed drinks at least occasionally (Spirits/mixers)	• Frequent use of spirits/mixed drinks and of beer or wine (9) • Frequent use of wine and occasional use of spirits/mixed drinks (5)	• Spirits or mixed drinks
	Cigarettes as primary product (Cig)	• Cigarettes at least occasionally – positive (Cig pos) • Cigarettes at least occasionally – negative (Cig neg)	• Cigarettes always, no or rare alcohol use, positive feelings (22) • Cigarettes often/always, no alcohol use, ambivalent feelings (8)	• Cigarettes
	Alcohol and cigarettes (Alc&Cig)	• Cigarettes *and* beer or wine (Cig&beer/wine) • Cigarettes *and* spirits or mixed drinks (Cig&spirits/mixers)	• Occasional cigarette use, rare or occasional use of beer/wine (6) • Cigarettes always, occasionally beer/wine (5) • Cigarettes often, beer/wine often, spirits/mixed drinks rarely or occasionally (8) • Cigarettes, beer/wine, spirits/mixed drinks: all often (7)	• Alcohol and cigarettes

The final typology was developed by contrasting the preliminary typology with the clusters derived from cluster analysis (considering also the 15 smaller clusters). This confirmed that valence was an important criterion for the spaces of no or rare substance use. In addition, it highlighted the importance of valence for the 'cigarette' spaces, and the final typology reflected this accordingly. At the more detailed level (28 clusters in the cluster analysis), valence was also found to be important for spaces associated with spirits or mixed drinks; however, it was not feasible to use this distinction in the final typology, as the number of corresponding elicited spaces was too low. Valence did not help to discriminate spaces related to other substances, as almost all spaces relating to other substances were construed positively.

The final typology included different levels of detail. At the most detailed level, eight situated substance use patterns were identified (in addition to the hypothetical ideal space). At the next

level, spaces were distinguished according to whether alcohol or cigarettes were the primary substance, or both. At the broadest level, spaces of (at least occasional) substance use were distinguished from spaces of no or rare substance use. The final typology was appropriate for the planned quantitative analysis, as it distinguished different substance use patterns in line with the study focus and aims. The number of types was low enough for analysis to be practically feasible and high enough to allow detailed insights and a range of comparisons.

Operational definitions

The final step was the operational definition of the various patterns. There were two aspects to this definition: i) what should be the minimum value for the substances in focus (e.g., wine and beer in a 'wine or beer' space); and ii) what should be the maximum value for the substances *not* in focus (e.g., cigarettes in a 'wine or beer' space)? Potential thresholds were considered theoretically but finally, the available data delimited what definitions were useful in practice. Additional considerations at this point were that definitions should be simple enough to be readily understandable and that equivalent rules should be consistently applied across all patterns. Different operational definitions were tried out to determine how many and which spaces would be included or excluded, respectively. The following definitions were found to meet the specified requirements best:

- Substances in focus should be used at least 'occasionally' (i.e., occasionally, often, or always)
- Substances *not* in focus should be used no more than 'rarely' (i.e., never or rarely)
  - Exception: For 'spirits or mixed drinks' spaces, there were no limits placed on the use of other alcoholic beverages, as spaces associated with spirits or mixed drinks use were typically also associated with beer or wine use
  - Exception: Medicines should never be used[402]
  - Exception: For 'alcohol or cigarettes' spaces, there were no limits placed on the use of other nicotine products or medicines

Correspondingly, for the spaces of no or rare substance use (NSU), this meant that alcohol and nicotine could be used no more than 'rarely' and medicines never. For valence, data were found to be strongly skewed toward the positive pole. Therefore, negatively perceived spaces (relevant for NSU and cigarettes) were defined operationally as associated with 'ambivalent',

[402] For consistency, the seven spaces associated with any medicine use (including rare use) were excluded, so that spaces included in the subsequent analysis would be limited to alcohol and nicotine products.

'rather negative' or 'negative' feelings. An overview of all patterns including operational definitions is shown in Chapter 11.

In summary, this analysis focussed on identifying situated substance use patterns that could be used for subsequent quantitative comparisons. Theoretical considerations were supplemented with numeric analyses of the empirical data to select and group substances, finally resulting in a typology of situated substance use patterns which was conceptually sound, empirically based and representative of a sufficiently large number of elicited spaces.

7.3.4. Assessing relationships between setting/situation and situated substance use patterns

The previous sections showed how elicited spaces were classified according to setting, everyday situation, or situated substance use pattern. In the results, section 9.3 examines to what extent the proposed typologies of settings and situations corresponded to each other, while section 12.2 examines to what extent situated substance use patterns could be predicted based on setting or everyday situation. This section gives further details on the supporting calculations and methodological limitations of the analyses.

A key challenge during these analyses was the high number of categories (i.e., 17 settings, nine types of everyday situation, eight situated substance use patterns at the most detailed level)[403]. This prompted some considerations about whether the analyses should utilise broader or narrower categories, whether categories should be merged, and so on. Finally, it was decided not to merge categories[404] but to undertake different calculations which would also allow insights into how the choice of categories affected the results. This showed that while in some cases, 'improvements' in the strength of a relationship were clearly due to a smaller number of categories, in other cases, using fewer categories produced a weaker relationship because key categories had been omitted. These issues are not commented upon here further, but relevant data are included in Appendix J.5.

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[403] Bivariate tables based on these categories could have as many as 153 cells. As a consequence, even though the overall number of elicited spaces (n=296) was high, cells were very sparsely populated in the bivariate tables, increasing the risk that chance outliers may disproportionality affect the results. It also meant that relationships in the data had to be very pronounced to be registered as statistically significant. Moreover, the results of calculations to determine the statistical significance and strength of a relationship can vary depending on table size and how the data are grouped. The literature on chi-square analyses typically shows tables as containing between four and nine cells (e.g., Benninghaus, 2005; Sahner, 2005; Corder and Foreman, 2009) (cf. the 153 cells noted above).

[404] Merging settings further would have produced overly heterogeneous categories. Also, the general typology of everyday situations already offered a way to re-organise the settings and thereby reduce the number of categories.

Calculations to explore relationships between setting, situation and situated substance use focussed on three measures: *Pearson's chi-square test for independence* to measure the statistical significance of any association, and *Cramer's V* as well as *Goodman and Kruskal's lambda* to measure the strength of the association. These are briefly discussed in the following paragraphs. The results are shown in sections 9.3, 12.2 and Appendix J.5.

Pearson's chi-square test for independence

Pearson's chi-square measures statistical significance by establishing to what extent observed data differ from what would be expected if there was no relationship between the two variables and considering the likelihood that such differences would be due to chance alone (by comparing the calculated value to a standardised reference value) (e.g., Benninghaus, 2005; Sahner, 2005; Corder and Foreman, 2009).

Chi-square was appropriate for the present analysis as it is suitable for nominal (categorical) and nonparametric data and therefore imposes few requirements on the data. In the present study, the chi-square statistic was calculated also if expected cell frequencies were below 5[405]. However, alternative calculations were also made which excluded categories with expected cell frequencies below 5[406], thereby limiting the analysis to the better populated categories.

A requirement of this statistic on the data is that observations be independent of each other. This requirement could not be met in the present dataset. Firstly, the same elicited space could appear in the dataset multiple times, namely if it related to (and was thus allocated to) multiple settings or types of everyday situation. Secondly, participants were represented with multiple spaces in the dataset (e.g., their home, workplace, university) and this was not standardised across participants (e.g., number and types of settings differed between participants). As these analyses were supplementary rather than main analyses in this study, special provisions to account for this multi-level clustering were not made (but were undertaken for the main analysis, described in section 7.4).

[405] A commonly cited requirement for calculation of the chi-square statistic is for expected cell frequencies to be 5 or greater (e.g., Sahner, 2005: 109). For tables greater than four cells, it has been argued that the test statistic will still be accurate as long as expected cell frequencies are 1 or greater and no more than 20% of cells have an expected frequency below 5 (Yates et al., 1999: 734). However, Corder and Foreman (2009) do not cite such requirements when using chi-square as a nonparametric statistic, and in their example data, two out of nine cells (22%) have an expected frequency below 5 (Corder and Foreman, 2009: 172). For transparency, Appendix J.5 shows the proportion of cells below 5 for each calculation.

[406] Where this would have led to the omission of key categories, lower thresholds were applied (e.g., excluding categories with any expected cell frequencies below 1).

Cramer's V

While the chi-square test statistic indicates if a significant relationship between two variables is present, it cannot be used as a measure regarding the strength of this relationship because it increases with sample size. Cramer's V is a measure of association that is based on the chi-square statistic but accounts for sample size and is applicable to tables of varying sizes. It is recommended as a way of expressing effect size based on a chi-square test in the case of tables exceeding four cells (Benninghaus, 2005: 116–121; Corder and Foreman, 2009: 169–173). In the present study, the strength of relationship was interpreted according to Cohen's (1988: 224–227) guidance (e.g., for df=1, effect sizes ≥0,1 were considered to be small, ≥0,3 medium, ≥0,5 large; with lower thresholds applied for higher degrees of freedom).

Goodman and Kruskal's lambda (λ)

In addition to Cramer's V, Goodman and Kruskal's lambda (*λ*) was utilised as a measure of association. While Cramer's V expresses the magnitude of deviation from statistical independence based on the chi-square statistic, lambda is a measure of proportional reduction in error (therefore also known as a 'PRE measure') suitable for nominal variables and any table size. It is based on the assumption that if the value on the dependent variable is to be predicted (guessed), errors can be minimised by referring to the modal categories in the bivariate table. It expresses the extent to which errors are reduced if information about the relationship between the independent and the dependent variable is taken into account, compared to using information about the distribution of the dependent variable only. Benninghaus (2005: 121–122) therefore argues that lambda is preferable over Cramer's V because the value itself can be meaningfully interpreted. The strength of the relationship was interpreted according to guidance by Babbie et al. (2007: 229) (i.e., ≥0,01 weak; ≥0,1 moderate; ≥ 0,3 strong).

Another advantage over Cramer's V is that lambda is asymmetric: it results in different values depending on which of the two variables is defined as dependent (i.e., which variable is to be predicted, with different notation: λ_r in case of the row variable, λ_c in case of the column variable). This made it appropriate for the present analysis, in which situated substance use was conceptualised as the dependent variable. For completeness, both values were calculated and compared. While these generally confirmed that it was easier to predict the situated substance use pattern based on setting or everyday situation, there were also instances where the data suggested that it was easier to predict the setting or situation based on the situated substance use pattern. However, these findings also depended on specifics of the table (e.g., a variable with fewer categories is easier to predict than one with many categories).

This highlights a key disadvantage of lambda: if all modal categories are located in the same row (or column, depending on whether λ_r or λ_c is calculated), then the error rate is not improved through knowledge of the independent variable and lambda consequently returns a value of zero, *even if* there is a statistically significant association present (Benninghaus, 2005: 133–136). This was a common occurrence in the current dataset, as many observations fell into a single category (e.g., 'no or rare substance use associated with positive feelings'), with the remaining data points dispersed across the table.

The calculation of both Cramer's V and Goodman and Kruskal's lambda therefore offered an opportunity to explore association from different perspectives and to compensate for shortcomings of either measure. Generally, the two measures suggested a similar strength of relationship (though note that the numerical values are not directly comparable, even if both measures vary from 0 to 1). Where they contradicted each other, this typically resembled the case outlined above (i.e., stronger relationship according to Cramer's V versus weaker relationship according to lambda due to most data points being located in a single row).

7.4. Grid ratings

7.4.1. Introduction

A key question of the present study was: how do spaces representing different substance use patterns differ? To answer this question, the elicited spaces were compared to each other on the supplied and elicited constructs with a view to identifying similarities and differences. Besides informing descriptions of different situated substance use patterns in Chapter 11, these analyses were also used to explore the relationship between socio-spatial aspects and situated substance use in section 12.3.

Numerical repertory grid data are traditionally analysed using advanced statistical techniques such as hierarchical cluster analysis, principal component analysis or multidimensional scaling (e.g., Bell, 1997; Fransella et al., 2004: 93–101; Jankowicz, 2004; Caputi et al., 2012a; Höft et al., 2019). However, Fransella et al. (2004: 111) suggest that other approaches may be used if these are more appropriate to the specific research context. The present analysis was characterised by four specific features which necessitated a different approach. These features are briefly outlined below before the analytic procedures are described in subsequent sections.

Using a typology of substance use patterns

In line with the above question, elicited spaces were not compared as individual spaces, but by substance use pattern. To do so, spaces were grouped by combining supplied construct data (e.g., on substance use frequency) to result in a typology of substance use patterns (as described in section 7.3.3). Elicited construct data (i.e., construed socio-spatial aspects) were then 'added' to explore differences. This is worth noting because an alternative approach might have used supplied and elicited construct data concurrently to compare or group elicited spaces[407, 408]. In the present study, grouping spaces by substance use pattern first was more consistent with the research question.

In relation to this, available guidance on the use of supplied constructs in repertory grids assumes that only one construct has been supplied or that supplied constructs will be analysed as individual items (e.g., Fransella et al., 2004; Jankowicz, 2004: 56–57). By contrast, the present study supplied multiple constructs and combined these during analysis to explore patterns of situated substance use involving different combinations of substances, use frequencies and other aspects (e.g., valence).

Visualising differences between patterns on 12 socio-spatial dimensions

The focus on comparing multiple patterns suggested a need for good visualisation techniques. Although the study protocol had foreseen – in line with standard repertory grid practice – that principal component analysis (PCA) would be used for this purpose, the analysis of elicited constructs resulted in the identification of 12 latent dimensions for space construal (Chapter 10). It was logical to continue the analysis with these 12 dimensions, instead of identifying new dimensions using PCA[409]. It also became clear that a visualisation using two or three dimensions (as in a typical PCA output) could not adequately represent 12 dimensions.

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[407] Standard repertory grid analysis techniques, such as cluster analysis or principal component analysis, typically consider supplied and elicited constructs concurrently (e.g., see examples in Jankowicz, 2004: 118–137).

[408] Another approach to answering the research question could have been to explore associations between supplied constructs and elicited constructs directly, without grouping the spaces; for example by inspecting the outputs of a principal component analysis or using Honey's content analysis (Honey, 1979; Jankowicz, 2004: 169–177) to measure similarity between elicited constructs and a given supplied construct. Similarly, measures of statistical association could have been calculated to address questions such as: "Are spaces of frequent beer consumption also likely to be construed as self-determined?" Such analyses could have considered only one substance/product at a time (e.g., only beer) or used indiscriminate summative indices (e.g., more/less frequent substance use). This would have limited the usefulness of results and not made optimal use of the available supplied construct data.

[409] Standard techniques for repertory grid analysis serve to identify structures in the data. For example, PCA typically results in the identification of two or three principal components, around which the constructs are grouped. Thus, these techniques were used to explore possible ways of grouping constructs and spaces (as described in sections 7.2 and 7.3), but they could not be used again to map and contrast spaces along the 12 identified dimensions.

The study finally used a visualisation approach based on semantic differential methods[410]. Technically, repertory grid data can be treated as if they were data resulting from a semantic differential task (Seelig, 2000: 39), even if, as Fransella et al. (2004: 59) caution, the "similarity of format should not be regarded as indicating similarity of underlying theory and assumptions". A major difference is that the objects and adjective pairs in a semantic differential task are all supplied, whereas repertory grid elements and/or constructs are elicited and thus differ between participants. This presents difficulties when aiming for 'semantic differential'-style visualisations of responses from multiple participants because such visualisations presuppose a shared set of constructs and elements across participants. In the present study, the 12 latent dimensions for space construal and the typology of situated substance use patterns were used to approximate a shared set of constructs and elements, as outlined below.

Considering study participants as a group

A related consideration was whether differences between patterns should be explored primarily at the individual level or across participants as a group. For example, in a different study (Hodgkinson et al., 2017), each grid was analysed individually, and findings emerging from each individual analysis were consolidated. In the present study, it was more consistent with the research question to consider participants as a group, as the research objective was to understand how different types of spaces were construed on average by the participants as a group. The research question could have therefore also been formulated as: "On average, how is substance use pattern A construed differently from substance use pattern B?"

This approach was also preferable methodologically. The study by Hodgkinson et al. (2017) involved ten participants which had all been supplied with the same elements. In the present study, an individual-level approach to analysis was initially tested using a small number of interviews. This suggested that the higher number of participants and the heterogeneity of elicited spaces in the present study would have made a meaningful synthesis of individual findings difficult. The preferred approach was therefore to identify shared spaces and constructs first (as outlined earlier) and to apply this shared framework to the individual grids.

With this shared framework, analyses could be carried out across participants by combining individual grids into a "collective super grid" (Wright, 2004: 353). For a super grid (also known

[410] The semantic differential was first proposed by Osgood et al. (1957). In a semantic differential task, participants are asked to rate objects (e.g., on a scale from 1 to 7) using a series of pre-defined pairs of adjectives (e.g., soft-hard, happy-sad, quiet-loud, beautiful-ugly; see also Schnell et al. (2005: 175)-176). The results are visualised by charting the scores of the objects on each adjective pair, representing each object with a line. It is then possible to compare how objects were viewed by a single person or a group of people. For the latter, summary scores can be obtained by averaging participants' ratings on each adjective pair for each object.

as a master grid)[411], constructs from different participants are first summarised through content analysis, and the corresponding grid ratings are then summarised as arithmetic means. This mirrored approaches used for semantic differentials. Consequently, in this study, super grids offered a way to prepare the data for the 'semantic differential'-style visualisations.

It is worth noting that the collective super grid approach is not a widely used technique for repertory grid analysis, and numeric merging of grids is not generally described in the literature. It is not included in major reference works (e.g., Fransella et al., 2004; Jankowicz, 2004; Caputi et al., 2012b; Winter and Reed, 2016), and studies using this approach (e.g., Stone, 2003; Wright, 2004; Tursch et al., 2014; Richter and Lara Herrera, 2017) do not cite specialised methodological papers. There are several likely reasons for this relative lack of popularity, one of which is that merging of grids is viewed critically by the repertory grid research community. Concerns include that this approach may not preserve the original meaning of the individual grids and may thus be incompatible with the epistemic premises of repertory grids (e.g., Easterby-Smith et al., 1996, also discussed in Rojon et al., 2019) and that averaged ratings presented without standard deviations mask differences between participants (Yorke, 1983: 345ff.). Another likely reason is that the research questions addressed in repertory grid studies typically do not require a merging of grids. The situation was different for the present study, as outlined above, and even though Jankowicz (2004) does not describe a super grid-type approach[412], he suggested the collective super grid as an option for the present study (D. Jankowicz, personal communication, 25.02.2016), pointing to Wright (2004) and Stone (2003) as possible key references. These two works subsequently informed the super grid approach taken in the present study, albeit in an adapted form (described below). In addition, special measures were taken to address the concerns mentioned above. For example, grid ratings are not only presented as averages but also (where relevant) at the individual level, and differences between individual participants and participant subgroups were also considered.

[411] Note that while Wright (2004: 353) and Stone (2003: 121) use the term "super grid" to describe a grid in which individual grids have been merged semantically and numerically, Höft et al. (2019: 357) or Harrison and Sarre (1975) use the term "supergrid" to describe a stacked grid in which individual grids have been entered side by side (unmerged). In this thesis, the term 'super grid' is used for merged grids only (as per Wright and Stone).
[412] Jankowicz (2004) recommends content analysis as the main approach to data analysis across study participants and Honey's content analysis as a way of partially incorporating grid ratings within such content analysis.

Accommodating heterogeneous and missing data

Data collection was designed to accommodate naturally occurring differences between participants, in particular regarding their everyday routines and ways of construing. As a result, data were heterogeneous, in the sense that the availability of spaces, constructs and ratings varied across the sample. Specifically:

- *Study participants* differed in terms of their substance use (e.g., from non-smokers to daily smokers, non-drinkers to weekly drinkers). Much of this heterogeneity was not intended but resulted from sampling difficulties as described in Chapter 5. As a consequence, spaces – and to a lesser degree constructs – also differed between participants[413].

- *Spaces* were elicited rather than supplied. Though spaces were suggested, participants were not obliged to include them if they did not feel they were relevant[414]. Each participant's map therefore represented an idiosyncratic partial snapshot of their life. Even if participants reported identical substance use *in general* (e.g., daily smoking), their elicited spaces were still likely to differ because their *situated* substance use and other routines (as well as their impromptu decision-making about what to include in the interview) were unlikely to be the same. As a consequence, no participant had spaces representing all situated substance use patterns identified in the typology.

- *Constructs* were also elicited rather than supplied. Construct elicitation is an integral part of the repertory grid method and a certain level of heterogeneity was therefore anticipated. Unexpected was, however, the unusually low number of elicited constructs per participant (between two and six, as explained in section 6.2.5) vis-à-vis a relatively high number of identified socio-spatial aspects across participants (initially over 30, iteratively reduced to 12, as described in section 7.2). Thus, no participant had data available for all 12 dimensions, and participants' constructs referred to different subsets of the 12 dimensions.

- *Ratings* were also not consistently available. Naturally, participants could not offer ratings for any spaces or constructs which did not feature in their respective interview. In addition, participants were allowed to abstain from rating a particular space if they felt that the construct was not applicable. This meant that availability of ratings differed not only across participants but also within participants' own constructs.

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[413] For example, a non-smoker could not have an everyday space representing their own cigarette use and was unlikely to construe spaces in terms of where she could or could not smoke.
[414] The reasons for eliciting rather than supplying spaces are given in Chapter 6.

Table 17: Missing data in the quantitative dataset

	Level	Missing data identified during data analysis (and possible reasons)	Instances of missing data
1	Types of spaces (i.e., situated substance use patterns)[a]	The study participant does not have any space representing a particular situated substance use pattern (either because there was no such space in her life or because she did not consider it relevant for inclusion on her map)	Ideal: 2 NSU: 1 NSU pos: 1 NSU neg: 4 Alc/cig: 0 Alc: 5 Wine/beer: 9 Spirits/mixers: 15 Cig: 17 Cig pos: 17 Cig neg: 19 Alc&cig: 16 Cig&beer/wine: 17 Cig&spirits/mixers: 19 (all out of 24 IP)
2	Socio-spatial aspects (i.e., latent dimensions for space construal)[a]	The study participant does not have any construct relating to a particular dimension (because this dimension did not play an important role in her construing in general or not in relation to the selected triads)	Closeness to people: 8 Orientation: 9 Togetherness of activity: 20 Changeability: 15 Enjoyment: 19 Relaxation: 13 Type of social gathering: 20 Substance use expectations: 21 Freedom of choice: 17 Self-presentation: 19 Physical pleasantness: 14 Sense of time: 19 (all out of 24 IP)
3	Grid ratings[b]	Space and construct are available, but the study participant does not have a rating for this combination (either because she felt the construct was not applicable to this space or because multiple values were applicable, even for the typical situation)	IP4: 4 (7% of 54)[c] IP5: 6 (9% of 65) IP7: 8 (17% of 48) IP8: 2 (3% of 70) IP9: 3 (5% of 55) IP10: 2 (9% of 22) IP12: 2 (3% of 65) IP13: 6 (12% of 52) IP14: 12 (23% of 52) IP16: 1 (2% of 45) IP17: 2 (4% of 56) IP18: 1 (3% of 33) IP24: 1 (1% of 84) No instances of missing ratings within the grids of the remaining 11 IP.

[a] For a description of patterns and dimensions, see Chapters 10 and 11. [b] Elicited constructs only (no missing ratings for supplied constructs). [c] Proportions are based on the max. number of cells in each elicited construct grid (i.e., number of spaces multiplied by number of elicited constructs).

As a result, missing data were encountered on three levels during analysis. Table 17 below quantifies the extent of missing data accordingly (note that the figures in the last column relate to missing rather than available data). Data availability differed depending on the type of space, socio-spatial dimension and participant (IP). Row 1 shows that all IP had at least one space representing alcohol or cigarette use on their map ('Alc/cig'), and almost all had at least one

space representing no or rare substance use ('NSU'). However, only five IP had at least one space representing cigarette use which was also associated with ambivalent/negative feelings ('Cig neg'), and only five IP had at least one space representing cigarettes and spirits/mixed drinks use ('Cig&spirits/mixers'). For these patterns, data was therefore missing for 19 IP each (79% of 24). The extent of missing data was higher for the socio-spatial dimensions (Row 2). For some, relevant constructs were reported by only three or four IP, meaning that data could be missing for as many as 21 IP (88% out of 24). Instances of grid ratings missing despite availability of spaces and constructs were less common (Row 3). Almost half of IP rated all spaces on all constructs (i.e., no grid ratings missing). There were, however, three IP who could not provide ratings for more than 10% of cells in their elicited construct grids.

Consequently, it was not possible to enter all data into a single analysis to compare all situated substance use patterns on all dimensions concurrently. This is a crucial point and therefore merits further explanation. While it would have been technically possible to create a super grid using these data (calculating arithmetic means for available data), this would not have been methodologically sound. Differences between patterns so calculated would have also reflected differences in data availability[415]. To avoid such errors, any comparisons had to refer to the same participants. Due to the heterogeneity of the data, this requirement could not be met with a single analysis covering all patterns and dimensions. Instead, it was necessary to carry out many separate analyses, considering only two or three substance use patterns at a time to maximise the use of available data.

The heterogeneous and partial nature of the data ruled out many potential approaches to data analysis, including conventional repertory grid analysis techniques (e.g., PCA) and other advanced statistical techniques (e.g., multilevel models). However, the planned approach outlined earlier (super grid plus 'semantic differential'-style data display) was flexible enough to accommodate this heterogeneity both during the analysis as well as for the results presentation. Further details are provided in the subsequent sections.

To summarise, the main quantitative analysis was guided by a specific research question (i.e., it was not purely explorative) and sought to describe and compare defined patterns of situated substance use/abstinence on defined socio-spatial dimensions across participants as a group. Heterogeneous and missing data posed challenges which had to be addressed through a

[415] To use a hypothetical extreme example, if space A was construed as 'relaxed' and space B was construed as 'stressful', but data on space A had been supplied only by IP1 while data on space B had been supplied only by IP2, then it would *not* have been accurate to state that space A was construed as more relaxed than space B. After all, it is possible that IP1 would have construed both types of space, A *and* B, as relaxed and that IP2 would have construed both types as stressful. In that case, there would have been no difference between the two types of space and the previously observed difference would have been a methodological artefact.

bespoke analytic approach. Therefore, even though initially PCA appeared as an appropriate technique, in practice, other methods were found to meet the study's needs best. Grid ratings were still subjected to preparatory cluster analysis and PCA, as described in sections 7.2 and 7.3. The following sections outline how super grids and data displays were prepared.

7.4.2. Preparing the super grid dataset

Super grids were prepared following the steps described by Wright (2004) and Stone (2003), with adaptations. To summarise, a super grid uses a framework of shared master constructs and elements to summarise individual grid ratings as arithmetic means. In the examples of Wright (2004) and Stone (2003), a shared framework was ensured by supplying elements (i.e., all study participants used the same elements) and by substituting elicited constructs with master constructs. To do so, elicited constructs were summarised through content analysis to create a set of master constructs, and the original numerical values were assigned to those master constructs (see Figure 9 below for an illustration)[416]. Correspondingly, in the present study, the 108 individually elicited constructs were summarised through content analysis (and also cluster analysis) (as described in section 7.2). This resulted in the 12 dimensions described in Chapter 10, which were used as master constructs for the super grids in this analysis. Supplied constructs required no such transformation, as they were already shared.

As in the examples cited above, repertory grid studies that aim for analyses across participants usually supply elements or (less common) constructs. A specificity of the present study was that both constructs and elements were elicited, with only one element (hypothetical ideal space) supplied. The 273 individually elicited everyday spaces (296 elicited minus 23 'dropped' spaces as per section 6.2.4) were therefore also summarised. This resulted in 14 patterns of situated substance use (as described in section 7.3.3), which were used as ex post facto supplied elements.

To set up the super grids, a stacked grid was prepared first by entering all individual grids diagonally side by side into a single datasheet *without merging them*. In the present study, the stacked grid had 123 columns (15 supplied plus 108 elicited constructs) and 295 rows (273

[416] This procedure may raise some concerns regarding data validity, and additional measures can be employed to ensure that the master constructs represent the meaning of the original constructs well. For example, Stone (2003: 121) involved several independent reviewers and contacted study participants to check if they felt that the master construct represented their original construct well. In the present study, the analysis of constructs was also undertaken in collaboration with other researchers but due to a two-year gap between data collection and data analysis, contacting study participants was not an option. The present study employed additional measures to ensure appropriate grouping of constructs, such as consulting interview transcripts in addition to construct labels and refining the semantic content analysis through a numeric cluster analysis (as described in section 7.2).

elicited spaces included in the repertory grid interviews, plus 22 supplied 'ideal' spaces). The dataset was then checked and cleaned, especially in relation to missing or ambiguous grid ratings. Ambiguities (e.g., where two ratings had been provided) were resolved on a case-by-case basis by checking the interview transcripts; 'not applicable' ratings were cleared and treated as missing grid ratings[417].

Next, the framework of shared master constructs and elements was applied to the stacked grid. Twelve columns were added to represent the 12 latent dimensions for space construal, and 14 rows were added to represent the 14 situated substance use patterns. The dataset was then rearranged so that elicited constructs and spaces were grouped according to the dimensions and patterns they represented.

Final cleaning of this dataset concerned two aspects. Firstly, constructs were reversed as necessary to ensure that all constructs were similarly aligned[418]. To do so, the semantic content of the constructs (e.g., 'stressful', 'relaxed') was checked as well as which one was the preferred pole (based on how participants had characterised their hypothetical ideal space[419]). Mostly, participants preferred the same poles (e.g., being relaxed over being stressed). The exceptions were 'orientation' and 'changeability', as participants expressed different preferences (e.g., some preferred dynamic spaces while others preferred static spaces) (further described in Chapter 10). To ensure equivalence of meaning across participants, these two dimensions were split up further, resulting in 14 master constructs to be used in subsequent analyses. Appendix I.2 documents the reversal of constructs and splitting up of dimensions further.

The second aspect concerned instances of multiple constructs from the same person being allocated to the same dimension. Such instances are problematic because an average calculated from such data would reflect more strongly the construing of those participants who contributed multiple constructs. Wright (2004) and Stone (2003) do not describe how they addressed this problem. In the present study, it was ensured that each participant contributed only one construct to a given dimension, by either selecting the better-fitting construct or by

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[417] This was a departure from the repertory grid literature, which usually replaces 'not applicable' or similar ratings with the mid-point value of the scale (e.g., '3' for a 5-point scale) or deletes the entire construct or element (Shaw, 1980; Feixas and Cornejo, 2002; Höft et al., 2019: 355). For the present study, these options were unattractive due to the already small number of constructs per person and the probable distortion resulting from imputed mid-point values. Furthermore, it was not necessary to pursue these options because the analytic approach was specifically designed to allow the accommodation of missing data.

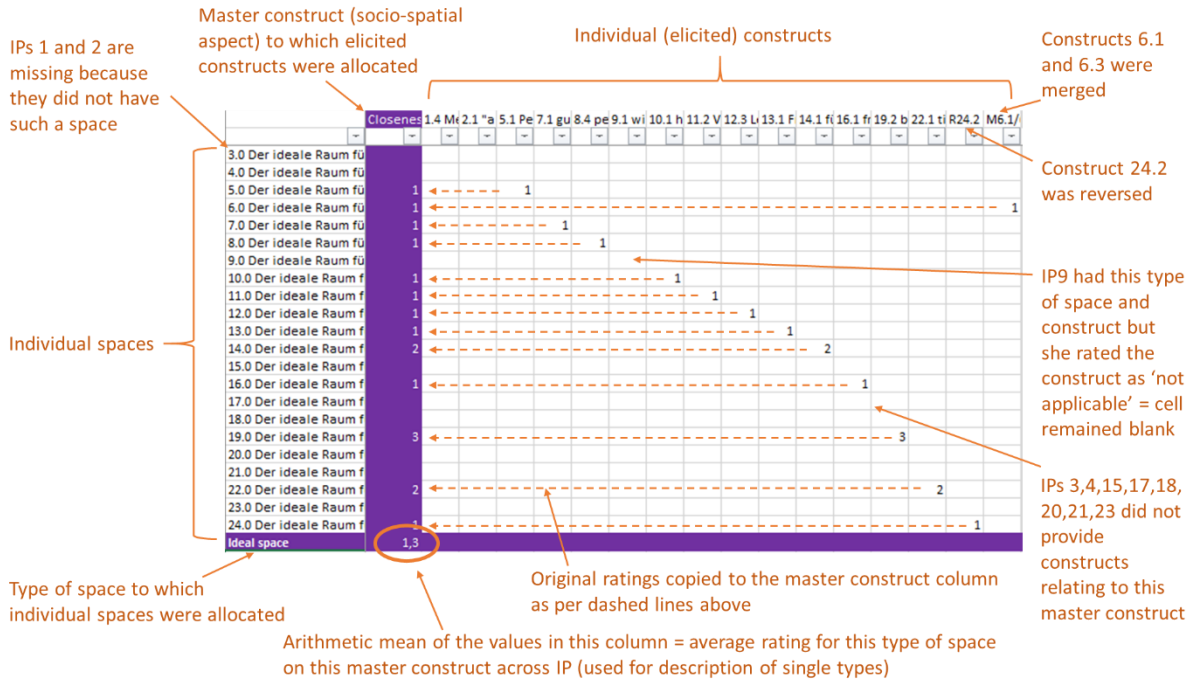
[418] i.e., that the left pole of the constructs allocated to a given dimension, and therefore the rating '1', held similar meanings across participants.

[419] According to Fransella et al. (2004: 91), the preferred pole can be identified by asking study participants directly to indicate a preferred pole or by using proximity to an ideal element (e.g., ideal self) as an indicator.

using the arithmetic mean of multiple constructs (thus creating a merged construct). An equivalent procedure was applied if several spaces from the same person corresponded to the same situated substance use pattern. Multiple spaces were merged using arithmetic means.

As a result, 144 rows of elicited spaces with no or rare substance use (NSU) could be represented via 23 rows, each of these providing the average construct ratings for all 'NSU' spaces from one participant[420]. Also for each of the 14 master constructs (12 dimensions plus two additional constructs for 'orientation' and 'changeability', as noted above), the data from the (merged) elicited construct columns were copied into the 14 columns representing the master constructs. Thus, ratings on the master constructs were approximated by using the ratings given on the corresponding elicited constructs. Figure 9 illustrates this process using a screenshot from the dataset (with explanatory notes in red), using one pattern ('ideal' space) and one dimension ('closeness to people') as examples. The so stacked, weighted and partially merged dataset formed the basis for further analysis.

Figure 9: Annotated snapshot from partially merged dataset



Source: Author's own. *Note.* Annotations are shown in red font.

[420] In other words, these data reflected how each participant construed 'NSU' spaces on average (based on the 'NSU' spaces included in their interview).

7.4.3. Analytic procedures

In total, 41 analyses were carried out at this stage[421], representing four different types:

- Descriptions of single patterns (14)
- Comparisons of participant groups (6)
- Comparisons of multiple patterns (19)
- Standardised comparisons with reference spaces (2)

This section starts with the comparisons of multiple patterns, as these illustrate the analytic procedures best. The other analyses are then described with a focus on how they differed from the comparisons of multiple patterns.

Comparison of multiple patterns

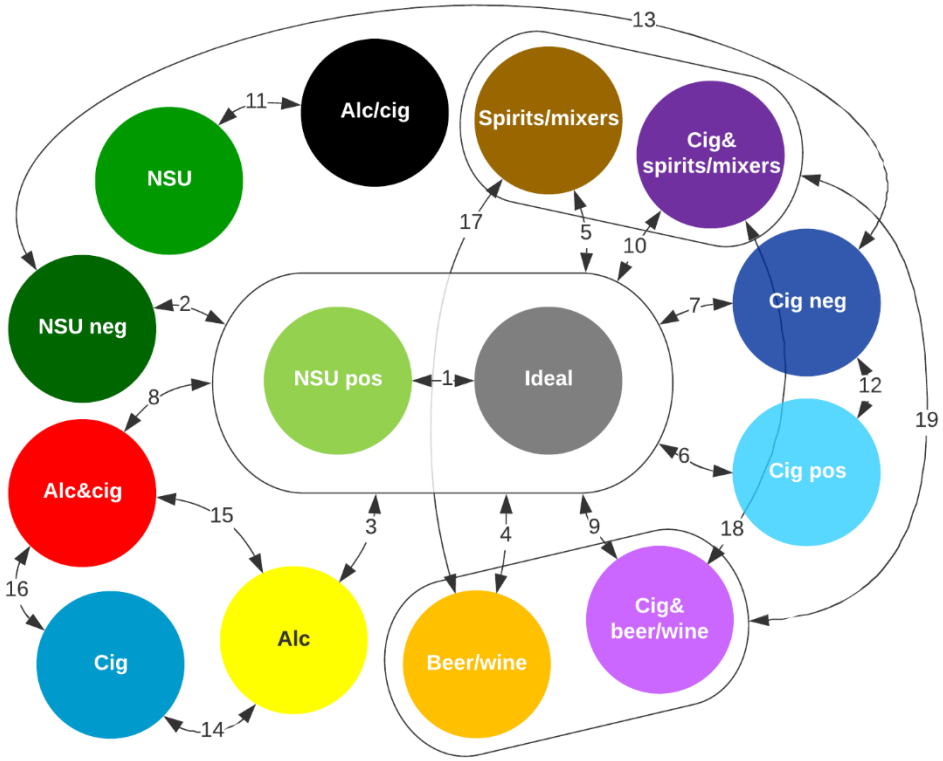
As explained earlier, it was not possible to enter all data into a single analysis without extensive data loss or data distortion. Instead, situated substance use patterns were compared through a series of analyses, including only two or three patterns at a time to maximise data use. It was not practical to undertake all possible pairwise comparisons, so comparisons were prioritised in line with research interests. Key comparisons stated in the study protocol were updated in light of the available data. For this, a table was prepared to show which spaces were available for which participants. Consequently, planning the comparisons could also take into account how many participants could be included for any given comparison.

The chosen comparisons are shown in Figure 10 below. Given the study's strengths-based prevention lens, positively construed spaces of no or rare substance use ('NSU pos') and participants' hypothetical ideal spaces ('Ideal') were chosen as the main reference types that should be compared against the other patterns. A key decision in this regard was whether to undertake these analyses separately (each pattern once against 'NSU pos' and once against 'Ideal') or jointly (all three types entered into the same analysis). A limitation of comparing more than two patterns was greater data loss (as participants were only included if they had provided data for all patterns included in a comparison)[422]. However, the added benefits of analysing all three patterns concurrently (e.g., additional insights from considering three patterns in relation to each other, reduction of necessary analyses by half) were judged to outweigh this limitation. Consequently, there were nine three-way analyses involving 'NSU pos', 'Ideal' and one other

[421] One additional 'comparison of multiple patterns' was carried out for section 13.5.2, not included in this overview.
[422] For example, study participants IP1, IP2 and IP16 could not be included in these comparisons because of missing 'Ideal' or 'NSU pos' spaces.

pattern (analyses 2 to 10 in Figure 10)[423]. Ten additional pairwise analyses compared broad patterns (i.e., 'NSU' vs. 'Alc/cig'; 'Alc' vs. 'Cig' vs. 'Alc&Cig': analyses 11, 14-16 in Figure 10) as well as detailed patterns that were similar or closest to each other in the typology (e.g., 'Cig pos' vs. 'Cig neg'; 'Wine/beer' vs. 'Spirits/mixers': analyses 1, 12-13, 17-19 in Figure 10) to obtain a more nuanced understanding of their characteristics.

Figure 10: Overview of comparisons across situated patterns of substance use and abstinence



Source: Author's own. *Note.* Consistent colours and numbering identify analyses/charts throughout the thesis. Details concerning the patterns can be found in Chapter 11. An additional comparison was conducted for section 13.5.2.

Each comparison required its own super grid and analysis. The dataset described earlier was copied and only the patterns of interest (i.e., those to be compared) were retained. Participants were also only retained if they had reported relevant spaces. To ensure that any observed differences would not be confounded by differences in data availability, the construct ratings were checked to ensure that *data came from the same study participants*. If a participant had provided a construct rating only for one pattern but not for the other, then they could not be considered in the comparison *on this construct*. To maximise the use of available data, this was done separately for each master construct. This ensured that even when a participant had to be excluded from one construct due to missing data, they could still be included for other

[423] Three patterns ('NSU', 'Alc/cig' and 'Cig') were initially not compared with the ideal space because the more detailed patterns were used instead. 'NSU' and 'Alc/cig' were entered later into such a comparison for Figure 39.

constructs within the same comparison. Arithmetic means were then calculated for each master construct on each pattern of interest, and the original elicited constructs and spaces removed. This resulted in a merged super grid specific to the comparison of interest. This procedure was repeated for each comparison. The resulting super grids had two or three rows (depending on whether the comparison included two or three patterns) and 29 columns (15 supplied constructs plus 14 master constructs derived from elicited constructs). In summary, the ratings represented the averaged ratings across participants who had provided data on relevant spaces and constructs.

Super grids were then visualised and interpreted separately for each comparison. Due to the heterogeneity of the data, attention was paid to representing the original data in an accessible format (further details and the resulting charts are provided in Chapter 11).

To support interpretation, simple effect sizes were calculated through subtraction of the arithmetic means per construct (e.g., 'Cig neg' minus 'NSU pos'). Compared with standardised effect sizes, unstandardised mean differences were more appropriate for the present study due to the limited range of the 5-point scales used for data collection as well as the fragmented and nonparametric nature of the data. Differences and similarities between the patterns of interest were examined overall and for each construct, referring to the chart as well as the data tables. To guide the interpretation, key questions were prepared with a focus on the two main reference spaces ('NSU pos' and 'Ideal'). In addition, preliminary hypotheses were formulated prior to inspection of each chart (e.g., anticipated differences). Caution was used in relation to extreme or otherwise unusual data points as well as data points based on very small sample sizes (e.g., n=1), and interview transcripts and original constructs were consulted for clarifications where necessary. Observations were noted in a bespoke matrix. This was a 14x14 matrix to start with, listing the 14 situated substance use patterns in the columns and again in the rows. Observations were noted in the cell corresponding to the specific comparison (e.g., what insights were gleaned about 'Cig neg' (column) based on its comparison with 'NSU pos' (row)). This matrix informed the write-up of findings for Chapter 11.

Comparison of all patterns relative to reference spaces

Even though it was not possible to enter all data into a single analysis, two additional analyses were undertaken to *display* all patterns in a single chart. This was made possible by using *one* pattern as a reference type and displaying all other patterns in relation to this one type. This analysis was therefore done for the two chosen reference types ('Ideal' and 'NSU pos'). All differences between means calculated during the three-way comparisons (described earlier) were copied into new datasets and visualised.

This resulted in charts mapping the relative distances of each pattern to the respective reference space, with the values for the reference space set to zero for each construct. Though these charts had to be interpreted with caution (e.g., due to being based on different subsamples of participants), they approximated a single analysis sufficiently to help discuss how patterns were positioned in relation to the reference spaces and on which constructs spaces appeared to vary the most. Sums of differences between means were also calculated to identify which pattern were closest to and furthest from the reference types. Furthermore, these charts were useful to inform an overall characterisation of the two reference spaces. Observations were noted in the results matrix mentioned above, extending the matrix with additional rows to indicate these comparisons as the source.

Description of single patterns[424]

The comparisons of multiple patterns were essential to explore construed differences between spaces representing different substance use patterns. They had, however, two shortcomings:

- the resulting charts showed arithmetic means *across* participants and therefore did not show how individual participants had construed the patterns and whether participants' ratings were similar to each other or varied; and

- comparisons included participants only if data were available for *all* the patterns of interest, so that some of the available data could not be considered.

To address these shortcomings and thereby allow better insights into the spaces and available data, descriptions of all 14 patterns were also prepared based on their own distributions (i.e., not compared with other patterns).

The procedure for data tables and charts was adapted from the one used for the comparisons of multiple patterns. The data tables were based on the original grid ratings provided by participants, which were copied from the elicited construct to the master construct columns. Arithmetic means were calculated separately for each master construct (see Figure 9 above for an example). As before, sample sizes varied for each master construct because participants had reported different constructs. However, these data tables could include all participants who had provided data for a particular pattern[425], and so some of the steps required for the comparisons of multiple patterns could be skipped (e.g., identification of missing data). While

[424] Thanks to Gerhard Paulinger for suggesting this display type.
[425] This had not been the case for the comparisons of multiple patterns, where samples had to be identical across spaces and participants were thus limited to those who had provided data for all patterns included in a comparison.

the data tables were more straightforward to prepare than for the comparisons of multiple patterns, visualisation of the single pattern charts required additional steps to represent all data points adequately. Specifically, the size of the data points was adjusted to represent the number of participants who had given that particular rating[426]. Charts and details on formatting can be found in Chapter 11.

To guide the interpretation, key questions and preliminary hypotheses were again prepared. Charts were inspected to identify noteworthy patterns (e.g., bimodal distribution of ratings) and data points (e.g., outliers). Indicators such as range, median, arithmetic mean and standard deviation were also calculated to understand how similarly participants had construed the spaces. Original constructs and interview transcripts were consulted as necessary. Observations were noted in the matrix mentioned earlier.

Comparison of participant groups

Finally, six analyses were undertaken to compare groups of participants to each other. As described in Chapter 5, although it was intended to recruit a fairly homogeneous group of participants, this was not possible in practice. Among the 24 participants, ten 'lighter' users (labelled as Group 1) could be distinguished from 14 'heavier' users (Group 2). The subgroup of smokers included five occasional smokers (Group A) and five daily smokers (Group B).

The purpose of these analyses was to check whether study participants with different general substance use patterns differed also with regard to their socio-spatial construing. This was mainly important to understand the study sample. Some differences were reported in the results (section 11.6) to inform hypotheses to be explored in future research. However, this was not a confirmatory analysis to test any prior hypotheses.

The analyses focussed on how different groups of participants had construed the same type of space (i.e., descriptions of single patterns by participant group). Analyses were limited to the six broad patterns in the typology (i.e., 'Ideal', 'NSU', 'Alc/cig', 'Alc', 'Cig', 'Alc&cig'). For the types 'Ideal', 'NSU', 'Alc/Cig' and 'Alc', lighter users were compared with heavier users (Groups 1 vs. 2), while for the types 'Cig' and 'Alc&cig', the analyses focussed on differences between

[426] An alternative option would have been to create histograms (a form of bar chart) separately for each construct on each space. The chosen visualisation approach allowed a more compact and precise display of the data. A further option trialled was to display each participant individually using separate lines, but the resulting charts were not easy to interpret, which is why the final solution represents only the average values as a line.

occasional and daily smokers (Groups A vs. B). Due to the nature of the data, more complex analyses (including comparisons of multiple patterns by participant group) were not possible.

The analytic procedures were analogous to those for the descriptions of single patterns outlined earlier. The main difference was that spaces were additionally grouped by participant group, and arithmetic means and sample sizes were calculated and visualised separately for each participant group. For the interpretation, differences between means were calculated through subtraction of the arithmetic means per construct (e.g., 'Group 2' minus 'Group 1'). Preliminary hypotheses were formulated prior to inspection of each chart (e.g., anticipated differences between groups). Attention was given to similarities and differences between the groups, including differences in data availability, as well as noteworthy patterns and data points considering each group by itself. Observations were noted in a separate results matrix which had the four groups as columns and the six types of space as rows.

7.4.4. Assessing relationships between dimensions for space construal and situated substance use patterns

The data tables and charts resulting from the comparisons of situated substance use patterns and of participants groups (described above) were of the kind that are usually presented together with test statistics (e.g., t-tests for comparisons of two samples, repeated measures analysis of variance [ANOVA] for three or more dependent samples, with respective p-values). Although hypothesis-testing was not within the scope of the present analysis as such, significance testing was still of interest to facilitate the following:

- distinguishing between noteworthy differences and differences that should not be overstated when comparing patterns or participant groups;
- identifying which patterns differed significantly from the two main reference types ('Ideal', 'NSU pos'); and
- identifying those constructs on which significant differences were most likely to occur and which might therefore be of most interest for future research.

Due to the properties of the data in this study, nonparametric alternatives to the tests mentioned above could have been used (on nonparametric statistics, see e.g., Corder and Foreman, 2009)[427], but finally, it was decided not to employ significance testing in the traditional

[427] Specifically, the Wilcoxon Signed Ranks Test would have been appropriate to judge the significance of differences in the pairwise comparisons of patterns, while the Friedman Test could have been used for the three-

sense. There were several reasons for this. At a practical level, the main issue was that, due to limited data availability, required minimum sample sizes were frequently not achieved[428]. Consequently, test statistics could have been calculated for some but not all constructs, which would have likely added more confusion than clarity to the analysis.

Therefore, 'significance' was conceptualised differently. For the *description of situated substance use patterns in Chapter 11*, it was necessary to decide which of the differences between patterns (calculated through subtraction, see previous sections) were noteworthy and thus important to report. To this end, conditional formatting was used in Microsoft Excel to highlight the largest and smallest differences between means within a given comparison. Other methods were also employed. For example, the lines connecting the data points in the charts were compared: if these lines ran parallel to each other in general, a noticeable deviation from this pattern indicated a noteworthy difference. 'Significance' was also established theoretically, for example by formulating ex ante assumptions about differences and then identifying data points or patterns that were unexpected and prompted further interrogation of the data.

For the *discussion of dimensions in section 12.3*, it was necessary to decide which dimensions distinguished best between different patterns of situated substance use in this study sample and in what way. In other words: which dimensions appeared to be related to situated substance use? This required a more quantitative approach (cf. the descriptions in Chapter 11), and therefore set indicators and criteria were applied for increased consistency and transparency. Appendix K.5 provides an overview of all sources, indicators, criteria and results, and the following pages explain how different estimation methods and sources were used and triangulated to obtain a comprehensive overview.

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way comparisons. Both tests are for dependent samples, which would have been appropriate, given that the same study participants rated spaces for each pattern in a comparison (a test for independent samples would have underestimated the significance of findings).

[428] According to Corder and Foreman (2009), the minimum sample size for the Wilcoxon Signed Ranks Test is n=5 (for $\alpha_{two\text{-}tailed} \leq 0{,}10$), and while the Friedman Test has a lower minimum sample size (n=3 for three comparison groups at $\alpha \leq 0{,}10$), it is usually followed up with a Wilcoxon Signed Ranks Test or similar post-hoc test, implying that a higher sample size is preferable. In the present study, tests would have been run separately for each construct on each comparison. Therefore, minimum requirements applied to the sample size *at the construct level* of a particular comparison. As Table 17 in section 7.4.1 shows, six out of the 12 identified 'latent dimensions for space construal' were mentioned by five participants or fewer. Actual data availability in the comparisons was typically lower because participants could only be considered if data were available for all patterns being compared. For example, constructs relating to 'togetherness of activity' were described by four participants. However, out of 19 comparisons, all four participants could only be included in the broadest comparison (NSU vs. Alc/cig). The sample sizes for the other comparisons varied between n=0 and n=3. Similarly, constructs referring to 'enjoyment' were described by five participants. In this case, there was not a single comparison where all five participants could be included (not even for 'NSU vs. Alc/cig', as one of these participants reported no space meeting the NSU criteria).

Comparisons between two patterns of situated substance use

Five indicators were used to examine comparisons between two situated substance use patterns for each latent dimension of space construal (see Appendix K.2):

- Considering study participants as a group, what was the *average* difference (MD) between the two patterns on this dimension? An average difference equal to or greater than 1 (given that the difference between two patterns measured on a 5-point scale could range from 0 to 4) was considered to indicate a large difference and was highlighted in bold.

- Considering study participants individually, what was the *smallest* difference (min) between the two patterns reported by any participant on this dimension? As above, smallest individual-level differences equal to or greater than 1 were considered to indicate a large difference and were highlighted in bold.

- Comparing study participants' individual ratings, how much did the reported differences *vary* across participants? A standard deviation of individual-level differences (SD) of 0,5 or below was considered to indicate consensus between participants regarding the magnitude of the difference and highlighted in bold (further explained below).

- Comparing study participants' individual ratings, what percentage of participants *ranked* the two patterns in the same way? A rank order consensus (labelled 'ROC' in this thesis) of 75% or over was considered to indicate consensus among participants on the direction of the difference and was highlighted in bold (further explained below).

- Finally, if 75% or more of study participants ranked the two patterns in the same way, was the pattern of interest rated *higher (+) or lower (-) than or the same (0) as* the other pattern? Higher or lower ratings were both considered noteworthy.

While the first indicator (i.e., average difference) could be calculated across participants, with data readily available from the comparison tables already prepared for the description of patterns, the remaining indicators required additional calculations. Specifically, differences between the two patterns were calculated separately for each individual participant contributing to a given comparison and then compared to each other to obtain the information required for the indicators shown above. These analyses were undertaken for all two-way comparisons except Comparisons 17 and 18 (due to small sample sizes, pooled data from Comparison 19 were used instead) and Comparison 13 (did not correspond to key questions).

These indicators, in particular the concept of a 'rank order consensus' (ROC), were developed specifically for this study as descriptive measures suitable for a minimum sample size of only n=2 (to substitute the established nonparametric tests discussed earlier with minimum sample sizes of n=3 or n=5) and are therefore explained further in the following paragraphs.

Applying the logic found in nonparametric testing, the assumption was that findings were more significant if they represented a consensus view among participants. This translated into the question: did participants tend to construe the *differences* between two patterns of situated substance use in the same way? Within this question, two aspects were distinguished: i) did participants construe the *direction* of the difference similarly; and ii) did participants construe the *magnitude* of the difference between two types similarly?

To address the *direction* aspect, a separate table was created to indicate for each participant whether they had rated the pattern of interest higher (+), lower (-) or the same (0) as the other pattern on a given construct. In other words, the relationship was expressed using ranks. It was then counted how many of the participants had construed the relationship between the two patterns in the same way, and this was expressed as a proportion of all participants who had rated both patterns on the construct (referred to as 'rank order consensus' above). Lower proportions indicated that participants had construed the direction of relationship between the two patterns differently, while higher proportions indicated that participants had construed the direction of relationship between the two patterns similarly. Comparisons with results of Wilcoxon Signed Ranks Tests conducted using sample data suggested that a 75% benchmark represented a consensus view (i.e., if 75% or more of participants had construed the relationship as differing in the same way, then the difference was also likely to be significant according to a Wilcoxon Signed Ranks Test). The 75% benchmark also meant that, while comparisons with n=2 and n=3 could be considered, they could only reach that threshold and thus produce 'significant' results if *all* these participants had ranked the patterns the same way.

To address the *magnitude* aspect, standard deviations (SD) of individual-level differences were calculated for each construct. Higher SD values indicated that there was less consensus among participants on the magnitude of differences between two patterns (e.g., some participants had construed the two patterns as fairly different, but others had construed them as fairly similar), while lower SD values indicated a greater level of consensus (e.g., most participants had construed the two patterns as very different). Hence, constructs with lower SD values could be considered more significant.

In Appendix K.2, this information was used to format tables as follows. If a dimension was associated with a directed relationship between patterns (+/-), with a rank order consensus

(ROC) of 75% or over, and if *any one* of the criteria on the first three indicators (average difference [MD] ≥ 1 *or* minimum individual-level difference [min] ≥ 1 *or* standard deviation [SD] of individual-level differences ≤ 0,5) was also met, then it was shaded with *light grey*. This was interpreted to mean that there was a relationship between the dimension and situated substance use patterns but that the effect size was not necessarily large (i.e., SD ≤ 0,5 but MD/min ≤ 1) or not consistently large (i.e., MD ≥ 1 but SD ≥ 0,5). *Dark grey* shading was applied for directed relationships (+/-) with a rank order consensus (ROC) of 75% or over, if *two* of the criteria on the first three indicators were met (e.g., MD ≥ 1 *and* SD ≤ 0,5). This was interpreted to mean that, in this dataset, there was a relationship between the dimensions and situated substance use patterns *and* that the effect size was consistently large. These procedures thus resembled traditional techniques in the sense that they examined separately whether there was a relationship and what was the strength of this relationship. Results from these analyses are included in Chapter 11 and informed section 12.3.

While the two-way comparisons between patterns provided a key source of information, they referred to only two patterns at a time. To assess the broader relevance of dimensions for section 12.3, further data sources were consulted as described below.

Comparison of all patterns relative to reference spaces

Section 7.4.3 described how all patterns were charted in a single display by using *one* type of space as a reference space and displaying all other patterns in relation to this one type; this was done for two reference spaces (‘Ideal’ and ‘NSU pos’). Although the resulting data tables (Appendix K.4) must be viewed with caution (e.g., comparisons do not refer to the same participants), these data gave some indications about the constructs on which the patterns were more likely to vary from each other or from the reference types. Standard deviations and average distances were calculated to assess the relevance of dimensions for distinguishing between patterns. As this information did not allow insights into consensus among participants, effect size was used as a proxy for a ‘significant’ relationship. Appendix K.4 provides further details on these indicators.

Ranking of constructs by participants

At the end of the interviews, study participants were asked to rank their elicited constructs depending on how decisive they considered them for their own substance use (as described in section 6.2.7). As participants often explained that last-ranked constructs had no impact on whether they used substances or not, first ranks were interpreted to indicate constructs most relevant to the present analysis. Therefore, it was considered how many participants had

ranked constructs *in first place* (i.e., as most important for their own substance use) (further details are available from Appendix I.3).

Triangulation of sources and indicators to summarise the findings

Appendix K.5 shows how the above-mentioned sources and indicators were triangulated to identify relevant socio-spatial dimensions for section 12.3. Each indicator was displayed in a separate column, and data for each dimension were entered in a simplified format, with the number of stars (*, **, ***) indicating how well a dimension distinguished between patterns of situated substance use (i.e., met specified criteria)[429]. Indicators were then grouped depending on what distinctions they supported: between patterns overall; between alcohol/cigarette use and no or rare substance use ('Alc/cig' vs. 'NSU'); between different patterns of situated substance use; or between patterns associated with positive or ambivalent/negative feelings. Within each group, information from different indicators was compared to prepare a summary table for section 12.3. A checkmark (✓) was entered in the summary table if at least one indicator had a two-star rating (**) on a given construct (the use of checkmarks reflected the descriptive nature of these analyses better). In addition, information about the direction of the relationship was extracted where available and included in the summary table.

In summary, this approach allowed the synthesis of a large and heterogeneous amount of information (different comparisons, patterns, indicators) into a concise summary table showing which dimensions distinguished well between patterns of situated substance use (and in what way). Given the methodological limitations of the dataset, further advantages of this approach were that it remained within a descriptive logic and that it could be applied to comparisons with very small sample sizes. Limitations are noted together with the results in section 12.3.

7.5. Interview transcripts

7.5.1. Introduction

As noted in section Chapter 6, all study participants gave permission to the audio-recording of their interviews. The original study protocol foresaw that these audio-recordings would mostly allow clarifications regarding the written data on participants' maps and grids (e.g., retrace how a map was produced, clarify the meaning of an elicited construct). However, as the fieldwork

[429] In Appendix K.5, blank cells indicate lack of data or lack of a significant relationship. The original working table included more details in this regard, but these were not included in the appendix for increased visual clarity.

progressed, two developments occurred which meant that participants' spoken answers, comments and explanations became a data source in their own right. Firstly, additional information conveyed verbally by participants (e.g., descriptions of situations they had thought of, explanations for *why* they had given a particular rating) were found to open up new perspectives onto the ratings recorded on the grids, thereby allowing a deeper understanding of the quantitative data. Secondly, participants' narrations during the interviews offered a way to address those research questions which could not be addressed using the quantitative data alone[430]. Both of these developments led to a methodological shift during the fieldwork towards encouraging more participant narration, as described in Chapter 6.

In line with these two developments, the analysis of transcripts finally served two purposes which translated into different analytical approaches:

- A review of all interview transcripts helped to understand the quantitative data more accurately and completely and to identify interview excerpts to help contextualise the quantitative findings. This review informed Chapter 11.

- A qualitative content analysis on a smaller sample of interview transcripts helped to explore how spaces of situational substance use or abstention come into being. Causal pathways were developed to answer the question: *how can socio-spatial aspects produce specific instances of situated substance use or abstinence?* This analysis informed Chapter 12.

The following sections document first how the audio-data were transcribed (section 7.5.2) and how the analytic approach was developed (section 7.5.3). Section 7.5.4 then describes the qualitative content analytic procedures for the smaller sample of transcripts, including the extraction of factors and visualisation of pathways. Finally, section 7.5.5 describes how these data helped to contextualise the quantitative findings.

7.5.2. Transcription of audio recordings

In repertory grid studies, it is *not* common to audio-record and transcribe the conversation that goes on during the interview, as the analysis focuses on what was documented *in writing* on the repertory grid (D. Jankowicz, personal communication, 25.02.2016). Researchers are encouraged to draw upon their knowledge of the interview when interpreting, for example, the

[430] The original study protocol foresaw that certain questions would be answered through (qualitatively oriented) follow-up interviews. However, during the fieldwork, it transpired that such interviews would not be feasible (as described in section 6.5). Identifying and generating relevant data within the context of the repertory grid interviews was therefore chosen as the way forward to address these questions without further data collection.

output of a principal component analysis (Jankowicz, 2004: 132). However, textbooks on repertory grid methodology (e.g., Fransella et al., 2004; Jankowicz, 2004) offer no guidance on how to systematically consider the verbal interview data. Repertory grid studies utilising such data do so through note-taking during or after the interview rather than audio-recording (e.g., Stone, 2003; Cullina, 2016). Consequently, the transcription of audio data in the present study represented a departure from usual repertory grid methodology, resulting from the relatively greater focus on narration. The transcription was therefore informed by general resources on transcription and qualitative methods (e.g., Froschauer and Lueger, 2003: 107–111, 223-224; Burke et al., 2010; Gläser and Laudel, 2010: 193–194; Burke, 2011; Fuß and Karbach, 2014; Lamnek and Krell, 2016; Dresing and Pehl, 2018). The transcription stage lasted from December 2017 to December 2018 and consisted of several tasks addressing the questions of *what* to transcribe, *how* to transcribe it and *who* should transcribe it, and how to assure the *quality* of the transcription. These are described in the following sections. The software programme used was EasyTranscript (www.e-werkzeug.eu), although external transcribers could use other software. As recommended by Burke (2011: 3), a spreadsheet was used to track the progress of each transcript from initial preparation to final revision and payment of external transcribers.

Selecting sections for transcription

In repertory grid studies, key data are already captured in writing (e.g., on the grid), meaning that it was not necessary to transcribe the interviews in their entirety. The first task was therefore to identify those interview sections that contained *additional* data for analysis. This could also be seen as the start of the qualitative data analysis, as it allowed the study author to become familiar with the data (e.g., Ritchie and Spencer, 1994: 178–179, describe "familiarization" as the first stage of their qualitative data analysis approach).

Before any decisions were made, the entire interview was reviewed in detail. To start with, a clickable table of contents (C-TOC) was created for each interview, adapting the approach suggested by Hauptmann (2005). In the present study, this involved listening to each interview and using transcription software to note the timing and nature of occurrences such as changes in interview topic, all participant utterances (including unprompted questions or comments) and methodological observations (e.g., interviewer mistakes, as described in Appendix H.1). Next, the C-TOC was transferred into an MS Excel table so that each occurrence corresponded to one table row. Each occurrence was categorised as either essential or not essential for

transcription[431]. Essential sections that were only a few minutes apart were then connected to form larger, more coherent sections, meaning that the non-essential parts in-between would also be transcribed. In addition, sections were defined to include one or two sentences before and after the essential parts. This avoided undue fragmentation of the data and ensured that the context would not be lost. Finally, remaining sections were reviewed once again to ensure that they contained no data relevant for the intended analyses. Consequently, this step sought to identify *all* sections relevant for analysis, rather than only the 'most important' parts (which would have reduced the transparency of the research; Gläser and Laudel, 2010: 193–194). As a result of this selection process, out of circa 53 hours of total interview time, around 32 hours (60%) were transcribed; corresponding to about 80 transcribed minutes per interview[432].

Transcription rules

The second task was to decide on consistent transcription rules appropriate for the intended uses of the data. This was especially important to ensure a consistent approach across multiple transcribers. A comparison of the examples and suggestions in the literature cited above showed a large variety, reflecting different analytical approaches and conventions. Detailed transcription rules (e.g., recording *how* something was said in addition to *what* was said) are usually associated with analytical approaches aimed at unravelling latent structures and meaning (e.g., Froschauer and Lueger, 2003: 223–224). Although the present study was more concerned with manifest interview contents (as explained further below), a relatively detailed transcription was still preferred, as it made the transcripts more accessible (e.g., to imagine the interview situation and retrace the conversation) and supported methodological insights.

A first set of relatively detailed rules was developed based on the recommendations in the literature cited earlier. However, feedback from the external transcribers suggested that a simplified set of rules would be more useful in practice[433]. The final set of rules resembled those suggested by Gläser and Laudel (2010: 193–194). Specifically, dialect was translated into standard German while maintaining idioms and speaker idiosyncrasies such as grammatical errors. Linguistic and other details (e.g., pauses, laughter, stutter, tone, volume of voice, interruptions) were documented using double parentheses where noticeable or essential to understand the conversation.

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[431] Participant utterances were generally all considered essential *unless* they were already recorded in writing (e.g., ratings on elicited spaces) or were purely methodological (e.g., participant asking for clarification).
[432] Interview parts that were not selected for transcription included, for example, instructions by the study author and the rating of elements on supplied or elicited constructs (if there was no additional conversation).
[433] The detailed set of rules was still applied to two interviews to support the preparation of Chapter 6.

Use of external transcribers

Smaller sections as well as fragments containing particularly sensitive data (e.g., participant mentions own name) were transcribed by the study author. However, external circumstances (as described in section 1.2.6) meant that larger sections had to be outsourced. In total, five external transcribers were engaged, transcribing between one and nine interviews each. Transcribers were university students or early-career researchers and were either personally known to the study author or recommended by academic colleagues. The approach took on board the useful guidance offered by Burke (2011).

Before sharing audio-recordings with transcribers, attention was given to appropriate ethics and quality assurance measures. For example, sections including particularly sensitive information were muted or cropped before sending audio files to the transcribers. Section 8.3.5 describes further the measures taken to protect study participants and their data during this process (e.g., use of a written contract, encryption).

To assure the quality of the transcription, each transcriber received a copy of the transcription rules as well as six pages transcribed by the study author from a sample interview to illustrate the rules. Additional instructions (e.g., how to use transcription software or encrypt files) were sent by email or given verbally. For each interview, transcribers received the audio file (sent as an encrypted file through a separate web service, as per section 8.3.5), the list of sections to transcribe and the participant's map to help them understand the recording (or if this was too sensitive, a typed list of the elicited spaces). Before the transcription work began in earnest, each transcriber transcribed a short sample section. The study author reviewed this section (e.g., adherence to agreed rules) and provided feedback to the transcriber to inform the transcription work. Full transcripts submitted to the study author were checked using a bespoke checklist. If transcripts met basic requirements, transcribers were informed that they could move on to the next interview. Transcripts that did not meet basic requirements were returned to transcribers for revision. Feedback was provided as necessary.

Finalisation of transcripts

For the final task, each transcript was revised by listening to the original audio file and reading through the transcript word by word. The emphasis during this stage was to ensure that the manifest content was appropriately captured and that transcripts were suitable for the intended analyses. Where this was not the case (e.g., transcriber had omitted or changed a key word or emphasis through which the sentence took on a completely different meaning), the transcript was corrected accordingly. Inaccuracies which did not change the overall meaning of a

sentence and which were irrelevant for the intended analyses (e.g., different word order, omission of filler words) were tolerated. This stage also provided an opportunity to add notable details (e.g., laughter, emphases, pauses) if omitted by the transcriber. On average, this quality control and revision took four to five hours per interview.

Finally, one complete file was prepared for each interview by adding all transcribed sections to the C-TOC created earlier. This ensured that the interview was represented in its entirety and that transcribed sections were placed within their original context. Formatting (font, indentation) and language (transcripts in German, C-TOCs in English) separated transcribed and C-TOC text. Before being imported into software for further analysis, these files underwent a first round of anonymisation (further described in section 8.3.4).

Translation of interview excerpts for use in the present thesis

Interview excerpts selected for use in the thesis were translated by the study author from German to English, with the German original added in footnotes. The translation sought a balance between giving a literal translation and emulating how an English native speaker might have expressed the same contents. The person's idiosyncratic way of speaking was preserved as far as possible. To keep excerpts concise, less relevant parts of the transcripts (e.g., repetitions, set phrases) were omitted (using '[...]'), paying attention not to distort the excerpt through omission. Omission was also used where excerpts contained specific personal details, as described in section 8.3.4. The letters 'I' and 'P' ('B' in German) identified the interviewer and the participant, respectively. All emphasis (underlined) was as in the transcript.

7.5.3. Development of the analytic approach

This section outlines how the qualitative data analysis approach was developed. Instead of following a single method from start to finish, different approaches were combined, with a new approach introduced when the previous one no longer met the study's needs. This progression from one analytic approach to another mirrored a continuous narrowing of the analytic focus. Overall, four phases could be distinguished which are further described on the following pages:

- an *initial coding of interviews* to chart the data available for qualitative analysis and to inform the overall data analysis plan;
- a combination of *qualitative content analysis* and *causation coding* to identify factors related to substance use;
- a shift towards *network displays* to understand complex interplay between factors; and

- a focus on the relationship between latent dimensions for space construal and other factors for the *final synthesis and results presentation.*

Once the transcription was completed, two challenges had to be addressed. One was that qualitative follow-up interviews, which had been planned in addition to the repertory grid interviews, had not been implemented (as described in section 6.5). Specific data to address one of the study's questions – how situational substance use outcomes are produced through the interplay of various factors – were therefore lacking. Rather than to dismiss this aspect of the study, it was decided to extract relevant data from the repertory grid interviews instead. Although it was not possible to change the focus of the repertory grid interviews, such data were generated by encouraging participant narration. It was, however, unclear what data were exactly available (e.g., to what extent, in what form) to address the research question. Consequently, it was also unclear what would be the best approach to explore these data. In relation to this, the other challenge was that, as the original study protocol had foreseen a range of possible analyses, with further ideas developed during the fieldwork, the *focus* of the qualitative analysis was yet to be determined.

Initial coding of interviews to focus the qualitative analysis

In line with the above, it was decided to take inventory of the available data by submitting the transcripts to a first round of coding. This was also an opportunity to sort and structure the data more generally and to identify information to support other parts of the thesis (e.g., description of participants, methodological issues, analysis of elicited constructs, contextualisation of quantitative data). Accordingly, a preliminary codebook[434] was developed to help identify different kinds of data, including data that could be relevant for qualitative data analysis (e.g., instances where participants related socio-spatial or other factors to substance use). The first four interviews were coded using these ex-ante defined codes as well as additional codes developed ad hoc during the coding process. The software used was MaxQDA 2018 (VERBI Software, 2018)[435]. The process was guided by literature on coding (e.g., Bazeley, 2013; Saldaña, 2013) and resembled the "elemental coding" approaches described by Saldaña (2013: 83ff.). Consequently, it served to index the data rather than to analyse it in detail. At

[434] The codebook was set up in MS Excel, imported in MaxQDA and then edited within that software using memos linked to codes. As DeCuir-Gunby et al. (2011: 138) note, code definitions may include several components. In this study, they included: code name, inclusion criteria, and exclusion criteria. Examples and non-examples where added during the coding where necessary.

[435] An initial review of software options suggested a choice between *atlas.ti* and *MaxQDA* for the present study. Based on the preliminary data analysis plan, a list of requirements was prepared (e.g., what functions the software should offer), trial versions of both software packages were tested and tutorials consulted. MaxQDA was found to meet the study needs better (e.g., ease of assigning and amending codes, viewing and filtering coded fragments).

first, it was considered to code all interviews in this way, but in practice the insights gleaned from the first four interviews sufficed to plan the further analysis as well as to reflect on the data collection methodology as intended (in combination with the C-TOCs[436]; as described in Appendix H.1). Therefore, even though the remaining interviews were also coded, this was done using a more focussed set of codes, as outlined below.

Qualitative content analysis and causation coding to identify factors related to substance use

The coding exercise confirmed that the repertory grid interviews contained data that could be submitted to a formal qualitative analysis. As noted in section 7.1, a data analysis plan was prepared to outline possible avenues for analysis, which were prioritised in consultation with the academic supervisor. This suggested that the qualitative data analysis should focus on exploring factors relating to participant's own substance use[437]. The following two aspects were considered most important at the start of this analysis:

- Explore if and how elicited socio-spatial aspects (i.e., latent dimensions for space construal in Chapter 10) were (causally) related to situated substance use in participants' accounts
- Identify additional factors (causally) related to situated substance use (socio-spatial *and* wider factors) that were not formally elicited through the repertory grid interview

In other words, the qualitative data analysis was conceptualised as a way to consider i) socio-spatial aspects that participants used (implicitly or explicitly) to make sense of their everyday spaces and ii) aspects that were more explicitly related to substance use (e.g., part of participants' subjective theories regarding their own substance use).

Considering various qualitative data analysis techniques (overviews are offered e.g., by Kuckartz, 2010; Flick et al., 2013; Saldaña, 2013), the qualitative content analysis method suggested by Gläser and Laudel (2010) – with its focus on theoretical models, factors, causal mechanisms and mediating variables – initially appeared most suited to analyse the data in line with the above: relevant information is extracted from the transcripts into a separate table, whereby each factor is documented on a new row using a pre-defined structure (Gläser and

[436] When creating the C-TOCs, ex-ante specified keywords (e.g., 'mistake') were used to highlight methodological observations (e.g., interviewer mistakes). To support methodological reflections, these were later auto-coded (i.e., MAXQDA was instructed to assign a specific code to any paragraph containing these keywords).
[437] Given that the repertory grid interview itself did *not* focus on substance use (but on "liked" and "disliked" aspects of everyday spaces, as described in Chapter 6), the quantitative analysis based on those data could only explore association (in the sense of co-occurrence) between socio-spatial aspects and situated substance use patterns. The qualitative data analysis could therefore complement the quantitative analysis by focussing on factors that were more explicitly related to substance use.

Laudel, 2010: 212–229). Thus, an extraction table was prepared based on guidance and examples by Gläser and Laudel (2010: 212–229). The four interviews already coded earlier were extracted first, and five further interviews were added based on a stepwise prioritisation of interviews (described below). To ensure that the extraction produced useful information, a matrix to summarise the results by extracted factor *across* participants was also prepared (in line with Gläser and Laudel, 2010: 229–246) and trialled using data from the first interviews.

However, the data extraction procedures and table were substantially revised already after the first few interviews, due to issues identified with the original approach. To illustrate one of these issues: while the approach suggested by Gläser and Laudel was very suitable for the identification and detailed description of factors, the *relationships* between factors could not be mapped adequately. To document relationships, Gläser and Laudel (2010: 212–229) suggest noting causes and effects separately for each factor in the table. This was found to result in significant duplication of information, as the same pathway would be reported multiple times (i.e., for each factor involved in a pathway). It also meant that data on pathways were scattered across multiple rows and columns in the table and pathways were not presented in their entirety. A further complication was that the original approach offered no way to appropriately capture the interactions and conflicts between factors observed in the data.

Therefore, the study incorporated "causation coding" (Saldaña, 2013: 163ff.). Text segments are labelled with a sequence of codes to reflect a chronological process described or implied by the participant (e.g., "CODE 1 > CODE 2 > CODE 3"; Saldaña, 2013: 164). This had been initially dismissed, as the approach by Gläser and Laudel offered a more systematic and comprehensive way of examining factors. Finally, however, Saldaña's notes on causation coding (as well as Miles et al., 2014: 234–253, on causal chains, fragments, streams and networks) informed the analysis where Gläser and Laudel's guidance did not meet the study's needs. As a consequence, for example, data extraction was re-organised to focus on *pathways* rather than factors (i.e., one row per pathway in the extraction table, rather than one row per factor). Further details on the final procedures are presented in section 7.5.4.

Network displays to understand complex interplay between factors

The previous paragraphs highlighted that while the qualitative data analysis started as a search for *factors*, working with the data encouraged a shift towards *relationships* between factors. One way of understanding this shift is that, despite the use of a theoretical model to inform the data analysis, the prior assumptions about how factors might affect situated substance use had been too simplistic. For example, different types of factors had been distinguished when formulating the theoretical model (shown in section 4.2.4), but little consideration had been

given to how factors within the *same* category might interact with each other. This prompted a desire to understand the complex interplay between factors better (including among socio-spatial aspects), and the best way to do so was considered to be through visualisation. As Gläser and Laudel's guidance on visualisation was limited, a different resource was used for this phase. The "network displays" suggested by Miles et al. (2014: 111–112) offered a useful framework to represent the data as intended, and two pathways were visualised early on to trial this approach and to gain a better understanding of the data. Details on how network displays were selected and prepared are given in section 7.5.4.

Final synthesis and results presentation

The steps outlined thus far resulted in a large body of information, which could be synthesised and presented in several ways, such as:

A. Develop a list of and describe all factors connected to substance use based on the data extraction table (socio-spatial and/or wider factors)
B. Describe only the *elicited* socio-spatial aspects (i.e., latent dimensions for space construal) further based on the data extraction table
C. Develop generalised pathways to show how the identified dimensions can result in different situated substance use outcomes (i.e., synthesis of pathways by dimension; for all or selected dimensions)
D. Develop generalised pathways to show how different situated substance use outcomes are produced (in line with the typology in Chapter 11) (i.e., synthesis of pathways by outcome; for all or selected outcomes)
E. Discuss selected pathways to illustrate different forms of interplay between latent dimensions for space construal and further factors identified in the transcripts
F. Explore differences between participants (e.g., by substance user profile) with regard to the above

During data analysis, all of these options were considered for inclusion in the thesis. As noted earlier, for example, a matrix to describe each factor (in line with option A) was prepared and partially completed during the qualitative content analysis. Ideally, all options would have been pursued; however, given the other analyses in this study (sections 7.2 to 7.4), this was not feasible. The last phase therefore meant reviewing these options to confirm the ultimate focus of the qualitative analysis. In light of the findings emerging from the other analyses, *option E* was selected, as it addressed an aspect not yet touched upon by the other analyses and it also allowed insights relating to the other options (albeit in less comprehensive ways).

7.5.4. Implementation of the analytic approach

While the previous section gave an overview of why and how the qualitative part of this study combined different approaches, this section provides further details on the procedures for the qualitative content analysis and preparation of network displays (the initial coding of interviews is only covered in the previous section). The analytical procedures – especially the data extraction – were refined during analysis. To keep this section concise, the descriptions focus on the final version of the procedures. As noted earlier, these steps were informed most by the guidance provided in Gläser and Laudel (2010), Saldaña (2013) and Miles et al. (2014).

Definition of relevant factors

A key question during the qualitative data analysis was how to identify relevant text segments in the transcripts. Given that the analysis sought to examine factors and mechanisms implicated in situational substance use, this was closely linked to a question about what factors and outcomes to consider.

A draft conceptual model was developed based on the literature review and refined, taking into account guidance and examples from Gläser and Laudel (2010: 77–90). On this basis, preliminary definitions and examples of independent and dependent variables were prepared. Importantly, these definitions were not limited to socio-spatial factors but considered *all* substance use-related factors mentioned by participants to allow an in-depth understanding of how different factors worked together to co-produce situated substance use outcomes. In line with the conceptual model (see section 4.2.4) and following on from Gläser and Laudel (2010: 78–82) as well as conceptualisations of moderators and mediators used in prevention science (e.g., Karazsia and Berlin, 2018), the preliminary definitions stated that:

- *independent* variables referred to *socio-spatial* factors (including but not limited to those formally elicited during the repertory grid interviews);
- *dependent* variables referred to any of study participants' *own* situated substance use-related outcomes (e.g., what substance used, how much);
- *mediating* variables were understood as those *events, actions, thoughts or feelings* which resulted from 'exposure' to a certain socio-spatial factor and contributed to a certain situated substance use outcome; they could therefore help understand *how* the independent variable affected the dependent variable;

- *antecedent and moderating* variables referred to *wider, non-socio-spatial* factors which, in this context, could be understood as the circumstances (e.g., “when”, “for whom”, Karazsia and Berlin, 2018: 12) under which the observed relationship between independent variables, mediators and dependent variables occurred and which might have therefore affected this relationship; in line with the theoretical model, antecedent and moderating variables could relate to individual or community/societal levels (e.g., biographical, cultural) and be of a more general nature (e.g., general preferences regarding places or people) or more specifically related to substance use (e.g., general substance use patterns, views and experiences relating to substance use).

Karazsia and Berlin (2018) suggest that mediating and moderating variables can be distinguished more easily by considering at what point in time they occur: moderators existed already *before* the independent variable, while mediators are affected by the independent variable and thus become relevant *after* the independent variable.

Thus, the approach integrated qualitatively and quantitatively oriented approaches to understanding relationships between phenomena. Although the reference to ‘variables’ above may suggest a quantitative perspective, Gläser and Laudel (2010: 78ff.) argue that the term can be usefully applied in qualitative research to conceptualise the role of complex phenomena in explanatory models. Similarly, although exploring causation and developing cause-and-effect models through qualitative research may be viewed critically by qualitative researchers (e.g., as simplistic, positivist and therefore antiquated) as well as quantitative researchers (e.g., as not sufficiently robust), qualitative data are key to understanding mechanisms (e.g., Gläser and Laudel, 2010: 69–73; Saldaña, 2013: 173–175; Miles et al., 2014: 222).

The initial definitions were developed further during the analysis to address emerging issues. To give one example encountered during the analysis, ‘setting’ (e.g., ‘*at home’*, ‘*friend’s house’*) was originally considered a socio-spatial factor (hence an independent variable). Working with the data showed, however, that information on the setting alone did not help to address the research question (i.e., how situated substance use outcomes are produced). ‘Setting’ was therefore reconceptualised as a substance use-related outcome in the sense of *where* substance use took place (hence a dependent variable) (thus setting appears multiple times in the final models shown in Chapters 12 and 13).

During the later elaboration of detailed pathways, the definitions were changed again. Socio-spatial aspects identified through elicitation (i.e., latent dimensions for space construal) were distinguished from socio-spatial arrangements (i.e., situation) and re-conceptualised as

mediators (cf. independent variable shown earlier). Also, the dependent variable finally included a broader range of outcomes.

Definition of relevant text segments

Text segments were defined in terms of content (e.g., specific topic or point addressed by study participant) and could thus vary in length (usually several paragraphs).

Segments were allocated to one of several categories, as illustrated in Table 18 below. Text segments 'for extraction' were those in which participants established a relationship between an independent, mediating or antecedent/moderating variable *and* a dependent variable (as defined above). These segments were identified by looking for references to substance use in combination with "cluing words and phrases" (Saldaña, 2013: 164)[438]. Saldaña (2013: 164) notes, however, that "analysts will also have to look for processes embedded within data narratives", as participants may not always arrange their narratives as easy-to-discern causal chains and may also leave out important details (ibid.). Therefore, additional segments that provided important details on identified independent, mediating or antecedent/moderating variables, or that described relationships between these variables (but not substance use), were also highlighted ('for context'). These segments were not analysed per se but were reviewed during the analysis when piecing together information about a pathway. Another group of text segments referred to substance use but contained such limited information that analysis would have relied mostly on speculation. These were categorised as containing 'not enough information'. Text segments outside of these three categories were disregarded as not relevant for this particular analysis. Further examples of coded segments are available from Appendix L.3.4.

In the present study, the identification of relevant text segments was a separate step prior to in-depth *analysis*, and thus the comments in the third column of Table 18 only illustrate why segments were allocated as shown. The examples also hint at the challenges encountered during analysis. To note one, the first example shows an instance where information was not explicitly stated by the participant but could – in line with Saldaña's guidance (2013: 164) – be plausibly inferred. Being over-inclusive at this stage ensured that no relevant segment would be missed during data extraction. Where such challenges were encountered, rules were set up for how to handle them (as suggested by Gläser and Laudel, 2010: 212).

[438] Saldaña (2013: 164) gives the following examples of such words and phrases: "because", "so", "therefore", "since", "if it wasn't for", "as a result of", "the reason is", "and that's why".

Table 18: Examples of judging relevance of text segments for the qualitative data analysis

Category	Examples from interview with IP14	Justification
For extraction	Interviewer: […] what would you say do you consume most often overall out of these [substances, and what is the reason for that]? Participant: Cigarettes […] why? Well … I have it at home, it's habit, it… reduces stress[439]	Contains information about an independent variable (availability of cigarettes at home); 'habit' and 'stress reduction' can be understood as moderators from which further independent variables can be plausibly inferred (e.g., stressful situation); dependent variables can be inferred (e.g., cigarette use at home, in stressful situations). Note also the occurrence of "why" as a cluing word, indicating a relationship between the mentioned aspects and cigarette use.
For context	I: […] And in the last three months, have you tried to smoke fewer cigarettes or to quit completely? P: Yes, I've tried to quit.[440]	Contains information about a potential moderating variable (intention to quit) but no information about situated substance use.
Not enough information	I: Ok.. erm, how is it here [in the shop] with the cigarettes? […] P: Now here, in the [shop] itself [I don't smoke] but afterwards by the park [I do].[441]	Contains information about situated substance use but no further explanations.
Not relevant for this analysis	P: […] when I'm running too late for the [library at one university], because it is all always very full [of students] there, then I go to the [other university], to the reading room, also to study […].[442]	Socio-spatial aspects are mentioned (e.g., 'always very full of students') and relationships are described (i.e., factors that result in going to another university), but the statement does not relate to substance use.

Consequently, the analysis focussed on retracing pathways to situational substance use (or abstinence) as narrated in the transcripts, either explicitly by participants or deducible from what they said. It was not relevant whether the pathways reflected established subjective theories that participants had held already prior to the interviews or were formulated on an ad hoc basis during the interviews, or if participants were aware that pathways could be inferred from what they said. The focus of the analysis was, however, generally on relationships with the dependent variable that were evident from *within the text*. This point is emphasised because it represented a key difference to Gläser and Laudel's approach[443].

[439] German original: „I: [...] was, würdest du sagen, konsumierst du insgesamt am öftesten davon [und was ist der Grund dafür]? B: Zigaretten [...] warum? Naja .. ich habe es zu Hause, es ist Gewohnheit, es... baut Stress ab".
[440] German original: „I: [...] Und hast du in den letzten drei Monaten versucht, weniger Zigaretten zu rauchen oder ganz damit aufzuhören? B: Ja, ich habe versucht, aufzuhören."
[441] German original: „I: Ok.... ahm wie ist es da mit den Zigaretten? [...] B: Jetzt da, im [Geschäft] selber nicht aber dann beim Park."
[442] German original: „B: […] wenn ich zu spät dran bin für die [Bibliothek an der einen Universität], weil da ist immer alles sehr voll, fahre ich dann [auf die andere Universität], zum Lesesaal, auch zum Lernen […]."
[443] Contrary to the present study, Gläser and Laudel (2010: 14) were less interested in how study participants construed events: their aim was to reconstruct how events occurred from a more objective point of view. Therefore, rather than limiting the analysis to causal chains reported in the transcripts, they suggest capturing *all* instances

Identifying factors within text segments

Once a text segment had been identified as relevant, the next task was to identify and label relevant factors within that segment. This involved several steps, which are illustrated over the following paragraphs using this example segment: "*Cigarettes […] why? Well … I have it at home, it's habit, it… reduces stress*" (IP14; from Table 18 above). Challenges are noted to help appreciate the analytic process.

First, the segment was read word by word to identify relevant pointers. In the above example, the three phrases "have it at home", "habit" and "reduces stress" pointed toward potential factors regarding (situated) use of cigarettes. Next, these words and phrases were allocated to the different types of variables. This helped establish their relevance for the analysis and gain clarity on what factors were present in the segment. To simplify this task, this was done based on content, distinguishing mainly between socio-spatial factors (independent variables) and any other factors (antecedent or moderating variables). For the purposes of this analysis, *socio-spatial factors* were understood as characteristics of micro-settings, whereas *other factors* were understood as characteristics of persons or meso-/macro-settings (e.g., culture).

The distinction between socio-spatial and other factors was not always straightforward. Uncertainties were resolved through reflection (e.g., comparison with theoretical model) and discussion (e.g., with the academic supervisor or second coder, described below). In the example, "*have it at home*" described a feature of a specific micro-setting (availability of cigarettes at home) and was therefore considered to refer to a socio-spatial factor (though a different interpretation is offered below). Initially, any factor that had a socio-spatial component was coded as a socio-spatial factor, but this approach was later revised. For example, "*habit*", also mentioned in the example, has a socio-spatial component, as habits are typically linked to specific socio-spatial arrangements. However, habit was finally classified as a characteristic of the *person* (rather than of those arrangements) and was therefore understood as a moderator (not a socio-spatial factor). Similarly, "*reduces stress*" was understood as a moderator in the present context (stress reduction as a perceived function of substance use).

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where factors are described (i.e., including what was categorised as 'for context' in the present study). In their examples, this information was used to produce descriptions of each case, whereby cases represented different outcomes (e.g., successful versus unsuccessful research cooperation). Relationships were then inferred by comparing factors across cases (e.g., how did the successful research cooperation case differ from the unsuccessful case) (Gläser and Laudel, 2010: 246-260). Consequently, Gläser and Laudel's approach establishes relationships not only based on the transcripts but also based on co-occurrence of factors and outcomes. In the present study, due to the high number of cases (296 formally elicited spaces) and the insights already offered through the quantitative comparison of spaces (Chapter 11), it was more meaningful to focus the qualitative analysis on mechanisms emerging from within the transcripts. Gläser and Laudel's approach was still applied where necessary. For example, in Pathway 3 (displayed in section 12.4), the mechanism relating to abstinence was inferred through comparison with the mechanisms relating to substance use as reported by the same participant.

In this case, the reference to 'stress' *also* highlighted a potential socio-spatial factor. The phrase was hence classified as referring to a socio-spatial *and* an 'other' factor.

Consequently, even though the three phrases in this example were mentioned together and could be part of the same pathway, they referred to different factors: two socio-spatial factors (availability of cigarettes at home; stress) and two moderators (habit; stress reduction as a perceived function of substance use). Because of their role as socio-spatial factors or moderators, all identified factors in this example were considered relevant for understanding *situated* cigarette use, even if the example segment referred to cigarette use *in general*.

These explanations also highlight that in order to categorise the phrases, the presumed factors had to be interpreted and labelled (i.e., construed by the study author). It was helpful to imagine where they might be placed in the conceptual model and what a corresponding causal chain or pathway might look like. The final step was to note these labels and initial thoughts on possible pathways. In some cases, the participants' words could be used directly (e.g., "habit") or paraphrased (e.g., "have it at home" became 'availability of cigarettes at home'). In other cases, more interpretation was required to highlight the underlying factor (e.g., "it reduces stress" became 'stress reduction as a perceived function of substance use'). At this point in the analysis, the study author had a sound knowledge of the interviews[444], and therefore the wider interview context informed the formulation and labelling of factors.

Balancing analysis of explicit and implicit contents of the text

The balancing between explicit (manifest) and implicit (latent) contents of the text (as evident above) was a recurrent topic of discussion and reflection throughout the qualitative data analysis, including during the identification of factors. At times, Gläser and Laudel (2010: 14, 217) appear to suggest a clear-cut distinction between the two levels, thereby implying that researchers can (or have to take) an either-or approach to analysis, while Froschauer and Lueger (2003: 89–91) acknowledge that approaches can also be situated between these two poles. In the present project, the boundaries between explicit and implicit contents often appeared to be blurred[445]. The study author sought to construe *factors* and *pathways* relating to *different situated substance use outcomes* based on participants' narratives, but as

[444] The identification of factors represented the fourth or fifth encounter with the interview, having been preceded by the study author participating in the interview, listening to the audio-recording twice (before and after transcription), and – for the interviews analysed later in the process – reading the transcript to identify relevant text segments.

[445] For example, putting study participants' words into context with what was said earlier or later in the interview tapped into implicit contents of the text, but this was often necessary to feel that participants' words had been appropriately understood. There were also instances where engagement with the text brought forth implicit contents that were relevant for the research question and could not simply be dismissed.

participants did not always utilise these concepts themselves, a move beyond the strictly explicit level was unavoidable.

Thus, even though the analysis did not specifically seek out implicit contents, refraining from making use of implicit contents would have greatly reduced the strength of the analysis. In agreement with the academic supervisor, and following Saldaña's (2013: 164) guidance, implicit contents of the text were admissible for the analysis if they could be plausibly inferred from the text (as in the "stress reduction" example above). In these cases, the inferred nature of observations was noted (e.g., by using double parentheses or question marks). Appendix L.3.4 shows examples of segments where implicit contents were considered during analysis.

Examining coding reliability for text segments and factors

The previous sections showed how relevant text segments and factors were identified from the transcripts. These definitions and procedures were based on theoretical considerations and practical experiences of working with the data, and they were tested and refined with a second coder. This section outlines this collaboration, with further details available in Appendix L.3.

The aim of this exercise was to check whether another person, when applying the same research focus, would identify the same text segments and factors as the study author. The exercise was undertaken not at the end of the analysis but after the 'initial coding' of the first four interviews (as described earlier). The benefit of this approach was that discrepancies could be discussed and thereby enrich the further data analysis (as suggested by Gläser and Laudel, 2010: 210; DeCuir-Gunby et al., 2011: 150; Bazeley, 2013: 150–152)[446].

Three interview transcripts were purposefully chosen. Following Ritchie and Spencer's (1994: 179) guidance on how to select sample material, transcripts represented a diversity of cases in terms of substance use patterns (i.e., substances used, frequency and quantity of use), data richness (i.e., interview duration, communicativeness of participants), interview functioning (i.e., many or few difficulties encountered by interviewer or interviewee), and discussion of prevention-related topics (e.g., personal strategies to reduce substance use). These aspects were considered to affect most strongly the number of relevant statements within a transcript and the ease with which these statements could be identified. Transcripts underwent a first round of anonymisation (e.g., removing direct identifiers) before being shared with the second coder. Characteristics of the three transcripts are shown in Appendix L.3.1.

[446] Statistical measures for interrater reliability are therefore not presented here. Relevant information is, however, available from Appendix L.3.

Appendix L.3.2 contains further details on how the exercise was prepared and implemented. Briefly, the second coder[447] was instructed to review the transcripts to identify relevant text segments; to indicate whether the segments referred to socio-spatial and/or other factors; and to label any identified factors. Labels could be *in vivo* codes (i.e., quotations from the transcript), paraphrases or conceptual (e.g., referring to the draft framework used during the content analysis of constructs; Table 12, p. 249). Thus, in this context, the identification of text segments and factors was framed as a coding activity. The two coders coded the three transcripts independently of each other. The study author used MaxQDA, whereas the second coder used a bespoke MS Excel template (shown in Appendix L.3.2). Results were compared and discussed once after the first transcript to ensure a shared understanding of the task, and then again at the end of the exercise. To compare results, the two coded transcripts for each interview were re-arranged so that corresponding text segments lay side by side, allowing a direct comparison of the codes assigned by the two coders. Coding discrepancies were highlighted, and all discrepancies were individually inspected by the study author. Selected examples were discussed with the second coder to understand better why they had occurred and how they could be resolved.

The review of coded transcripts focussed on areas of correspondence and discrepancy[448] with respect to i) what text segments were considered relevant; ii) what factors of substance use were identified, if any; and iii) the classification of factors as socio-spatial or other factors.

With regard to the first point, the key questions were whether the study author had missed any relevant text segments or included text segments that others would consider irrelevant. Across the three interviews, there were only eight text segments that had been highlighted by the second coder *but not* the study author (out of 100 text segments considered relevant by the second coder; see Appendix L.3.3 for data tables). Conversely, there were 20 text segments that had been highlighted by the study author *but not* the second coder, but this included segments marked as ‘for context’. Discussing a sample of these segments with the second coder during follow-up confirmed that their inclusion by the study author was justifiable. These findings suggested that the study author adequately identified text segments that would also

[447] The second coder knew the project well, as she had already contributed to the analysis of elicited constructs and elicited spaces (as outlined in sections 7.2 and 7.3 above) and had also transcribed several interviews (including one selected for the coding reliability exercise).
[448] Terms such as “agreement” and “disagreement” (often used in literature on coding reliability, see DeCuir-Gunby et al. (2011: 149–150) for examples) are purposefully avoided here because the follow-up conversation with the second coder showed that agreement could be easily reached, once coders had an opportunity to explain their rationale behind a certain decision.

be considered relevant by other persons familiar with the research objectives. Appendix L.3.4 shows examples of text segments included by one coder but not the other.

With regard to the second point, the labels assigned by both coders were used as proxies to judge whether the two coders had 'seen' the same factors in the text. Counter to what might be expected, this showed that even though there was agreement on the text segments, the two coders often identified different factors within these segments. Due to the high number of segments and factors, this was difficult to quantify across the three interviews. However, a qualitative review found that where the identified factors differed, they often complemented each other rather than being in conflict: for example, one coder referred to explicit contents to construe a factor (e.g., 'with every meal'), while the other coder went a step further to tap into possible implicit contents (e.g., 'habit'). This prompted the study author to consider more strongly the relationship between explicit and implicit contents and to discuss the appropriate level of interpretation with the academic supervisor. Appendix L.3.4 includes examples from the coded transcripts to highlight how different levels of interpretation affected the coding.

Although factors as identified by the two coders were not generally in conflict, there were instances where one coder had identified factors which had not been touched upon at all by the other coder. For example, the second coder frequently identified a factor called 'personal preference' which had not until then been considered by the study author as a potential moderator. This led to the identification of additional factors and the development of a checklist approach to identify factors more comprehensively and systematically in the text.

With regard to the third point on the classification of factors as 'socio-spatial' or 'other', the comparison of coded transcripts showed that even if the same factor had been identified (i.e., similar labels assigned by the two coders), it was not always classed in the same way. Some discrepancies could be disregarded on the basis that the second coder reported difficulties with the allocation and agreement was reached quickly through discussion. However, some discrepancies highlighted that factors could indeed relate to either category (also the earlier examples of 'availability of cigarettes in the home' and 'habit'[449]). The coding reliability exercise

[449] The previous section mentioned 'availability of cigarettes in the home' as a socio-spatial factor. However, involving the second coder showed that this could also be viewed as a characteristic of the person, as the person ensures this availability of cigarettes in the home. Another factor mentioned earlier was 'habit'. The second coder considered this to be a personal attribute and therefore an 'other' (i.e., not socio-spatial) factor. The study author, however, had at this stage classified it as 'socio-spatial', given that many habits described by participants referred to actions embedded within specific times and places. Another factor identified by both coders was 'a sense of responsibility'. The study author had considered this to be a socio-spatial factor insofar that a particular situation called for a responsible action. Yet, the second coder considered it to be an 'other' factor, as it could reflect personal attributes unrelated to particular spaces.

thus prompted the study author to review the definitions of variables and factors and to acknowledge that factors could have socio-spatial and non-socio-spatial components.

In summary, the review showed that there was a high level of agreement between the two coders with regard to which segments were relevant to the analysis, though there was less agreement on what factors for substance use were contained within those segments.

These findings informed the further analysis of interviews in several ways. Insights obtained through the coding reliability exercise helped to identify areas that required further clarification, such as variable definitions and the desired level of interpretation. These issues had already been considered before, and the review of discrepancies and the discussions with the second coder supported further work on them.

In addition, the coding strategy was expanded to incorporate the second coder's perspective. Although it could be argued that the second coder's perspective was as idiosyncratic as the study author's and that others might have identified yet other relevant segments and factors, combining both coders' perspectives made optimal use of the insights gained from this exercise. Factor labels already developed by the study author were updated to incorporate the label provided by the second coder, where it added a useful perspective. For the three transcripts included in this exercise, the coding in MaxQDA was updated to include relevant segments and factors that had been identified by the second coder but missed by the study author. The question arose how to ensure that this expansion of perspective would be reflected in the remaining interviews without enlisting the second coder's help for all transcripts. To resolve this, factors that had been missed by the study author were discussed with the academic supervisor and noted in a separate document. The study author then returned to the first three interviews (coded during initial coding but not included in coding reliability exercise) to review and update the codings accordingly. For the remaining interviews, a printed version of this sheet served as a reminder of the second coder's perspective during the identification of segments. During data extraction (described below), the factors were included in the data extraction table and were thereby considered by default.

Review and prioritisation of interviews

Through the initial coding and the above coding reliability exercise, six interviews (25% of 24) were reviewed with regard to relevant text segments and factors. These interviews were then submitted to a formal content analysis using a data extraction table. Given the focus on a limited number of individual pathways for the final analysis (as outlined in section 7.5.3), it would have been possible to stop the data extraction at this point and to select pathways from

the six interviews already analysed. However, data-richer interviews (e.g., where participants were more communicative) also allowed the formulation of richer pathways (e.g., greater number of well-described factors, better insights into mediators and moderators). It was therefore decided to identify and include other data-rich interviews in the analysis before moving on to the selection of pathways.

First, the 18 remaining interviews were coded using MaxQDA 2018 software. This was similar to the initial coding described in section 7.5.3. However, now, a narrower set of codes was used to reflect the final analytic scope (shown in Appendix L.1). They included the qualitative data analysis codes described earlier ('for extraction', 'for context', 'not enough information') as well as codes to inform the description of participants, methodological observations and discussion. An additional code ('key statements') was used for statements that appeared to 'sum up' an interview or the participant's general narrative, regardless of whether this was related to substance use. For the qualitative data analysis, this coding step focussed entirely on the identification of relevant text segments (cf. analysis of those segments). Consequently, this intermediary step helped to select further material for analysis, and it was also the first step of data extraction described by Gläser and Laudel (2010: 212), as described below.

After coding, a summary overview was prepared to aid with the prioritisation of interviews. The bespoke table, with one table row for each of the 24 interviews, consisted of four parts. The *first part* presented key information regarding each interview from the post-interview protocols (e.g., noteworthy aspects, preliminary conclusions, emerging questions). The *second part* contained the preliminary assessments that had been prepared when selecting interviews for the earlier coding reliability exercise. The *third part* was prepared after each interview had been coded as described above. It included columns to describe any unique aspects of the interview and provide reasons why it should be included or excluded from further analysis, thus making the selection process transparent. In addition, each interview was rated from 1 to 3 depending on: i) how detailed and vivid the participant's explanations were, and ii) whether it contained additional socio-spatial factors not mentioned by other participants. The latter ensured that interviews selected for further analysis represented a diversity of perspectives that would allow exploring of a range of socio-spatial factors. The *fourth* part was prepared once *all* interviews had been coded and assessed. Based on the available information, the interviews were ranked in terms of their relevance for analysis, and the table was sorted to reflect this rank order. The order was reviewed by comparing interviews on a pairwise basis, always ensuring that the more relevant one was indeed ranked higher. This resulted in five interviews being ranked as 'essential'. Two of these had already been reviewed during the coding reliability exercise (which had purposefully included data-rich interviews). This left three essential interviews to

be added to the existing analysis of six interviews, resulting in the inclusion of *nine interviews (38% of 24) in the data extraction*. Appendix L.2 summarises the prioritisation of interviews.

As a consequence of this prioritisation, participants with heavier or more complex substance use patterns who were good at imagining situations, who were willing and able to reflect on socio-spatial characteristics of their own substance use and verbalise their thoughts and emotions on this topic were more likely to be included in the data extraction, while participants who were less communicative or who did not focus on socio-spatial characteristics of their own substance use during the interview were less likely to be included. Also, preference was given to interviews presenting complex pathways highlighting socio-spatial factors in relation to substance use, while interviews presenting (seemingly) simple pathways or pathways focussed on other (non-socio-spatial) factors were de-prioritised. Although this introduced a bias into the analysis, this kind of prioritisation was most congruent with the final aims of this analysis as well as the recommendation in the qualitative research literature to choose good informants and "information-rich cases" (Patton, 1990: 181, also e.g., Rubin and Rubin, 1995: 66). Nevertheless, because four interviews were reviewed *before* the prioritisation, the final sample represented a greater variety of substance use patterns and pathways. This is evidenced in Appendix M.8, which shows that the subsequent data extraction included three 'lighter' users and six 'heavier' users (in line with the group definitions shown in section 5.1.2). In terms of smoking status, there were four (de facto) non-smokers and five smokers, of whom two were occasional and three were daily smokers, and for alcohol, this subsample spanned the full range from the lightest to the heaviest drinker in the sample.

Data extraction

Nine interviews (38% of 24) were included in the data extraction: six were reviewed during the initial coding and the coding reliability exercise, and a further three were selected following a review of all interviews, as described above. As noted in section 7.5.3, the procedures for data extraction were based on Gläser and Laudel's (2010) approach and revised over the course of the analysis to better meet the specific needs of the present study. This section focuses on the final version of the procedures.

The data extraction was carried out using a bespoke data extraction table, set up in Microsoft Excel. Appendix L.4 gives an overview of the table's final version to show what information was extracted. Five sections could be distinguished. *Section A* showed information exported from MaxQDA software, such as relevant segments from interview transcripts and related preliminary notes. *Section B* was used to record basic information that would help reflect on the possible scope and applicability of statements, such as what substances, settings or

activities participants referred to. The pull-down menu options were developed based on the analysis of elicited spaces and constructs (as per sections 7.2 and 7.3) and expanded during the extraction to accommodate new details. In *Section C*, the causal chain or pathway[450] including its endpoint were described in detail. *Section D* was for additional notes by the study author, such as open questions and apparent contradictions in the data. Additional text segments that were used to build the causal chain or pathway were also added here. Finally, *Section E* contained columns to help describe each factor identified during the analysis.[451] An initial list of factors was developed based on the analysis of elicited constructs, and this was edited and expanded as new factors were identified during the analysis. Written extraction rules were formulated to guide the completion of the table where necessary (e.g., to standardise operators and symbols used in pathways).

The data extraction procedure itself can be summarised as follows:

- For the selected interviews, all segments coded earlier in the MaxQDA software as 'for analysis', 'for context', 'not enough information' and 'unsure/caution needed'[452] were exported into Microsoft Excel and copied into Section A of the data extraction table.

- Within the interviews, the segments were sorted by pathway[453]. To do so, the text segments coded as 'for analysis' were first sorted by the substance they referred to (e.g., alcohol, cigarettes). Each segment was then re-read and assigned a provisional pathway label, usually referring to setting (e.g., 'smoking at university'), people (e.g., 'drinking beer with friends') or other conspicuous factors (e.g., 'smoking and stress'). Segments relating to the same or similar pathways were then grouped together[454]. Segments coded as 'for context', 'not enough information' or 'unsure/caution needed' were also reviewed and, if appropriate,

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[450] A "causal chain" is "a researcher-constructed *linear* display of events, actions, and/or states that suggests a plausible sequence of causes and effects" (Miles et al., 2014: 235, emphasis added). "Network pathways" (also: "network models", "causal networks", "causation networks") build upon and interweave such chains and are thus more complex and not necessarily linear (Miles et al., 2014: 236–240).

[451] Initially, the data extraction table was set up so that each factor identified in a segment was entered in a new row (this corresponded with Gläser and Laudel's approach). This meant that different factors were captured in the same column and that related information was spread across many rows. Later on, the data extraction table was therefore revised to have a dedicated column for each factor (with a new column added to the table whenever a new factor was identified; resulting in 100 columns by the end of the analysis). The revised layout greatly increased the ease with which information could be entered and retrieved. Earlier versions of the data extraction table included additional sections and fields that sought to describe the relationship between individual factors and the pathways they belonged to, but these fields became obsolete once the data extraction shifted from one factor per row to entire pathways per row.

[452] This was an additional code introduced during the analysis, similar to 'for context'.

[453] As noted in section 7.5.3, organising the data by pathway (rather than by text segment or factor) was found to offer the best option for analysis.

[454] Though some pathways were based on a single text segment, most pathways pulled together information from multiple text segments. These were sometimes only a few minutes apart, and sometimes from different parts of the interview. The highest number of segments used to build a pathway in the current analysis was 14 segments.

added to the existing segment groups. Any remaining segments were placed at the bottom of the table to be checked again later.

- Next, all segments representing the same pathway (or similar pathways) were reviewed and merged into a single row: this was the key analytic step. The first interview excerpt in the group was re-read to *identify socio-spatial and other factors and to arrange them in a probable chronological order,* with findings noted in the comments field of Section A in the data extraction table. Any additional segments and corresponding notes for the same pathway were then also re-read, and the notes in the *first* row were continuously developed further to incorporate all information. Through this process, causal chains could be built and developed into more complex pathways, as suggested by Miles et al. (2014: 234–253). Questions and further observations regarding the data were also noted. All additional text segments were copied into Section D of the *first* row in the group and the other, now-redundant rows deleted. As a result of this, all information belonging to the pathway was contained in a single row (including the interview excerpts, thus retaining the link between original data and analysis).

- The study author then went through all fields in the table to add relevant information about the pathway (e.g., describing the factors), drawing upon the (merged and revised) notes from Section A. When the analysis was completed for one pathway, the segments representing the next pathway were analysed, and so on.

- Finally, any segments at the end of the table that could not be allocated previously were reviewed again and added to the analysis if possible.

Through this approach, data could be systematically extracted on pathways present in the interviews as well as on the various factors making up these pathways.

To conclude the analysis of a single interview, case notes were prepared before moving on to the next interview. These were intended to support a description of the subsample as well as further work with the data. They summarised the overall interview narrative, key characteristics of the participant, noteworthy aspects of the interview, and factors related to the participant's substance use.

Selection and visualisation of pathways

The final focus of the analysis was on examining the interplay among socio-spatial aspects and other pathway elements. Visualisation through causal network displays (Miles et al., 2014: 111, 236; also recommended by Saldaña, 2013: 174, as a follow-up technique to causation

coding) offered a suitable format to illustrate the pathways extracted earlier and thus support this analysis. The term “networks” reflects that “categories interact and interplay in complex pathways to suggest interrelationship“ (Saldaña, 2013: 252). However, the data extraction identified several dozen[455] pathways and it was neither feasible to visualise them all individually, nor was it desirable to visualise them all in a single, aggregated display[456].

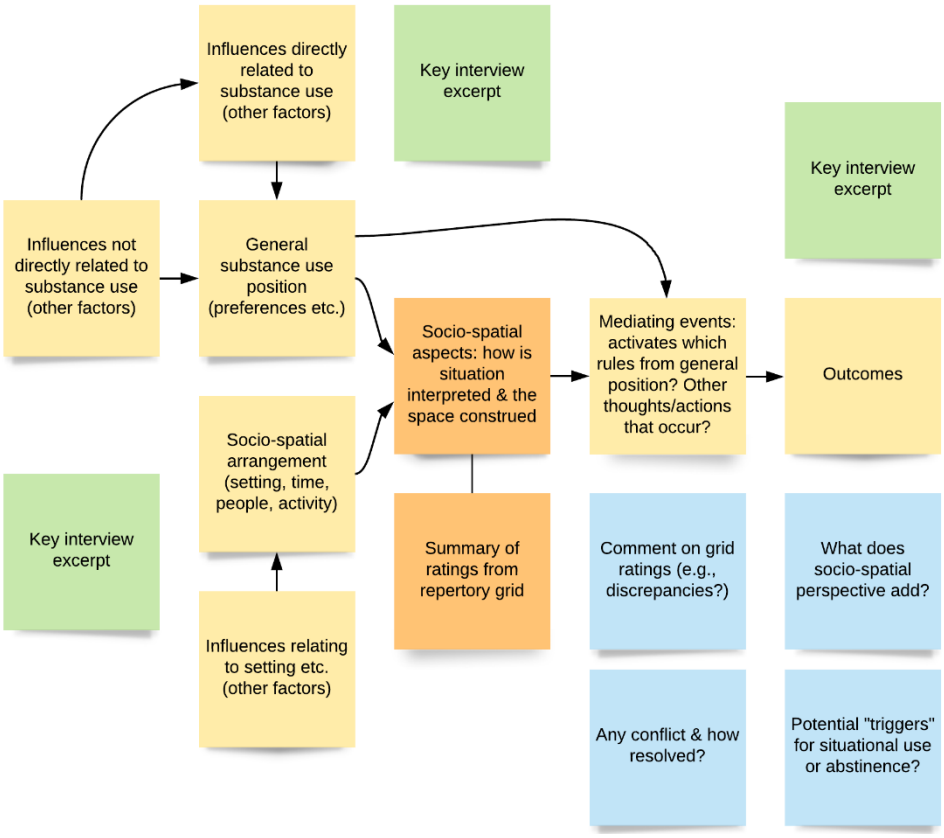
The first task was therefore to select a smaller number of pathways that could serve as ‘case studies’ and illustrate different forms of interplay among socio-spatial aspects and other pathway elements. To do so, the nine cases included in the data extraction were reviewed, first by case and then across cases, to identify the most suitable and interesting pathways. Decisions about what constituted the ‘most suitable and interesting’ pathways were guided by the study author’s intuition and generally included those which had been a key focus of interviews (and were thus well described), represented recurring themes across interviews, or aligned particularly well with research interests (e.g., pathways representing apparent conflicts). A matrix was then prepared to group these pathways on selected characteristics (e.g., setting and situated substance use pattern as per Chapters 9 and 11, prominent socio-spatial and other factors, mediators, apparent conflicts between factors). The final selection of 17 pathways (subsequently re-conceptualised as ‘streams’ and integrated into seven broader pathways) was chosen to reflect variety on these characteristics to illustrate and explore different scenarios (similar to the “maximum variation sampling” approach described by Patton, 1990: 172, also e.g., Rubin and Rubin, 1995: 66ff.), even if, due to resource limitations, it was not possible to address the full range of scenarios[457].

The second task was to identify an appropriate visualisation tool and format. Examples of network displays, logic models and similar diagrams (e.g., Saldaña, 2013: 172, 203; Miles et al., 2014: 111, 210, 244; Yin, 2018: 186ff.) were used as templates to develop the overall format and details regarding layouting (the final displays are shown in section 12.4). Draft diagrams were created using different software packages[458] and shared for feedback with the academic supervisor and fellow students. The study author subsequently developed a bespoke template in Lucidchart (www.lucidchart.com) (see Figure 11 below). This identified major pathway elements in line with the ex-ante conceptual model as described in section

[455] It is not appropriate to give an exact number because pathways were often interconnected and could have thus been arranged in several different ways, each of which would have resulted in a different total number of pathways.
[456] Miles et al. (2014: 253) also advise that analyses across many cases should be described rather than visualised.
[457] Consequently, most information produced during data extraction could not be included in the results presentation. Extracting information on a greater number of pathways than could be visualised was nevertheless an essential intermediary step, as it allowed better informed decisions regarding the choice of pathways for visualisation.
[458] Microsoft PowerPoint, MAXMaps (MAXQDA’s inbuilt visualisation tool) and Lucidchart (a web-based application for drawing diagrams)

4.2.4, enhanced with insights gleaned during previous analytic steps. Factors were to be grouped according to the pathway elements, which was a way of developing "categories of categories", as suggested by Saldaña (2013: 250).

Figure 11: Background diagram as preparatory step toward final pathway displays



Source: Author's own, created in Lucidchart.

The pathways were then visualised and described. It was decided to display up to three similar pathways (subsequently re-conceptualised as 'streams') together to deepen the analysis (similar to "stacking comparable cases", Miles et al., 2014: 103). Each display started with the same background diagram (Figure 11) which emulated the process of arranging sticky notes on a pinboard as suggested by Miles et al. (2014: 209). Here, all information on the relevant streams from the data extraction table was collated and allocated to the major pathway elements (yellow and orange boxes in Figure 11). In case of gaps or discrepancies, the original interview transcript was checked again for clarification. The information was then compared across the streams to *identify similarities and differences* within each pathway. For further validation, key interview excerpts were added (green boxes) as well as summaries of the repertory grid data. Additional prompts were prepared to stimulate analytical reflection (blue boxes in Figure 11). Only then was the actual display drawn by manually inserting and arranging boxes, text, lines and arrows from scratch. This approach ensured that all pathways were *comparable* (using the same overall structure and elements) and aligned to the ex-ante

conceptual model, while each display was *tailored* to the specific circumstances of the interviews it represented[459]. Supplementing the displays with written descriptions offered a chance to guide the reader through the displays as well as highlight unique aspects of each pathway and provide further details, including interview excerpts. Writing the description was also an analytical step, as it prompted further dialogue with the data and revision of the displays. The final displays and descriptions are shown in section 12.4.

Efforts were made throughout to ensure that the displays and accompanying descriptions accurately mirrored the participant's representation of the spaces and pathways. In the displays, information was generally only included if it was explicitly supported by the data (e.g., interview transcript). An exception to this rule was the identification and positioning of socio-spatial aspects, which often had to be inferred by the study author based on how participants had described the spaces overall. Additional hypotheses formulated by the study author were either presented in the accompanying descriptions (if they were supported by the data but it was not clear whether the participant would agree with this interpretation) or they were not presented at all (if they relied primarily on speculation[460]). Displays and accompanying descriptions were finally read from the assumed perspective of the participants to identify and improve areas that did not yet fully reflect the interviews or required further anonymisation[461].

7.5.5. Use of qualitative data to contextualise quantitative findings

While the interview transcripts informed Chapter 12, they were also used to contextualise the quantitative findings in Chapter 11, which presents and compares different patterns of situated substance use, based on 273 spaces elicited from the 24 study participants. While quantitative data (in the form of grid ratings, see section 7.4) were systematically collected for all of these spaces, additional qualitative descriptions were also available in the transcripts[462]. This section outlines how excerpts were selected to enrich the quantitative with the qualitative data.

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[459] For example, the background diagram included a set of arrows to indicate the general flow of direction and influences, but these arrows were revised to reflect each pathway as appropriate.
[460] For example, a possible interpretation of Pathway 4 (section 12.4) could be that substance use presented an opportunity to perform cultural identity, or a possible interpretation of Pathway 6 could have focussed on gender aspects. However, there were no explicit statements by participants to support such interpretations and thus they were disregarded in the present analysis (although they might have been included for a different analytic approach).
[461] Due to the significant time gap between the original interviews and the preparation of pathways (two to three years), it was not appropriate to send the pathways to study participants to check for accuracy, as by this point any feedback would have inevitably also reflected study participants' own reinterpretations of their past.
[462] During the repertory grid interviews, descriptions of the elicited spaces were not collected systematically for all elicited spaces, but were nevertheless generated as a 'by-product' of the interview, specifically in the following contexts: i) study participants thinking aloud (e.g., whilst preparing their map of everyday spaces or deciding on a grid rating) ; ii) interviewer asking for clarification (e.g., to better understand the participant's map or a grid rating); and iii) study participants discussing spaces included in a triad during the construct elicitation.

First, Chapter 11 presents information on what settings and 'typical situations' (as imagined by participants) the various patterns of situated substance use were associated with. For each pattern, a list of all the corresponding elicited spaces was reviewed to describe the 'typical situations' that participants had thought of. Interview excerpts are included to give concrete examples and make the descriptions of patterns more vivid and engaging. To select interview excerpts, the list of elicited spaces corresponding to a particular pattern was consulted to identify those spaces which were representative of the participants as a group as well as those which illustrated unusual and potentially unexpected spaces. The corresponding interview transcripts were then reviewed, using the labels assigned to the spaces during the interview as search terms (e.g., "bedroom"), and relevant text passages (e.g., describing the 'typical situation' imagined for a space) were copied into a new file. The final passages were then selected based on, for example, which excerpts would be easiest to understand for readers without further knowledge of the interview.

Second, qualitative data were used to offer possible explanations and further details regarding the quantitative findings. This emerged as part of the writing process, whereby the study author would add qualitative data (either summarised/paraphrased or in the form of original excerpts) on an ad-hoc basis whilst writing up the quantitative findings. Due to space restrictions, this was not done for every quantitative finding but was limited to: i) instances where the study author knew that a participant had offered a notable comment related to this finding; or ii) instances where a quantitative finding was particularly intriguing, in which case the transcripts were searched for further information.

Third, while the previous two paragraphs showed how use of the qualitative data was guided by the general structure of Chapter 11 and selected quantitative findings, the qualitative data also shaped the description of situated substance use patterns in unexpected ways. When reviewing the transcripts as outlined above, additional insights emerged. An example of this was the observation that participants did not always *talk about* spirits or mixed drinks when describing spaces featuring spirits or mixed drinks use, indicating that spaces may feature substance use but not be construed as such by substance users. Such insights were also reported in the chapter to enrich the pattern descriptions, even if they did not directly relate to the quantitative data.

Consequently, even though the qualitative data were not formally analysed for Chapter 11, the rudimental analyses above helped to identify possible explanations for quantitative findings as well as additional issues and themes relevant to the study and participants. Through this approach, *all* 24 interview transcripts could be considered in the overall analysis, even if the formal analysis described in section 7.5.4 was limited to a subsample of nine interviews.

8. Ethical considerations

8.1. Institutional ethics approval

The present study was approved by the Ethics Committee of the University of Vienna on 16th January 2017 (reference number 00213)[463]. As it was not mandatory to obtain institutional ethics approval at the University of Vienna, the project was submitted for review on a voluntary basis (as explained in section 1.2.5). The Ethics Committee agreed to approve the research under three conditions which can be summarised as follows:

1. Limiting the research to legal substances only (the original proposal included cannabis as one of the substances of interest)

2. Providing a justification for excluding male students from study participation

3. Storing non-anonymised electronic materials on the university server only (instead of on a password-protected personal laptop or external hard-drive)

Regarding the first point, the Committee stated that, within the Austrian legal context, research into the use of illegal substances was considered too risky for the study author and for the participants, especially as the university could not offer any institutional support in case of problems. The Committee was also concerned that discussions of illegal substances might have prompted participants to disclose an intention to commit a punishable offence, which would have created a legal obligation to stop them from committing that offence.

Although the voluntary nature of the submission for ethical review meant that the research could have been carried out as originally planned without the approval of the Ethics Committee, it was deemed more important to conduct a project that raised no concerns by the Ethics Committee than to adhere to the original study protocol.

The first point was consequently resolved by amending the study design (e.g., eligibility criteria, recruitment materials) to exclude users of illegal substances from study participation. An instruction to participants to focus on the past and not talk about the future during the interviews was also included. The second point was resolved by providing a more detailed explanation regarding the eligibility criteria (see section 5.3). The third point was resolved by agreeing to

[463] The pilot study (see section 1.2.6) was approved by Liverpool John Moores University Research Ethics Committee (REC) on 29th September 2010 (reference number 10/HEA/131).

ordinarily store electronic files on a password-protected personal drive within the university IT system, and that files kept on a personal password-protected laptop or an external hard-drive would contain no identifying information.

The next sections describe measures taken during data collection and analysis to ensure an ethical approach. Some measures might appear overly cautious, given that the study population was limited to legal substances. At the time of receiving the decision of the Ethics Committee, the materials and measures had already been prepared with users of illegal substances in mind. It was decided to keep most measures in place and let participants benefit from a higher level of protection than they might have otherwise been afforded as users of legal substances. This turned out to be beneficial, as some participants were concerned about family members or partners finding out about their (legal) substance use.

8.2. Identification of potential ethical issues and solutions

This study was designed with the express intent to follow good practice guidance regarding research ethics (as described in section 1.2.5). This section describes how potential ethical issues were identified, while section 8.3 documents how they were addressed in practice.

8.2.1. Guidance documents and guiding principles

Table 19: Example of how ethics guidance was applied to the present study

Example ethical issue	"Setting a date and place" (Decorte, 2000: 286)
Description of the issue	In a study on cocaine use, Decorte (2000: 286) describes a situation where the researcher calls the study participant to arrange a date and place for the interview, but a housemate or family member picks up the phone instead. As it cannot be assumed that household members know about the participant's cocaine use, it is essential that they do not find out about the topic of the research.
Applicable to present study?	Yes. Interviews will be arranged in person, by email, text message or over the phone. It is possible that other people overhear the conversation, access the email account or pick up the phone call.
Possible solutions discussed in literature	Decorte (2000: 286) notes: "If they wanted to know what our call was about, it was essential to be discreet". Study participants could also be given the possibility to contact the researchers instead of being contacted (ibid.).
Possible solutions for present study	• When presenting the study, emphasise the 'everyday spaces' rather than the 'substance use' aspects. • Offer participants the option to initiate contact rather than for them to be contacted.

Note. This is an edited excerpt from the study author's research diary.

Guidance on research ethics was consulted, including resources specific to drug research (e.g., Decorte, 2000; Fry and Hall, 2004; Miller et al., 2010) and on research ethics in general

(e.g., Häder, 2009; Gläser and Laudel, 2010: 48–57; Jensen, 2012; Consortium of European Social Science Data Archives, 2015a), research articles (e.g., Peter and Strazzari, 2016) and relevant legislation (e.g., data protection laws). Consideration was given to how the issues outlined in these documents applied to the present study. Table 19 exemplifies this process.

The literature (e.g., Fry and Hall, 2004; Miller et al., 2010) referred to four guiding principles (Beauchamp and Childress, 2001) to support discussions of ethical questions in drug research. The implications of these principles for protecting individuals and institutions participating in the present study were considered as documented below.

Autonomy

This principle addresses potential study participants' freedom of choice (e.g., whether to take part in research or not). The literature discussed questions around prospective participants' ability to freely give informed consent to take part, especially in studies with children or dependent drug users (Fry and Hall, 2004; Miller et al., 2010). This was not an issue in the present study, as participants were not under 18 years old, mentally impaired, drug dependent, or societally marginalised. However, the literature also discussed the potential coercive effect of offering financial compensation for study participation, which was identified as a potential issue for the present study (further discussed in section 8.3.6).

No issues were identified concerning the right to autonomy of the participating university, as the university approved the study during the institutional ethics review and was also represented by the academic supervisor who was involved in all major decisions.

Non-maleficence

This principle addresses potential harms resulting from study participation. In drug research, major risks stem from the fact that behaviours of interest are often illegal or stigmatised (Decorte, 2000: 289; Fry and Hall, 2004: 4, 15-16). Fry and Hall (2004: 4) explain as follows:

> The principal potential harm from epidemiological research on drug use exists from the possibility that sensitive information on drug use and other illegal and stigmatized behaviour could become known to a third party, who could use it to the detriment of the study participant, that is, it may lead to their being discriminated against or, in some circumstances, to criminal prosecution. Participants in epidemiological research need to be protected from such an outcome.

This was relevant for the present study, especially in its original form including users of illegal substances. Part of this issue was addressed in the process of obtaining institutional ethics

approval by limiting the study to legal substances. But users of illegal substances could still sign up to the study, and study participants could unexpectedly disclose use of illegal substances during the interviews. In addition, users of *legal* substances can also experience harms if their substance use becomes known to others. Indeed, several participants were very worried about their parents or partners finding out about their cigarette use.

As regards other harms discussed in the literature, no issues were identified for the present study[464]. The pilot study only suggested that the interviews might be too long and therefore exhausting, and the interview procedures were revised accordingly.

For the participating university, the main risks related to potential reputational damage. For example, people could wrongly assume that the university commissioned the study and that this reflected a particular stance for or against substance use, or that the study was carried out at this university because there was a substance use related problem. It was also possible that study findings would present the university in unfavourable ways. Consideration was also given to how the study might affect the university's student population more generally. For example, study findings reporting excessive alcohol use on university premises could contribute to an increase in the use of restrictive and punitive measures (e.g., increased surveillance, 'zero tolerance' policy). This highlighted the importance of careful framing regarding the results and the participating university in project outputs.

Beneficence

This principle addresses the benefits of study participation, also in relation to potential costs. Although rewards are often considered to be financial, Leeuw and Hox (2008b) give examples of non-monetary rewards that study participants may experience, such as being able to do something fun or interesting, to feel special or important, to help someone or to learn something about oneself. Indeed, non-monetary rewards were experienced in the present study, as participants reported taking part because they wanted to help a fellow student, found the topic interesting, or wished to reflect on their substance use. However, as it could not be assumed that all participants would experience or be interested in such benefits, offering other compensation was also considered important.

For target institutions, offering anonymised feedback is commonly used as an incentive to obtain institutional support, for example, in research with schools (Leeuw and Hox, 2008b:

[464] The methods were not physically invasive (e.g., no blood samples taken) and were unlikely to be emotionally upsetting (e.g., no focus on traumatic events). No emotional distress was reported during the pilot study.

260). Similarly, in the present study, the main potential benefit for the participating university lay in the availability of data (e.g., on how the university is perceived) that could inform its own future activities. If such activities included, for example, the development or improvement of services to support student well-being, then the wider student population could also benefit from the present study.

Distributive justice

This principle is most relevant to cases where experiments are carried out on vulnerable populations but benefit privileged populations (Fry and Hall, 2004: 7). In the present study, no corresponding issue was identified, as interviews were carried out with non-vulnerable populations in the hope that study findings would eventually benefit vulnerable populations.

8.2.2. Exercising reflexivity

Section 1.2.5 described various strategies to support reflexivity in the present project. This was especially useful for identifying and addressing ethical questions. For example, participation in doctoral student groups included discussions of how consent was obtained in practice or how the (at the time newly introduced) EU General Data Protection Regulation (GDPR) affected research activities. This led to revisions in the project (e.g., regarding the contract for transcribers). Exercises in a research diary also helped to identify potential ethical issues and solutions. Three such exercises are described below to illustrate this.

Example exercise 1: Overview of material generated through the fieldwork

Through the fieldwork, diverse data and materials were generated, in different formats (hard-copy, electronic, online) and with differing sensitivity (e.g., potentially identifying information, other sensitive information). A key exercise before the fieldwork was therefore to anticipate all the materials that would be generated for each participant, along with their format and level of sensitivity. Table 20 shows an edited version of the original table, updated in line with how the fieldwork actually proceeded (e.g., omitting elements that were not realised). This overview helped to identify areas that required special attention (e.g., to separate materials containing identifying information from other materials).

Table 20: Materials generated during fieldwork

Material per study participant	Research stage		Default format			Sensitivity	
	Screening	Interview	Hard-copy[a]	Electronic[b]	Online[c]	Potentially identifying	Potentially other sensitive
Sign-up form (including consent)	✓		*	✓	✓	✓	
Screening questionnaire	✓		*	✓	✓		✓
Consent form for interview		✓	✓	#			
Confirmation of voucher receipt		✓	✓	#			
Additional in-person questionnaire		✓	✓	#		✓	✓
Map		✓	✓	#		✓	✓
Repertory grids with supplied and elicited constructs		✓	✓	#		✓	✓
Rep grid with supplied element		✓	✓	#			
Construct ranking sheet		✓	✓	#			
Recording and transcript		✓		✓		✓	✓
Post-interview notes and documentation		✓	✓	✓		✓	✓

[a] * Sign-up forms and screening questionnaires were offered in hard-copy but were all completed online in practice.
[b] # Collected in hard-copy and then digitalised for further use.
[c] Limited to online data collection.

Example exercise 2: Taking participants' point of view to identify ethically relevant moments

Figure 3 (p. 184) illustrated study participation from the participants' point of view from the initial invitation through to the final 'thank you'. This flow diagram was examined step by step to note at which points the following would take place:

- providing information about the study;
- inviting participant questions;
- asking for participant consent to continue with the research;
- collecting identifying and other sensitive information;
- mentioning the voucher;
- thanking participants for their time; and
- mentioning or sending results from the study.

These were conceptualised as ethically relevant moments relating to informed consent, privacy and rewards, and guided the planning of measures to protect study participants.

Example exercise 3: Stakeholder-specific risk analysis

The guidance mentioned earlier prompted a kind of risk analysis. Different stakeholders that could impact on participants' lives were listed in the research diary, including: law enforcement (e.g., police); lecturers, tutors and academic supervisors; other students; current and (potential) future employers; work colleagues; family (e.g., parents); partners and friends; unknown persons online (e.g., hackers) and offline (e.g., people who might find misplaced data). The following questions were then considered for each stakeholder:

- how they could find out about the study, and how likely this was;
- what actions they could take that would affect participants negatively, how likely it was that they would take such action, and how severe the negative consequences would be for study participants; and
- what could be done to prevent negative consequences from occurring.

Table 21 illustrates this process for two types of stakeholder (police and parents). It should be noted that at the time of undertaking this exercise, the planned study population still included users of illegal substances (subsequently excluded as described earlier).

Table 21: Risk analysis assuming users of illegal substances as study participants

How might they find out about the study?	What might happen, and how severe could it be?	How to prevent negative consequences?
Stakeholder: Law enforcement (especially police)		
• Coincidentally see study information online or offline (e.g., advertisements) • Someone tells them about the study on purpose or by accident (e.g., university staff, study participant) This could easily happen.	• Force me or survey providers to hand over all data • Spy on who takes part in the study • Arrest & question me or study participants Not probable in Viennese context but still a possibility. Consequences could be severe.	• Advertise study in a neutral way, emphasising socio-spatial aspects rather than substance use so as not to attract unwanted attention • Substance use status of participants must not be evident • Use linking system to separate identifying from other data and store separately in secure locations • Transcription soon after recording, delete audio recordings, anonymise data already during transcription
Stakeholder: Family (especially parents)		
• Participants tell them • Interview takes place at home • Intercept communication regarding interview date/place (e.g., pick up the phone) • Find invitation/thank-you card This could easily happen.	• Parents could question participants about their substance use • Arguments, fights, etc. This could easily happen, also for legal substances. Severity of consequences likely to differ by family.	• Describe the study as a sociological study about everyday spaces • Highlight that non-users can also take part • If interview takes place in the parents' house, make sure that cannot be overheard. Re-arrange interview if condition not met.

Note. The above table shows edited excerpts from the study author's research diary.

8.3. Measures to protect study participants

The previous sections showed that the main risk to be addressed was the possibility of third-party access to sensitive data, especially on illegal or stigmatised behaviours. Consequently, the study protocol stated that a serious risk or reasonable suspicion of unauthorised access to the data would lead to the study being terminated or substantially modified.

To avoid negative outcomes in this regard, measures to protect study participants sought to:

- avoid unwanted attention (e.g., during study advertisement);
- avoid or limit sensitive data collection (e.g., names, use of illegal substances);
- prevent third-party access to sensitive data (e.g., anonymisation, storage);
- oblige research assistants and transcribers to confidentiality.

The most important of these measures are described below. This section concludes by addressing the second issue identified earlier, namely the potential for financial compensation to have a coercive effect on potential study participants.

8.3.1. Directing attention away from sensitive issues

Broadening the advertised study focus to include non-users

The study included only users of legal substances (as described earlier). Nevertheless, it was important to be discreet about the study topic during recruitment. For example, parents or partners finding out that their daughter or partner was interested in a study on substance use could have led to unpleasant situations for potential study participants (see also Table 21, p. 324)[465]. Key measures in this regard were to allow non-users to sign-up to the study and to highlight on recruitment materials (e.g., posters, invitation cards) that substance use was *not* a requirement for sign-up[466]. Furthermore, the study focus was emphasised as being about

[465] For example, this was identified as an issue in the study by Hathaway et al. (2010: 4): "A concern […] related to having the title of the project ('drug normalization and stigma study' without specifying the drugs) on the card to be given out. The REB [Research Ethics Board] expressed concern that mentioning these terms would be a risk to participants if discovered by the 'wrong' person".

[466] There are arguments pro and contra collecting data from ineligible persons. Hibell (2003: 65–66) considers this question in the context of classroom-based school surveys, where ineligible students (e.g., ineligible birth year) may sit in the classroom when the questionnaire is administered: should they be asked to leave the classroom? On the one hand, it could be considered unethical to ask students to invest time in providing data that will not be used. On the other hand, being excluded may be perceived as being treated unfairly. Another consideration in the present context was that excluding non-users might have perpetuated notions that substance use is 'interesting' (and abstinence is 'boring'). Therefore, including non-users at the sign-up stage served not only to better protect substance users but it also avoided marginalisation of non-users.

everyday spaces: although recruitment materials referred to alcohol and cigarettes, interested persons were invited to 'talk about their everyday spaces' rather than their substance use (which accurately reflected the contents of the repertory grid interview, see Chapter 6). During recruitment, questions (e.g., by potential study participants) about the eligibility criteria relating to substance use were answered by stating that the study covered a range of substance use patterns. Consequently, it could not be inferred that somebody was a substance user (or what kind of user) on the basis of their study participation.

Asking about illegal behaviours only indirectly

The study's focus on legal substances meant that illegal substances were not discussed during the interviews. However, information on illegal substances still had to be collected on the screening questionnaire to avoid inviting users of illegal substances to interview. The solution was to provide the exclusion criteria as lists of statements, whereby each list contained also legal behaviours[467]. Participants had to indicate only if *any* of these statements applied to them. This not only decreased completion time, but also reduced the sensitivity of the data while increasing perceived privacy.

8.3.2. Using a 'Don't state your name' policy

Anonymous sign-up

As names are direct identifiers, it was decided not to ask study participants to provide their names at any point of the research. Besides ethical considerations, offering anonymity was also intended to increase potential participants' willingness to take part. The first point at which this was relevant was during sign-up (as described in section 5.5). Two levels of anonymity were offered:

- The *default level* ensured anonymity by not asking individuals for their names. Where contact details were required, the sign-up form asked for an email address which did not contain direct identifiers (e.g., name, student number), and participants without such email addresses were advised to state a mobile phone number instead.

[467] This approach was inspired by the Unmatched Count technique, a truly anonymous response technique for obtaining point estimates in surveys, whereby the sensitive behaviour of interest is presented in a list containing also non-sensitive behaviours (Lensvelt-Mulders, 2008: 471–475). The assumption underlying this approach is that participants will admit to the sensitive behaviour more readily if it is grouped with non-sensitive answer options, not least because others cannot know exactly which answer options applied to them.

- To accommodate the needs of participants who preferred a greater level of privacy (keeping in mind that the study originally sought to include users of illegal substances), an *advanced level* offered pen-and-paper completion (i.e., not online) as well as sign-up without contact details. Although these kinds of procedures offered a greater level of privacy for potential study participants, they were not used by default due to their drawbacks (e.g., no follow-up possible). The project website and first page of the sign-up form informed participants of this option.

In practice, likely due to the focus on legal substances, the advanced option was not used. None of the individuals recruited in person refused to fill out electronic forms or to supply their contact details, and nobody expressed an interest to sign up to the study offline. However, offering both options was important to accommodate different privacy needs and to demonstrate a commitment to data protection, which might have increased participants' willingness to sign-up even if they did not make use of the advanced options themselves (on the importance of perceived privacy, see Lensvelt-Mulders, 2008: 468–471).

Anonymous informed consent during the interview

The second point at which names are usually involved is when giving informed consent. This section describes first how informed consent was obtained in the present study and concludes by introducing the use of pseudonyms (further discussed in the next subsection).

Throughout the study, participants had the opportunity to obtain information and to ask questions by viewing the website or contacting the study author. Specific points at which information was provided included during the initial invitation and at the beginning of the interview. At the interview, participants received a written participant information (see Appendix H.3). Key points were highlighted verbally, and time was set aside for participants to read the information and ask questions. At the time of preparing the fieldwork in 2016, relevant institutional templates were not yet available[468]. Bespoke procedures and materials used to obtain informed consent were therefore developed based on relevant guidance (e.g., Fry and Hall, 2004; Jensen, 2012; Consortium of European Social Science Data Archives, 2015b; UK Data Service, 2016) and by considering how informed consent was obtained in other research projects (e.g., conducted by peers). Procedures and materials were adapted to the Austrian context and the sensitive nature of the study topic.

[468] Institutional templates for doctoral students were first issued by the University of Vienna in autumn 2018.

Fry and Hall (2004: 11) emphasise that established ethical procedures may need to be adapted for use in contexts that do not yet have a tradition of institutional ethics review. This was the case in the present study. Institutional ethics approval was not mandatory for social science or student research projects in Austria at the time of conducting the study, and it was therefore uncommon to provide detailed participant information sheets and formal consent forms in these contexts. Gläser and Laudel (2010: 48–49) also note that debates and procedures concerning research ethics are more established in countries such as the United Kingdom or the United States of America than in countries such as Germany. The academic supervisor and fellow doctoral students suggested that long or formal procedures would be perceived as unusual and possibly as suspicious or threatening. The materials were therefore designed to balance the wish to obtain informed consent in line with international research practice with the need to maintain participants' trust and conform to local research traditions. While a detailed participant information was provided on the project website, the participant information provided during the interview was kept short and informal so as not to unsettle participants. Even so, some participants expressed surprise at how formal the procedures and materials to obtain informed consent were in the present study.

After thanking participants for their agreement to take part, study questions and aims were summarised. Participants were then reassured that their data would be treated confidentially. Circumstances under which confidentiality would be broken were mentioned (e.g., suicidal intent). Participants were encouraged to answer questions honestly or to let the interviewer know if they preferred not to answer. The sheet further explained that data would be published in anonymised form and that the audio recording would not be published. Participants were reminded that their participation was voluntary and that they could withdraw from the study at any time without facing negative consequences. If participants needed any advice regarding substance use, the sheet referred them to a website where they could find more information. Contact details were provided, including those of the academic supervisor.

Consent to take part in the study was obtained when participants signed up to the study and at the beginning of the interview. For the latter, participants received a written consent form which they were invited to review and complete once they had read the participant information sheet and received answers to their questions, if any.

The consent form (see Appendix H.4) used a granular approach allowing participants to choose which aspects of the study to consent to (e.g., they could choose to agree to the interview but not to the audio recording). The statements on the form covered the following:

- Consenting to take part in one or more interviews

- Confirming that information about the project was provided and that any questions were answered satisfactorily
- Confirming that information about the possibility to withdraw from the study at any time was provided
- Consenting to the audio recording and its transcription
- Consenting to the use of (anonymised) data in the context of the doctoral research project including in reports, presentations and other scientific publications
- Consenting to the reuse of the data for non-commercial scientific purposes in thematically related research areas
- Expressing a desire to receive the study results
- Expressing a desire to review the report prior to publication

Thus, the form also invited participants to express preferences for follow-up and to confirm that the interviewer had supplied them with all relevant information.

An important aspect of taking consent was that participants were not required to give their names or signatures on the consent form. Instead, they were asked to use their ID codes from the sign-up stage as pseudonyms, as described below. Using a pseudonym to obtain informed consent is considered acceptable research practice (e.g., Fry and Hall, 2004: 15). Furthermore, obtaining oral rather than written consent is acceptable practice where it is safest for researchers not to know participants' names (e.g., Fry and Hall, 2004: 15; Häder, 2009: 14; UK Data Service, 2016). Using a pseudonym on a written consent form therefore offered a compromise between non-anonymous written consent and purely oral consent.

8.3.3. Separating identifying data from other sensitive information

Even though sensitive data collection was limited as described above, data collected during sign-up and screening still included information that could directly identify participants (e.g., contact details) as well as other sensitive information (e.g., perceived mental health, negative experiences related to substance use). To best protect participants, it was considered important not to store these raw data unencrypted in the same dataset.

Although there is consensus in the literature that identifiers should be stored separately from other data as soon as possible (e.g., Johnston, 2003a: 29; Fry and Hall, 2004: 15), common research practice foresees anonymising, encrypting, destroying, hiding or locking away data *after* it has been collected (e.g., Decorte, 2000: 288; Miller et al., 2010: 87). For the present study, the desired option was to separate identifying and other sensitive data already *during* sign-up and screening. This was considered to offer the best level of protection for participants

and had important added benefits (see section 5.5). Practical guidance on how to separate identifying and other sensitive data during data collection while retaining the possibility for data linkage could not be identified, so a bespoke procedure was developed for the present study[469].

The first aspect of this procedure concerned how data could be separated at the point of data collection. This was done by using a separate sign-up form and screening questionnaire (rather than a single instrument to collect all sign-up and screening data), which were hosted on servers in two different countries. Further details on this are provided in section 5.5.

The second aspect of this procedure concerned how the two datasets could be linked to identify and contact study participants. To link the datasets, a unique piece of information had to appear in both datasets that would allow responses from the same individual to be identified and matched. Two options were used in the present study.

Linking system using user-generated identification codes

In longitudinal survey research, user-generated identification codes (also known as 'subject-generated identification codes', SGIC) are used to link data across survey waves without having to ask for identifying information (e.g., Yurek et al., 2008)[470]. Study participants answer a series of questions to generate a string of letters and numbers that cannot identify them but has a high probability of being unique to them. This system was used in the present study for individuals who signed up to the study via social media or word of mouth. At the end of the sign-up form, these persons were asked questions to create a unique ID code (e.g., '3E8') (see Appendix G.2)[471]. At the beginning of the screening questionnaire, they were asked to enter the same ID code (or to answer the same questions again if they could not remember the code) (see Appendix G.3). Participants were informed that ID codes served as pseudonyms for the duration of the study to help protect their privacy.

Using this system meant that identifying data and other sensitive information could be linked only if somebody had access to both data sets. Efforts to physically separate the two datasets meant that this was unlikely to happen, but it was considered that using the same identifier on

[469] Feedback received from the academic supervisor, peers, and from conference delegates at the 29th annual European Society for Social Drug Research (ESSD) meeting (Brotherhood, 2018b) confirmed that standard research practice does not include special provisions to ensure confidentiality at the data collection stage, and that the approach used in the present study could be considered novel. Linking systems discussed in the literature for the data collection stage typically seek to link data across several waves of anonymous longitudinal surveys, but do not aim at separating and linking contact details and other sensitive information.
[470] Similarly, in research with parent-child pairs, user-generated codes help identify responses from the same family.
[471] The questions were developed based on examples found in the literature (e.g., Yurek et al., 2008: 437). Yurek et al. use four questions, but given the low number of expected participants in the present study (compared with a large longitudinal survey), three questions were deemed sufficient to generate unique codes.

the sign-up form and the screening questionnaire could lower participants' confidence in the protection of their data and thus negatively affect response rates or the accuracy of responses. Therefore, a more sophisticated system was developed which allowed participants to enter two *different* pieces of information on the sign-up form and in the screening questionnaire.

Linking system using supplied ID and PIN

Recruitment strategies also foresaw that individuals would be recruited in person or through invitation cards. This meant that codes could be supplied, and a more sophisticated system was developed to take advantage of this possibility. Codes (or identifiers) were prepared in advance which consisted of two different parts. Keeping in mind how study participants might perceive and use them, the first part was called an 'ID code' and the second part was called a 'PIN number'. In line with this labelling and to help distinguish the two parts, the ID code was set up to consist of three letters (e.g., 'AKJ'), while the PIN number was set up as a four-digit number (e.g., '2390'). Using three letters and four digits meant that the two parts were short enough for participants to enter without errors but long enough to meet the technical needs of the study and to allow a high level of perceived privacy.

ID code and PIN number were hand-written on the back of each invitation card. At the end of the sign-up form, participants were asked to enter the ID code stated on the invitation card (but not the PIN number), and at the beginning of the screening questionnaire, they were asked to enter the PIN number (but not the ID code). They were further instructed not to share their invitation card or codes with anyone, and to strike out the codes once they had entered them and to dispose of their invitation card. To ensure that participants received the correct prompt on the forms, the preceding page always asked if they had an invitation card to hand. If they answered 'no', the following page prompted them to generate their own code (as described above) instead of asking for the identifier stated on the invitation card.

The ID code and PIN number were linked using a key known only to the study author. Consequently, using this system meant that to reliably link individual identifying and other sensitive data, it was necessary to have *both* data sets *as well as* a copy of the key or allocation table. For participants, this system reduced the perceived cost of questionnaire completion (i.e., no need to generate a code, and a two-part identifier was likely perceived as more secure than a single code). Although it would have been preferable to use the more sophisticated system also for those who signed up to the study without an invitation card, this was not practically feasible. Regardless of whether participants generated their own code or used a prepared identifier, identifying and other sensitive data were separated from the very beginning, and pseudonymisation was integrated into the recruitment and sign-up process.

The two-part solution (with two instruments and in some cases a two-part identifier) was found to work well in practice. Potential study participants did not take issue with the need to complete two instruments or enter codes. Rather, they were positively surprised that the sign-up form was so short. Offering a short sign-up form was also found to increase sign-up rates, as many participants were not prepared to complete a long questionnaire on the spot. Feedback from the pilot study (using draft materials) suggested that the two-part solution may have been perceived as cumbersome but necessary to ensure anonymity. Although a few participants did not enter the identifiers as intended (e.g., typographical errors; providing ID code *and* PIN number on the same form), this did not affect data linkage due to the small number of cases.

Separate data storage

A key principle of data storage is to separate identifying data (e.g., contact details) from other sensitive information (e.g., on substance use) (e.g., Johnston, 2003a: 29; Fry and Hall, 2004; Häder, 2009: 12). As described above, this was in part ensured by design. The sign-up form and screening questionnaire were hosted on two online survey platforms located in different European countries, accessed with different usernames and passwords. Both platforms assured the use of SSL-secured data connections and secured servers located in Europe[472]. As it was possible to view participant responses (including the entered contact details) online, it was not necessary to download data to contact participants. When data were downloaded for analysis, measures to protect participants included overwriting all fields with contact details and replacing user-generated codes with PIN number-like identifiers.

Another example of separation by design was that the in-person questionnaire used at the interview start (see section 6.2.1) used separate sheets of paper for socio-demographic data and for substance use data, so that these could be easily separated for storage. These and other hard-copy materials generated during the interview (Table 20, p. 323, gives an overview) were stored in a locked aluminium briefcase. In analogy to the linking systems used for the online data, materials containing potentially identifying information were labelled with ID codes, while PIN numbers were used for materials containing other potentially sensitive information. Audio-recordings of interviews and interview transcripts were labelled with the interview date (i.e., neither ID code nor PIN number). In line with institutional ethics requirements, electronic materials with potentially identifying information were either anonymised (e.g., repertory grid data) or stored on a password-protected personal drive within the university IT system (e.g.,

[472] https://www.soscisurvey.de/index.php?page=privacy and https://www.onlinesurveys.ac.uk/help-support/bos-security/ (last accessed 11.7.2016)

electronic scans of maps, audio recordings of interviews). When it was necessary to keep sensitive files on personal devices (e.g., during transcription), encryption was used (e.g., Microsoft Bitlocker for entire drives or 7-Zip software with AES-256 encryption for individual files and folders). Similar principles were applied when sharing data with others working on the project, as described below.

8.3.4. Anonymising interview data

In line with standard practice in drug research, anonymisation was offered by default and no participant objected to this or expressed a desire to be identified.

Compared with studies involving very small populations (e.g., people with rare diseases, Saunders et al., 2015), ensuring anonymity in general was not a challenge in the present study[473]. Anonymisation was rather an issue at the specific level. At the end of the interview, participants were asked if there were any aspects of their interview that required special attention with regard to anonymisation. Most participants highlighted no or only minor aspects (e.g., asking for a detail on their map to be removed), but some participants – especially those who concealed their (legal) substance use from partners or parents – appeared very concerned about identification by people they knew (e.g., that their handwriting may be recognised if their map was shown) (what Kaiser, 2009: 1635 refers to as "internal confidentiality"). Also, some participants knew each other and of each other's participation in the study (e.g., they had been recruited concurrently). A high level of anonymisation was therefore pursued to meet participants' needs for perceived safety. For practical reasons, the same procedures were applied to all interviews. The key material in terms of anonymisation was the interview transcript, but similar procedures were used for other materials (e.g., maps, repertory grids).

Similarly to Saunders et al. (2015: 628), the transcripts were anonymised in two stages. The transcripts underwent a first round of anonymisation prior to data analysis (i.e., before importing transcripts into coding software), with a focus on removing immediately noticeable identifiers (direct or indirect). Based on recommendations in the literature (e.g., Clark, 2006; Häder, 2009: 7–8; Kaiser, 2009; Gläser and Laudel, 2010: 55, 279-281; Jensen, 2012: 66–67; Wiles et al., 2012; Saunders et al., 2015: 621–627; Consortium of European Social Science Data Archives, 2015a), an anonymisation strategy was developed which included the following rules for anonymisation:

[473] Participants came from a large population (including three different university faculties) and the topics referred to everyday practices that were not unique to few individuals.

- *Personal names and nicknames* of study participants or individuals mentioned by them were replaced with the relationship (e.g., [her brother]) or, if the name itself was relevant, a placeholder (e.g., [name of study participant]). Personal names of well-known persons (e.g., celebrities) remained as they were.
- *Place names* were generalised while maintaining an indication of the setting or other important aspects (e.g., [city in Eastern European country where IP grew up]). This extended to names of bars, restaurants, workplaces and the like. Well-known places or places that were common to several participants remained as they were.
- *Years, dates and similar indications of time* were generalised if they were specific to study participants (e.g., [when I was a small child] instead of a specific age). Dates relating to well-known (e.g., historical) events remained as they were.
- *Personal attributes* of participants or individuals mentioned by them (including indirect identifiers such as occupation, categories protected by data protection laws such as ethnicity, as well as distinctive characteristics such as life events) were generalised if they were rare in the study sample.

At this stage, details were maintained as much as possible to avoid decontextualisation and allow meaningful analysis. Anonymised passages of text were marked using brackets (e.g., '[her sister]'). Words removed during anonymisation were saved in a separate encrypted file.

The second round of anonymisation concerned interview excerpts included in this thesis. At this point, omission (rather than generalisation) was used more often. For example, indications of the setting (maintained in the first round) were more likely to be removed if they were not essential to the point being made. Smoke-screen techniques (i.e., changing details rather than generalising them) were used only in a few instances where neither generalisation nor omission were appropriate. Special attention was given to whether participants could be identified if several quotes from the same person were viewed together ("jigsaw identification", Saunders et al., 2015: 627). This was also one reason[474] why the pathways presented in Chapter 12 (describing specific situations) were 'separated' from the other results chapters: while participants are generally codified as 'IP1', 'IP2' and so on, Chapter 12 uses pseudonyms, so that the information cannot be readily connected. In line with concerns that pseudonyms chosen to fit a particular minority ethnicity or cultural background can reinforce

[474] Another reason was that the use of pseudonyms was more appropriate given the qualitative and person-centred orientation of the pathways.

stereotypes (Clark, 2006: 6), pseudonyms were chosen to reflect the study population overall rather than individual characteristics[475].

Where a participant reported knowing another participant (i.e., that they had talked with each other about the study), references to either participant in the thesis were scrutinised separately and, in case of any doubt, participants were contacted individually and asked to review excerpts from the thesis prior to it being shared with any other participants. In addition, the near-final dissertation was shared with those ten study participants who had asked to view the thesis prior to submission. In either case, no changes were requested, suggesting that the level of anonymisation was considered adequate.

8.3.5. Obliging research assistants and transcribers to confidentiality

Parts of recruitment, transcription and data analysis were outsourced to hired research assistants and transcribers (as described in Chapters 5 and 7). To ensure that research assistants and transcribers could be trusted to treat participant data confidentially, only individuals with relevant qualifications and prior experience were selected. All had either been recommended by academic colleagues or been met in person prior to commencing the work.

The contract specifying pay and work conditions also included a section outlining obligations regarding data protection (updated when the EU General Data Protection Regulation (GDPR) came into force). Amongst other things, the contract obliged transcribers to take all necessary precautions to protect data, to inform the study author in case of any data protection breach, and to safely destroy all data upon completing their assignment. Transcribers who were students at the University of Vienna were asked to store files on their password-protected personal drive on the university server rather than their personal devices. Upon completion of the transcription work, all transcribers were asked to sign a document confirming deletion of all files relating to the assignment. The contract for the research assistant tasked with recruitment was less comprehensive, as this person did not have physical access to any study participant data.

Data protection was also addressed in practice. For example, audio recordings were labelled with the interview date (rather than ID codes). Transcription of sensitive parts was not outsourced, and audio recordings containing sensitive information were muted or cropped where relevant before being sent to transcribers. Transcribers were instructed to abort the

[475] The role of ethnicity or culture was still addressed within the pathways where it was identified as a relevant factor.

transcription and contact the study author if they knew the study participant by chance. Audio recordings and maps were encrypted using the software 7-Zip (AES-256 encryption method) and sent using the ACOnet FileSender provided by the Austrian Academic Computer Network. Passwords for decryption were sent separately to transcribers via mobile phone text message, and all transcribers received instructions on how to encrypt and decrypt files.

8.3.6. Balancing incentives and rewards for study participation

The rewards offered to study participants were a personalised copy of the results emerging from their own interview and a voucher worth EUR 10[476, 477]. With regard to the vouchers, participants could choose among four stores that were considered appropriate for the study population[478]. Vouchers were preferable over cash because they were more likely to be seen as tokens of appreciation than as payment[479]. The amount was chosen deliberately to be low enough so as not to have a coercive effect on individuals who would not have taken part otherwise, but high enough to represent a genuine token of appreciation and a modest compensation for participants' time.

In line with relevant guidance (e.g., Fry and Hall, 2004: 15), vouchers were not generally mentioned during recruitment (e.g., on invitation cards or posters, or when first inviting individuals to sign up). However, vouchers were occasionally mentioned when advertising the study on social media, as this appeared to be the standard practice. At the interview, vouchers were handed over at the beginning so that participants did not feel they had to complete the interview to receive the voucher. The study protocol foresaw that participants would be able to keep the voucher even if they did not complete the interview. The voucher was consequently presented as a thank-you for *showing up* to the interview, rather than for the interview itself.

Offering financial compensation for research participation is a controversial issue (Fry and Hall, 2004: 9, 14-15; Miller et al., 2010: 84)[480]. In determining whether financial compensation for

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[476] Though not planned as such, an additional incentive for the participating law students was that their interviews were held in a law firm (see section 6.4).
[477] There was no financial or other material compensation for completing the sign-up form and screening questionnaire, as the time investment was relatively small and the available non-monetary rewards (e.g., satisfying one's curiosity, helping another student) were considered appropriate.
[478] Selected stores specialised in academic books and course materials, books in general, clothing, or music and film (but not alcohol or cigarettes).
[479] Using vouchers also avoided inadvertently funding (illegal) substance use, and while vouchers can be re-sold to obtain money (Miller et al., 2010: 84), the latter was considered unlikely to occur in the present study.
[480] On the one hand, it could be such a strong incentive that participants are no longer able to consent freely. Potential risks may be ignored more readily, and participants may become more willing to take risks or endure harms because they feel they have been paid to do so. Methodological issues may also arise if people take part mainly to receive the financial reward, with associated problems of sampling bias and poor data quality (Lozar

study participation was required, the present study drew upon the discussion of costs and rewards according to the Total Design Method (TDM) (Dillman, 1978, 2007; Leeuw and Hox, 2008b). The major cost of study participation was considered to be the time needed to take part. With a planned interview duration of at least 1,5 hours, the time commitment could be perceived as substantial by students, especially during exam periods and given that the study population included business and economics students[481]. Thus, it could not be assumed that perceived non-monetary benefits would always outweigh perceived costs. A modestly valued voucher was therefore appropriate for the present study.

Nevertheless, participants' feedback on why they took part in the study suggested that non-monetary incentives also played a role. Some participants were not personally interested in the study but took part to help a fellow student or to support a scientific research project, while others found the study topic personally interesting. Several participants specifically signed up because they wanted to find out more about their own substance use or because they wanted to reflect on recent changes in their substance use practices. It is also worth noting that one participant did not want to accept a voucher initially, and others commented that the voucher was not necessary. One participant who found out about the study online described how she had already wanted to take part before finding out about the voucher:

> *P: […] I thought the topic itself [of the study] was interesting, already when I saw the title, [I thought] I want to take part […]*
> *I: To what extent was the voucher an incentive to take part?*
> *P: Actually almost not at all. So I read the title [of the study] and thought, "ooh, I would like to take part in this". And then right at the end it said you also get a voucher […].*[482]

8.4. Measures to protect participating university and its students

The key risks arising from the present study for the participating university (i.e., University of Vienna) and its general student population related to i) potential reputational damage and ii) potential for the university to introduce restrictive or punitive measures targeting students in response to unfavourable study findings.

Manfreda and Vehovar, 2008: 275). On the other hand, research participants have a right to be compensated for their time and effort.

[481] Feedback obtained during the pilot study confirmed that students might not agree to more than one hour of interview time unless there was an additional incentive.

[482] German original: „B: […] das Thema an sich fand ich interessant, wie schon der Titel war, da will ich mitmachen […] I: Inwieweit war der Gutschein eine Motivation mitzumachen? B: Eigentlich fast gar nicht. Also ich habe den Titel gelesen und habe mir gedacht, 'uh, da will ich mitmachen'. Und dann stand ganz am Ende, einen Gutschein wird man bekommen […]".

Potential negative consequences were avoided through careful communication regarding the study. To avoid implying there may be substance use related problems at the university, study materials clarified that the study was not about 'problematic' substance use. The study protocol foresaw that in case the research identified any major substance use issues, limitations of the data (e.g., not statistically representative) would be highlighted and that findings would be contextualised using data from other student populations. It also foresaw the possibility to discuss unfavourable descriptions of the university with the rectorate prior to submission of the thesis they were considered likely to cause reputational damage. In practice, such issues or descriptions did not emerge from the data and therefore these steps were not necessary.

To avoid negative outcomes for the student population resulting from restrictive and punitive measures introduced in response to study findings, the thesis offers tentative suggestions for alternative prevention activities in section 13.5.2.

Whilst it was considered to not name the university in publications arising from the study, this was deemed impractical as it would have precluded the inclusion of details regarding study participants and fieldwork sites. Furthermore, it would have been possible to guess the university regardless, given its unique position in the Austrian educational context and the study author's own institutional affiliation[483].

8.5. Measures to protect the researcher

It is important to consider not only potential harms to participants but also to researchers (Decorte, 2000: 288; Fry and Hall, 2004: 16–18). Harms to researchers may arise, for example, from conducting fieldwork at unusual hours (including late at night), at potentially unsafe places (e.g., visiting participants in their homes), forming emotional bonds with participants which may lead to role confusion, neglecting one's own relationships with partners and friends, and so on.

Due to the planned inclusion of users of illegal substances, the original study protocol identified a range of potential issues and foresaw measures to protect the psychological well-being and physical safety of the study author. However, these issues were not as pertinent in the study's final form which included users of legal substances only[484].

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[483] Walford (2018) uses similar arguments to advocate for "openness" about research settings and notes additional benefits (e.g., increased accountability resulting in a need for researchers to work more precisely) (ibid.: 520–521).
[484] For example, the original protocol anticipated that participants would prefer to be interviewed in their own home (rather than discuss the use of illegal substances on university premises) and included special precautions for this scenario. However, likely due to focus on legal substances only, all participants agreed to be interviewed in the researcher-chosen interview locations, so that additional safety measures were not necessary.

PART 3: RESULTS

Results are presented in four chapters that build upon each other, each addressing a different set of research questions:

- Chapter 9, “Everyday spaces”, describes the 296 spaces upon which the analysis was based, grouped by setting. These were mapped by participants during the interview. The chapter presents the findings from the content analysis of spaces (as described in section 7.3.2) and addresses the following question: *what settings and situations can be part of everyday life?* At the end, the usefulness of an exclusively setting-focussed approach is discussed and a suggestion for a general typology of everyday situations is offered.

- Chapter 10, “Latent dimensions for space construal”, describes the 108 constructs that emerged during the interviews as study participants thought about their everyday spaces. The constructs are summarised as 12 dimensions. The chapter thus presents the findings from the content and cluster analyses of elicited constructs (as described in section 7.2) and addresses the following question: *what socio-spatial aspects might people refer to when interpreting their everyday spaces?* At the end, the chapter reflects on the interrelated nature of the identified dimensions.

- Chapter 11, “Patterns of situated substance use or abstinence”, introduces 14 situated substance use patterns (focussed on alcohol and cigarettes) and describes these in relation to the dimensions from Chapter 10. It presents the findings from the cluster analysis of elicited spaces and a series of quantitative comparisons between spaces (as described in sections 7.3.3 and 7.4), while addressing the following questions: *what patterns of situated substance use could be distinguished in relation to alcohol and cigarettes;* and *how might they differ in terms of the identified socio-spatial aspects?* At the end, the chapter reflects on potential differences between substance user groups[485] and how the various patterns co-occurred on participants’ maps.

- Chapter 12, “Pathways to situational substance use or abstinence”, considers to what extent the settings, situations and dimensions identified in the previous chapters can be used to predict situated substance use and abstinence. The chapter then presents the

[485] Participant differences were not within the original scope of the study (e.g., no research question focussed on participant differences). In the results, participant differences are therefore discussed only where this was necessary to contextualise the findings. Appendix M includes a discussion of such differences, including subgroup analyses relating to Chapters 10 and 11.

findings from the qualitative analysis of interview transcripts (as described in section 7.5) in the form of pathways to situated substance use or abstinence. These offer a way of visualising causal relationships between situation and substance use, also considering influences such as a person's general position on substance use (e.g., attitudes, preferences, routines, perceived functions of substance use). The chapter thus addresses the study's overall research question: *how do construed socio-spatial aspects relate to situated substance use?* The chapter concludes with key assertions regarding the interplay of socio-spatial and other influences on substance use.

All chapters in Part 3 focus on the results obtained in the present study. A discussion of results with reference to the literature and findings of prior studies is offered in Part 4.

General notes

- A description of study participants is available in Chapter 5. Table 9 (p. 178) gives a basic indication of each participant's substance use profile (e.g., non-smoker, occasional smoker, daily smoker).

- Participants are referred to as 'IP1', 'IP2', and so on; however, in Chapter 12, pseudonyms (e.g., 'Anna', 'Barbara') were more appropriate to protect participants' identity (as explained in section 8.3.4).

- For the elicited spaces and constructs, the numbers in front refer to specific participants and spaces/constructs reported by that participant. For the constructs (but not the spaces), the number also reflects the elicitation order (e.g., construct '13.1' would be the first construct elicited by participant IP13).

- All emphasis in interview quotes reflects spoken emphasis during the interviews. The German original for interview excerpts is given in footnotes for increased transparency.

9. Everyday spaces

9.1. Introduction

In this thesis, the term 'everyday spaces' refers to spaces (including places and situations) that people produce and participate in as part of their everyday lives. For the empirical study, this included spaces that had featured in study participants' lives at least once in the six months prior to interview as part of weekly routines, personally important spaces, or spaces where participants used legal substances. Spaces were elicited through a mapping task, as described in section 6.2.2.

This chapter gives an overview of the spaces that were elicited during the interviews, as these form the basis upon which the constructs were elicited (presented in Chapter 10). In addition, this chapter gives pointers for how everyday spaces can be described or classified. The chapter consequently also addresses the following question: what settings and situations could be relevant to consider in socio-spatial research generally and in substance use research and practice more specifically?

Across the 24 study participants[486], data collection resulted in 296 elicited spaces. Examples of elicited spaces will be provided in the next section. Figure 13 (p. 343) shows that the number of elicited spaces ranged from 8 to 18, with most participants reporting between 10 and 15 spaces (Figure 13-A). On average, 12 spaces were elicited per interview.

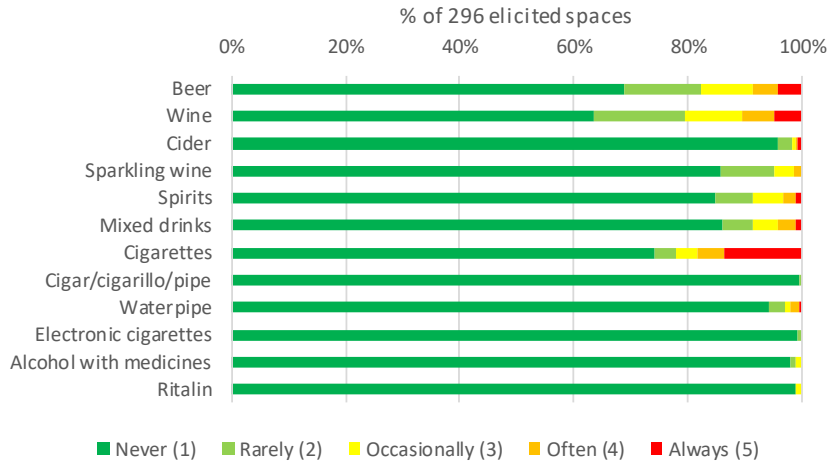
Additional data were collected for each space using supplied constructs, as described in section 6.2.3. Study participants considered most spaces (67%) to be very or rather important and some spaces (14%) to be rather unimportant or not at all important (Figure 13-B)[487]. Feelings were heavily skewed towards being positive (47%) or rather positive (29%) (Figure 13-C). Very few spaces (4%) were associated with negative or rather negative feelings. In terms of frequency, elicited spaces were visited or occurred mostly on a weekly basis (41%)

[486] Chapter 5 describes the sample of 24 study participants. Briefly, participants were recruited in person, via social media and through referral. All were recent users of alcohol or cigarettes but not illegal substances; they were female, 18 to 26 years old and studied business/economics, statistics or mathematics at the University of Vienna; and none reported significant health and social problems. A homogeneous sample was preferable in the present study due to the variety of spaces and substances; however, as explained in Chapter 5, the final study sample was more varied than planned in terms of the general substance use patterns (e.g., non-smokers and daily smokers).
[487] This included spaces which were not personally important but featured in participants' weekly routines or which had been added for completeness (e.g., thinking of her parents' house, one participant added the journey to the house as an additional space), as well as spaces which had been added in response to a specific interviewer prompt (e.g., to think of the last substance use occasion).

(Figure 13-D). Frequency for some spaces (14%) was every few months or less frequently; these were mostly located abroad or were spaces representing clubbing and partying.

Figure 12 gives an overview of reported substance use frequency across all elicited spaces. The figure shows that, in terms of substance use, spaces were most likely to be associated with the use of wine, beer or cigarettes. The following descriptions note the main substances reported for each setting. However, substance use is the focus of Chapters 11 and 12, and an overview of situated substance use patterns by setting is provided in section 12.2. The large proportion of spaces representing no or rare substance use is explored in section 11.4.

Figure 12: Reported frequency of substance use across all elicited spaces, by product

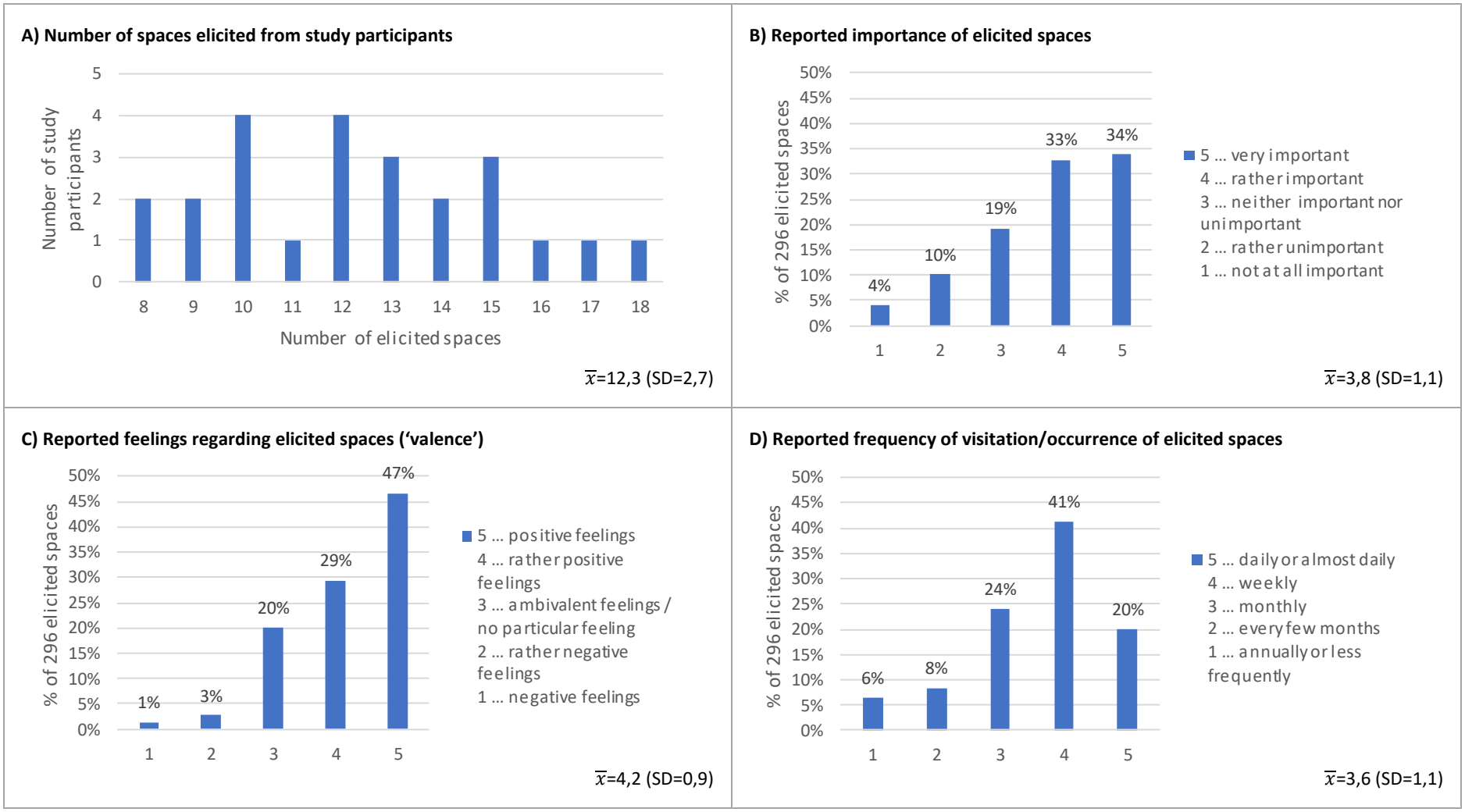


Product	$\bar{x}$	SD
Beer	1,6	1,1
Wine	1,7	1,1
Cider	1,1	0,4
Sparkling wine	1,2	0,6
Spirits	1,3	0,8
Mixed drinks[a]	1,3	0,8
Cigarettes	1,8	1,5
Cigar/cigarillo/pipe	1,0	0,1
Waterpipe	1,1	0,5
Electronic cigarettes	1,0	0,1
Alcohol with medicines	1,0	0,2
Ritalin	1,0	0,2

[a] 'Mixed drinks' included drinks that participants mixed themselves as well as pre-mixed drinks (also known as 'ready-to-drink' or 'RTD' beverages). In subsequent analyses, 'spirits' and 'mixed drinks' were considered together, as participants did not consistently distinguish between the two categories.

The 296 spaces were summarised through (semantic) content analysis and (numeric) cluster analysis, as described in section 7.3. The remainder of this chapter presents the findings from the content analysis. The elicited spaces are first described by setting. This is followed by a discussion of the complex nature of spaces, which prompted ad hoc analyses to identify key components of situations and to develop a draft typology of everyday situations. The results from the cluster analysis are presented in Chapter 11.

Figure 13: Key data on elicited spaces



9.2. Elicited spaces by setting

Table 22 below provides an overview of the elicited spaces by setting. Conceptually, settings can be thought of as institutionalised socio-spatial arrangements (see Chapter 3). In the substance use field, settings can be of interest to researchers for place-based research, recruitment or as possible intervention settings.

In the table, the first column shows the name of the setting. Settings were developed through the content analysis of elicited spaces and summarised further for the purposes of this overview (for a more detailed classification, see Appendix J.1). The second column provides examples of elicited spaces allocated to this setting. Examples were chosen to illustrate the diversity of situations reported within a single setting. The numbers provided in front of each space identify the participant and the specific space. The third column shows how many spaces were allocated to the setting, expressed as an absolute number and as a proportion of all spaces. The final column provides the same information with reference to the number of study participants. The absolute numbers differ between these two columns if one individual named several spaces allocated to the same overall setting. Settings are ordered thematically, with home settings (from private to public) followed by settings relating to study/work, leisure and travel (similar settings ordered by number of participants).

The following sections describe the spaces by setting, including also the typical situations which participants thought of during the interviews. The heterogeneous nature of certain settings is highlighted as well as how participants differentiated settings further. Excerpts from the interview transcripts are occasionally given to further elaborate and illustrate points of interest. Notable observations regarding (averaged) importance, valence (i.e., positive, ambivalent or negative feelings), frequency of visitation or occurrence of the space, and frequency of substance use are included for completeness (only for descriptive purposes, not to imply statistic association). Supporting data (arithmetic means and standard deviations on supplied constructs by setting) are available from Appendix J.2.

Table 22: Elicited spaces by setting

Setting	Examples of elicited spaces	Nr of spaces (% of 296)	Nr of IP (% of 24)
Own home	2.1 My apartment for studying 2.2 My apartment with the flatmates 8.11 Study breaks on the balcony 15.14 Living room/kitchen - in the evening with friends 15.15 Living room/kitchen - watching TV 16.2 Bedroom	50 (17%)	24 (100%)
Parents' home	1.3 At home at my parents' during the holidays 5.2 My room [at my parents'] 22.8 [Region where I'm from] - studying 23.2 At home at the parents' - eating	18 (6%)	13 (54%)
Partner's home	5.5 [Partner's] room (just the two of us) 5.6 [Partner's] room (in company with others) 18.10 Evening ritual at home 23.8 At home (partner's place) - film 23.9 Partner - food and drink [at his place]	14 (5%)	9 (38%)
Home of friends or acquaintances	1.5 At home at a friend's place (evening and night) 3.5 Meeting a friend during the day (in city centre or at home) 6.4 Best male friend 6.5 Best female friend 15.6 Living room [at partner's parents' house] 19.6 My friends - cosy hang-out (evening) 19.7 My friends - party	15 (5%)	11 (46%)
Home of relatives or family acquaintances	11.2 [Region where I'm from] - relatives 11.3 [Region where my partner is from] X.10 Granny [a] X.7 Cousin's apartment [a]	7 (2%)	5 (21%)
University	3.9 Yesterday's party ([at the university]) 8.4 Uni - breaks 8.14 Uni - lectures 15.8 Reading room 15.9 Library 15.10 Cafeteria 15.11 Lecture theatre 17.4 Uni - campus lawn [grassed area]	39 (13%)	23 (96%)
Workplace	13.6 My office 16.8 Work [breaks with work colleagues] 17.2 Work - break 17.14 Work - at the computer X.8 University institute (work) [a] X.11 Baby-sitting [a]	16 (5%)	15 (63%)
Café/bar/ restaurant	7.11 Village pub/bar 8.7 Drinking coffee with girlfriends 12.10 Eating after university 12.11 Eating with partner [at a restaurant] 17.5 Starbucks with [friend] = studying 17.7 McDonalds 17.8 London – pub 19.11 Bar - Partying/Club 19.8 Café/restaurant at lunch-time 19.9 Restaurant in the evening	46 (16%)	23 (96%)

(continued on next page)

(continued from previous page)

Setting	Examples of elicited spaces	Nr of spaces (% of 296)	Nr of IP (% of 24)
Nightclub	3.10 Party ([nightclub]) 10.8 [Nightclub]	4 (1%)	4 (17%)
Sports facilities	10.10 Swimming ([Name of swimming facility]) X.8 Gym - training [a] X.9 Gym - breaks/way home [a] X.14 Dance studio [a] X.10 Volleyball [a]	16 (5%)	13 (54%)
Other leisure facilities	2.8 Museum 14.12 Cinema X.17 Riding stable [a] X.13 Music school [a] X.6 Dog – training [a]	9 (3%)	6 (25%)
Nature	3.4 Going for a walk outside (Stadtpark [central park], Danube) 4.2 Mountains (holiday) 4.3 Beach (holiday) 7.18 Outdoors (nature, forest) 8.5 Dog - walking 17.4 Uni - campus lawn [grassed area] 18.4 Sport - outdoors 19.12 Park - break X.7 Forest (horse) [a]	20 (7%)	15 (63%)
Urban spaces	1.9 Stephansplatz (in the afternoon) [central square in Vienna] 2.7 Going for a walk in Vienna 3.5 Meeting a friend during the day (in city centre or at home) 4.4 Children [playing with friends' children] 12.9 Gym - breaks/way home 14.5 Mariahilfer Straße [major shopping street] 22.9 Donaukanal [outdoor and bar area along the canal] 23.6 Walking the dog	24 (8%)	12 (50%)
Shopping	1.11 [Shopping mall] 3.13 Supermarket	4 (1%)	3 (13%)
Public transport	5.4 Train 11.12 Journey to [region where parents live] 11.6 Tramway 14.11 Subway	8 (3%)	7 (29%)
Car	8.1 My car 8.2 [Partner's] car 11.12 Journey to [region where parents live]	4 (1%)	3 (13%)
Holiday/Work trip	4.2 Mountains (holiday) 4.3 Beach (holiday) 5.11 [Music festivals] 17.8 London - pub 17.9 London - sightseeing	20 (7%)	10 (42%)
Setting not defined[b]	X.2 Vienna - friends- [friend M.][a] X.3 Vienna - friends - [friend S.] [a]	3 (1%)	2 (8%)

Note. Twenty spaces (7% of 296) were allocated to more than one setting.

[a] IP number not stated to protect study participants.

[b] Three spaces (1% of 296) could not be allocated to any setting due to lack of detail.

9.2.1. Own home

All participants included their own home on the map, although occasionally they did not consider it until the interviewer asked about it. In total, there were 50 spaces allocated to this setting, making it the most common setting in this study. Participants lived in their own apartment, their parents' or partner's home, a shared flat or student halls (see also section 5.1). Most (17; 71% of 24) participants distinguished different situations within their home. Typical situations in the home referred to household chores (e.g., laundry, dishes), studying, eating, watching television (e.g., with the partner in the evening or alone in-between studying), and/or being in the company of family, partner, friends or flatmates. Out of all settings, study participants were most likely to report multiple spaces for this setting, reporting on average 2,1 spaces associated with their home. While some participants referred to their home in general, others referred to specific areas (e.g., bedroom, kitchen). For this overview, outdoor areas such as balcony, garden or courtyard were also allocated to the home setting[488].

Spaces relating to the own home were among the most important ones and were overall the most frequently visited/occurring spaces. Most of these spaces occurred on an almost daily basis, though some occurred less frequently, such as parties or certain hobbies. On average, wine, cigarettes and beer were the most frequently used substances[489].

9.2.2. Parents' home

Just over half of participants (13; 54% of 24) included their parents' home on the map, and there were 18 spaces allocated to this setting. For this overview, this setting excluded participants who lived at their parents' home (i.e., their homes were allocated only to the setting 'own home'). In this sample, parents' homes were typically located outside Vienna or abroad, meaning that this setting was also associated with weekends or term breaks. Specific areas identified within this setting included, for example, participants' old bedrooms; however, most participants referred to their parents' home without distinguishing areas further. Outdoor areas such as the garden were allocated to this setting for this overview.

Although some participants thought of specific activities (e.g., studying, eating), others construed their parents' home as not associated with one particular situation. Rather, the typical situation was that there were many possible situations. Counter to what might be

[488] Further explanations regarding classification decisions are available from section 7.3.2.
[489] Notes on frequently used substances per setting should be seen in context of the fact that most spaces were associated with no or rare substance use (further explored in subsequent chapters).

expected, interaction with the parents was not always the focus in this setting. For example, one participant (IP3) noted that she might also be alone or with somebody else at her parents' home. The following explanation from another participant (IP19) illustrates this further:

> *Participant: [At my parents'] it's also a second home so to speak. […] sure, if I'm invited for dinner or so, then it might be different, but sometimes if I feel like it, then I also go after uni, just so, and … maybe we'll watch something together, chill out together, but I don't necessarily have to talk with them for a long time or so […]*
> *Interviewer: Ok, what is the typical situation at your parents' that you've been thinking of?*
> *P: Well… eating, in any case ((laughs)) […] yes, actually, eating together, doesn't matter if it's a breakfast table or dinner but it is always related to food somehow .. and .. yes, that you talk, but… if I am there the whole day, then of course I also retreat and .. do something for myself, I might study or .. just chill out or something like that. (IP19)*[490]

These spaces were among the most important ones overall, though participants differed most on their importance ratings for these spaces. On average, spaces associated with the parents' home were visited/occurred only on a monthly basis (less frequently than most other spaces) but there was variety among participants, depending on whether parents lived in Vienna or abroad and how close they were emotionally. On average, wine, sparkling wine and beer were the most frequently used substances in the spaces associated with the parents' home.

9.2.3. Partner's home

Nine participants (38% of 24[491]) included their partner's home on their map, and there were 14 spaces allocated to this setting. For this overview, this setting excluded participants who lived permanently with their partner. Four participants distinguished different typical situations within this setting (in one room or in different rooms); of these, three distinguished being alone with the partner from being with additional friends, for example during a social gathering.

Spaces associated with the partner's home were among the most important, among the most positively construed and among the most frequently visited/occurring ones. Participants tended

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[490] German original: "B: es [bei meinen Eltern] ist ja quasi auch ein zweites Zuhause. […] klar, wenn ich jetzt zum Abendessen oder so eingeladen bin, ist vielleicht wieder was anderes, aber halt wenn ich mal .. Lust habe, dann gehe auch einfach mal nach der Uni hin und .. wir schauen uns vielleicht irgendwas zusammen- also chillen dann zusammen, aber ich muss jetzt nicht zwingend mich mit ihnen jetzt... lange unterhalten oder so.. […] I: Okay, was ist die typische Situation bei deinen Eltern, an die du gedacht hast? B: Naja .. auf jeden Fall mal essen ((lacht)) […] .. ja, eigentlich zusammen essen, jetzt egal, ob es ein Frühstückstisch oder Abendessen aber es ist halt immer irgendwie mit Essen verbunden .. und .. ja dass man sich schon auch unterhält, aber .. wenn ich mal den ganzen Tag dort bin, dann ziehe ich mich natürlich auch zurück und .. mache was für mich, also egal jetzt ob ich lerne, oder .. einfach so chille oder irgendwie so etwas." (IP19)

[491] i.e., 82% of the 11 participants who reported having a partner but not living permanently with them.

to rate these spaces similarly, especially on the valence construct (i.e., feelings). They were also among the spaces with the most frequent substance use. On average, wine and beer were the most frequently used substances. Comparing all settings, wine, cider and waterpipe were more likely to be used here than in most other settings.

9.2.4. Home of friends or acquaintances

Just under half of participants (11; 46% of 24) included homes of friends or acquaintances on their map, and there were 15 spaces allocated to this setting. Participants distinguished between visiting friends during the day or in the evening, for a cosy get-together or for a party, or depending on the friend's gender. Specific areas were not distinguished within this setting.

This was one of two settings where participants' valence ratings varied the most (i.e., as a group, participants expressed mixed feelings about these spaces). These spaces were among those with the most frequent substance use. On average, wine, beer and cigarettes were the most frequently used substances. Comparing all settings, wine, sparkling wine and spirits were more likely to be used here than in most other settings. However, there was notable variety among participants with regard to how often wine and sparkling wine were used in this setting.

9.2.5. Home of relatives or family acquaintances

Relatively few participants (5; 21% of 24) included homes of relatives or family acquaintances on their map. In total, there were seven spaces allocated to this setting, making it one of the less common settings in this study. Some participants described close relationships with older female relatives such as grandmothers or aunts. Other relations in this setting included cousins, the extended family, parents' friends and the partner's family. Typical situations in this setting focussed on interaction with the relatives. Participants did not distinguish different situations or areas within spaces allocated to this setting. Consequently, if participants named several spaces allocated here, these related to different relatives' homes.

Spaces associated with the homes of relatives and family acquaintances were among the least frequently occurring/visited ones (less than monthly on average), but there was notable variety among participants in terms of the reported frequency of visitation/occurrence. With regard to importance, participants tended to rate these spaces very similarly as rather important. On average, cigarettes and beer were the most frequently used substances. There was notable variety among participants with regard to how often sparkling wine or cigarettes were consumed in this setting.

9.2.6. University

Almost all participants (23; 96% of 24) included university settings, and 13 (54%) participants included multiple spaces representing university settings on their map. In total, there were 39 spaces allocated to this setting, making it one of the most common settings in this study. One participant did not consider the university relevant for inclusion as she preferred to study at home. The examples of elicited spaces in Table 22 show the range of typical situations associated with this setting (e.g., studying, partying). While some participants distinguished particular areas within the wider setting (e.g., cafeteria, library, lecture room), many participants referred simply to "Uni". Some participants also referred to spaces situated in front of the university (e.g., for breaks from studying). One participant described how for her, all areas and situations associated with the university building belonged together and formed one space, as the following quote shows:

> *Interviewer: What is the typical situation at the university that you're thinking of?*
> *Participant: When I have a course there or also … a bit before or a bit afterwards, when I have to wait that it [the course] starts, or it has just finished […] or I meet some fellow students […] or we might see or meet each other in the cafeteria, before, after, between the courses. […]*
> *I: But the smoking [you mentioned earlier] is not … inside?*
> *P: No no, that is only outside. I mean in front of the university. […] For me, it all belongs to the university. […] [When I smoke] I also don't go far away from the university, I can always see it. ((laughs a bit)) (IP11)*[492]

These spaces were among the most frequently visited/occurring ones, but among the least positively construed. They were also among the spaces with the least frequent substance use. Most substances were never used in spaces associated with the university setting. As in the quote above, substance use in these spaces referred mostly to cigarettes.

9.2.7. Workplace

Fifteen participants (63% out of 24[493]) included their workplace on the map, and there were 16 spaces allocated to this setting. As the examples in Table 22 show, these spaces could refer

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[492] German original: "I: Was ist die typische Situation am Juridicum, an die du denkst? B: Wenn ich dort eine Lehrveranstaltung habe oder auch ... bissl vorher oder bissl nachher, wenn ich warten muss, dass sie beginnt oder sie gerade fertig ist […] oder ich treffe noch irgendwelche Kommilitonen […] oder wenn man sich in der Mensa sieht oder in der Mensa trifft, vor, nach, zwischen den Lehrveranstaltungen. […] I: und das Rauchen ist aber nicht ...drinnen? B: Nein nein sondern das ist nur draußen. Also vor dem Juridicum. […] Das gehört dazu für mich alles. […] Also da entferne ich mich auch nicht weit vom Juridicum, ich sehe es immer. ((lacht wenig))" (IP11).
[493] i.e., 79% out of 19 who reported being employed at least occasionally.

to work as well as breaks from work (e.g., with colleagues). However, participants typically included only one space associated with this setting and did not distinguish different areas within the workplace.

These spaces were similar to those associated with university: they were among the most frequently visited/occurring ones, but among the least positively construed. Workplace was one of the settings were participants' importance and valence ratings varied the most (i.e., as a group, participants expressed mixed views about these spaces). They were also among the spaces with the least frequent substance use. Most substances were never used in these spaces, and substance use referred mostly to cigarettes.

9.2.8. Café, bar or restaurant

This was one of the most commonly reported settings (by 23 participants; 96% of 24). In total, there were 46 spaces allocated to this setting, making it the second most common setting in this study (after 'own home'). It should be noted, however, that this category included a wide range of establishments. Although some participants distinguished cafés, bars, pubs and restaurants, others did not, as the same establishment might function as a café, bar or restaurant depending on the time of day or area within the establishment. A single category was therefore used in this overview. Chains such as "Starbucks" or "McDonalds" were also allocated here, as well as refreshment areas located within leisure or sports facilities. The activities within this setting were therefore diverse, as participants described, for example, going for lunch or grabbing a quick dinner after university, going for a formal dinner (e.g., with the partner), meeting friends, family or colleagues over a coffee or drink, attending a party, or working on university assignments. Consequently, a common distinction was between establishments located near the university and establishments located elsewhere. Areas or situations within the spaces allocated to this setting were not differentiated further.

Spaces associated with cafés, bars or restaurants were among those with the most frequent substance use. At the same time, participants' reported substance use frequency varied the most for this setting. There was especially notable variety among participants with regard to how often beer, wine, cider, spirits or mixed drinks were consumed in this setting. On average, beer, wine and cigarettes were the most frequently used substances. Comparing all settings, beer, wine, cider, spirits, mixed drinks and cigarettes were more likely to be used here than in most other settings.

9.2.9. Nightclub

Very few participants (4; 21% of 24) included nightclubs on their map. In total, there were four spaces allocated to this setting, making it one of the least common settings in this study. It was also the setting with the fewest number of spaces per participant. All clubs were located in Vienna. More participants reported having visited a club in the months prior to the interview, but most chose to include only the settings they visited *before* the club (e.g., bar, friend's home). They excluded the club itself, explaining that the club was too rare and too unimportant for inclusion on their map. Even those who included a club space on their map were unlikely to consider it important. Further areas or situations were not differentiated within this setting. One participant commented on the highly routinised nature of activities in a club (see the interview quote by IP3 on page 375).

These four spaces were overall the least important, among the least positively construed and among the least frequently visited/occurring. Participants all reported the same frequency of visitation/occurrence for the club spaces (a few times per year). They were, however, the spaces with the most frequent substance use. On average, wine, beer and spirits were the most frequently used substances in club spaces. Comparing all settings, beer, wine, spirits, mixed drinks, alcohol with medication and waterpipe were most likely to be used in club spaces, and cigarettes were more likely to be used here than in most other settings. There was notable variety among participants in terms of how often spirits or mixed drinks, waterpipe or alcohol with medication were used in club spaces, though this also reflected differences in participants' general substance use patterns.

9.2.10. Sports facilities

Over half of participants (13; 54% of 24) included sports facilities on their map, such as the gym, volleyball/football grounds, and dance studios. There were 16 spaces allocated to this setting. The typical situation imagined here was the sport itself, though some participants also thought of the situations immediately before or after (e.g., getting changed) or whilst waiting for one's turn. Spaces located in front of the gym (e.g., going outside for a break and to smoke) were also allocated to this setting.

These spaces were among those with the least frequent substance use. Most substances were never used, and if substance use did occur, it referred mostly to cigarettes and beer.

9.2.11. Other leisure facilities

Six participants (25% of 24) included other (not sport related) leisure facilities on their map. In total, there were nine spaces allocated to this setting, making it one of the least common settings in this study. These were heterogeneous and included museum and cinema, music and language schools, riding stables and dog training facilities, as well as youth and voluntary associations (including parties organised by these). If participants described different areas, the additional areas referred to another type of setting and were allocated accordingly for this overview (e.g., a café within the facility was allocated to 'café/bar/restaurant'; the journey to the language course was allocated to 'public transport').

Spaces associated with other leisure facilities did not receive particularly high or low ratings on any of the supplied constructs. It was notable that participants rated them similarly in terms of importance (as 'somewhat important'). On average, beer, cigarettes and wine were the most frequently used substances.

9.2.12. Nature

Fifteen participants (63% of 24) included nature spaces on their maps. In total, there were 20 spaces allocated to this setting. For this overview, this setting includes natural areas in the suburbs or outside the city (e.g., forest, mountains) as well as green spaces in the city (e.g., parks). Activities in these settings were diverse and could relate, for example, to study breaks, walking the dog, sports (e.g., hiking, cycling) and/or social interaction. If participants differentiated these spaces further, the additional areas typically referred to another setting (e.g., university, workplace, sports facilities) and were allocated accordingly for this overview.

Spaces associated with nature were the most important overall and among the most positively construed. In terms of frequency of visitation/occurrence, participants' ratings varied the most (from annually to almost daily, see also standard deviation data in Appendix J.2). On average, cigarettes and wine were the most frequently used substances in these spaces.

9.2.13. Urban spaces

Half of participants (12; 50% of 24) included urban public spaces on their map, and there were 24 spaces allocated to this setting. Four participants included three or more spaces on their map that represented this setting. The word 'urban' is used here to emphasise that participants referred to the cityscape (e.g., streets, squares) rather than green spaces (see previous

setting). Consequently, parks were excluded from this setting for this overview, although the distinction was not always straightforward.

Activities referred mostly to walking, either alone, with friends or the dog, in the daytime or in the evening. Walking could be a study break, a leisure activity in itself ("going for a walk"), associated with a café/bar visit, or a means of transportation (e.g., walking home). Some participants reported going for a walk specifically to smoke. Other typical situations associated with this setting included hanging out with friends or playing with children, though these were uncommon. Spaces described as "meeting a friend in town" or similar without further details were also allocated here. Out of all settings, this setting was among the most likely to overlap with or relate to other settings, with seven out of 24 spaces (29%) allocated to at least one other setting. Hence, participants often construed urban spaces with reference to multiple aspects (e.g., referring to a street *and* the bars located on that street).

Urban spaces were the most positively construed overall, and participants' ratings were very similar in this regard. On average, cigarettes were the most frequently used product and, comparing all settings, cigarettes were most likely to be used here. However, there was notable variety among participants in terms of how often cigarettes were used in these spaces, reflecting differences between non-smokers and daily smokers in the sample.

9.2.14. Shopping

This was one of the least common settings in this study, included only by three participants (13% of 24). Across these, there were four spaces allocated to this setting. For this overview, two different settings are considered together: shopping malls and supermarkets. These differed in that going to the shopping mall was seen as a leisure activity (e.g., window shopping; the mall could therefore also be considered a leisure facility) while the visit to the supermarket to buy food was seen as a practical necessity. Situations or areas within these spaces were not differentiated further.

Participants rated these four spaces similarly. They were among the least important and among the least positively construed. They were also the spaces with the least frequent substance use overall: no study participant reported any substance use.

9.2.15. Public transport

Seven participants (29% of 24) included public transport on their map. Most included only one such space on their map, resulting in eight spaces allocated to this setting and making it one

of the least common settings in this study. For this overview, this setting includes public transport within the city (e.g., subway, tramway) as well as outside the city (e.g., interregional train). Adjacent areas (e.g., stopping outside the subway station for a cigarette) were also allocated to this setting. Participants described different scenarios within public transport: from looking out of the window and daydreaming, to pre-loading of alcoholic drinks with friends on a night out. For some participants, the journey to a place was an integral part of the overall space associated with that place, as the following quote shows:

> *Whenever I go to class [at university], I always go with [a particular tramline] through [several Viennese districts] and somehow the journey is a part of it [the class] because I always go with [this tramline] (IP11)*[494]

The explicit listing of several Viennese districts in the above quote highlights that this setting related not only to the act of travelling to a destination but could also relate to places being passed en route. Another participant (IP9) emphasised this further by stating that she considered not only the interior of the subway when rating this space on the constructs, but also the places she passed whilst on the subway (e.g., associated with certain memories).

Public transport spaces were among the least important ones and were construed as least positive overall. However, there was notable variety participants in terms of how important they considered these spaces. On average, cigarettes, spirits, mixed drinks and beer were the most frequently used substances in spaces associated with public transport, although these spaces was generally characterised by no substance use.

9.2.16. Car

This was one of the least common settings in this sample, included by three participants (13% of 24). In total, there were four spaces allocated to this setting. The low number likely reflects the study population as well as the study context (e.g., well developed public transport in Vienna). Participants thought of driving the car or being passengers in their partner's or friend's car. Areas within the car were not distinguished; however, typical situations included driving to work, the parents' home or a holiday destination. One participant (IP13) initially thought of a variety of situations in the car, two of which related to smoking, but eventually chose being a passenger without smoking as the most typical one.

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[494] German original: "B: immer wenn ich zum Unterricht fahre, fahr ich immer mit [einer bestimmten Straßenbahn] durch [mehrere Wiener Bezirke] und die Fahrt gehört irgendwie dazu weil ich immer mit [dieser Straßenbahn] fahre" (IP11).

The four car spaces were among those construed least positively, and participants' valence ratings were most similar for this setting. They were also among the spaces with the least frequent substance use. No substance use was reported except cigarette use.

9.2.17. Holiday or work trip

Many spaces included on participants' maps were located outside Vienna, including abroad (e.g., parents' home, workplace, village pub). This was especially the case for those participants who were not from Vienna and who commuted on a daily, weekly or term basis. It did not seem useful to allocate many spaces a second time simply to highlight their location outside Vienna. This setting was therefore limited to spaces that represented holidays or work trips (day trips excluded). Ten participants (42% of 24) included such spaces on their maps, resulting in 20 spaces allocated to this setting. Labels typically included the word "holiday" (*Urlaub*) or the name of the destination visited. Spaces were diverse and referred, for example, to beach, hiking and city holidays (with family or friends), music festivals in Austria as well as study-related excursions. Some participants distinguished different situations within the holiday setting (e.g., pub visit versus general sightseeing), while others did not.

Participants thought of *specific* holidays they had recently been on and therefore struggled to think of a 'typical' situation as instructed. Instead, they either thought of a single event during the holiday (e.g., visiting a specific bar) or considered the holiday as a whole. Discussion of spaces in this setting was more likely to be based on particular memories rather than imagined typical situations[495], as the following quote shows:

> *Interviewer: What is the situation that you thought of now [in relation to the holiday]?*
> *Participant: London. Along the Thames. Hm ((thinking)) […]*
> *I: And […] how often do you drink beer in this situation?*
> *P: … ((long pause)) […] I think I didn't drink any beer then.*
> *I: Is it <u>one</u> specific … day you're thinking of?*
> *P: Yes, that's right. (IP23)*[496]

These spaces were the least frequently visited/occurring spaces overall. They were among the most positively construed ones, and participants' valence ratings were very similar. On average, beer and wine were the most frequently used substances in the spaces associated

[495] A further discussion of this was outside the scope of the present thesis, but Brotherhood (2019) presented the analysis informing this paragraph.
[496] German original: "I: […] was ist die Situation, an die du jetzt da [beim Urlaub] gedacht hast? B: London. An der Themse. Hm ((überlegt)) […] I: Und […] wie oft trinkst du in dieser Situation Bier? B: ... ((lange Pause)) […] ich glaube, da habe ich kein Bier getrunken. I: Ist es <u>ein</u> konkreter ...Tag, an den du da denkst? B: Ja genau." (IP23)

with holidays. However, there was notable variety among participants in terms of how often beer, wine or cider were consumed in these spaces.

9.3. From 'setting' to 'situation'

9.3.1. Beyond setting: four main components of everyday situations

Limits of an exclusively setting-focussed approach

The previous section grouped elicited spaces by setting, as the 'settings' concept offers an accessible way to describe space and place and is commonly used in health research. However, the analysis highlighted several issues of a setting-focussed approach which substance use professionals should bear in mind and which prompted a shift away from an exclusively setting-focussed approach in this study.

Firstly, the content analysis of elicited spaces found that participants did not always refer to settings when labelling or describing their spaces. The main reasons for this appeared to be:

- Even though the space was associated with a specific setting, *another* aspect of the space (e.g., people present, activity) was more salient for the participant. The setting was thus not reported. For example, space *4.5 Family* was associated with one setting (i.e., the participant's own home; information obtained from interview transcript); however, the salient aspect for the participant was the presence of her family.

- The space was *not* associated with one particular setting but with a particular activity or person. For example, space *4.4 Children* was associated with multiple settings (e.g., participant's own home, children's home, playgrounds, public spaces), with the common denominator being the presence of children who the study participant enjoyed playing with.

Even though most settings missing from the labels could be inferred or obtained from the interview transcripts, it is – from the constructivist point of view employed in the present thesis (see Part 1) – questionable whether a setting-focussed classification approach is desirable if it does not represent adequately how people think about space.

Secondly, an exclusively setting-focussed approach leads to the inclusion of vastly different situations in the same category. For example, participants reported the following activities in relation to the university setting: attending a lecture or seminar, studying in the library or reading room, taking a break within or outside the university, meeting fellow students and

friends, or attending a party held at night within the faculty building (see also Table 22, p. 345). If such details are not captured or reported, readers are likely to fill in the resulting gaps with their own imaginations regarding a space. These may differ from what a space actually represented. Another example illustrates this further. Two spaces referred to the coffeehouse chain “Starbucks”. Considering the setting alone, these two spaces might be grouped with other cafés (as was done in Table 22 above). However, in both cases, “Starbucks” referred to working on university assignments. It could therefore be considered to be more similar to the university than to other cafés. In summary, a setting-focussed approach runs the risk of omitting important details without which a space cannot be adequately understood. Moreover, if settings comprise such different situations that they cannot be interpreted meaningfully, the usefulness of a setting-focussed approach is questionable. In the present study, it became apparent that *setting* is just one component of everyday spaces.

Setting, activity, people, and time as main components of everyday spaces

To address the issues outlined above, the content analysis produced a classification system accounting for aspects other than ‘setting’. The components *setting, activity, people* and *time* were identified as main aspects referred to in the space labels, as illustrated in Table 23 below. Further aspects were, for example, place (e.g., name of a particular street) or personal relation (e.g., “my apartment”), but these could be subsumed within ‘setting’. Table 23 also identifies components (e.g., animals) which can be considered as additional aspects.

This is a departure from an exclusively setting-focussed approach which may suggest that knowledge of the setting alone is sufficient to understand a space. By definition, the setting – as an institutionalised socio-spatial arrangement including norms and physical structures – determines which people typically participate in a space, at what times, and with what activity. However, the elicited spaces highlight that settings are not necessarily associated with a single figuration on the other components (e.g., a café can be used for meeting friends but also for studying alone). Consequently, to characterise or understand a space, each of the four components should be considered (including in relation to each other, see Chapter 3).

The *conceptual implications* are that: i) at the basic level, space can be understood to emerge from specific combinations of the components *setting, activity, people* and *time*; and ii) in the sense of Chapter 3, space results from the interplay between these four components and the person construing the space. The next section builds upon this classification to propose a typology of everyday situations that may be relevant for understanding situated substance use.

Table 23: Components used by participants to characterise everyday spaces

Component	Example values	Examples of elicited spaces[a]	Nr of spaces (% of 296)[b]
Setting	Apartment, university, workplace, …	8.10 Studying – at home 10.2 Balcony 11.6 Tramway 13.9 My room in summer	197 (67%)
Place	Place names, street names, building names, …	1.9 Stephansplatz (afternoon) 11.9 Juridicum 17.12. Japan - Sightseeing 22.9 Donaukanal	83 (28%)
Relation to self	"Home", "my", …	8.1 My car 8.8 Regular pubs (Stammlokale) 11.4 At home 13.9 My room in summer	36 (12%)
Relation to others	His/her, …	7.10 [Relative's] kitchen 8.2 His car 9.10 At friends' homes 12.4 Apartment of partner	17 (6%)
Geographic relation	To, in front of, by, …	7.13 At home – downstairs 13.14 By the subway station before going home 14.9 In front of the Juridicum	8 (3%)
Activity	Attending lectures, studying, taking a break, …	5.10 Birthday parties 8.10 Studying – at home 17.12. Japan - Sightseeing 22.10 [Sport]	98 (33%)
Topic	Study subject	X.3 Uni – economics lectures X.8 Maths faculty	5 (2%)
People	Alone, parents, partner, friends, …	4.5 Family 13.2 With friends 16.4 Mum 18.7 Meet friends – restaurants/uni	77 (26%)
Animals	Dog, horse, …	7.7 Forest (horse) 8.5 Dog - walking	4 (1%)
Objects	Computer, …	17.14 Work - computer	1 (0%)
Time	Before/after, day-time, evening, weekday, weekend, summer, winter, term break, …	1.3 At parents' home during term break 1.9 Stephansplatz (afternoon) 13.18 Before the training 13.9 My room in summer 19.9 Restaurant in the evening 23.10 Lunchbreaks	31 (10%)

Note. Highlighted cells indicate main components. Participants always combined 'relation', 'topic', 'animals', 'objects' or 'time' with 'setting/place', 'activity' or 'people'.

[a] Underlined words show which aspect justified allocation to a particular component. Most elicited spaces referred to at least two components. During the analysis, spaces were allocated to more than one component as appropriate.

[b] Numbers are indicative only due to limitations of the analysis (e.g., allocation by a single coder, conceptual overlap between components [e.g., between 'setting' and 'place', with participants more inclined to refer to setting due to the interview situation], numbers do not account for differences between participants).

9.3.2. Suggestion for a general typology of everyday situations

The above considerations were of interest to the present study because *setting, activity, people* and *time* can be understood as 'construed socio-spatial aspects' in line with the overall research question. The question thus arose whether the additional components of activity, people and time could help predict situated substance more accurately than setting alone (further explored in section 12.2).

To support such analysis, the present study developed an ad hoc typology to incorporate the additional components. However, the multi-component classification system identified over 70 possible values across the four components (see Table 23 above for examples), meaning that combinations of these values could result in thousands of different situations. This level of complexity was not deemed useful for further research, and as noted above, in practice, components tend to coalesce in certain ways due to the institutionalised nature of settings.

The content analysis described in section 7.3.2 produced superordinate categories to summarise elicited spaces according to salient features (rather than classifying each aspect as above). By adapting these superordinate categories, the above complexity could be reduced by identifying nine types of everyday situation[497]: *at home; study/work; pauses; in company; going out/party; hobbies/leisure; eating/food-related; holiday/travel;* and *in transit*. A discussion of these types is beyond the present scope, but Table 24 shows how elicited spaces could be reordered accordingly. Format and order are the same as for the previous Table 22.

This typology was an attempt at developing an alternative to an exclusively setting-focussed approach in the hope that it would account better for the complexity of space and shift the attention away from *where* something is happening to *what* is happening[498]. Conceptually, the typology is not optimal[499] and should therefore be seen as a draft to inform the development of future typologies.

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[497] This thesis views 'situation' as "the 'smallest' possible relational arrangement" of a space (see section 3.2.3).
[498] In this context, 'at home' refers less to home as a setting but points to a particular characteristic of the home setting, namely flexibility of activity. Evidence for this was found, for example, in that participants were most likely (compared with other settings) to map several spaces when they thought of their home. IP19's description of her parents' home in section 9.2.2 also illustrates how the typical situation at home is that many different situations are possible. IP19 even developed a construct to express this (see construct *19.1* in section 10.2.11). Hence, in this typology, 'at home' refers to the particular *state* of being at home: going about everyday routines, completing tasks, engaging in spontaneous social interactions, doing 'nothing', and so on.
[499] The draft typology focusses mainly on activities in addition to settings (i.e., people and time are not well captured) and, by including different settings in the same category, includes different rules and constellations of people in the same category. The arrangement of types can also be questioned (e.g., whether study and work should be grouped together). Methodologically, 51 spaces (17% of 296) were allocated to more than one type (and more could have been allocated multiple times), suggesting that the types are not sufficiently distinct or well-defined. Additional

Table 24: Elicited spaces by everyday situation

Everyday situation	Examples of elicited spaces	Nr of spaces (% of 296)	Nr of IP (% of 24)
At home	2.1 My apartment for studying 2.2 My apartment with the flatmates 2.10 At home [where parents live] 15.14 Living room/kitchen - in the evening with friends 15.15 Living room/kitchen - watching TV 23.14 At home - [doing the] laundry	58 (20%)	23 (96%)
Study/work	2.1 My apartment for studying 8.3 Office 15.9 Library 15.11 Lecture theatre 17.5 Starbucks with [friend] = studying 20.2 University cafeteria	55 (19%)	23 (96%)
Pauses	8.11 Study breaks on the balcony 12.6 Reading room - breaks (outside) 12.9 Gym - breaks/way home 13.1 in front of the university (study break, before/after lecture) 17.2 Work – break 23.10 Lunchbreaks	12 (4%)	9 (38%)
In company	2.2 My apartment with the flatmates 4.4 Children [playing with friends' children] 5.5 [Partner's] room (just the two of us) 5.6 [Partner's] room (in company with others) 8.7 Drinking coffee with girlfriends 16.4 Mum 16.8 Work [breaks with work colleagues] 17.5 Starbucks with [friend] = studying 19.4 At my home - in company [friends visiting]	68 (23%)	23 (96%)
Going out/party	3.9 Yesterday's party ([at the university]) 3.10 Party ([nightclub]) 4.6 Homeparty 4.8 Bars 5.10 Birthday parties 5.11 [Music festivals] 7.11 Village pub/bar 17.8 London – pub 18.7 Meeting friends - restaurants/university	43 (15%)	21 (88%)
Hobbies/leisure	1.9 Stephansplatz (afternoon) [central square in Vienna] 2.7 Going for a walk in Vienna 2.8 Museum 3.7 [Shopping mall] 4.2 Mountains (holiday) 5.11 [Music festivals] 5.13 Music school 7.7 Forest (horse) 18.5 Sport – gym 23.6 Walking the dog	65 (22%)	24 (100%)

(continued on next page)

analyses could have tested the validity and reliability of the typology (e.g., using construct ratings or input from participants), but additional work on this typology was outside the remit of the present study.

(continued from previous page)

Everyday situation	Examples of elicited spaces	Nr of spaces (% of 296)	Nr of IP (% of 24)
Eating/food-related	3.13 Supermarket 12.10 Eating after university 12.11 Eating with partner [at a restaurant] 17.7 McDonalds 18.7 Meeting friends - restaurants/university 19.8 Café/restaurant at lunch-time 19.9 Restaurant in the evening 23.9 Partner - food and drink [at his place]	19 (6%)	14 (58%)
In transit	5.4 Train 8.1 My car 8.2 [Partner's] car 11.6 Tramway 13.5 Walking to work 17.15 Subway	13 (4%)	9 (38%)
Holiday/travel	4.2 Mountains (holiday) 6.7 Abroad (travel) 8.13 Holiday [Southern Europe] (evening) 17.8 London - pub 17.9 London - sightseeing	20 (7%)	10 (42%)

Note. Fifty-one spaces (17% of 296) were allocated to more than one type of everyday situation.

Even as a draft, the typology helps to understand the relationship between settings and situations. Comparing Table 22 and Table 24, there are notable differences in how elicited spaces have been allocated (e.g., *17.5 Starbucks with [friend] = studying* was allocated to 'café/bar/restaurant' in Table 22 but to 'study/work' in Table 24).

Table 25 shows the correspondence between both classifications across all 296 elicited spaces and allows several general insights[500]. It confirms that situations were *not* limited to certain settings (e.g., study/work spaces were also found in home settings and in cafés) and settings were rarely limited to just one type of situation (e.g., university setting also included pauses, being in company, partying, hobbies and eating). The number of situations per setting differed, and settings such as 'own home' or 'café/bar/restaurant' emerged as particularly 'flexible' settings, in the sense that they accommodated a range of situations. The marginal frequencies (last column/row) show, for example, that 'own home' and 'café/bar/restaurant' were the most common *settings*, but 'in company' and 'hobbies/leisure' were the most common *situations*. Hence, considering situations allows a different perspective on the data.

[500] At the detailed level, further observations could be made but these are beyond the scope of this thesis. To give some examples: home settings could be distinguished into general situations at home and situations specifically oriented toward being in company; university and workplace settings could be distinguished into 'work' and 'pause' situations (but 'pauses' include not just breaks from studying and work); café/bar/restaurant settings could be distinguished into 'eating/food-related' and 'going out/party' situations; elicited spaces where the setting was not defined were always defined by the people present; and so on.

Table 25: Classification of elicited spaces by setting and by everyday situation

Setting	Type of everyday situation									
	At home	Study/Work	Pauses	In company	Going out/Party	Hobbies/Leisure	Eating/Food-related	In transit	Holiday/Travel	**Total**
Own home	**40**	6	1	**14**	1	3	0	0	0	**65**
Parents' home	**16**	1	0	5	0	1	0	0	2	25
Partner's home	3	0	0	**13**	1	1	1	0	0	19
Home of friends or acquaintances	0	0	0	**12**	4	0	0	0	0	16
Home of relatives or family acquaintances	0	0	0	**7**	0	0	0	0	0	7
University	0	**31**	**6**	1	2	2	1	0	0	43
Workplace	0	**14**	2	1	0	0	0	0	0	17
Café/Bar/Restaurant	0	2	1	8	**30**	3	**16**	0	2	**62**
Nightclub	0	0	0	1	**4**	0	0	0	0	5
Sports facilities	0	0	1	0	0	**15**	0	1	0	17
Other leisure facilities	0	0	0	0	1	**8**	0	0	0	9
Nature	0	0	2	2	0	**16**	0	0	3	23
Urban spaces	0	0	1	7	5	**15**	0	2	0	30
Shopping	0	0	0	0	0	**2**	**2**	0	0	4
Public transport	0	0	0	0	0	0	0	**8**	0	8
Car	0	0	0	0	0	0	0	**4**	0	4
Holiday/Work trip	0	1	0	1	3	4	0	0	**18**	27
Setting not defined	0	0	0	**3**	0	0	0	0	0	3
Total	59	55	14	**75**	51	**70**	20	15	25	383

Note. Sixty-two spaces (21% of 296) were allocated more than once. For increased readability, populated cells are highlighted through shadowing, with top ranking cells (by column and by row) additionally emphasised. Allocation of elicited spaces to everyday situations was based primarily on labels developed during the interview, and allocation to multiple types was restricted by the information provided on these labels, as described in section 7.3[501].

At the same time, Table 25 shows that – despite diversity within settings – settings and situations *were* strongly related (e.g., study/work spaces were most likely 'found' in university and workplace settings). A statistical analysis of the data found the relationship between setting and general type of everyday situation to be highly significant ($\chi^2_{(136)}$= 1287,17; p < 0,001) and very strong (Cramer's $V_{(df=8)}$ = 0,65; λ_r= 0,36; λ_c= 0,59)[502]. This was to be expected, given that 'setting' is a key component of everyday situations.

[501] As a consequence, for example, even though interview transcripts showed that several participants reported thinking of food-related situations for their own home, this was not captured unless the labels associated with 'home' explicitly mentioned food.

[502] The λ_c value can be interpreted to mean that knowledge of the setting (and how settings relate to the general typology of everyday situations) improved the ability to accurately predict the general type of everyday situation with a single guess by 59% (see section 7.3.4 for further information on these indicators).

It was easier to predict the situation based on the setting (λ_c=0,59) (put simply: “tell me where you are and I’ll tell you what you are doing”) than the setting based on the situation (λ_r=0,36). Although this also reflected the higher overall number of settings, it emphasised that settings tended to be associated with few types of situations, while the same type of situation could be found in many settings. Section 12.2 extends this analysis by considering to what extent situated substance use patterns could be predicted using the above categories.

To summarise, the content analysis of elicited spaces found that an exclusively setting-focussed approach did not adequately represent participants’ construal of everyday spaces. Consequently, the analysis resulted in a list of settings as originally intended, as well as four components for characterising everyday spaces and considerations regarding a general typology of everyday situations. The findings suggest that everyday spaces may be grouped differently for different purposes. A setting-based approach can be appropriate, for example, for descriptive purposes (as in this chapter). If, however, we wish to understand how target populations construe spaces and how this relates to their own substance use, then alternative approaches (such as those presented in this section) may be more useful. The next chapter offers another perspective on how target populations may construe everyday spaces.

10. Latent dimensions for space construal

10.1. Introduction

This chapter addresses a key question of socio-spatial research: how do people construe everyday spaces? To explore this question, study participants were invited to talk about their own everyday spaces by comparing them to each other[503]. The resulting descriptions were summarised already during the interviews in collaboration with participants and written down as opposing pairs of phrases ('constructs'). Across the 24 participants, 108 constructs relating to everyday spaces were elicited, with an average of 4-5 constructs per interview[504]. These constructs were summarised through content and cluster analyses (documented in section 7.2), and this chapter presents the findings from these analyses.

In line with Kelly's (1963/1955) personal construct theory (see section 3.4.2), the descriptions were thought to represent personal constructs that participants held in their mind about their everyday spaces. However, from the perspective of the literature on substance use and space, they can also be seen as features of the immediate environment (e.g., 'contextual', 'situational' characteristics, see Chapter 4). Phrases such as 'socio-spatial aspects' or 'dimensions for space construal', which are more in line with 'sociology of space' thinking, are therefore used here to highlight that these aspects are neither located solely 'in the mind' nor 'in the environment' but *emerge from the interplay* between society, environment, and individual.

Interviews focussed on socio-spatial aspects that were personally important and salient for study participants[505], *independently* of whether these aspects related to substance use. In line with the arguments presented in Chapter 2, the idea underpinning the present study was to identify first what aspects constituted spaces from participants' perspective, and to consider only as a second step how these related to substance use and abstinence. This was intended to facilitate new insights regarding substance use and space.

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[503] Chapter 6 describes the interview methodology, while Chapter 9 gives an overview of the everyday spaces that formed the basis for the construct elicitation.

[504] One participant could only think of two constructs (i.e., all presented triads of everyday spaces resulted in the same two constructs); the remaining participants reported between three and six constructs ($\bar{x}$=4,5; SD=1,2). This was below the number of constructs typical for repertory grid interviews (further discussed in section 13.4).

[505] It was not feasible within this study to elicit all aspects that participants referred to in their construal of spaces. To ensure that elicited constructs were *personally important*, the present study used a relevant prompt ("liked or disliked" aspects) (see section 6.2). The study focussed on *salient* constructs in the sense that it captured whatever participants thought of first when asked about specific everyday spaces. A tenet of personal construct methodology is that participants will think of those constructs first which are in some way important to them.

This chapter therefore describes the socio-spatial aspects that were elicited from participants independently of their role for substance use. Chapters 11 and 12 then explore how the identified aspects related to situated substance use patterns in the present sample. In addition, Chapter 12 shows how socio-spatial aspects related to each other, how they emerged from the interplay of immediate environment, personal and societal factors, and how they shaped behaviour and other outcomes. Thus, this chapter forms the basis for subsequent analyses.

10.2. Twelve salient dimensions to summarise elicited constructs

Table 26 below provides an overview of the 12 dimensions[506] which emerged from the analysis of elicited constructs, as described in section 7.2. The first column provides the proposed name of the dimension and a brief definition. It then illustrates the contents of the allocated constructs, preserving the bipolar structure. Dimensions were generally named to reflect the pole preferred by participants (e.g., 'relaxation' rather than 'stress'). In addition, each pole was given a summary label (e.g., 'feeling close' vs. 'feeling distant'). The second column shows how many constructs were allocated to the dimension, expressed as an absolute number and as a proportion of all constructs. The final column provides the same information with reference to the number of participants. The absolute numbers differ between these two columns if a dimension contained several constructs from the same individual. Appendix M.4 shows the frequencies of elicited constructs by participant group, while Appendix I.2 lists the original constructs as allocated to the 12 dimensions. The dimensions are ordered thematically. Each dimension is described further from section 10.2.1 onwards.

Judging the 'importance' of dimensions

In repertory grid studies, it is common practice to quantify and account for the 'importance' of identified dimensions. Jankowicz (2004: 152–153) suggests presenting the categories emerging from the content analysis (i.e., 'dimensions') in an order that reflects how many constructs were allocated to them. Others include categories in their results presentation only if they include a minimum number of constructs (e.g., at least five constructs in Stone, 2003)

[506] Although the thesis generally refers to 'socio-spatial aspects', the term 'dimension for space construal' is used to describe the findings at hand. The term emerged naturally during the interviews when referring to the elicited constructs, and it was understood best by study participants (cf. 'constructs', 'aspects'). It is appropriate due to the bipolar nature of the categories emerging from the analysis of constructs, and helps distinguish the socio-spatial aspects presented here from the manifest aspects discussed in Chapter 9 (e.g., setting, activity, people, time). Conceptually, it can be said that people refer to these dimensions when construing spaces; the 'construed socio-spatial aspects' of a space are the *result* of applying these dimensions. In other words, participants described socio-spatial aspects of everyday spaces during the interviews, from which the dimensions guiding their construal (and consequently their descriptions of spaces) could be inferred.

Table 26: Twelve latent dimensions for space construal (summary of elicited constructs)

Latent dimension for space construal (label, brief definition, characterisation of both poles based on elicited constructs)	Nr of constructs (% of 108)	Nr of IP[a] (% of 24)
Closeness to people Whether we feel close or distant to other people emotionally. feeling close[b]: important people, close friends, family, people from my own country, know each other well, want to see each other often, liking them, can have good time with them, can have deep and meaningful conversations, easy to get on with, people who understand me, people I can trust and share anything with, part of my everyday life, part of who I am *versus* feeling distant: less or unimportant people, strangers, acquaintances, annoying people, disliked people, unknown or less well known, see less often, not much in common, don't know or understand me well, not emotionally attached to them, meeting up out of obligation, superficial relationship, can't imagine living with them	20 (19%)	16 (67%)
Orientation Whether we are focussed on our surroundings or on our ourselves. outward/interaction[c]: focus on other people, exchange with others, someone to talk/chat with, having fun with others, happy to be with others, others to cheer me up, getting to know new people, social, public, extroverted, being active, feeling productive, full of energy, no silence, no refuge *versus* inward/self[c]: alone, lonely, pursuing activities side-by-side, not talking to anyone, doing nothing, feeling bored, tired, lazy, unproductive, waiting for others to return, thinking about myself, a sanctuary, secluded, silence, privacy, time for myself, introverted, no demands from others	17 (16%)	15 (63%)
Togetherness of activity Whether we feel part of a shared activity or separated from others. together[b]: sitting together and talking with each other, doing something together as a group, few discussions, same opinions, young people, same age as me, friends *versus* separate: separate/different activities, not all together, old people, much younger or much older than me, family	5 (5%)	4 (17%)
Changeability Whether we experience a space as representing change or stability. varied[c]: movement, variety, colourful, special, occasion, new/novelty, adventure, stimulating, unpredictable, conflict possible *versus* the same[c]: sedentary activities, nothing new, nothing special, not stimulating, boring, everyday, routine, familiar, trust, shared history, memories, predictable, no conflict	12 (11%)	9 (38%)
Enjoyment Whether we feel joy or reluctance. feeling delighted[b]: interesting, fun, like doing this, leisure, looking forward to it, want to do it *versus* feeling reluctant: boring, less fun, necessary evil, nuisance, obligation, serious, serves a specific purpose, rather do something else	6 (6%)	5 (21%)
Relaxation Whether we feel relaxed or are occupied with outstanding tasks and issues. resting mind[b]: relaxed, clear head, calm, switching off, easy, trivial matters, no pressure, at my own pace, everything is done *versus* active mind: cognitive processes, intellectual, thinking or worrying about things to do, goal-oriented thinking, pressure, need to perform, not being good enough, work, studies, effort	12 (11%)	11 (46%)

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Latent dimension for space construal (label, brief definition, characterisation of both poles based on elicited constructs)	**Nr of constructs (% of 108)**	**Nr of IP[a] (% of 24)**
Type of social gathering Whether we experience a social gathering as a cosy get-together or as oriented toward party and excess. cosy get-together[b]: sitting together, cosy atmosphere, conversation or board games in focus, close friends, serious topics are allowed, can also wear sweatpants, staying in the same place, drinking not a focus *versus* party/excess: going out to party, inebriation as a shared goal, must have fun, drinking to get drunk, dancing, party music, loud, shout to be heard, meeting new people, gossip, serious topics not welcome	5 (5%)	4 (17%)
Substance use (SU) expectations Whether we feel that substance use is expected, acceptable or inappropriate. substance use expected[b]: can smoke if I want to, nobody bothered by smoking, expectation that alcohol (and possibly shisha) will be consumed, substances go together with this setting *versus* substance use opposed: people against smoking, can't smoke, must go out to smoke, alcohol does not belong here	3 (3%)	3 (13%)
Freedom of choice Whether we feel able to influence a space or must accept other people's decisions. self-determined[b]: my own choice, free to decide whether to do something or not, independent, doing something for myself, only things I like, be by myself if I choose to, feel at ease, something I want to do, something I'm pleased to have done *versus* other-determined: no choice, predetermined, limited options, I can't change the situation, doing something for others, obliged, something I have to do	7 (6%)	7 (29%)
Self-presentation Whether we feel able to show 'true' self or need to present a socially desirable self. can be myself[b]: few people, close relationship, no strangers, closed circle, feel at home, at ease, safe, relaxed, free, no accountability, no need to worry or be careful, can talk about anything, like being here *versus* have to restrain myself: many strangers, no privacy, restrictions, need to be aware of what I say, how I behave or how I dress, can't do everything, need to watch out, monitor the situation, can be held accountable, feel tense, effort required	6 (6%)	5 (21%)
Physical pleasantness Whether we experience the environment as physically pleasant or unpleasant. physically pleasant[b]: pleasant temperature/climate, clean, civilised, musicians playing and tourists watching, calm, can just sit and relax, outdoors, sun, fresh air, in nature, cosy/friendly atmosphere, can wear cosy clothes, furnished like my bedroom *versus* physically unpleasant: too hot, unhygienic, deviant behaviour, smell of cannabis in the night, hectic, loud, exhausting, indoors, dark, not much space, stuffy, in the city, formal, not cosy, furnished like a room at the doctor's	10 (9%)	10 (42%)
Sense of time Whether we experience time as endless or limited. open-ended[b]: long duration, time appears to stand still, nowhere else to go later, open end, holiday feeling, unstructured time, spending time together, a real meet-up, planned, more likely to be in the evening *versus* time-limited: limited/defined duration, structured, planned, an appointment, coming and going, spontaneous, got other things to do later, more likely to be during the day	5 (5%)	5 (21%)

Note. The format for this table was adapted from Jankowicz (2004: 154–155).

[a] IP = Interview participant. [b] Generally preferred pole. [c] For 'orientation' and 'changeability', participants differed in terms of preferences (further described in sections 10.2.2 and 10.2.4).

or if they represent a minimum number of participants (e.g., at least five participants in Naoi et al., 2006). Tomico et al. (2009) distinguish two aspects: “dominance” refers to how often a construct is mentioned relative to all constructs, while “importance” refers to the elicitation order of a construct (assuming that those elicited first are more important). Although Tomico et al. (2009) use the terms “salience” and “importance” interchangeably, Heckmann et al. (2019) show that salient constructs (i.e., which are elicited first) are not necessarily the most important constructs for a given topic. To measure importance, Heckmann et al. (2019) used a separate ranking exercise, and a similar approach was used in the present study (see section 6.2.7).

In the present study, all elicited constructs were considered to be salient and subjectively important, given the limited number of constructs per person and the use of specific interviewer prompts to elicit personally important constructs (as described in section 6.2.5). A further consideration which was not addressed in the reviewed literature is that an aspect may not be commonly used or ranked highly by the study sample but may still be theoretically important. In the present study, this affected several dimensions such as those explicitly relating to substance use. This is also in line with a more qualitative perspective on the data, which would establish importance through the theoretical significance of a dimension rather than its frequency. Consequently, all elicited constructs are considered in this chapter, regardless of whether they represented few or many participants.

Nevertheless, frequencies indicate which dimensions were important to a majority of study participants and which may therefore reflect constructs that are widely shared. In addition, elicitation order and perceived importance for a given topic can help paint a more nuanced picture of a dimension. Accordingly, Table 27 below presents simplified data on three indicators: frequency of constructs and participants (see also Table 26); number of times a construct was elicited first or second; and number of times a construct was considered to be most important or second most important in relation to the ideal space[507]. To facilitate comparisons between indicators, the original data were transformed into ranks per column[508], with the first rank (*1.*) indicating the most important dimension on a given indicator. For the interpretation, the original data were used (shown in Appendix I.3).

The frequency data show that elicited constructs most commonly referred to the perceived relationship with the people present (‘closeness to people’) and to whether participants were focussed on interaction with others (outside world) or on themselves (inner world)

[507] The ‘ideal space’ was a hypothetical and subjective ‘space of total well-being’ that participants were asked to imagine during the interview, as described in section 6.2.6.
[508] In the case of tied ranks (i.e., equivalent values), the rank mean was calculated in line with standard practice.

('orientation'). Constructs relating to each of these dimensions were elicited from more than half of participants, thus they represented widely shared dimensions in this sample.

Table 27: Indicators relating to the importance of constructs (ranks only)

Latent dimension for space construal	Frequency		Elicitation order		Importance for ideal space	
	Among 108 constructs	Among 24 participants	Elicited first	Elicited first or second	Most important	Most or 2nd most important
Closeness to people	1.	1.	1.	1.	6.	3.
Orientation	2.	2.	7,5. (=)	8.	7.	8.
Togetherness of activity	10. (=)	10,5. (=)	4,5. (=)	3,5. (=)	-	-
Changeability	3,5. (=)	5.	2.	2.	-	4.
Enjoyment	7,5. (=)	8. (=)	7,5. (=)	11.	1.	1.
Relaxation	3,5. (=)	3.	-	12.	5.	7.
Type of social gathering	10. (=)	10,5. (=)	4,5. (=)	3,5. (=)	-	10.
Substance use expectations	12.	12.	3.	5.	-	-
Freedom of choice	6.	6.	-	10.	2,5. (=)	5,5. (=)
Self-presentation	7,5. (=)	8. (=)	-	7.	2,5. (=)	5,5. (=)
Physical pleasantness	5.	4.	7,5. (=)	9.	4.	2.
Sense of time	10. (=)	8. (=)	7,5. (=)	6.	-	9.

Note. '(=)' indicates tied ranks within the column. '-' means that constructs allocated to this dimension were never elicited first or never ranked as most important, respectively. The original data can be found in Appendix I.3.

The additional data confirm the importance of 'closeness to people', as constructs relating to this dimension were also typically elicited first and were likely to be considered important for the ideal space. A different picture emerges, however, for 'orientation', which was not as likely to be elicited first and was also not as likely to be considered important for the ideal space. A possible interpretation could be that 'orientation' is a construct shared by many participants but is not as personally important as 'closeness to people'. The data from this table are further considered in the subsequent sections.

Note on subsequent sections

The following sections supplement the summaries in Table 26 above by describing each of the dimensions in more detail. Even though most of them do not relate to substance use per se, a more detailed elaboration of these dimensions is important, as subsequent analyses and chapters explore their relevance for substance use.

All original constructs are available in German from Appendix I.2, with English language summaries provided in Table 26 above. In the following sections, constructs which illustrate a

dimension well are translated in full. The numbers provided in parentheses after constructs identify the participant and the specific construct, including elicitation order[509]. Relationships between dimensions, including potential causal mechanisms, are explored, and indications given for how dimensions could be split up further if necessary. Selected excerpts from the interview transcripts further elaborate and illustrate points not fully captured in the constructs as written down during the interviews. Each section concludes by noting the likely importance of the dimension to the participants as a group and as individuals, based on the quantitative indicators shown earlier. Comparisons with the literature are drawn in section 13.2.3.

10.2.1. Closeness to people

'Closeness to people' refers to those constructs which described the relationship between the study participant and the other people present in the situation. These emerged, for example, when comparing different groups of friends or private versus public settings. This was the main dimension used to characterise the people present in a given situation. Constructs allocated to this dimension described a near/distant opposition which was associated with feelings of trust, attachment and well-being (e.g., feeling at ease). The complexity of this dimension is well expressed in the following construct:

> *Group of friends which are very close to me, part of my life, essential, can tell them everything, see them often, trust – Friends but not that close, don't see each other as often, seldom, don't need to know everything [about me], no obligation (13.1)*

Participants identified the kinds of individuals who they felt close to (e.g., family, partner, close friends, people with same language) and the kinds of individuals they felt distant from (e.g., acquaintances, strangers, people speaking another language). An important marker appeared to be how often participants saw the people concerned. However, they also identified other markers (which could be seen as prerequisites, features or consequences of closeness), such as having a good time together or meaningful conversations.

The dimension can be distinguished further by differentiating closeness (i.e., how close I feel to somebody) from likeability (i.e., how much I like somebody). Participants gave examples of where the two aspects were not related (e.g., IP19 referred to friends who lived abroad and who she liked but was not close to emotionally). Such a distinction was also evident in how opposite poles were worded. While some poles referred to people who were simply not well

[509] For example, construct 13.1 refers to the first construct reported by participant IP13. An added "R" indicates that the poles of a construct have been swapped ("Reversed") for the purposes of this overview.

known (closeness), others referred to people who were disliked (likeability). However, participants typically associated liking somebody with feeling close to them. A further possible distinction was between objective and subjective closeness. This was especially relevant in the case of (close) family members who could be close objectively but not experienced as close relations by participants.

'Closeness to people' was the most important dimension for study participants as a group. It was most commonly reported (by 16 participants; 67% of 24). Participants were likely to report multiple constructs related to this dimension[510]. It was most likely to be elicited first (by ten participants; 63% of 16) or to be among the first two elicited constructs (13 participants; 81% of 16). Although it was not generally considered to be the most important dimension in relation to one's hypothetical ideal space (ranked as most important aspect only by four participants; 29% of 14), it was still considered important for such an ideal space overall (ranked as most or second most important aspect by ten participants; 71% of 14).

10.2.2. Orientation

'Orientation' refers to those constructs which distinguished whether study participants were focussed on themselves or on their surroundings. This was conceptualised as an outer-inner axis. Further possible concepts to characterise this dimension include extroverted/introverted, outward-looking/inward-looking, processing inputs from outside/inside, or public/private. The following construct illustrates this dimension well:

> *Going out, meeting other people, exchange with others, extroverted – Time for me/us, refuge, introverted (17.4)*

The constructs related to several perspectives. While some constructs described possibilities for social interaction in a neutral way, others included an emotional component. Here, two different views emerged. One group of participants spoke of being glad to be in the company of others as opposed to feeling lonely (loneliness). By contrast, the other group described interaction with others as exhausting or a distraction, while the time by themselves was seen as a sanctuary or chance to focus on themselves (self-reflection). The following two constructs (both comparing situations in company or alone) exemplify this difference:

> *Feel at ease, familiarity, can talk [with each other] but don't have to, being together is fun – Alone, nobody to talk to, bored, focus on tasks and wait until other people come back (14.4)*

[510] Specifically, four participants were represented with two constructs each in this dimension (see Appendix I.2).

Not relevant for ourselves, just chatting, less reflective, focus on the present, switching off -- Thinking about what has happened, what [might happen] in the future, self-reflection (20.3R)

Several constructs allocated to this dimension referred to feeling active and productive (energy). Although somewhat different from the other constructs, an outer-inner axis was also implied here, as the following example shows:

Energy, productive (nature, outdoors, doing sports) – Being lazy, doing nothing, unproductive, procrastinating (9.4)

As participants did not evaluate the poles in the same way (e.g., inner-oriented pole as negative loneliness or as a positive chance for self-reflection), this dimension was split up during the later quantitative analyses to account for those differences in construal.

'Orientation' was the second most important dimension for the participants as a group (reported by 15 participants; 63% of 24). However, it was not as likely to be among the first elicited constructs (reported first or second by only five participants; 33% of 13). Participants were also not as likely to consider it important for their own hypothetical ideal space[511] (ranked as most or second most important aspect by only five participants; 38% of 13). To repeat the earlier interpretation, these data suggest that 'orientation' is a construct shared by many study participants but that may not be as important at the individual level.

10.2.3. Togetherness of activity

'Togetherness of activity' refers to those constructs which distinguished between undertaking activities together as a group or separately, as exemplified by this construct:

Sitting together and talking with each other – Separated, not all together, not everyone doing the same (8.1)

Participants reporting such constructs preferred for activities to be undertaken together.

The likelihood of undertaking activities together was seen to be greater if the group of people was small or if everyone in the group had similar preferences for what to do. Additional information from the interview transcripts suggested that the setting also played a role. One

[511] This can be interpreted to mean that most participants could imagine their hypothetical ideal space as inward- or outward-oriented (i.e., they had no strong preference for either pole).

participant noted that at a home party or on a beach holiday her and her friends were more likely to do things together (and to have fewer arguments about what to do) compared with when they went out to party or visited a city for holiday, as the following excerpt indicates:

> *At a home party… you can't just say "let's go somewhere else", because it is a home party and you stay where you are. (IP4)*[512]

The numeric cluster analysis suggested that constructs relating to age differences (e.g., distinguishing between older and younger people) could also be allocated to this dimension. It can be hypothesised that similarity in age ensures shared interests which translate into shared activities and the associated feeling of togetherness. In other words, it may be more likely that we do something together as a group if we are with people of our own age.

Although this dimension has links with 'closeness to people' and 'orientation', it constitutes a distinct dimension. People who are close to each other may still pursue activities separately (e.g., members of a family going about their everyday activities whilst being at home at the same time). Furthermore, one participant (IP5) used the example of going out with friends (i.e., an outward-oriented situation) to explain how the level of 'togetherness' can decrease as the group size increases. Consequently, the together/separate distinction adds another perspective with which outward-oriented situations can be better understood.

'Togetherness of activity' was one of the least frequently mentioned dimensions (reported only by four participants; 17% of 24). If relevant constructs were used, they were likely to be elicited first or second (three participants; 75% of 4). However, participants never considered constructs allocated to this dimension to be most or second most important for their hypothetical ideal space.

10.2.4. Changeability

'Changeability' refers to constructs describing change (or lack thereof) as a characteristic feature of spaces. Study participants used different reference points to identify variation or sameness. One group of constructs described change in absolute terms (dynamic/static). Another group identified change as a deviation from everyday life (special/everyday). Finally, one participant identified spaces representing change with reference to her own biography (biographical meaning). The following constructs illustrate those three reference points:

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[512] German original: "und auf einer Homeparty ... kann man jetzt nicht sagen, 'Ja gehen wir dort weiter', weil das ist eine Homeparty und man bleibt da wo man ist" (IP4).

Varied, always something else, associated with emotions – Boring, monotonous, no emotions, always the same, routine, nothing special (3.1R)

"Colourful", special occasion – Everyday (3.5)

New, recent addition to my life, not yet associated with memories – Grown up [here], a lot of history, memories (9.3R)

The same setting could be evaluated differently on these three perspectives. For example, one participant (IP3, see constructs 3.1 and 3.5 above) went out clubbing only rarely and thought of parties in nightclubs and similar settings as special occasions. However, when comparing different activities with friends, the parties in clubs were considered boring and monotonous due to their predictable structure, as the interview excerpt below shows. This example also highlights how personal preferences and reference points influence socio-spatial construing:

Well, there was nothing in particular, nothing special I'd say, well…. Many people, much… alcohol and… music and what do you do… at the party? You don't talk very often, well, you dance and .. nothing, erm, well I would say that… they [party situations] are similar […] all parties are similar ((laughs)) […] yes and I don't have so many emotions at the parties because… well, it's monotonous. (IP3)[513]

Consequently, the above perspectives show how the dimension could be distinguished further to produce more nuanced descriptions.

The numeric cluster analysis suggested that constructs relating to physical activity (e.g., distinguishing sedentary activities from walking/hiking) could also be allocated here. This made conceptual sense because moving through a landscape changes what we see or interact with. In fact, one participant (IP4) developed these two kinds of construct – one on physical activity and one on changeability generally – at the same time during the interview. Movement can therefore also be regarded as a marker of changeability. Overall, a situation was perceived as more varied if, for example, there were more people present or if there was much to see and do (e.g., when sight-seeing).

As the examples above suggest, participants often added an emotional component, whereby the new or dynamic was associated positively with stimulation and excitement, whereas the familiar or static was thought of as boring. However, there were also instances where the

[513] German original: "also da war nichts bestimmtes, nichts Besondres würde ich sagen, also ...viele Leute, viel ...Alkohol und ...Musik und was macht man ...bei der Party? man spricht nicht so oft, also man tanzt und ...nichts ahm, also ich würde sagen dass... die ähnlich sind […] alle Partys sind ähnlich ((lacht)) […] ja und ich habe nicht so viele von Emotionen bei den Partys weil .. ja, es ist monoton" (IP3).

familiar or static pole was positively associated. For example, one participant (IP6) highlighted that meaningful conversation was more likely to take place in familiar situations rather than situations which represented adventure and novelty. This also showed how 'changeability' can relate to 'closeness to people'. Another participant (IP21) preferred the static pole because the dynamic pole – as defined by her – referred to unpredictable situations (i.e., a negative form of excitement)[514]. To account for these differences in perception (e.g., static pole perceived negatively as boring or positively as reliable), this dimension was split up during the later quantitative analyses.

Considering the participants as a group, 'changeability' was neither particularly important nor particularly unimportant (reported by 9 participants; 38% of 24). However, participants were likely to report multiple constructs related to this dimension[515]. Furthermore, constructs relating to changeability were likely to be reported first or second (by seven participants; 78% of 9) and had some importance for participants' own hypothetical ideal space (ranked as second most important aspect by four participants, 57% of 7; never ranked most important). These data suggest that although changeability was not among the most commonly reported ones, it was an important dimension for those participants who referred to it in their construals.

10.2.5. Enjoyment

'Enjoyment' refers to those constructs which described feelings of enjoyment (or lack thereof) regarding the activities in a given situation. The construct poles were summarised as 'delighted' versus 'reluctant'. The following constructs, developed by study participants when comparing different groups of friends or kinds of activities, exemplify this dimension:

> *I enjoy doing this, I like doing this – I don't enjoy doing this as much, not as interesting for me (23.3)*

> *Looking forward to it, [I] set time aside for this – "I still have to …", feel reluctant, [I would] rather [do] something else (16.3)*

> *Voluntary, self-determined, fun/enjoyment – Obligation, serious, "dry" (17.1)*

The constructs allocated to this dimension suggested that participants enjoyed themselves if the activities were in line with their personal interests and if there was freedom of choice. It

[514] In this example, the dynamic pole characterised a situation with family members who were quick to start arguments so that the situation could change suddenly from being pleasant to being unpleasant.
[515] Specifically, three participants were represented with two constructs each in this dimension (see Appendix I.2).

was initially difficult to establish this dimension, as enjoyment can be the result of other socio-spatial aspects[516]. Finally, the role of *personal interests* clearly set 'enjoyment' apart from the other dimensions, as it highlighted how a space that corresponds to personal interests is associated with a sense of joy and the related notion of "looking forward to it". This also clarified how enjoyment related to freedom of choice (as participants were then free to act according to their own interests) without being part of the 'freedom of choice' dimension.

Possibly because of this overlap with other dimensions, constructs focussing on 'enjoyment' were not frequently reported (by five participants; 21% of 24). They were not likely to be reported first or second (reported first by only one participant; 20% of 5; never reported second). However, *all* participants who reported such constructs ranked them as most or second most important for their hypothetical ideal space (five participants; 100% of 5). This latter finding highlights the importance of 'enjoyment' as a dimension for space construal.

10.2.6. Relaxation

'Relaxation' refers to those constructs which characterised mental states in relation to (absence of) stress. The constructs were typically elicited with reference to study and work situations. A calm or resting mind, which dealt with nothing important or was "switched off" (a phrase used in several constructs), was distinguished from an active or stressed mind, which dealt with matters requiring conscious effort, intellectual activities, tasks to be accomplished, but also pressures to perform and associated worries. Another way to conceptualise this dimension was in terms of a pause/work opposition. The following constructs illustrate different causes of an active or stressed mind:

> *Clear/empty head – Cognitive processes, having to think, something intellectual (3.6R)*
>
> *No pressure, [no] stress, can go at my own pace – pressure (to accomplish things), nothing is right [the way I do it], being compared with others, not being good enough (6.4)*
>
> *Doesn't stress me out, doing nothing and not having to think of anything – Stress situations, still something to finish or do, thinking about it (12.4R)*

[516] For example, constructs 16.3 and 17.1 above show that enjoyment can be associated with freedom of choice, a separate dimension in the present analysis (section 10.2.9). Also, the simple like/dislike opposition implied in construct 23.3 could not be used to distinguish this dimension from the other dimensions, as these also referred to liked and disliked poles. In hindsight, laddering techniques (e.g., asking *why* participants enjoyed this space, see also Voss, 2015) – used only on an ad hoc basis in the present study – could have helped explore what aspects led to enjoyment or why enjoyment mattered and thus provided further insights into this dimension.

Reflexive thinking, relaxing, switching off – Stressful, goal-oriented thinking, more effort (14.3)

Although the stress-oriented pole was generally described negatively, some participants commented that being active was not necessarily negative and that stress could also mean excitement in a positive sense. However, it was not necessary to split this dimension during subsequent quantitative analyses, as no participant preferred the stress-oriented pole.

In terms of overlap between dimensions, the resting/stressed axis in this dimension could be seen to mirror the static/dynamic axis characterising 'changeability' (section 10.2.4); however, the specifics of the constructs allowed a clear distinction between the two dimensions (e.g., greater emphasis on relaxation in the present constructs). A challenge during the content analysis was that participants described different forms of relaxation, and that these could also be related to each other. Initial attempts to group those constructs together resulted in overly heterogeneous dimensions. Finally, a closer analysis of the opposing poles (i.e., relaxation in opposition to *what*?) in combination with the numeric cluster analysis allowed a more nuanced understanding of the constructs. As a result, it was possible to define the dimension 'relaxation' more clearly as referring to mental states and (absence of) stress. Constructs describing other forms of relaxation (e.g., in opposition to a hectic atmosphere) were allocated elsewhere (e.g., to the dimension 'physical pleasantness'), albeit acknowledging the interdependence of, for example, physical and mental relaxation[517].

'Relaxation' was the third most frequently mentioned dimension (reported by 11 participants; 46% of 24). These constructs were unlikely to be among the first two elicited (reported first or second only by two participants; 18% of 11); however, this may have been due to the order of triad presentation[518]. They were more likely to be considered important for participants' own hypothetical ideal space (ranked as most or second aspect for ideal space by four participants; 40% of 10).

10.2.7. Type of social gathering

'Type of social gathering' refers to those constructs which described different kinds of social gatherings, specifically whether these represented party and excess or cosy get-togethers.

[517] Alternative labels for the present dimension could have therefore been 'stress' or 'mental activity'. 'Relaxation' was considered to distinguish this dimension more clearly from the previous dimension 'enjoyment'.
[518] These constructs were usually elicited in relation to study/work contexts, but these were not typically covered in the first two triads (which were more likely to include home settings, cafés, bars and restaurants). Section 6.2.4 describes the triad formation procedures further.

These constructs were typically elicited when comparing leisure-time group activities with different friends or set in different locations or at different times of day.

This was one of two dimensions where substance use was a key characteristic (see also the next dimension). Most constructs included alcohol references, and one participant (IP14) defined her construct exclusively with reference to alcohol (see below). However, there were also instances where alcohol was not mentioned. For example, one participant (IP5) offered a construct on social interaction as being oriented toward fun or toward serious topics:

> *Goal: get drunk, can get out of hand, meet up to drink – Moderate drinking (if at all), drinking not a focus (14.1)*

> *Party, community, fun, it has to be fun, maintain contacts, find out what's new, "problems" do not belong here – it doesn't have to be funny, you can also talk about something serious (5.4)*

The constructs in this dimension suggested that it was the *interplay* of bodies, objects, substances, activities, sounds, and so on (rather than *singular* aspects) that produced the complex arrangements that in turn represented distinct types of social gatherings. One participant (IP5, represented in this dimension with two constructs) gave particularly vivid and detailed descriptions which illustrate this:

> *Going out, drinking, intoxication, party music, loud, on the move, need to shout to be heard – Sitting together, cosy, staying in one place, playing games (e.g., board games, not drinking games), drinking on the side (mostly because of the taste [rather than to get drunk]), music in the background, [emphasis on] conversation (5.5)*

Another participant (IP10) also mentioned dancing as part of the party-oriented pole.

It was noteworthy that the constructs in this dimension were phrased very similarly. For example, all participants used the word "cosy" (*gemütlich*) to describe one pole and most of them used the words "going out" or "party" to describe the other pole.

Construct 5.4 above hints at links between this dimension and 'closeness to people' (which covered the superficialness/depth of relationships)[519]. Links between these two dimensions were also evident from other constructs allocated here. For example, one participant (IP10) associated party and excess with meeting new people, and cosy get-togethers with close

[519] In fact, construct 5.4 could have also been allocated to 'closeness to people', but content and cluster analyses suggested that it was more closely related to 'type of social gathering'.

friends. A similar link was possibly implied by another participant (IP6) who noted that she could wear sweatpants during cosy get-togethers but not when going out to party.

Although the party-oriented pole was elicited first in most cases, cosy get-togethers were actually preferred for the hypothetical ideal space. This was noteworthy because in all other dimensions, the first-elicited pole was generally preferred for the ideal space[520].

'Type of social gathering' was one of the least frequently mentioned dimensions (reported only by four participants; 17% of 24). It was likely to be among the first two elicited constructs (reported first or second by three participants; 75% of four), but this may have been due to the presentation order of triads. Participants did not consider it to be especially important for their hypothetical ideal space (ranked second most important by only one participant, 25% of 4; never ranked most important). This relative lack of importance for participants as a group and as individuals was noteworthy, given the dimension's pertinence to the study topic. Additional comparisons suggested, however, that this dimension may have been more important for the 'heavier' substance users in this sample (see Appendix M.4).

10.2.8. Substance use expectations

'Substance use expectations' refers to those constructs which described whether substance use was more likely to be accepted (or even expected) or more likely to be considered out of place (or even opposed) in a given situation. This was one of two dimensions where substance use was a key characteristic (see also the previous dimension). Constructs referred to alcohol (and to a lesser extent water pipe) and cigarettes, as the following examples show:

> *Expectation that alcohol (and shisha) will be consumed, [substance use is] a part of it – Alcohol does not belong to this place (21.4)*

> *I can smoke here, it doesn't bother anyone – People are against smoking, can't smoke (13.2R)*

For this dimension, it was interesting to consider whose expectations these constructs referred to, what their content was, and whether they were formal or informal expectations. The analysis

[520] Further details on this are available from Appendix I.2: items *not* marked with an "(R)" are those where the preferred pole was elicited first. A possible interpretation could be that participants had a more complex or ambivalent relationship towards constructs in this dimension. However, it may have also been a methodological effect of the triads that were offered. For example, triad 5 included two spaces representing frequent poly substance use and one space representing infrequent substance use (see Box 4 in section 6.2.4). Since participants were asked to state first what two spaces in the triad had in common, this combination would explain why the party-associated pole was often mentioned first.

was limited because only three constructs related to this dimension. The following observations could be made based on the available constructs[521].

Regarding the first point (whose expectations), the two constructs on smoking referred to *other* people's views on substance use (e.g., whether others would be bothered), whereas the alcohol construct referred to the participant's *own* expectations. This was specifically clarified during the interview, as the following interview excerpt shows. The quote also hints at how expectations regarding substance use are formed based on past experiences ("that's how it's going to be"):

> *Interviewer: So, what I heard now […] is that substance use belongs to <u>these</u> situations-*
> *Participant: [It's] a bit of an expectation, yes*
> *I: […] ok but I had the feeling that it was not about peer pressure, I don't know […] how important peer pressure is for you*
> *P: No, it's also my own expectation, because I don't associate it [substance use] with my family, but when I meet up with friends, then I <u>do</u>*
> *I: So then you also expect it from yourself, it's not that you-*
> *P: ((interrupts)) Sometimes I also go there [to meet friends] with the- not in the sense of "you <u>have</u> to drink something now" but more like.. "yes, that's how it's going to be now", not positively or negatively, just as a … general attitude towards it (IP21)*[522]

Regarding the second point (content), the two smoking constructs were about acceptability versus opposition, whereas the alcohol construct was about alcohol not belonging to a place versus an expectation to drink. In other words, in this very small set of constructs, the expectations regarding cigarettes were tilted against use, whereas the expectations regarding alcohol were tilted towards use.

Regarding the third point (formal or informal), formal rules on substance use (e.g., smoking ban) did not feature in these constructs. Rather, the two smokers in this group specifically

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[521] Given the low number of constructs allocated to this dimension, it was considered to subsume them within related dimensions (i.e., 'type of social gathering' for the alcohol construct and 'freedom of choice' for the smoking constructs). However, the constructs were found to differ too much from those already allocated to these dimensions. Moreover, given their relevance for the study topic, it seemed important to keep them separate.

[522] German original: "I: Und was ich jetzt .. rausgehört habe [...] ist eher so dieses .. [...] zu <u>diesen</u> Situationen gehört der Substanzgebrauch dazu- Befragte: Die Erwartungshaltung ein bisschen, ja. [...] I: Okay weil um den Gruppendruck als solchen, habe ich jetzt das Gefühl gehabt- ich weiß nicht, ob der im [...] Vordergrund wirklich steht oder nicht für dich? B: Nein, es ist auch, es ist auch von mir persönlich ja auch eher so eine Erwartungshaltung, weil ich es zu meiner Familie nicht dazu ordne, aber wenn ich mich mit Freunden treffe, dann <u>schon</u>. I: Also da erwartest du das auch von dir selber, es ist jetzt nicht so, dass du- B: ((gleichzeitig)) Manchmal gehe ich auch hin mit der- also nicht jetzt so 'du <u>musst</u> jetzt unbedingt was trinken', sondern mehr so .. 'ja, das wird jetzt so sein'. Weder auf positiv noch negativ, sondern einfach so ...Grundeinstellung dazu."

clarified that formal smoking bans were less relevant to them than bans imposed by the people present in a given situation (e.g., friends, co-workers)[523].

As noted above, a challenge in establishing and describing this dimension was that it was rarely mentioned (by three participants; 13% of 24). It was the least important dimension for the participants as a group. Although it was likely to be among the first two elicited constructs (reported first or second by two participants; 67% of 3), it was never ranked as most or second most important aspect for participants' own hypothetical ideal space (even though two of these participants were daily smokers). This relative lack of importance assigned by participants was noteworthy, given the dimension's pertinence to the study topic.

A greater number of constructs in this dimension might have brought forth additional aspects, including formal expectations or alcohol expectations formulated by others. The analysis of interview transcripts allowed better insights in this regard (see section 12.4).

10.2.9. Freedom of choice

'Freedom of choice' refers to those constructs which described how much influence study participants had on a given situation. Construct poles were summarised as 'self-determined' versus 'other-determined'. The following construct illustrates this dimension well:

> *Free decision whether meet up or not, decide myself whether [to] do [it] or not – Forced, not my choice (12.2)*

The self-determined pole referred to having choices and being able to choose in line with one's preferences, doing something out of one's own free will, fulfilling one's own needs and wishes, and acting independently of others. The other-determined pole referred to having no choice, being unable to make changes, feeling obliged to do something, fulfilling other people's needs, and acting within parameters set by others. Several participants used the word "free" in relation to the self-determined pole. Consequently, this dimension could also be characterised as being about autonomy or power relations.

The other-determined pole was not limited to a certain situation but was expressed in relation to a variety of contexts. For example, one participant (IP9) felt that she could not change the way her family functioned, while another (IP3) felt that she could not avoid interacting with strangers when in a nightclub. One participant (IP16) referred to work contexts where she had

[523] It should be noted that a full smoking ban in cafés, bars and restaurants was not in force at the time of the fieldwork. Section 13.4 notes this as a point to consider when transferring the study findings to other populations.

to adapt to the situation as it presented itself to her, while another participant (IP11) referred to leisure contexts where she went out in the evenings only to comply with her friends' expectations. These examples suggested that there were links between this dimension and 'closeness to people', but that the relationship between the two dimensions differed depending on the study participant and the setting. Two multidimensional constructs[524] further suggested that participants felt less in control when interacting with family members or with co-workers, and more in control when interacting with close friends or mere acquaintances, indicating a non-linear relationship between 'closeness to people' and 'freedom of choice'.

The dimension had links with 'enjoyment' and 'relaxation', as constructs suggested that situations which were other-determined were less likely to be enjoyed and more likely to be associated with an active or stressed mind.

Considering the participants as a group, constructs relating to 'freedom of choice' were not commonly elicited (reported by seven participants; 29% of 24). They were not likely to be elicited first or second (reported second by two participants, 29% of 7; never elicited first). However, 'freedom of choice' had some importance for the hypothetical ideal space (ranked as most important aspect by three participants, 50% of 6; never ranked second).

10.2.10. Self-presentation

'Self-presentation'[525] refers to those constructs which described whether study participants felt able to show their 'true' self or a need to monitor and adjust their behaviour to ensure it was socially acceptable or socially desirable. The constructs implied that participants experienced vulnerability, anxiety or inner tension in those situations where they felt a need to monitor themselves, and increased well-being when this was not the case. The following constructs illustrate this dimension:

> *Cosy atmosphere, few people, feeling safe and relaxed – Many strangers, being aware of or thinking about what I do or how I dress (1.6R)*

> *I like being here, freer, at ease, relaxed – You have to restrain yourself, can't do everything, [need to] be on guard (13.4)*

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[524] These were constructs 7.2 and 16.1 (see Appendix I.2), initially allocated to 'freedom of choice' but finally allocated to 'closeness to people'.
[525] This dimension was originally labelled 'self-monitoring', as this expressed the contents of this dimension most accurately. However, the more neutral term 'self-presentation' was finally chosen to ensure consistent labelling practices across dimensions; such consistency was important for the subsequent analyses in Chapter 11.

Not effortful, not having to think – Keep the conversation alive, pay attention to how I behave (e.g., polite, entertaining), effortful, [requires] energy (18.2)

The construct poles were summarised as ‘be myself’ versus ‘restrain myself’. A private/public axis was implied in most, although not all constructs. Furthermore, the constructs suggested that ‘self-presentation’ was closely related to the dimension ‘closeness of people’. Participants explained that they were more likely to feel they could be themselves when they were in private settings, with few people who were (very) close friends, and if they had little or no responsibility. Conversely, participants were more likely to feel that they had to restrain themselves or be on guard when there was a lack of privacy (e.g., in public settings, surrounded by many strangers), in social situations with persons they did not feel close to, or if study participants had a certain responsibility or public role (e.g., as party host).

Study participants repeatedly (including in the examples above) referred to feeling relaxed or feeling free, suggesting an overlap with the dimensions ‘relaxation’ and ‘freedom of choice’. However, the constructs allocated to ‘self-presentation’ described much more strongly how awareness and behaviour differed between intimate and non-intimate settings.

‘Self-presentation’ was one of the less frequent dimensions in this sample (reported by five participants; 21% of 24). It was not likely to be among the first elicited constructs (reported second by two participants, 40% of 5; never elicited first). However, some participants viewed it as an important aspect for their hypothetical ideal space (ranked as most important by two participants, 50% of 4; never ranked as second most important).

10.2.11. Physical pleasantness

‘Physical pleasantness’ refers to those constructs which evaluated material or physical aspects of the environment. The constructs allocated to this dimension identified a variety of aspects that can distinguish a physically pleasant environment from an unpleasant one.

Of the ten constructs, one construct referred to *temperature* (pleasant or too hot), while another referred to *cleanliness* (clean or unhygienic). Two constructs referred to an *outdoors/indoors* distinction which was connected both times to air quality (fresh air or stuffy air). One of these participants extended this construct to include additional aspects such as nature versus city (see below). The following constructs illustrate these aspects:

Pleasant climate, pleasant temperature, not so hot – Very hot, much too hot (4.1)

Cleanliness, hygiene – Unhygienic, disgusting, don't want to be there or need to clean first (12.5)

Fresh air, outside, animals, nature, sun, exercise, sport – Inside the room, dark, small, enclosed/restricted, stuffy, city (24.4)

The remaining constructs described atmospheres emerging from complex arrangements. These had initially been grouped with other dimensions (e.g., 'relaxation') but were finally allocated here, as they were more strongly related to the environment. Two constructs described the *cosiness* of a place (cosy or formal). One participant (IP15) (when comparing living rooms in different homes) defined cosiness exclusively through interior design, whereas another (IP19) (when comparing a bar with a home setting) also considered how many activities were possible in a given situation (see below). Three constructs referred to the *peacefulness* of a place in terms of whether it was calm and quiet or hectic and loud (e.g., people coming and going). Study participants indicated feeling relaxed when it was calm, and exhausted or restless when it was hectic. Finally, one construct referred to *social order versus deviance*[526]. The following constructs illustrate these aspects:

Cosy, many activities possible (e.g., cooking, films), also sweatpants are acceptable – One activity (e.g., sit, talk, drink), formal, one-sided (19.1)

Calm, relaxed, keep my energy – Exhausting, tiring, draining, because [it's] loud (volume), restless, hectic (11.6)

"Civil", musicians play, tourists – "Free", rowdy/deviant behaviour (smell of cannabis in the night) (1.3)

Consequently, this dimension was more heterogeneous than other dimensions in this analysis. This led to some inconsistencies in the poles of this dimension, as preferred poles could refer to physical inactivity (sitting and relaxing under the aspect *peacefulness*) or activity (exercise and sports under the aspect *outdoors/indoors*). Similarly, hygiene could be preferred (under the aspect *cleanliness*) but appear to be at odds with preferences for cosiness or being in

[526] Construct 1.3 requires further commentary, as it was particularly difficult to group with other constructs during the analysis. It was developed by participant IP1 when comparing different kinds of public spaces in Vienna's city centre and was noteworthy in several respects. Most importantly, it was the only construct which explicitly addressed social order and deviance in an objective way (the participant appeared as an onlooker rather than a reference point). Moreover, it explicitly mentioned an illegal substance (cannabis) and used this as a marker for deviance and rowdiness (as opposed to a postcard image description of musicians and tourists representing orderly behaviour). It was therefore highly interesting from a theoretical point of view, and it might have been interesting to consider this aspect on its own as referring to social norms. However, given the planned quantitative analyses, it was not desirable to keep a dimension containing only one construct. Finally, the construct was allocated to the present dimension, given its parallels with the cleanliness construct 12.5 shown earlier.

nature. This had to be accounted for during interpretations of these data. Finally, it did not affect subsequent quantitative analyses, as these constructs were summarised with regard to whether they were perceived to create physically pleasant or unpleasant environments.

Considering the various aspects together, 'physical pleasantness' was among the more frequently mentioned dimensions (reported by 10 participants; 42% of 24). It was not likely to be among the first elicited constructs (reported first or second by three participants; 30% of 10). However, these constructs were among the most likely to be considered important for participants' own hypothetical ideal space (ranked as most or second most important aspect for ideal space by seven participants; 78% of 9). This included all constructs relating to cosiness, peacefulness, and cleanliness, and one of the outdoors/indoors constructs, suggesting that participants considered these physical/material aspects to be particularly important for their well-being in a space.

10.2.12. Sense of time

'Sense of time' refers to those constructs which focussed on characteristics of time, including objective and subjective ones (see below). The construct poles were summarised as 'open-ended' versus 'time-limited'. The following constructs illustrate this dimension well:

> *Time stands still, nowhere else to go later, nothing more to do, holiday feeling, open end (in the evenings) – Shorter, planned, fixed duration, must still do something afterwards (during the day) (18.1)*

> *"Proper" meeting, plan, certain goal, longer duration – short, coming and going, passageway, spontaneous (15.2)*

Study participants referred to the length of time (short versus long), the scheduling of time (planned versus spontaneous), the structure of time (structured versus unstructured), and the passage of time (keeping or losing track of time). The time of day (during the day or in the evening) also played a role, as well as whether or not there were additional activities planned for later in the day (defined or open time-frame).

Appointments during the day were generally portrayed as short, planned, structured and with a defined end. Participants implied that during these meetings they were conscious of time and what else they still had to do on that day. These appointments referred not only to work contexts, but also to meet-ups with friends, as the following quote shows:

I have so little time and therefore in my week it's always this kind of .. even though I don't have such an Outlook calendar […] where you make entries and they are coloured in […] well, my week is also always like, I always have appointments, appointments, appointments .. and at the back of my mind I also always have some sense of obligation, "I have to see these friends, otherwise I'll lose them", something like that, and then, well, I have to … insert appointments for them. (IP18)[527]

Descriptions of structured time (as in the quote above) typically emerged from a contrast with situations in the evenings, at weekend or during holidays, which were of a longer duration. In these situations, participants were more likely to feel they could lose track of time, and even though these situations were also organised in advance and could not continue endlessly, they were perceived as less planned and more open-ended than appointments during workdays. While this may suggest availability of time as an important criterion, construct 15.2 above identified a different kind of situation, namely *short* spontaneous meetings. Again, planned meetings were construed as less preferred due to their organised nature.

'Sense of time' was a less frequently elicited dimension in this sample (reported by five participants; 21% of 24). It was somewhat likely to be among the first two elicited constructs (reported first or second by three participants; 60% of 5). Participants were not as likely to consider it important for their hypothetical ideal space (ranked as second most important aspect for ideal space by one participant, 33% of 3; never ranked as most important).

10.3. The interrelated nature of socio-spatial aspects

The twelve dimensions presented above were the result of repeated and varied analyses, but the question of how to summarise and thereby structure the 108 elicited constructs is not simply methodological. It has strong theoretical implications in this thesis, since the resulting categories are proposed as 'socio-spatial aspects' that could be used in future socio-spatial research. The question of structure is thus considered not only in the methods but also here.

Even though repertory grid terminology refers to 'eliciting' constructs from study participants, constructs are not understood as clearly defined entities located within individuals ready to be discovered by researchers. This is especially relevant if participants are unlikely to have thought about the study topic before the interview (Höft et al., 2019: 353), which was found to

[527] German original: "B: Dadurch dass ich so wenig Zeit habe, ist es in meiner Woche immer so dieses, ...ich habe zwar nicht so einen Outlookkalender [...] wo man dann so etwas einträgt und dann hat das eine Farbe [...] also meine Woche ist halt auch immer so, ich habe halt immer so Termine Termine Termine ...und ich habe auch immer ein bisschen so diese Verpflichtung im Hinterkopf, 'ich muss diese Freunde sehen, weil sonst verliere ich sie', irgendwie so, und dann muss ich halt ...Termine für sie eintragen."

be the case in the present study[528]. Thus, constructs were *(co-)produced* by participants and the study author during the interviews (rather than being 'collected'), and this creative process of (co-)production continued during the analysis (this time involving the study author and other researchers, as described in section 7.2). Appendix I.1 gives an overview of the three main category systems that were developed over the course of the analysis. An initial category system comprising 39 subcategories was revised twice to result in 12 final categories (i.e., dimensions). The fact that constructs were 'produced' and could be organised in different ways emphasises the complexity and interrelatedness of socio-spatial aspects.

Given the critique of existing socio-spatial frameworks in section 3.4, the question at the core of this analysis was: how to define a socio-spatial aspect conceptually? This translated into more specific questions such as: how broad or fine-grained should the identified socio-spatial aspects be? How many (and which) aspects are necessary for a framework of core aspects to inform socio-spatial analysis? Should aspects refer to manifest characteristics of space and/or to more latent ways of construing? These questions were answered through the empirical work with the data, as the following paragraphs show.

The initial categorisation sought to distinguish very clearly between different socio-spatial aspects. For example, a number of categories were developed to characterise the people present in a given situation (e.g., by age, ethnicity), as these characteristics were explicitly mentioned in the elicited constructs. However, as the analysis unfolded, the question arose whether those aspects were not merely manifest markers of more latent phenomena. In other words, it was considered *why* aspects such as the age or ethnicity of the people present might matter in a given situation. The data suggested that they might have mattered because they helped participants feel close to others and to engage in shared activities. These latter aspects therefore became increasingly important in the present study. The analysis shifted from a focus on semantic *differences* between constructs towards the consideration of their deeper meaning and *relationships* among constructs, including possible causal chains. To develop such chains, manifest characteristics of a space (e.g., number of people, age, ethnicity, relationship, kind of activity) were positioned at the beginning of the chain, followed by more latent ways in which participants construed space (such as feeling distant, lonely or bored)[529].

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[528] Several participants commented that they were not used to thinking about their everyday life in terms of spaces and socio-spatial aspects. This highlights the value of the dedicated element elicitation phase at the beginning of the present interviews (i.e., mapping of spaces and imagining typical situations, as described in section 6.2.2) to make the study topic more relatable.

[529] This approach was based on causal chains already formulated in this study, including in the draft conceptual model (see section 4.2.4) and during the analysis of interview transcripts (see Chapter 12).

Hypothesising about possible causal chains helped develop the final set of dimensions. It was useful to identify constructs that were semantically different but that could be grouped together as referring to the same underlying phenomenon. For example, cluster analyses found numeric similarities between physical activity (e.g., walking/hiking) and the construal of a space as varied (as described in section 10.2.4). It was hypothesised that physical activity is a possible antecedent for the perceived changeability of a space and that – from a socio-spatial perspective – physical activity mattered primarily *because* it made a space more varied. Consequently, the two aspects were grouped together, understood as representing the manifest side and the latent side of the same phenomenon (or manifest and latent variables in the same causal chain).

Furthermore, this approach was useful to learn from and allocate multidimensional and difficult-to-allocate constructs, which are often disregarded in other repertory grid studies. These frequently implied miniature causal chains, as the following examples show:

> *Cosiness and well-being, feeling "at home", no strangers, not accessible to others, you feel freer – No privacy, many people whom you don't know, restrictions (4.4)*

> *([I] like this because) [it is] easier, simple – ([I] don't like this because) [it] requires effort, [I need] to concentrate, need to memorise something, need to be active (22.4)*

The constructs above could be reorganised into causal chains such as the following:

> *private space, only accessible to friends → no strangers, know everyone present → feel freer, unrestricted → space associated with cosiness and well-being, feeling "at home"*

> *need to memorise something → need to concentrate → requires effort → space is disliked*

Construct 4.4 is an example of a complex chain showing how privacy, closeness to people, self-presentation and well-being are related, while construct 22.4 is an example of a simpler chain of more closely connected steps. In both cases, the four steps shown in each example could all be considered as distinct socio-spatial aspects. To reduce complexity, it was decided to focus on the last socio-spatial factor in a chain as the key underlying phenomenon. However, most chains had the same or similar (explicit or implied) endpoints, related to liking/disliking a space or personal well-being (as in the examples above). Referring to such similar endpoints would not have allowed for sufficient distinction between constructs and would have precluded the development of useful categories. Such endpoints were therefore conceptualised as outcomes rather than as socio-spatial aspects in themselves. To return to the examples above, "feel freer, unrestricted" and "requires effort" were therefore interpreted as the key socio-spatial

aspects in these chains (consequently allocated to the dimensions ‘self-presentation’ and ‘relaxation’).

In summary, exploring relationships between and within constructs as outlined above helped to group constructs, merge draft categories, and develop a better understanding of the final dimensions. This approach produced a set of 12 relatively broad dimensions that referred to latent ways of construing space rather than manifest characteristics of space. The advantage of this approach is that it allows for a more concise and widely applicable set of dimensions, relevant to a broad range of everyday spaces. The dimensions can be split up further if necessary (as indicated in the descriptions), but as subsequent chapters will show, they are sufficiently clear and distinguished in their current form to be theoretically and practically useful. The descriptions of each dimension in section 10.2, alongside the documentation of draft categories in Appendix I.1, allow the reader to judge the categorisation process and to develop a more refined category system if needed. It should be noted that while dimensions could be split up further, the data did not support further merging of dimensions without producing overly complex and ambiguous categories.

The next chapter uses the latent dimensions for space construal presented here to discuss different patterns of situated substance use and abstinence. The interrelated nature of socio-spatial aspects – only briefly explored in this section – is revisited in a more systematic way in Chapter 12, where additional narrative data from the interview transcripts are used to trace dynamic pathways to situated substance use outcomes.

11. Patterns of situated substance use or abstinence

11.1. Introduction

The previous two chapters described what everyday spaces study participants thought of and what socio-spatial aspects participants used to construe these spaces. This chapter builds upon these findings to address a key question of the present study: are spaces representing different patterns of situated substance use construed differently, and if so, how? The underlying assumption was that spaces which differ in terms of substance use patterns may also be construed differently on the socio-spatial aspects identified in Chapter 10. By exploring this assumption, we can also begin to think about how construed socio-spatial aspects might causally relate to situated substance use (further explored in Chapter 12).

While Chapter 9 provided an overview of reported substance use frequency across all 296 elicited spaces[530] individually for each substance/product (Figure 12), it is more accurate and useful to consider patterns accounting for multiple substances. This chapter therefore introduces a typology of situated substance use patterns[531] (with a focus on alcohol and cigarettes) based on substance use and valence[532] data collected for each elicited space[533].

The typology (shown in Table 28 below) includes different levels of detail, from a broad distinction between no or rare substance use (abbreviated as 'NSU' in the present thesis) and at least occasional use of alcohol or cigarettes, to a further distinction by broad substance category (i.e., alcohol, cigarettes) and, at the most detailed level, distinctions according to specific products and valence. Due to this nested structure, elicited spaces could be allocated to up to three patterns (e.g., spaces of occasional beer consumption were allocated to 'Wine/beer', 'Alc' and 'Alc/cig'). Ideal spaces imagined by study participants are also included as proxies for subjectively ideal patterns of situated substance use or abstinence[534]. Table 28

[530] Elicited spaces included spaces that were part of study participants' weekly routines, personally important spaces (regardless of whether these were visited weekly), as well as spaces related to substance use (e.g., last use occasion, subjectively heavy use, subjectively typical use). Section 6.2.2 describes how spaces were elicited, and Chapter 9 describes elicited spaces by setting.
[531] The terms 'spaces', 'types of space' and 'patterns' are used somewhat synonymously in the present chapter, as the chapter explores types of spaces representing different patterns of situated substance use or abstinence.
[532] Participants were asked what feelings they had regarding each elicited space (i.e., positive; rather positive; ambivalent; rather negative; or negative feelings) (as described in Chapter 6).
[533] The analyses that led to this typology are described in section 7.3.3.
[534] The 'ideal space' was a hypothetical, subjective "space of total well-being" that participants were asked to imagine during the interview, as described in section 6.2.6. It provided a reference point in the analysis to better understand how participants viewed spaces associated with substance use or abstinence. It was also understood as an indication of how participants construed their ideal substance use (further explored in section 11.3).

starts with these subjectively ideal spaces and proceeds then from lighter to heavier substance use patterns[535]. The first two columns show the colour and label used in later visualisations; the six broader patterns are highlighted in bold, and the two main reference spaces (as introduced in section 7.4.3) are underlined. The third column provides a definition for each pattern. The fourth column shows how many elicited spaces were allocated to the pattern, expressed as an absolute number and as a proportion of all spaces. The final column provides the same information for the number of participants. The absolute numbers differ between these two columns if several spaces from one individual were allocated to the same pattern. Appendix M.5 shows the frequencies of patterns according to participant subgroups.

Methodological details regarding the typology are available from section 7.3.3. To summarise, for a space to be considered (primarily) associated with particular substances/products, the substances/products of interest had to be used *at least occasionally*, while other substances/ products were to be used *never or rarely*. Exceptions were made for the overarching 'Alc/cig' pattern (no restrictions on other nicotine products or medicines), for spirits and mixed drinks[536] (no restrictions on other alcoholic beverages) and medicines (to be used never, except in the overarching 'Alc/cig' pattern). The typology was devised so that 271 elicited spaces (99% of 273[537]) could be included at the broadest level ('NSU', 'Alc/cig'), and 249 elicited spaces (91% of 273) could be included at the most detailed level comprising eight patterns. Relatively few spaces were excluded: these represented substance use patterns not in line with the study focus or not common in the sample (hence Table 28 refers to 'main' patterns)[538].

The next section shows visualisations from the quantitative analyses for all patterns, and subsequent sections describe each pattern separately. The descriptions identify possible unique characteristics of each pattern by comparing it with the two main reference spaces as

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[535] Though keeping in mind that patterns were established based on product categories and frequency of substance use in that space; they did not account for quantities used or overall visitation frequency of the space.
[536] 'Mixed drinks' included drinks that participants mixed themselves as well as pre-mixed drinks (also known as 'ready-to-drink' or 'RTD' beverages). In this chapter, 'spirits' and 'mixed drinks' are considered together, as participants did not distinguish consistently between the two categories.
[537] i.e., 296 elicited spaces minus 23 spaces 'dropped' before construct elicitation, as explained in section 6.2.4.
[538] At the broadest level comprising spaces of no or rare substance use (labelled 'NSU') and spaces associated with alcohol or cigarette use ('Alc/cig'), 271 elicited spaces (99% of 273) were allocated to either pattern. Two spaces (<1% of 273) were associated only with the use of waterpipe or medicines but no alcohol or cigarette use. In line with the study focus, they were excluded from analysis. At the next level, four patterns distinguished whether spaces were associated only with alcohol ('Alc') or cigarettes ('Cig), with both ('Alc&Cig'), or neither ('NSU'). Of the 271 spaces mentioned earlier, 261 were included. The remaining 10 spaces were associated with alcohol or cigarettes *as well as* other products (waterpipe, medicines). They were included only in the broad pattern representing alcohol or cigarette use ('Alc/cig'). At the most detailed level distinguishing different products (e.g., 'wine/beer', 'spirits/mixed drinks'), 249 elicited spaces (91% of 273) were allocated to one pattern each. Twelve spaces represented other patterns but were too few to form separate categories in the analysis. Consequently, spaces associated with the use of cider (3 spaces) or sparkling wine (8 spaces) were only included in the broad alcohol pattern ('Alc'), and one space associated with cigarettes and sparkling wine was included only in the broad pattern referring to alcohol and cigarette use ('Alc&cig').

Table 28: Main patterns of situated substance use and abstinence in the present sample

Colour[a]	Label[b]	Description and operational definition	Number of elicited spaces (% of 273)[c]	Number of IP (% of 24)
	Ideal	• Hypothetical ideal spaces representing total well-being, as imagined subjectively by participants (as per section 6.2.6) • No further operational definition required, as the space was already defined during the interview	N/A	22 (92%)
	NSU	• Spaces of no or rare substance use • Operational definition: Any alcoholic beverage or nicotine product used 'never' or 'rarely', medicines 'never'	144 (53%)	23 (96%)
	NSU pos	• Positively perceived spaces of no or rare substance use (a subcategory of 'NSU') • Operational definition: as for NSU, with additional requirement that valence is 'rather positive' or 'positive'	102 (37%)	23 (96%)
	NSU neg	• Negatively perceived spaces of no or rare substance use (a subcategory of 'NSU') • Operational definition: as for NSU, with additional requirement that valence is 'ambivalent', 'rather negative' or 'negative'	42 (15%)	20 (83%)
	Alc/cig	• Spaces associated with alcohol or cigarette use, regardless of other substance use • Operational definition: at least one alcoholic beverage or cigarettes used 'occasionally', 'often' or 'always', no restrictions on other nicotine products or medicines	127 (47%)	24 (100%)
	Alc	• Spaces associated primarily with alcohol (a subcategory of 'Alc/cig') • Operational definition: at least one alcoholic beverage used 'occasionally', 'often' or 'always', nicotine products 'never' or 'rarely', medicines 'never'	61 (22%)	19 (79%)
	Wine/beer	• Spaces associated primarily with wine or beer (a subcategory of 'Alc') • Operational definition: wine or beer used 'occasionally', 'often' or 'always', other alcoholic beverages and nicotine products 'never' or 'rarely', medicines 'never'	34 (12%)	15 (63%)
	Spirits/mixers	• Spaces associated primarily with spirits or mixed drinks (a subcategory of 'Alc') • Operational definition: spirits or mixed drinks used 'occasionally', 'often' or 'always', no restrictions on other alcoholic beverages; nicotine products 'never' or 'rarely', medicines 'never'	16 (6%)	9 (38%)
	Cig	• Spaces associated primarily with cigarettes (a subcategory of 'Alc/cig') • Operational definition: cigarettes used 'occasionally', 'often' or 'always', alcoholic beverages and other nicotine products 'never' or 'rarely', medicines 'never'	35 (13%)	7 (29%)
	Cig pos	• Positively perceived spaces associated primarily with cigarettes (a subcategory of 'Cig') • Operational definition: as for Cig, with additional requirement that valence is 'rather positive' or 'positive'	26 (10%)	7 (29%)

(continued on next page)

(continued from previous page)

Colour	Label[a]	Description and operational definition	Number of elicited spaces (% of 273)[b]	Number of IP (% of 24)
	Cig neg	• Negatively perceived spaces associated primarily with cigarettes (a subcategory of 'Cig') • Operational definition: as for Cig, with additional requirement that valence is 'ambivalent', 'rather negative' or 'negative'	9 (3%)	5 (21%)
	Alc&cig	• Spaces associated primarily with alcohol *and* cigarettes (a subcategory of 'Alc/cig') • Operational definition: at least one alcoholic beverage used 'occasionally', 'often' or 'always', cigarettes used 'occasionally', 'often' or 'always', other nicotine products 'never' or 'rarely', medicines 'never'	21 (8%)	8 (33%)
	Cig&beer/wine	• Spaces associated primarily with lower percentage alcohol *and* cigarettes (a subcategory of 'Alc&cig') • Operational definition: beer or wine used 'occasionally', 'often' or 'always', cigarettes used 'occasionally', 'often' or 'always', other alcoholic beverages and nicotine products 'never' or 'rarely', medicines 'never'	11 (4%)	7 (29%)
	Cig&spirits/ mixers	• Spaces associated primarily with higher percentage alcohol *and* cigarettes (a subcategory of 'Alc&cig') • Operational definition: spirits or mixed drinks used 'occasionally', 'often' or 'always', cigarettes used 'occasionally', 'often' or 'always'; no restrictions on other alcoholic beverages; other nicotine products 'never' or 'rarely', medicines 'never'	9 (3%)	5 (21%)

Note. Additional patterns were identified but could not be included in the analysis (as described in section 7.3.3).
[a] Colour used in later visualisations. [b] Bold emphasis indicates broader patterns. Underlined emphasis indicates main reference spaces for the comparisons of multiple patterns. The symbol "/" denotes an "OR" relationship in a Boolean sense (e.g., 'Wine/beer' means that spaces were allocated to this type if they were associated with the use of wine or beer or both), while "&" denotes an "AND" relationship (e.g., 'Alc&cig' means that spaces were allocated to this pattern only if they were associated with alcohol as well as with cigarette use). [c] The quantitative analysis was based on 273 elicited spaces (296 elicited spaces minus 23 spaces 'dropped' before construct elicitation as per section 6.2.4).

well as selected other patterns. Data tables in Appendix K show further details which, although considered in the analyses, could not be included in the text. The descriptions also present data on the settings associated with each pattern[539], typical situations imagined by participants, and other contextual information provided during the interviews. Quantitative and qualitative data typically referred to the same elicited spaces, so that the data complement each other. Interview excerpts illustrate why participants construed spaces differently[540].

[539] Section 12.2 considers more extensively how the identified patterns related to the settings and general types of everyday situations presented in Chapter 9.
[540] Section 7.5.5 documents how interview excerpts were selected. It is worth noting that the excerpts contain many interesting aspects that could not be commented upon in this section. Selected results from a separate analysis of interview transcripts are presented in Chapter 12.

The descriptions of situated substance use patterns serve several purposes. Above all, they portray what was learnt about each pattern through the present data analyses. Through this, they show *that, how and why*[541] spaces representing different substance use patterns were construed differently by study participants. This can in turn inform hypotheses on how spaces might be construed by substance users beyond the immediate sample. Section 12.3 summarises the descriptions by identifying those latent dimensions for space construal that could help to distinguish between different patterns of situated substance use or abstinence.

The question of how different substance users (e.g., occasional vs. daily smokers) might construe patterns differently was originally outside the remit of this study for practical reasons, but it became more relevant as the study progressed[542]. Finally, group differences were addressed but only in part, namely by focussing on differences that seemed particularly noteworthy during analysis. This was the case for spaces associated with alcohol *and* cigarette use, and sections 11.5.3 and 11.6 include relevant pointers. Appendix M provides additional data according to participant subgroups, including an overview of which subgroups reported which patterns and which subgroups were represented in which comparisons.

The final section in this chapter explores how the situated patterns and related spaces can be understood as parts of socio-spatial networks at the individual level.

11.2. Charts showing key data

This section displays 35 charts: 14 ‘single pattern’ charts to show each pattern of situated substance use or abstinence individually; 19 ‘comparison’ charts comparing multiple patterns; and two ‘standardised comparisons’ of all patterns relative to reference spaces. Additional charts comparing participant subgroups are shown in Appendix M.6, and a further comparison

[541] The quantitative data in this study could, in principle, support statements regarding possible associations (though not causal relationships) between substance use and the identified dimensions for space construal. However, the fragmented nature of the data in this study (as described in section 7.4) resulted in some extremely small sample sizes (e.g., n=1, n=2), so that generalisations from these data in a statistical sense would not be justified. The present descriptions therefore contextualise the quantitative findings using qualitative data, highlighting also possible explanations for *why* spaces might be construed differently. This allowed moving the analysis from one focussed on association to one exploring possible causal mechanisms, adding to the credibility and potential transferability of the quantitative findings to other contexts despite small sample sizes.

[542] As described in Chapter 5, the present study (due to its inclusion of multiple spaces and substances) required a relatively homogeneous study sample to avoid an overly complex study design. The present study therefore sought to focus on a single group and to exclude group differences by design. In practice, a homogeneous study sample was not achieved. As a consequence, it was necessary to account for the de facto heterogeneity of the sample, but the possibilities to do so were limited because such an analysis would have required a different study design (e.g., including a greater number of participants per comparison group). Finally, the heterogeneity of the sample was accommodated by including relevant data in Appendix M and considering it in the main text where participant differences were particularly notable during analysis.

chart is included in section 13.5.2. Further details on the underlying analyses and choice of comparisons are available from section 7.4.

The descriptions of patterns from section 11.3 onwards can be read without referring to data visualisations. Nevertheless, the charts are shown first to clarify the basis upon which the descriptions were developed. Readers may choose to skip the present section and return later on to view specific charts. The charts are, however, displayed in a very compact format (e.g., without legends)[543]. The following pages therefore explain their format and contents in a generalised way. Section 13.5.2 (Figure 39, p. 568) contains an additional comparison chart with a full legend, and readers may find it helpful to familiarise themselves with that chart first before inspecting the charts included here.

The following types of charts are presented:

- 'Single pattern' charts show how participants rated spaces representing a particular pattern[544]. Their strength is that they show how individual answers were distributed and how much data was available for each construct, contributing to the transparency of the analysis. They also include all participants reporting on a given pattern. Their weakness is that they present each pattern by itself, so that it is not possible to judge whether a particular feature is unique to one pattern or common to several patterns.

- 'Comparison' charts show several patterns to allow comparative analyses. Each pattern is at least compared with the two reference spaces (participants' hypothetical ideal space; and positively perceived spaces of no or rare substance use). Additional comparisons were made for some patterns as applicable. Vis-à-vis the 'single pattern' charts, these charts are more relevant to the research questions, but they do not show data from individual participants[545] and typically do not include all participants[546]. Therefore, both types of chart ('single pattern' and 'comparison') must be considered to understand the data.

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[543] The charts could have also been placed in an appendix or interspersed within the descriptions of patterns, but the present solution was considered most practical. It maintained proximity to the main text (cf. placing charts in the appendix) and facilitated comparisons between charts representing the same or similar patterns. It was also preferable from a layout perspective, given the high number of charts.
[544] It was often the case that several elicited spaces from the same participant were allocated to the same pattern. In these cases, elicited spaces were 'merged' by using their arithmetic means on each construct to create an 'average' space to represent that pattern for that participant (as described in section 7.4). Therefore, although responses were generated on a discrete 5-point scale during the interview, individual values shown in the charts can also be located between the five points of the scale.
[545] For selected comparisons, differences between patterns were considered at the level of individual participants as described in section 7.4.4. Relevant data are available from the data tables in Appendix K.2.
[546] Due to differences in substance use patterns among participants, as described in section 7.4.

- The 'standardised comparisons' approximate analyses in which all spaces were entered[547]. They show how different types of spaces (representing different substance use patterns) related to the two reference spaces (e.g., which patterns were 'closest' or 'furthest' from participants' hypothetical ideal spaces).

From Figure 16 to Figure 29, charts are generally ordered by pattern as in the earlier overview (Table 28, p. 393). Main charts belonging to a particular pattern are generally displayed side by side, as illustrated in Table 29 below. Some figures show additional comparison charts (e.g., Figure 17 shows the two standardised comparisons relative to the reference spaces).

Table 29: Types of charts and their order from left to right within figures

Feature	Type of chart		
	'Single pattern' chart	**Main 'comparison' chart**	**Additional 'comparison' charts (optional)**
Content	Distribution of individual participants' responses on each construct for a particular pattern	Average construct ratings for a particular pattern as well as the two main reference spaces ('NSU pos', 'Ideal')	As applicable: for example, average construct ratings in relation to similar patterns
Typical position in the figures	Left or middle (if two charts)	Middle or right (if two charts)	Right

Note. Charts are shown in Figure 16 to Figure 29, starting from p. 401.

In the charts (see Figure 14 and Figure 15 below for examples), the label at the top identifies the pattern in line with the abbreviations in Table 28 (e.g., 'NSU pos' stands for 'spaces of no or rare substance use associated with (rather) positive feelings'). In a comparison involving two patterns, the space of interest is named second (represented by a square in the chart area). The sample size is provided in parentheses (e.g., 'n=23')[548]. The top label shows the comparison identification number used during data analyses (as in Figure 10, p. 281).

The vertical axis to the left of the chart provides identifying numbers for each construct[549]. Numbers 1 to 10 refer to supplied substance use constructs[550]; 12 to 14 to additional supplied

[547] As explained in section 7.4, due to a heterogeneous dataset, it was not possible to enter all data in the same analysis, but such an analysis was approximated via 'standardised comparisons' using reference spaces.
[548] For the 'single pattern' charts, this is the number of participants who provided repertory grid ratings for spaces relevant to that one pattern; for the comparison charts, it is those participants who provided repertory grid ratings in relation to all patterns included in the comparison. If the sample size in a comparison chart is lower than for a single pattern, then one or more participants could not be considered in the comparison due to missing data (i.e., did not provide data for all patterns of interest).
[549] Due to layout constraints, it was not feasible to include a legend for each chart. Table 30 below provides an overview, Appendix K.7 a printable legend, and Figure 39 (Chapter 13) a comparison chart with legend.
[550] In line with the analysis, the charts focus on alcoholic beverages and nicotine products. Participants reported limited use of medicines with alcohol and use of Ritalin. Spaces including medicine use were only eligible for the pattern 'Alc/cig', and relevant data are provided in Appendix K.1.6. Participants did not report the use of any other substances (legal or illegal) for the six months prior to interview.

constructs[551]; and numbers 15 to 28 to master constructs summarising individual elicited constructs[552]. These 'master constructs' are equivalent to the 12 latent dimensions for space construal presented in Chapter 10[553]. Two dimensions are included twice (C16/17, C19/20) to account for differences in participants' preferences for construct poles. In the text to follow, constructs are identified by their number, preceded by the letter 'C'.

Figure 14: Layout features of 'single pattern' charts

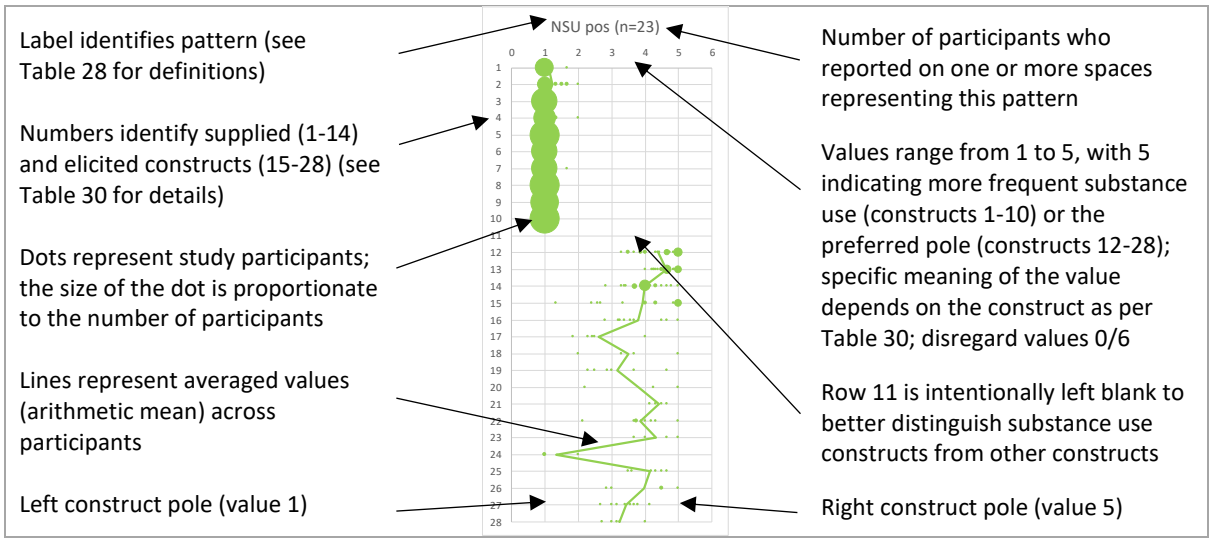
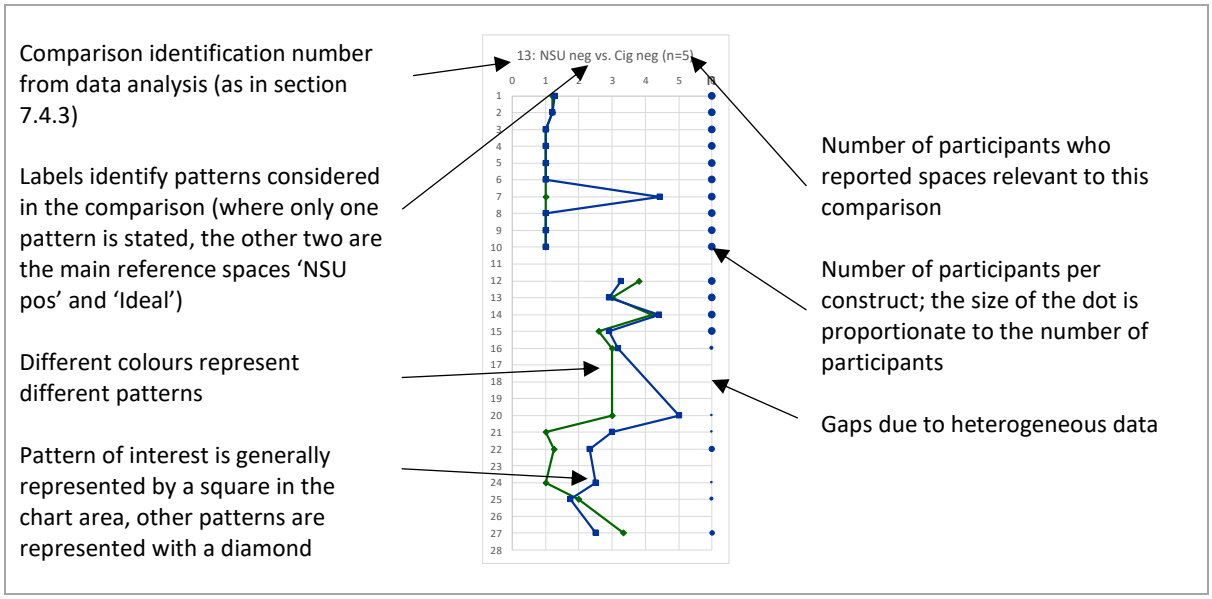


Figure 15: Additional layout features of 'comparison' charts



[551] For details on supplied constructs including wording during interviews, see Chapter 6 and Appendix H.6.
[552] Table 30 below provides an overview of the identified latent dimensions for space construal, with full details available from Chapter 10.
[553] Although these could have been referred to as 'D1' to 'D12' (rather than 'C15' to 'C28'), it was not practical to label and number them separately from the supplied constructs in the charts.

The horizontal axis above the chart shows the numerical values that study participants could choose from for each construct[554]. All constructs ranged from 1 to 5, representing the two construct poles (see Table 30 below for details). For the charts, the substance use constructs (C1-10) were aligned so that a high value (right half of the chart) represents more frequent substance use, while the remaining constructs (C12-28) were aligned so that a high value (right half of the chart) represents the preferred construct pole[555]. For layout purposes, the chart area is wider than the actual value range. In the comparison charts, the last column (what would be value '6' but is shown as 'n') indicates the sample size per construct[556].

In the actual chart area, each type is represented by a different colour, in line with Table 28. Dots represent study participants, with the size of the dot indicating the number of participants (i.e., a greater diameter represents more participants), while lines show arithmetic means of ratings across participants. In the comparison charts, the arithmetic mean is additionally identified with a marker (e.g., square for the pattern of interest and a diamond shape for the reference spaces). Arithmetic means were connected using lines to aid visual interpretation[557]. Arithmetic means and corresponding lines may differ between single pattern charts and comparison charts if participants were not included in a comparison due to missing data.

In the two charts showing standardised comparisons (all patterns relative to reference spaces, Figure 17), relative values show the distances between a reference space and the remaining patterns, *with the values of the reference space set to zero* (as explained in section 7.4.3). As data were collected on a 5-point scale, the maximum possible distance is 4 points (hence the scale ranging from -4 to +4). The alignment of constructs and other features match those of the other charts (e.g., further to the right equals more frequent substance use).

Supporting data (e.g., means, sample sizes per constructs) are available from data tables in Appendix K[558]. Subsequent sections describe each pattern separately.

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[554] For the master constructs based on elicited constructs (C15-28), participants did not receive the constructs and poles as stated in the table. Instead, the master constructs summarise and approximate the meaning conveyed by participants in their elicited constructs (for details, see sections 7.2 and Chapter 10).
[555] Preference for a pole was established by considering how participants described their hypothetical ideal space (understood here to indicate participants' general socio-spatial preferences). Although preference may depend on the situation (e.g., a participant might generally prefer a 'calm' space but also enjoy the occasional 'hectic' party space), alignment by general preference was found to facilitate interpretation of the charts.
[556] Sample size differed per construct depending on data availability. During comparisons, samples were matched at the construct level, meaning that ratings on a particular construct came from the *same* participants and were therefore directly comparable (as explained in section 7.4). To reduce complexity, sample sizes per construct are not shown in the single pattern charts. They are available from the data tables in Appendix K.1. In the charts, the individual data points may be used for reference.
[557] In the single pattern charts and the standardised comparisons, gaps in the data resulted in disconnected lines. In the comparison charts, such gaps were avoided to increase the legibility of charts.
[558] Separate data tables are not provided for the standardised comparisons, as the data are available from the comparison data tables (columns labelled 'MD' in Appendices K.2 and K.3).

Table 30: Constructs included in subsequent figures

	Nr	Construct	1 (left pole in chart)	5 (right pole)
Constructs supplied during interview	C1 – C10 How often used in the typical situation …		never	always
	C1	Beer		
	C2	Wine (including spritzer)		
	C3	Cider		
	C4	Sparkling wine		
	C5	Spirits (e.g., tequila, vodka, gin, rum)		
	C6	Mixed drinks (e.g., alcopops, long drinks, cocktails)		
	C7	Cigarettes		
	C8	Cigars, cigarillos		
	C9	Waterpipe (with tobacco)		
	C10	E-cigarettes (with nicotine)		
	C11	(Row intentionally left blank to distinguish substance use constructs from other constructs.)		
	C12	**Importance:** how important the situation/space was to participants	not at all important	very important
	C13	**Feelings:** what feelings participants had when they thought of the situation/space	negative feelings	positive feelings
	C14	**Frequency:** how frequently the situation was visited/the space occurred	1-2 times per year or less	daily or almost daily
Latent dimensions for space construal (master constructs based on elicited constructs)	C15	**Closeness to people:** how close the relationship was between the study participant and other people present in the situation	feeling distant	feeling close
	C16	**Orientation:** whether study participants were focussed on themselves or on their surroundings ('outward' preferred)	inward/self	outward/interaction
	C17	*Orientation ('inward' preferred)*	*outward/interaction*	*inward/self*
	C18	**Togetherness of activity:** whether activities were undertaken together as a group or separately	separate	together
	C19	**Changeability:** how much change was characteristic of the situation ('varied' preferred)	the same	varied
	C20	*Changeability ('the same' preferred)*	*varied*	*the same*
	C21	**Enjoyment:** feelings of enjoyment (or lack thereof) regarding the activities in the situation	feeling reluctant	feeling delighted
	C22	**Relaxation:** mental states in relation to (absence of) stress	active mind	resting mind
	C23	**Type of social gathering:** what kind of social gathering the situation represented	party/excess	cosy get-together
	C24	**Substance use (SU) expectations:** whether substance use was accepted (or even expected) or considered out of place (or even opposed)	SU opposed	SU expected
	C25	**Freedom of choice:** how much influence study participants had on the situation	other-determined	self-determined
	C26	**Self-presentation:** whether participants felt able to show their 'true' self or a need to monitor and adjust their behaviour	have to restrain myself	can be myself
	C27	**Physical pleasantness:** how physical aspects of the environment were evaluated in relation to one's own body	physically unpleasant	physically pleasant
	C28	**Sense of time:** how the passage of time was experienced	time-limited	open-ended

Figure 16: 'No or rare substance use, positive feelings' vs. 'Ideal spaces imagined by participants'

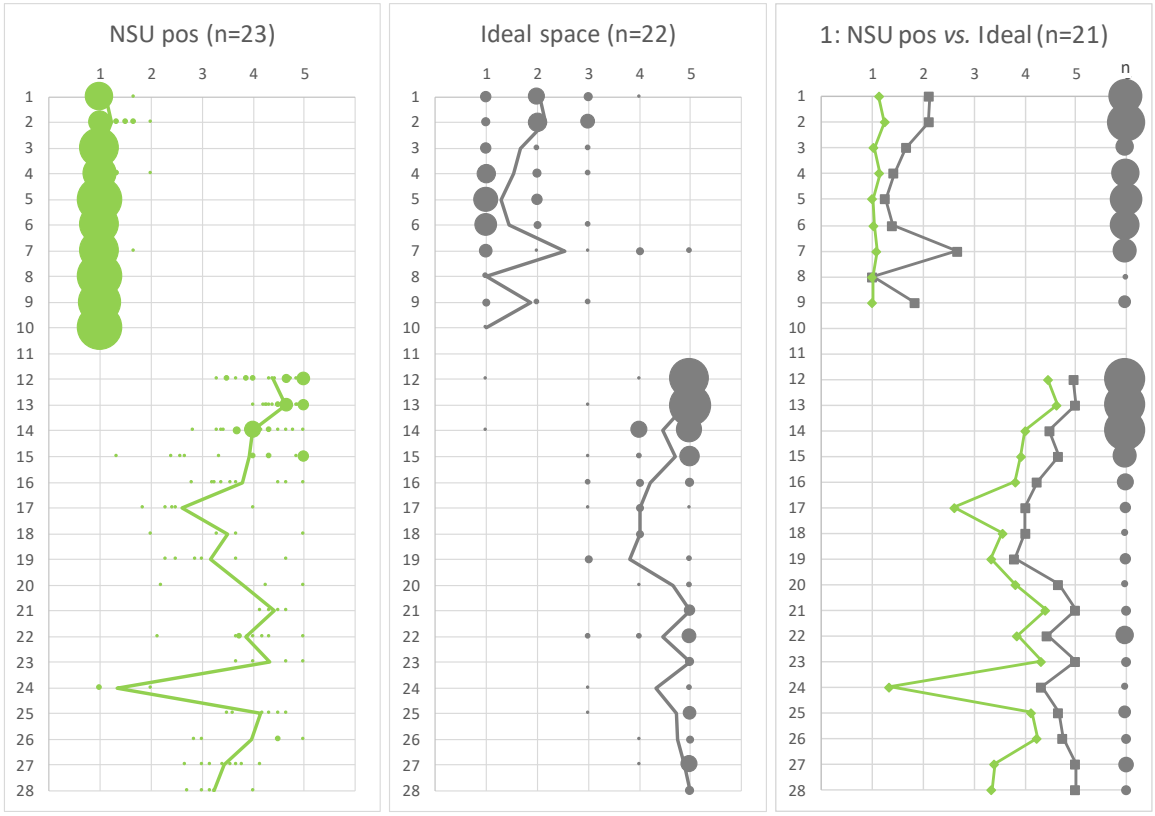
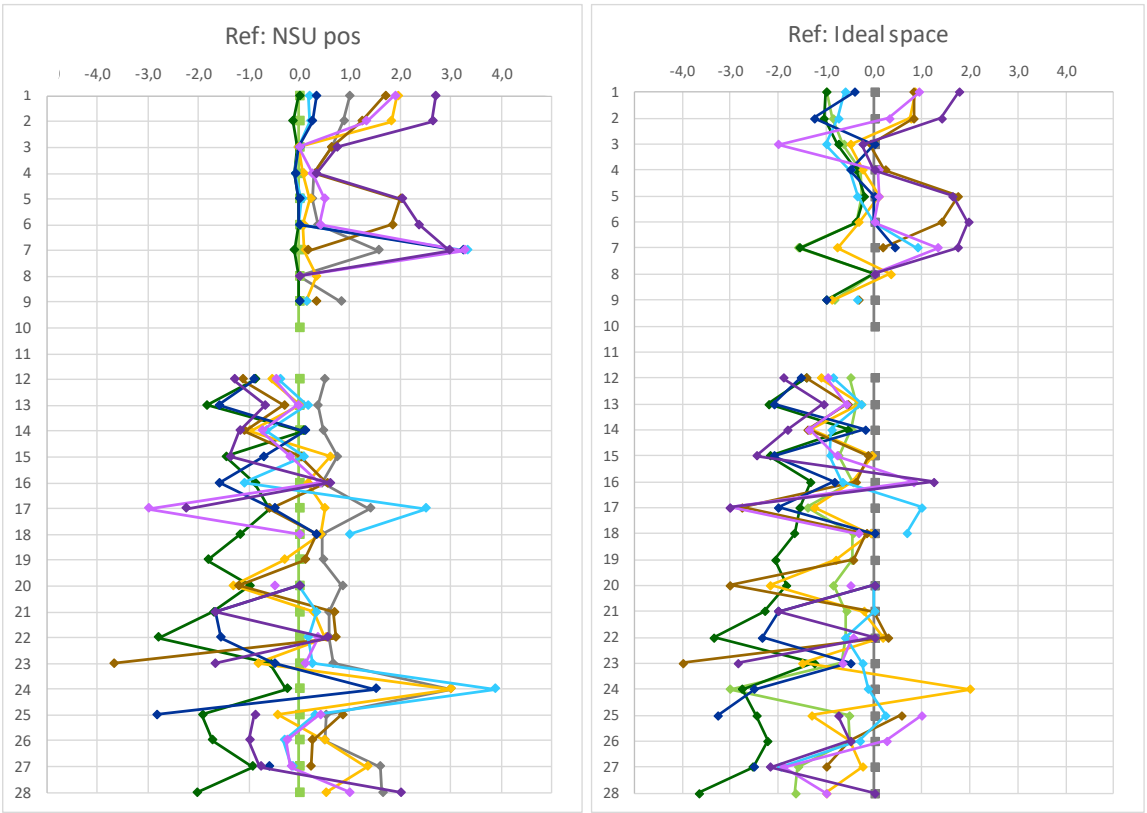
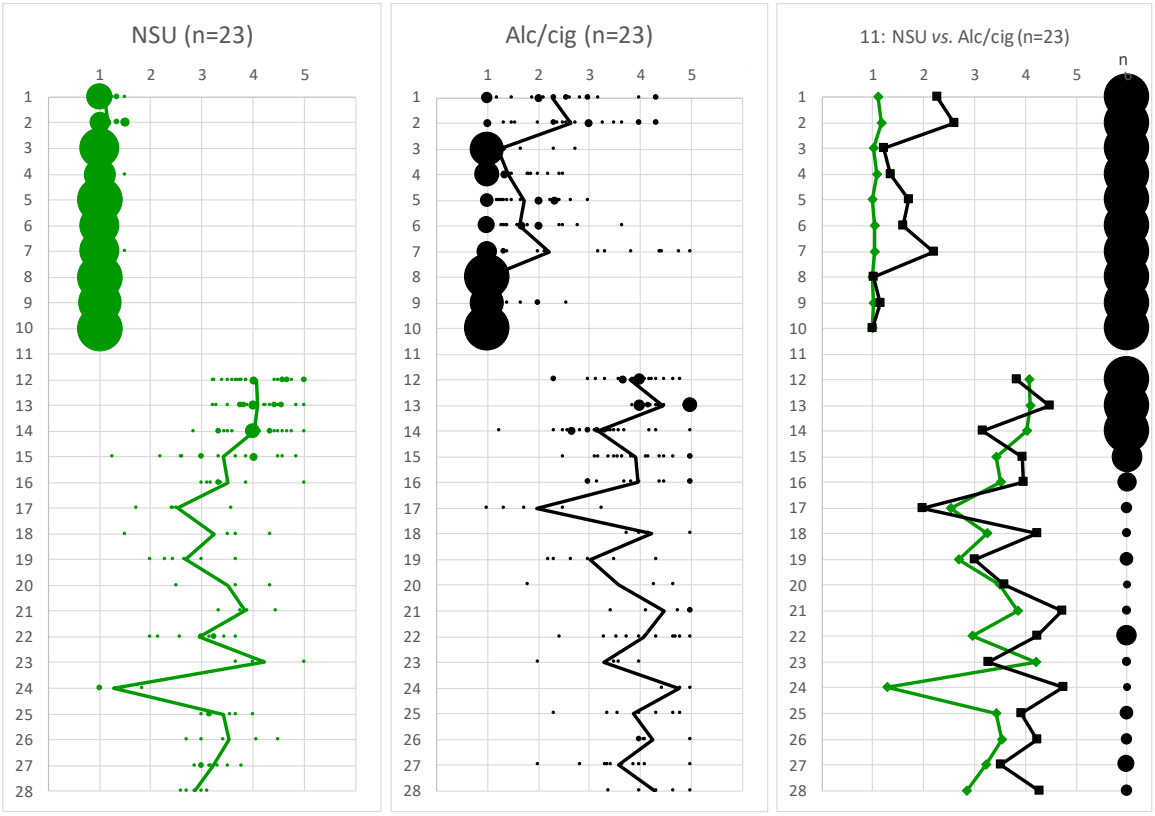


Figure 17: Detailed patterns relative to two main reference spaces



Note. The charts in Figure 17 above integrate data from multiple comparisons. As participants differed between comparisons, interpretation should focus on the distance between a single pattern and the reference space (represented by the value '0'). Distances between other types of spaces should not be interpreted. A legend for the colours is available from Table 28, p. 393.

Figure 18: 'No or rare substance use' vs. 'Alcohol or cigarette use'



Note. A further chart comparing 'NSU' and 'Alc/cig' is available in Figure 39, p. 568, in Chapter 13.
Data on medicine use in the 'Alc/cig' spaces are available from Appendices K.1.6 and K.2.3.

Figure 19: 'No or rare substance use, ambivalent/negative feelings' (vs. 'Cig neg')

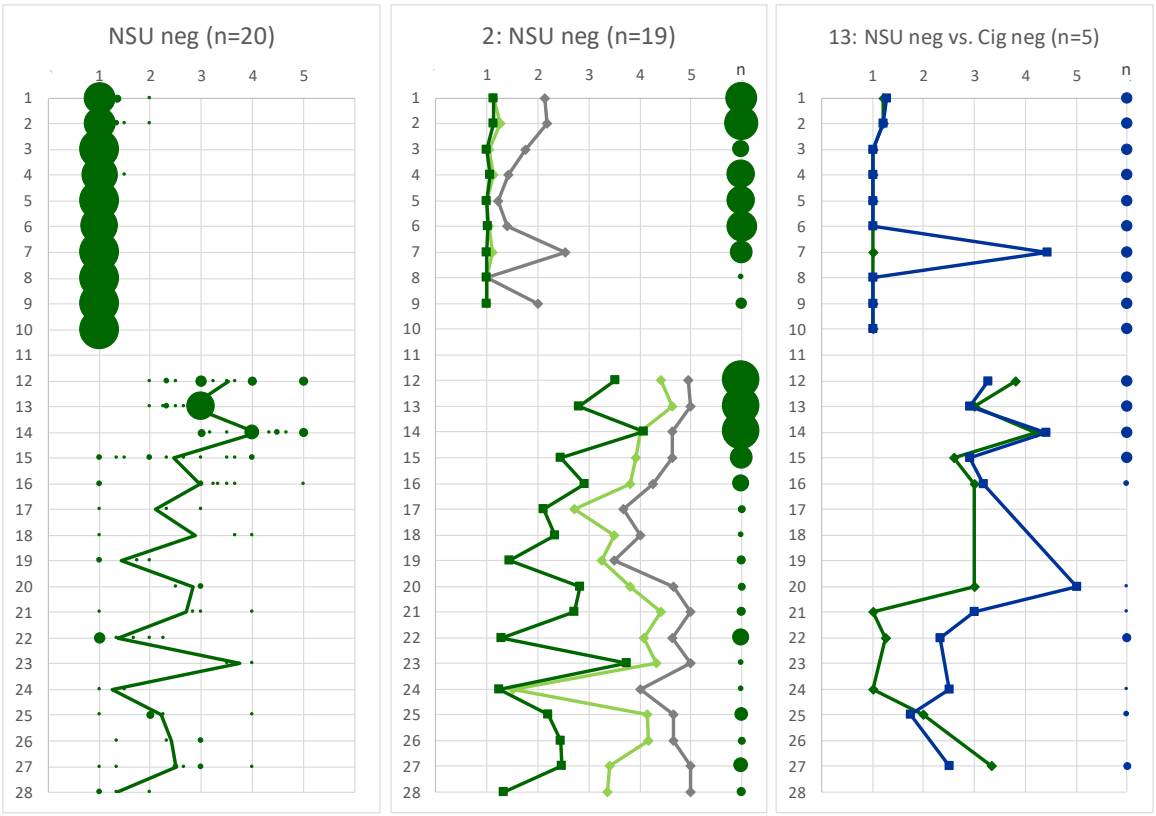


Figure 20: 'Alcohol' vs. 'Cigarettes' vs. 'Alcohol and Cigarettes' (comparison charts only)

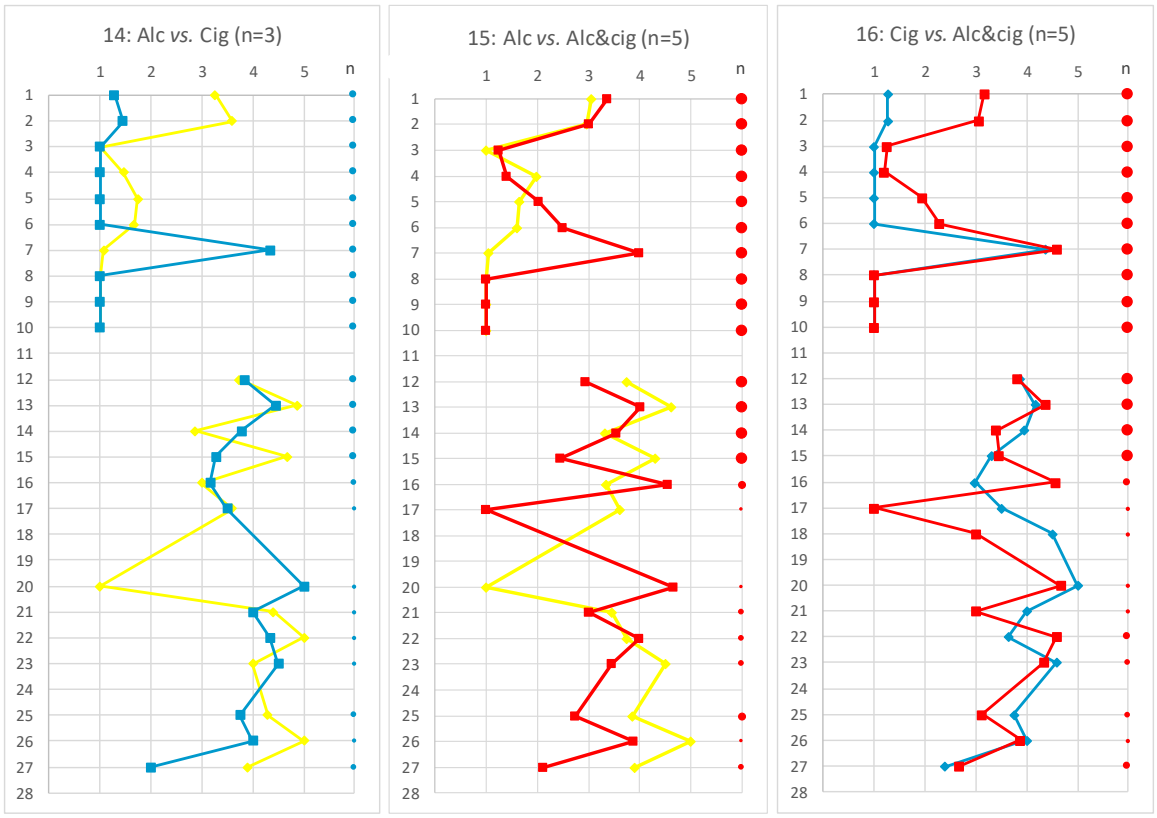
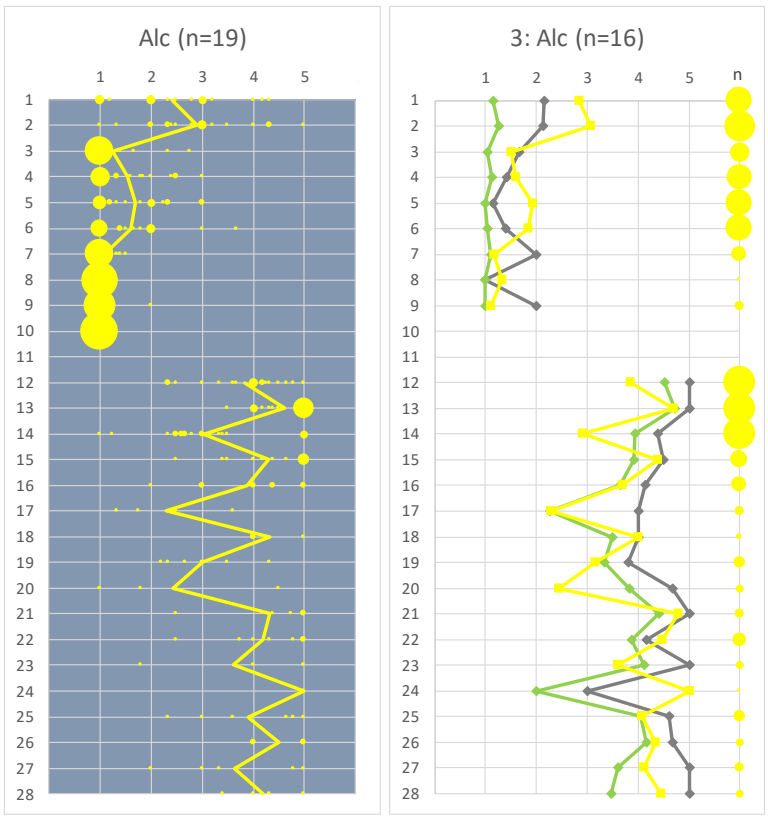
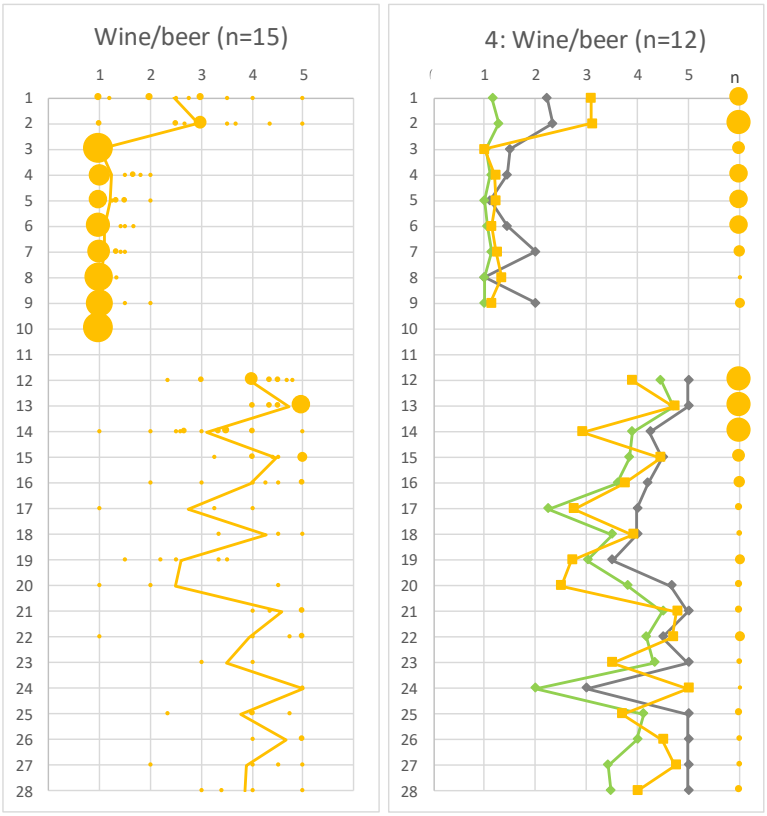


Figure 21: 'Alcohol' (as primary substance)



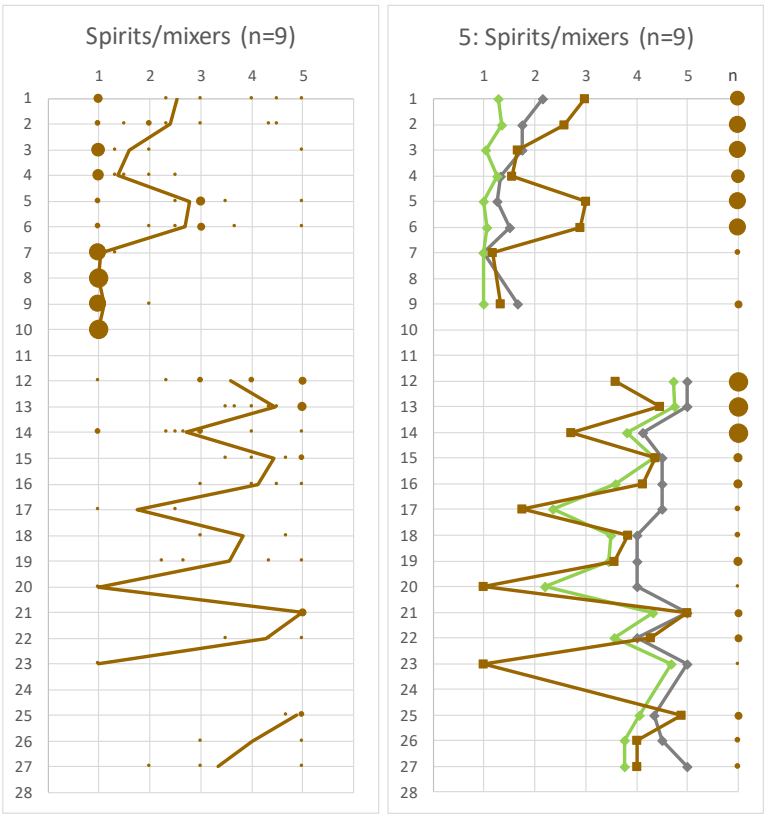
Note. A dark background has been chosen for the left chart to increase visibility of the data points. Further comparisons involving 'Alc' are shown in Figure 20 above.

Figure 22: 'Wine or beer'



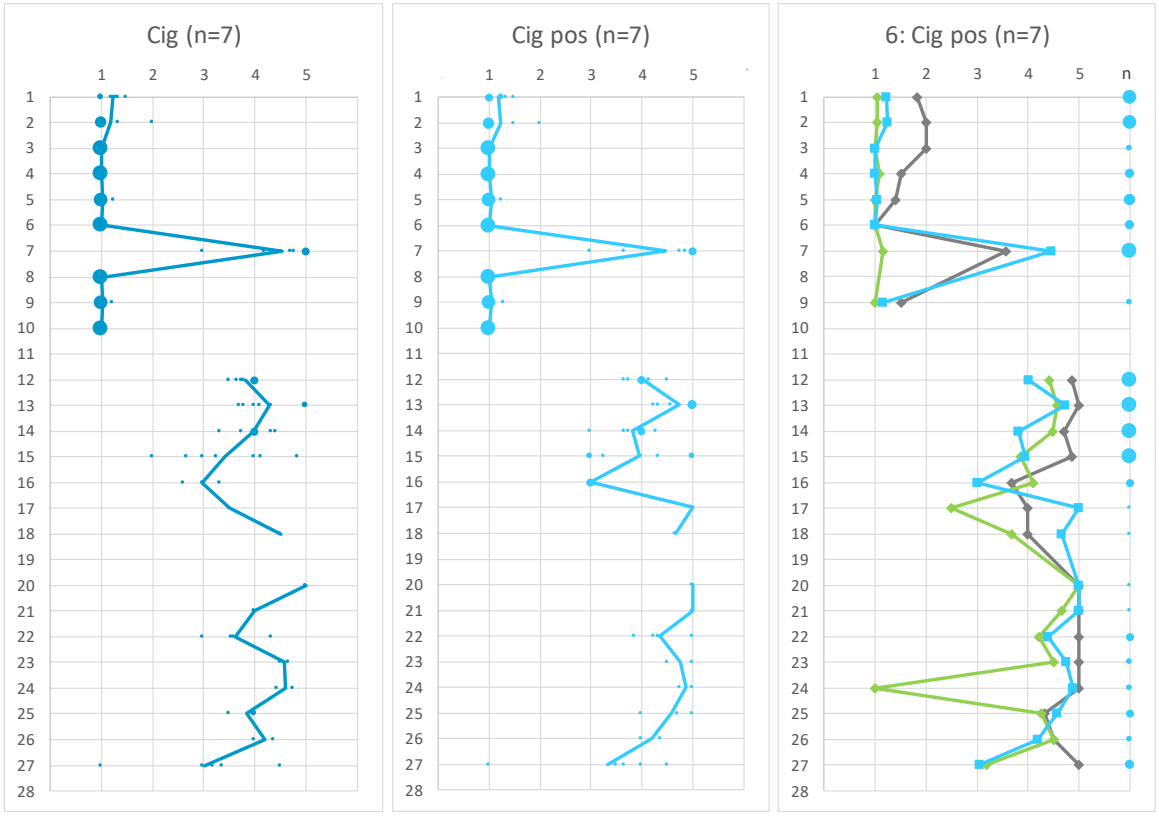
Note. Further comparisons involving 'Wine/beer' are shown in Figure 29 below.

Figure 23: 'Spirits or mixed drinks'



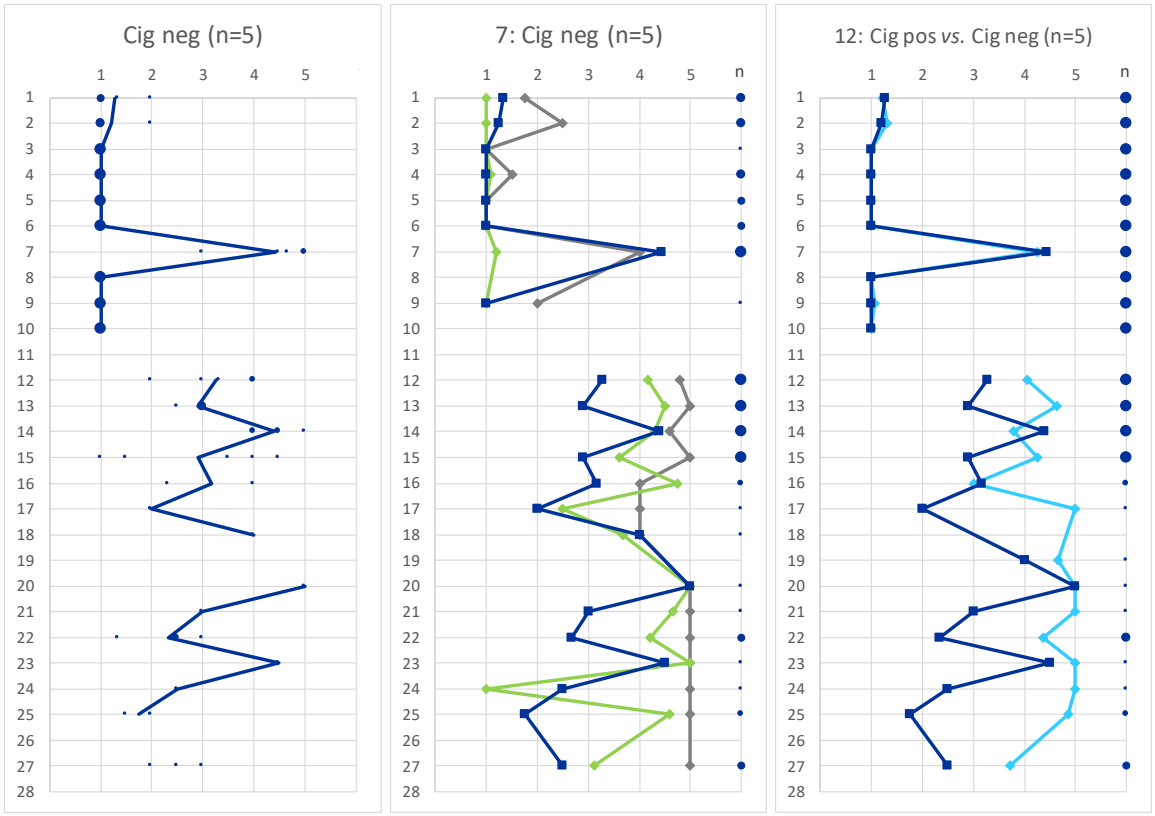
Note. Further comparisons involving 'Spirits/mixers' are shown in Figure 29 below.

Figure 24: 'Cigarettes' (as primary product); 'Cigarettes, positive feelings only'



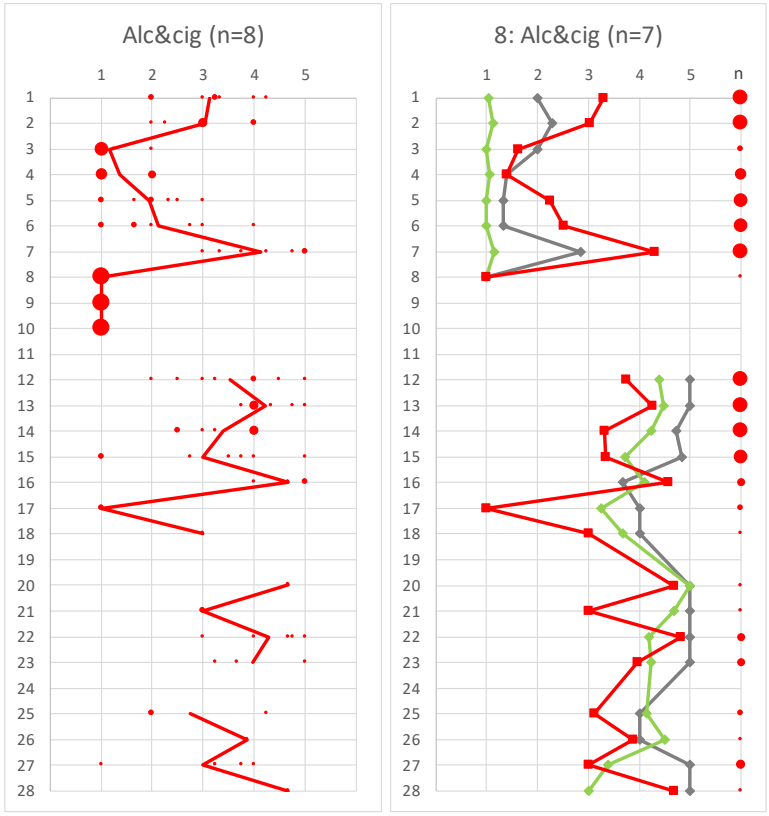
Note. Further comparisons involving 'Cig' are shown in Figure 20 above. An additional comparison involving 'Cig pos' is shown in Figure 25 ('Cig neg') below.

Figure 25: 'Cigarettes, ambivalent/negative feelings' (vs. 'Cig pos')



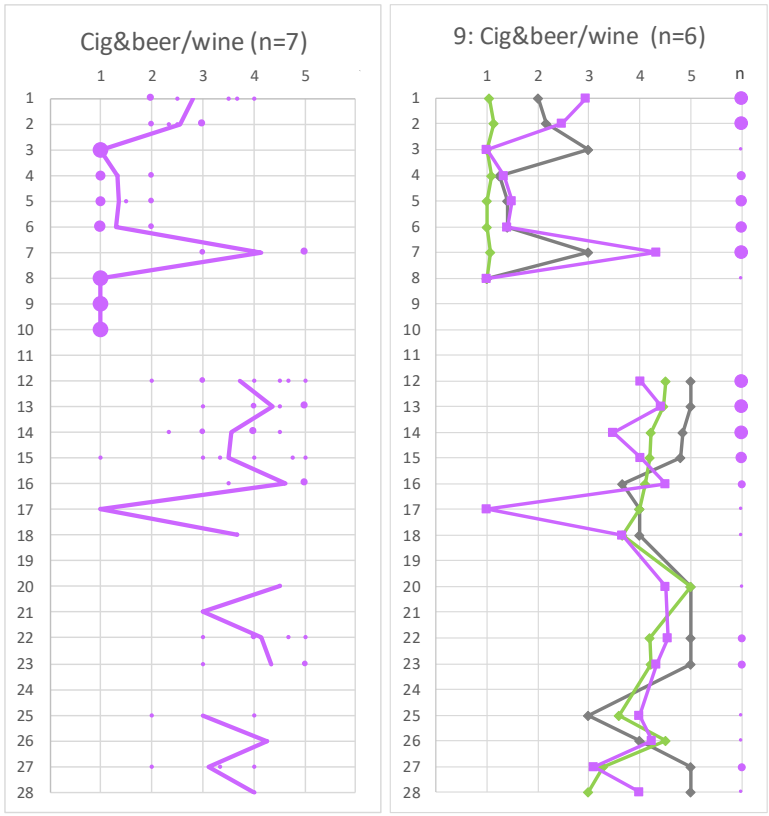
Note. A further comparison involving 'Cig neg' is shown in Figure 19 ('NSU neg') above.

Figure 26: 'Alcohol and cigarettes'



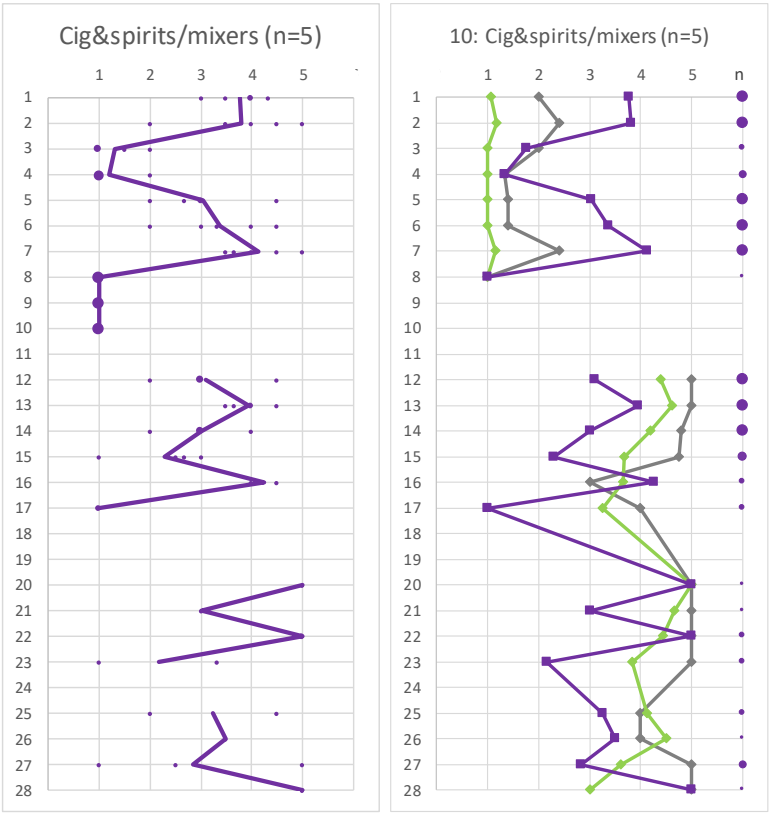
Note. Further comparisons involving 'Alc&cig' are shown in Figure 20 above.

Figure 27: 'Cigarettes and beer or wine'



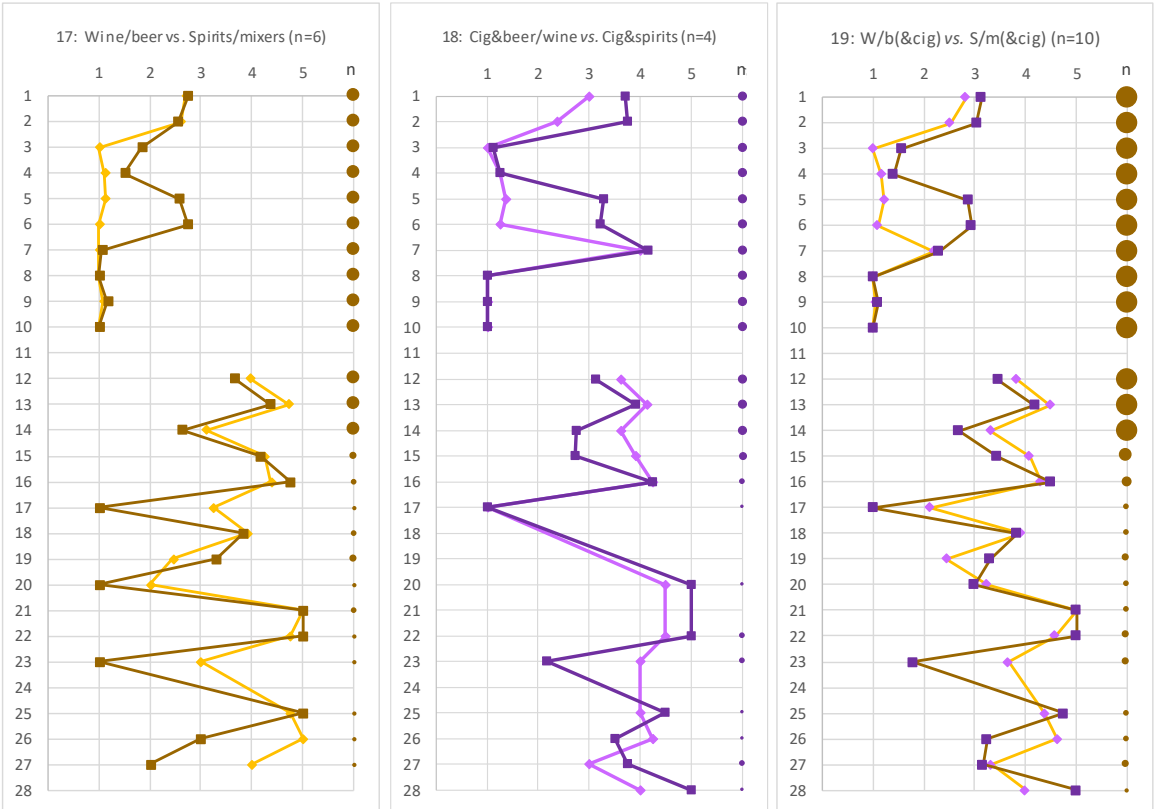
Note. Further comparisons involving 'Cig&beer/wine' are shown in Figure 29 below.

Figure 28: 'Cigarettes and spirits or mixed drinks'



Note. Further comparisons involving 'Cig&spirits/mixers' are shown in Figure 29 below.

Figure 29: 'Wine or beer' vs. 'Spirits or mixed drinks'



Note. Due to very small sample sizes in Comparisons 17 (left chart) and 18 (middle chart), data were pooled to result in Comparison 19 (right chart). Here, 'beer/wine' and 'spirits/mixed drinks' spaces are compared, considering alcohol-only spaces for non-smokers (from Comparison 17) and cigarette-associated spaces for smokers (from Comparison 18). Colours are mixed in the right chart to indicate the pooled nature of the data.

11.3. Subjectively defined 'ideal' space

Study participants were asked to imagine "a hypothetical space of total well-being" (labelled 'Ideal' in Table 28, p. 393). As described in section 6.2.6, the ideal space was included from the third interview onwards, so that data on ideal spaces (one per participant) were available from 22 individuals (92% of 24).

The inclusion of hypothetical ideal elements is common in repertory grid studies (e.g., Jankowicz, 2004: 57–58), and the inclusion of an ideal space in this study was a logical consequence of applying a prevention lens. Understanding how different patterns of situational substance use or abstinence are evaluated by substance users might usefully inform preventive action. Although two supplied constructs ('importance' [C12], 'valence' [C13]) provided some information in this regard, the comparison with ideal spaces was particularly helpful because it allowed a nuanced picture that included all constructs. The 'ideal space' data also informed other aspects of this study[559].

Consequently, participants' hypothetical ideal spaces served as a main point of reference in this analysis, meaning that each situated substance use pattern was compared to the ideal spaces. The study author's underlying assumption was that substance users' readiness to change a 'substance use' space would be greater if that space differed from their ideal, while correspondence between the 'substance use' space and the ideal would make preventive efforts more challenging. Also, substance users' readiness to abstain (or reduce use) might be greater if spaces of no or rare substance use corresponded to their ideal (and they were aware of this correspondence); while promoting abstinence (or reduced use) might be challenging if spaces of no or rare substance use differed notably from the ideal (and were therefore more likely to be construed as undesirable spaces by users). Even if these ideas were finally not pursued in this project (as noted in section 6.5.3), comparisons with the ideal spaces in later sections of this chapter should be understood from within this context.

Imagining an ideal space

It was noteworthy that some participants visualised a specific room or place when prompted to think of an ideal space. This was an imaginary space, or a real place they had visited in the

[559] The ratings on the substance use constructs (C1-10) served as proxies of what substance use frequency the participants considered ideal for themselves in general. This helped to group participants according to general substance use patterns, particularly where other data were inconclusive (as described in Appendix M.2). During data analysis, the ratings for the ideal spaces on the other constructs (C12-28) helped to identify the preferred pole for each construct. It also enhanced possibilities for feedback of results to participants (e.g., to include information on which of their real-life spaces were most or least similar to their ideal).

past, or a space from their everyday life, as the following interview excerpts show[560]:

Interviewer: Okay … erm and when you think [about rating your ideal space] here ((refers to repertory grid)), this dimension "outside, fresh air" or "inside, it's stuffy and smoky"? ((referring to an elicited construct))
Participant: … hm… ((long pause, approx. 20 seconds)) then the "2", yes.
I: Ok, what did you think about just then?
P: The ideal space… for me, this would be an own flat, with a terrace… where there's enough space for … a few people. And this situation in the ideal space is me sitting on this terrace. ((laughs)) (IP13)[561]

Interviewer: OK, how often would you be in such [an ideal] space?
Participant: ((notable pause)) Ideally… daily ((laughs)), ((stutters a bit)) I think, if you were to transfer that …. to reality, then probably not ((laughs))
I: What- why are you saying, "probably not"?
P: Erm, in my mind I am still [abroad] now ((laughs)).. […] in the park and… if I were there, I would go there every day but… since it is so far away, [it's] rather not possible ((laughing))
I: Is this park missing, should we add that or … […] ((refers to the map))
P: No no so it's several parks which I'm jumbling together in my head right now.
I: OK but shall we… I mean, are these parks missing on the map or do you think that is not… so important now?
P: I don't think it's so important (IP17)[562]

Interviewer: […] So if you imagine now, a space, or place, which is ideal for you, which represents total well-being, a fictional, hypothetical place, yes?
P: ((simultaneously)) OK, fictional
I: doesn't have to be some real place but… [it] can just be a- imagine, ok, "something where I feel really well and at ease".
P: Can this also be a real space?
I: What would you think of there?

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[560] Due to time restrictions during the interviews, it was not possible to clarify systematically what participants thought of when prompted to consider an ideal space, so that these examples are illustrative only.
[561] German original: "I: Okay. ..Ahm und wenn du denkst hier, an diese Dimension von 'draußen, frische Luft' oder 'drinnen, es ist stickig und rauchig'? B: ... hm... ((lange Pause ca. 20 Sekunden)) dann die 2, ja. I: Okay, was hast du jetzt überlegt? B: Der ideale Raum ...für mich wäre eine eigene Wohnung, mit einer Terrasse, ...wo paar Leute.. rein passen. Und diese Situation im idealen Raum ist, wie ich auf dieser Terrasse sitze. ((lacht))".
[562] German original: "I: Ok wie oft wärst du in so einem Raum? B: ((überlegt länger)) Wunschmäßig ...täglich ((lacht)), ((stottert etwas)) ich glaube, rein wenn man das jetzt... in Echt übertragen würde, eher nicht ((lacht)) I: Was, warum meinst du 'eher nicht'? B: Ahm ich bin jetzt gerade so gedanklich noch in [Ausland] ((lacht)).. […] im Park und..wenn ich dort wäre, würde ich gerne täglich hingehen, aber ...dadurch, dass es so weit weg ist, eher nicht möglich. ((lachend)) I: Fehlt dieser Park, sollten wir den dazuschreiben, oder... […] ((bezogen auf Karte)) B: Nein nein also es sind mehrere Parks, die ich gerade im Kopf zusammenwürfle. I: Ok. Aber sollen wir das ..also fehlen diese Parks auf der Karte oder meinst du, das ist jetzt nicht ...so wichtig? B: ich glaube nicht, dass es so wichtig ist."

P: Of the bedroom ((laughs))
I: […] no, it should- since we have the bedroom in here [on the map] anyway- because now I will ask the same questions ((referring to supplied constructs)) again, therefore- it should be even more fictional, so to speak, yes?
P: Okay (IP24)[563]

As the excerpts indicate, these spaces were not usually added to the map as elicited spaces, either because they were already on the map or because participants did not consider them relevant for inclusion. However, in one case, the prompt to think of an ideal space did result in the addition of one extra space to the participant's map (see the quote by IP6 in section 11.5.2, p. 438). Where it became apparent that participants thought of a specific setting, they were usually encouraged to think in more abstract and hypothetical terms[564].

Substance use

Figure 16 middle (p. 401) shows how participants construed their ideal spaces on the supplied constructs (C1-14) and the master constructs derived from elicited constructs (i.e., latent dimensions for space construal as per Chapter 10) (C15-28). For ethical reasons, participants were only asked about substances which they had used in the six months prior to interview[565].

To some extent, substance use as imagined for the ideal space (C1-10) reflected participants' actual substance use patterns as described in section 5.1. Out of the alcoholic beverages, wine (C2) featured most prominently in the ideal space, followed by beer (C1). However, in both cases, the frequency of substance use was not high. Even if some participants imagined occasional wine use for their ideal space (and one person imagined drinking beer 'often'), on average, participants reported rare use for either product in their ideal spaces. The data for cigarette use (C7) were more varied, with answers ranging from 'never' to 'always'. A comparison of occasional and daily smokers showed that, on average, the five occasional

[563] German original; the German phrase "sich wohlfühlen" (essential to the interview prompt) has no direct English equivalent and has been translated as "feel well and at ease" in this context: "I: […] Also wenn du dir jetzt vorstellst, einen Raum, oder Ort, der ideal ist für dich, wo du dich total wohl fühlst, ein fiktiver, hypothetischer Ort, ja? B: ((gleichzeitig)) OK, fiktiv. I: muss jetzt nicht irgendein echter Ort sein, sondern .. einfach nur ein, stell dir einmal vor, ok, 'etwas, wo ich mich wirklich wohl fühle'. B: Kann das auch ein echter Raum sein? I: Was, an was würdest du da denken? B: Ans Schlafzimmer ((lacht)) I: […] nein, es sollte- also nachdem wir das Schlafzimmer sowieso hier [in der Karte] drinnen haben- ich werde jetzt nämlich dieselben Fragen nochmal stellen, deshalb- quasi, noch fiktiver, ja? B: Okay".

[564] One reason for generating the data on ideal spaces was to obtain a better understanding of what frequency of substance use the participants considered ideal for themselves in general. Asking for a more abstract space was therefore necessary to ensure that substance use data collected for the ideal space reflected these general preferences rather than what might be fitting for a particular setting (e.g., park, bedroom).

[565] For example, only those participants who had indicated cigarette use in the six months prior to interview were asked how often they would use cigarettes in their ideal space. Consequently, the data on cigarette use in the ideal spaces (C7 in Figure 16 middle) refers only to the smokers in the sample (ten smokers plus two participants who used cigarettes but did not qualify as smokers for the analysis, as described in section 5.1).

smokers in this sample imagined smoking 'never' or 'rarely', whereas the five daily smokers in this sample imagined smoking 'often' or 'always' in their ideal spaces (Appendix M.6).

However, there were also instances where substance use in the ideal spaces differed notably from actual substance use reported by participants. The following pages illustrate how and why such discrepancies occurred, thereby indicating also why actual use may not reflect personal preferences. While it might be assumed that ideal use was always lower than actual use, substance use reported for the ideal space was sometimes *higher* than in real life.

At the level of individual products, this was the case for cider and waterpipe. Some participants enjoyed using these products (hence including them in the ideal space) but did not use them much in real life for practical reasons (e.g., less accessible than other products). For one participant, waterpipe use was simply not part of her everyday routines:

> *Interviewer: […] for shisha it was interesting now that you said you would like to use it "occasionally" [in your ideal space] … and- but in reality it is not so often, perhaps you can say something more about this?*
> *Participant: ((simultaneously)) yes ((laughs a bit)).. mh.. ((clicks tongue)) yes, I also tend to forget that I like smoking shisha and then… ((laughs a bit)) I don't know, because I do it so rarely, I think of it so rarely and then I do it so rarely, but actually it is quite… pleasant after all.. erm.. yes, well… I am not going to do it more often in reality now but… in the ideal space I would do it more often (IP22)*[566]

At the level of study participants, some of the 'lighter' users reported more frequent substance use for their ideal space. For example, one participant (IP19) reported drinking one to two alcoholic beverages on a less-than-monthly basis when signing up for the study but indicated 'occasional' use of alcohol for her ideal space. When prompted by the interviewer about this discrepancy, she responded:

> *Participant: […] maybe it would really be something between "rarely" and "occasionally" [for the ideal space]. […] that would also not mean now that I would drink a lot then, perhaps it would be just the one glass again, but … maybe in this ideal space, the way I imagined it, where there are… where you wouldn't have to restrict yourself by anything at all or so… I think, it doesn't make a difference if I also drink a glass more ((laughs)) or not. That's why [I chose] "occasionally". […] Just because, maybe, I think that in this ideal space there are*

[566] German original: "I: […] bei Shisha war es jetzt interessant dass du gesagt hast, würdest du gern 'manchmal' konsumieren ... und- aber in Wirklichkeit ist es gar nicht so oft, vielleicht kannst du da etwas dazu sagen? B: ((gleichzeitig)) ja ((lacht etwas)).. mh.. ((schnalzt mit der Zunge)) ja ich vergesse auch oft, dass ich gerne Shisha rauche und dann.. ((lacht etwas)) keine Ahnung, weil ich es eben so selten tue, denke ich so selten darauf und dann tue ich es so selten, aber eigentlich ist es ja ganz ... kommod …ahm... ja, also... ich werde es jetzt nicht in der Realität öfter machen aber ... im idealen Raum würde ich es öfter machen, halt".

more… opportunities where it- where you celebrate and let loose and so and where it fits better than.. in normal everyday life where you- well […] the need [for me to drink alcohol in the ideal space] is not there necessarily but… if it fits, the- if the circumstances are right, then why not? (IP19)[567]

This excerpt contains many interesting aspects, but here it specifically highlights the way some of the 'lighter' users might have construed their ideal space, namely as a space where they could be less restrained than in their everyday lives and where, as a (so perceived) consequence, they could also use substances more often.

In other cases, substance use reported for the ideal space was *lower* than in real life. At the level of individual products, this was the case for spirits and mixed drinks. One participant (IP14) offered the following response to explain why actual substance use did not always reflect personal preferences:

Interviewer: […] spirits and mixed drinks.. you said "never" now [for the ideal space]?
Participant: Yes, for me that is […] no relaxation when I drink something like that. So I drink [spirits and mixed drinks … because] there are fewer beer drinkers there [in that group of friends]… […] and then I have to adapt […] (IP14)[568]

With regard to cigarettes, most occasional users in this sample preferred no or rare cigarette use for their ideal space. As one of these participants put it: "*cigarettes 'never' because I- … such spaces that stink of smoke… that would not be my ideal space, actually*" (IP15)[569]. Another occasional smoker (IP24) wanted to quit smoking for health reasons and explained that, in her ideal space, she would abstain from cigarette use for that reason. However, there were also several instances where smokers reported attempts or intentions to quit or reduce during other parts of the interview, but still imagined their ideal space as one with frequent cigarette use. The following explanation from a daily smoker (IP14) indicated that in such

[567] German original: "B: […] vielleicht wäre es wirklich was zwischen 'selten' und 'manchmal'. […] das würde jetzt auch nicht heißen, dass ich dann viel trinken würde, vielleicht wäre es eben halt wieder auch nur dieses eine Glas, aber .. vielleicht in diesem idealen Raum, also wie ich ihn mir vorgestellt habe, wo es halt auch .. wo man sich jetzt durch gar nichts einschränken müsste oder so .. finde ich, spielt es jetzt keine Rolle, ob ich jetzt auch ein Glas mehr trinke ((lacht)) oder nicht. Deswegen 'manchmal'. […] Also einfach, vielleicht, weil ich mir denke, bei diesem idealen Raum gibt es mehr ...Gelegenheiten, wo es- wo man halt feiert und ausgelassener ist und so und wo es halt mehr dazu passt als .. im ganz normalen Alltag, wo man das jetzt- also […] das Bedürfnis ist nicht unbedingt da, aber .. wenn es halt passt, die- das ganze drum herum, dann wieso nicht?".
[568] German original: "Spirituosen und Mixgetränke .. hast du jetzt gesagt 'nie' ..? B: Ja, das ist für mich […] keine Entspannung, wenn ich sowas trinke. Also ich trinke [Spirituosen und Mixgetränke … weil] halt weniger Biertrinker [in diesem Freundeskreis] dabei sind .. […] und da muss ich mich halt anpassen […]".
[569] German original: "Zigaretten nie, weil ich ...so Räume, die nach Rauch stinken.. das wär nicht mein idealer Raum, eigentlich".

cases, the ideal space might have still involved less use than in real life – but rather in quantity per occasion than overall frequency:

> *Interviewer: and for the cigarettes I found it interesting now that you said "often" [for the ideal space]… but actually you also said before that you would like to reduce it…*
> *Participant: Yes.. no.. yes, "often", what is "often"? […] well… after all, [that] can also be one cigarette, just one relaxation cigarette, so when you arrive, one relaxation cigarette, or then when you leave this space, so "okay, now one more cigarette to finish".. but more regularly […] but not always… but just when it feels right.*
> *I: Okay that means, ideal would be- your ideal cigarette use would be… still regularly but then just not so much.*
> *B: Yes, and really out of desire.. not this "whoa, I need it now" but just this "wow, now I feel like it, now I'll smoke one"… and not "I need it now, I'll smoke five".*
> *I: So rather a controlled use, so to speak*
> *B: Yes, exactly (IP14)*[570]

These excerpts suggest that the substance use data generated for the ideal space accurately reflected participants' personal preferences. However, the excerpts also have in common that participants appeared to 'construe' their ideal substance use whilst speaking during the interview, as evidenced by instances of participants correcting themselves, qualifying earlier statements, adding further explanations, laughter, stutter, and so on. Although phenomena such as social desirability likely shaped the interviews as a whole, the substance use data in the ideal spaces in particular must be viewed also in this context[571].

General construal of the ideal space

Most participants construed their ideal spaces as very important and as associated with

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[570] German original: "I: und bei den Zigaretten habe ich es jetzt interessant gefunden, dass du gesagt hast 'oft' .. aber eigentlich hast du ja vorher auch gesagt, möchtest du es gerne reduzieren.. B: Ja .. nein, .. ja, oft.. was ist 'oft'? […] naja .. kann ja auch eine Zigarette sein, einfach nur so eine Entspannungszigarette, so wenn man hinkommt, einmal eine Entspannungszigarette, oder wenn man dann geht von diesem Raum, so 'okay, jetzt noch eine Zigarette zum Abschluss' .. aber dann doch regelmäßiger […] Aber nicht immer … aber halt gerade, wenn es sich richtig anfühlt. I: Okay, das heißt, ideal wäre- dein idealer Zigarettenkonsum wäre für dich.. schon regelmäßig, aber halt dann nicht so viel. B: Ja, und nach Lust wirklich .. nicht so dieses 'Boah, ich brauche es jetzt' sondern einfach so 'Wow, ich habe jetzt Lust, jetzt rauche ich eine' …Und nicht 'Ich brauche es jetzt, ich rauche fünf'. I: Also eher so ein kontrollierter Konsum, sozusagen. B: Ja, genau".

[571] In some cases, this appeared to be due to the interviewer's presence, whereas in other cases, this appeared to reflect the participant's own conflicted views regarding their substance use. Overall, participant ratings of the ideal space appeared to reflect what participants thought was 'ideal' from their own, society's or the interviewer's point of view. A review of the transcripts suggested that in some cases (e.g., where participants corrected ratings or contradicted themselves), participants may have altered the quantitative ratings to make them more socially or personally acceptable. In other cases, the ratings appeared to be accurate representations of what participants thought, and participants used other ways to present their substance use preferences in a more acceptable way (e.g., where participants laughed or lowered their voice when announcing their ratings).

positive feelings (C12 and C13 in Figure 16, middle chart)[572]. In terms of frequency (C14), most participants wished to visit this space on a daily or weekly basis[573].

For the latent dimensions for space construal (C15-28 in Figure 16 middle), participants did not always choose an extreme value (e.g., '5') for the ideal space, explaining that the extreme value was ideal in some cases but not others. For example, all participants who offered 'enjoyment'-related constructs construed their ideal spaces as very enjoyable (C21 in Figure 16 middle). However, for 'relaxation' (C22), some participants did not envisage a completely relaxed state for their ideal spaces. To illustrate, one participant commented that her ideal space was geared *"rather toward 'relaxation, time out' but there's also a sense of anticipating something"* (IP9)[574]. A comparison of 'lighter' and 'heavier' users showed that, on average, the 'lighter' users in this sample imagined a slightly more active space, whereas the 'heavier' users in this sample preferred complete relaxation (Appendix M.6.1 left)[575].

The analysis used participants' 'ideal' ratings to determine which poles of the latent dimensions for space construal were preferred. However, in light of the above, references to 'preferred' poles in subsequent sections must be seen as describing general trends (e.g., the extreme value on the pole was not always the preferred one)[576]. Also of note, participants' ratings varied so much on two dimensions ('orientation' and 'changeability') that these were split up further for the analysis (as C16/17 and C19/20) to reflect differences in preference.

Comparison with situated patterns of use and abstinence

The earlier paragraphs presented participants' hypothetical ideal spaces by themselves and in comparison with participants' actual substance use patterns and preferences. As this type was a main reference space in this analysis, it was also compared with all detailed patterns as based on spaces elicited from participants. Figure 17 right (p. 401) and Appendix K.4 indicate the position of all detailed patterns relative to participants' hypothetical ideal spaces, by charting the distances for each construct. Although the data are not directly comparable, this comparison can indicate overall trends within this sample. In terms of substance use (C1-9), several patterns associated with beer or wine and/or cigarettes resembled the substance use patterns imagined for the ideal space, reflecting the diverse substance use preferences of the

[572] The exception here was one participant (IP16) who rated their ideal space as 'not at all important' and as associated with 'ambivalent' feelings. When prompted by the interviewer, she explained that she did not need such an 'ideal space' because she was content with the spaces she already had in her life.
[573] The exception here was one participant (IP20) who referred to a specific situation abroad as an ideal space.
[574] German original: "Es ist eher (auf) 'Entspannung, Auszeit' aber die Vorfreude auf etwas ist auch da".
[575] A similar trend was also found for occasional versus daily smokers, although the difference was not as pronounced (Appendix M.6.1 right).
[576] Furthermore, subsequent sections will suggest that a general preference might not apply in all situations.

participants. It was noteworthy, however, that for those participants who reported spaces associated with cigarettes and spirits or mixed drinks (see section 11.5.3), the substance use in these spaces deviated notably from their ideal substance use. Overall, the ideal spaces emerged as representing a middle ground between participants' actual spaces of no or rare substance use and their actual spaces of substance use.

In terms of the latent dimensions for space construal (C15-28), spaces associated primarily with cigarettes and (rather) positive feelings (see section 11.5.2) and spaces associated primarily with wine or beer (see section 11.5.1) were construed most similarly to the ideal spaces. It was noteworthy that spaces of no or rare substance use associated with ambivalent or (rather) negative feelings were construed as vastly different from the ideal spaces, but this was not the case for spaces of no or rare substance use associated with (rather) positive feelings (see section 11.4).

Having exploring hypothetical ideal spaces above, the chapter now turns to actual patterns of situated substance use or abstention, based on the everyday spaces mapped by participants.

11.4. Spaces of no or rare substance use

A novel approach in this study was to explicitly consider spaces of no or rare substance use, as a better understanding of how these (from a prevention perspective desirable) spaces differ from spaces of substance use may allow new insights.

Of the 273 elicited spaces included in the interviews[577], 144 (53%) were characterised by no or rare substance use (labelled 'NSU' in Table 28, p. 393). This was the most common pattern overall. Almost all participants (23; 96% of 24) included such spaces on their maps: seven spaces on average (ranging from two to 15 per map). Among these, the proportion of spaces representing no or rare substance ranged from 17% (2 out of 12; IP14) to 91% (10 out of 11; IP1) of all spaces on a participant's map. The following interview excerpts illustrate how participants evaluated the role of substance use within their maps very differently:

> *Participant: ((towards end of interview)) […] well, funnily enough, when I <u>see</u> all these places [on my map].. I <u>don't</u> think of alcohol or cigarettes or something like that first … that is just*

[577] The phrase "included in the interviews" highlights that although 296 spaces were elicited during the mapping task, 23 spaces were not included in the repertory grid interviews ('dropped spaces' as per section 6.2.4). Of 161 elicited spaces of no or rare substance use, 17 (11%) were dropped prior to the repertory grid interview, resulting in 144 spaces of no or rare substance use included in this analysis.

independent of it […] so these are all not places where I would generally [think of] alcohol- [it is not] the first thing that comes to mind.
Interviewer: OK but that is not because there is a space missing [on your map], it is just not an important topic for you on the whole?
P: Yes exactly, yes (IP2, 7 out of 12 elicited spaces characterised by no or rare substance use)[578]

Participant: ((finishes drawing map)) I can't think of anything more now… That's all, anyway.
Interviewer: Erm, I have a question, did you think mostly of places now where you smoke? … Or … in general?
P: I thought of those … places or situations where I smoke the very very very most. (IP13, 5 out of 18 elicited characterised by no or rare substance use)[579, 580]

Spaces of no or rare substance use were included as a broad pattern in two comparisons to contrast them with spaces associated with alcohol or cigarette use (Figure 18 right, p. 402; also Figure 39, p. 568, in Chapter 13). On average, spaces of no or rare substance use were visited/occurred more frequently (on a weekly basis) than spaces associated with alcohol or cigarette use (monthly) (C14). Although both patterns were associated with (rather) positive feelings (C13), the broad contrast of 'no or rare substance use' versus 'substance use' showed that, on average, spaces of no or rare substance use were construed as less preferred than spaces associated with alcohol or cigarette use *on almost all elicited constructs*[581]. The greatest differences suggested that, on average, spaces of no or rare substance use were associated with strong expectations against substance use (C24), a more structured sense of time (C28) and a more active mind (C22). They also revolved less around shared group activities (C18) and were enjoyed less (C21) than spaces associated with alcohol or cigarette use. The main preferred aspect emerging from this comparison was that spaces of no or rare substance use were associated with cosier forms of social gatherings, whereas substance use spaces were construed as less cosy (instead oriented more toward party and excess) (C23).

An additional analysis of individual responses (Appendix K.2.3) showed that differences on 'relaxation' (C22), 'enjoyment' (C21), 'substance use expectations' (C24) and 'sense of time'

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[578] German original: "B: […] also witzigerweise wenn ich diese ganzen Orte sehe ...da fällt mir nicht als erstes Alkohol oder Zigaretten oder (so was) ein… das ist einfach so unabhängig davon […] also das sind alles jetzt nicht so Orte wo ich jetzt Alkohol generell- so was mir sofort in den Kopf kommt. I: Ok aber es ist nicht deshalb weil ein Raum dort fehlt, es ist einfach insgesamt für dich nicht ein wichtiges Thema? B: ja genau, ja".
[579] German original: "((Stille)) B: Mir fällt jetzt nichts mehr ein. ... Das sind eh alle. I: Ahm.. Ich habe eine Frage, hast du jetzt hauptsächlich an Orte gedacht, wo du rauchst? .. Oder .. allgemein? B: Ich habe an die ...Orte oder Situationen gedacht, wo ich am aller-aller-allermeisten rauche".
[580] IP13 was subsequently invited to add also spaces of no or rare substance use to her map.
[581] However, as section 13.5.2 will show, considering whether spaces of no or rare substance use were associated with positive or with ambivalent/negative feelings allows a more nuanced interpretation of these data.

(C28) were not only relatively great but were also construed very similarly by participants. For example, *all* ten participants who contributed a 'relaxation'-themed construct in this comparison construed spaces of no or rare substance use as more stressful than spaces of alcohol or cigarette use (on average by 1,3 points on a 5-point scale), strengthening the observations made above.

Although participants associated spaces of no or rare substance use mostly with rather positive feelings (C13 in Figure 18 left, p. 402), almost a third (42 spaces; 29% of 144) were associated with ambivalent or (rather) negative feelings. Spaces of no or rare substance use were therefore distinguished by valence, and detailed descriptions are offered separately for each subtype in the next two sections. In addition, section 13.5.2 explores spaces of no or rare substance use more explicitly from a prevention perspective.

11.4.1. No or rare substance use, positive feelings

Spaces of no or rare substance use were given special attention in this study, as they were considered desirable from a prevention perspective. Consequently, while the ideal spaces imagined by participants (described above) could be understood as *subjectively* ideal spaces, spaces of no or rare substance use could – in this specific context – be understood to represent *objectively* ideal spaces. Given the orientation of this study toward an ethical and strengths-based approach (as noted in Chapter 2), it was important to limit the so defined 'desirable' spaces to those which substance users themselves construed positively. In addition to participants' own hypothetical ideal spaces, spaces of no or rare substance use *associated with (rather) positive feelings*[582] were therefore a main reference type in this analysis.

Among the 144 spaces of no or rare substance use, 102 (71%)[583] were associated with (rather) positive feelings[584] (labelled 'NSU pos' in Table 28, p. 393). Almost all participants (23; 96% of 24) included such spaces in their maps: five spaces on average (ranging from one to nine spaces per map).

Spaces were allocated to this pattern if substance use was reported to occur no more than 'rarely' (and 'never' for medicines). Within the confines set by this definition, wine emerged as the most frequently used substance for this pattern (C2 in Figure 16 left, p. 401). Substance

[582] Throughout these sections, patterns are referred to using their full name as much as possible. Feedback received on draft versions of this text suggested that this was preferable over, for example, abbreviations such as 'NSU pos'.
[583] In total, 110 such spaces were elicited but eight (7%) were dropped prior to the repertory grid interview (as per section 6.2.4), resulting in 102 spaces included in this analysis.
[584] As measured by a single supplied construct (C13).

use was marginally more frequent in this pattern than in spaces of no or rare substance use associated with *ambivalent or (rather) negative* feelings (Figure 19 right, p. 402). Compared with participants' hypothetical ideal spaces (Figure 16 right; see previous section), substance use frequency was lower than what participants imagined for their ideal spaces, especially for beer (C1), wine (C2) and cigarettes (C7). However, this pattern approximated the ideal spaces in terms of use frequency for sparkling wine (C4) and spirits or mixed drinks (C5-6).

On average, spaces of no or rare substance use associated with (rather) positive feelings were visited/occurred on a weekly basis (ranging from 'monthly' to 'daily') (C14 in Figure 16 left). In terms of settings and situations, this pattern was linked to a variety of settings, including participants' own home (20%), the university (12%), and urban public spaces (11%) (Appendix J.3.2). Typical situations were also very varied; they referred most frequently to hobbies (e.g., going for a walk, doing sports, going to the cinema) but also to everyday life at home (e.g., daily routines, meals, watching TV). About a fifth of these spaces referred to study or work (Appendix J.4.2), which was noteworthy given the negative construal of study and work to be described in section 11.4.2. Examples of typical situations are provided further below.

The key comparison for this pattern was with participants' own hypothetical ideal spaces. Considering the non-substance use constructs (C12-C28 in Figure 16 right), it was striking how similar the two patterns were. Although spaces of no or rare substance use associated with (rather) positive feelings were not the most similar to the ideal spaces overall (Appendix K.4.2), their construal still resembled that of the ideal spaces. For the most part, the lines connecting the data points ran parallel to each other in the comparison chart, with spaces of no or rare substance use associated with (rather) positive feelings construed about 0,5 points closer toward the less preferred pole. In other words, spaces of no or rare substance use associated with (rather) positive feelings could be understood as participants' hypothetical ideal spaces transferred into a real-life context.

There were, however, some notable deviations from this trend of similarity, indicating where this pattern differed from the imagined ideal. Specifically, spaces of no or rare substance use associated with (rather) positive feelings were construed as representing a less close relationship with the present people (C15 in Figure 16 right)[585], outward-orientation where some participants preferred inward-orientation (C17), expectations opposed to substance use where some participants preferred expectations in favour of substance use (C24), a less pleasant environment (C27) and a more structured sense of time (C28). An additional analysis

[585] Considering this pattern on its own (Figure 16 left) showed, however, that participants' ratings regarding the closeness to people (C15) varied greatly.

of individual responses (Appendix K.2.2) showed that differences on 'substance use expectations' (C24), 'physical pleasantness' (C27) and 'sense of time' (C28) were not only relatively great but were also construed very similarly by participants.

As this pattern was itself a main reference space in this analysis, it was also compared with all detailed patterns. Figure 17 left (p. 401) and Appendix K.4.3 indicate the position of all detailed patterns relative to spaces of no or rare substance use associated with (rather) positive feelings, by charting the distances on each construct. This comparison confirmed that this pattern was construed very positively overall. On average, it was construed more positively than most other patterns on most constructs[586]. Two notable exceptions were 'substance use expectations' (C24) and 'sense of time' (C28)[587].

What spaces represented no or rare substance use associated with (rather) positive feelings?

The following pages present selected interview excerpts to show some of the spaces of no or rare substance use associated with (rather) positive feelings. Given the large number of spaces allocated to this type, this selection cannot represent the entire spectrum of situations. However, excerpts were chosen to hint at the diversity of situations and to contextualise some of the quantitative differences described earlier. Because of the importance of this type of space for the present study, the interview excerpts are greater in number and length than in other sections of this chapter.

While this pattern included many spaces where alcohol or cigarette use was not permitted or not the social norm (e.g., university library, fitness centre, museum), it also included spaces where substance use might be expected but where it did not take place. These latter spaces were of particular interest for closer examination.

For example, one non-smoker (IP18) reported two spaces which she used to wind down in the evenings "when everything is already done"[588]. One space was labelled "time for myself" during which she would listen to music, tidy up, read, or engage in beauty rituals, while the other

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[586] In Figure 17 left, on most constructs (C12-28), there are several patterns further to the left (less preferred pole) of the midline (whereby the midline represents spaces of no or rare substance use associated with positive feelings), and the patterns to the right are relatively close to the midline.
[587] Spaces of no or rare substance use associated with (rather) positive feelings were characterised by expectations opposed to substance use (C24) and a more structured sense of time (C28). However, the comparisons were limited by the heterogeneous nature of the data, as noted in section 7.4. For example, for 'sense of time' there were no quantitative data available for spaces associated primarily with cigarette use (i.e., none of the participants who reported such spaces reported a 'sense of time'-related construct during their repertory grid interview).
[588] German original (with context): "das Abendritual beginnt, wenn schon alles erledigt ist. […] ...das finde ich das Angenehme daran, dass es praktisch so ...etwas ist was halt für mich bedeutet, dass halt... ich jetzt nichts mehr leisten muss heute."

space was labelled “evening ritual with my boyfriend” during which they would eat, get ready for bed and watch TV. She reported positive feelings and no substance use at all for either space, which led to the following conversation toward the end of the interview:

> *Interviewer: I will ask you a really stupid question now. […] “Time for myself” or such an “evening ritual”, for some people that would include a glass of wine for example. […] What would you say, why is that… not the case for you, or why… do you not need that, or why does that not feature there? […]*
> *Participant: Well, I don’t know, well I have … I think in my life I have never drunk really by myself? … […] And besides, … I don’t associate that kind of reward or relaxation with alcohol, that I need that now when I somehow have time for myself. That’s why it’s not applicable there… and during the evening ritual … it is a thing that somehow… that somehow just doesn’t have a place there… because it just, I don’t know, we’ve never done that. Alcohol is rather a social thing… for me. I mean, of course, I have sometimes drunk a glass of wine with my boyfriend, with a meal or so, but rather when there are even more people present. (IP18)*[589]

Besides exemplifying the spaces allocated to this pattern, the above excerpt also furthers our understanding of ‘substance use expectations’: the participant explains that and why she did not expect substance use in those spaces (e.g., “*doesn’t have a place*”, “*never done it*”).

The above example referred to spaces where substances were never used, but this pattern also included spaces of rare substance use[590]. Of the 102 spaces considered in the analysis for this pattern, there were 68 spaces (67%) with no substance use at all (i.e., all substances were reportedly used ‘never’) and 34 spaces (33%) with ‘rare’ use of at least one substance.

The following examples illustrate different scenarios of ‘rare’ substance use. The first example comes from one occasional smoker (IP15) who described a café area situated within a sports facility. There, she and her friends would sit at the end of their session, have a (usually non-

[589] German original: “I: Ich werde dir jetzt eine ganz blöde Frage stellen. […] ‘Zeit für mich selbst’ oder ‘Abendritual’, da würde bei manchen Leuten zum Beispiel ein Glas Wein dazugehören. […] Warum, würdest du sagen, ist das bei dir jetzt... nicht der Fall, oder warum... brauchst du das nicht, oder warum kommt das da nicht vor? […] B: Naja ich weiß nicht, also ich hab ....glaub ich noch nie in meinem Leben wirklich alleine getrunken? ... […] Und abgesehen davon, ...verbinde ich mit Alkohol jetzt nicht die Art von Belohnung oder Entspannung, dass ich das jetzt brauche wenn ich irgendwie Zeit für mich alleine habe. Deswegen fällts da weg und ...beim Abendritual ....ist es so eine Sache die irgendwie.. ....die da irgendwie einfach keinen Platz hat... weil es einfach. Ich weiß nicht, das haben wir noch nie gemacht. […] Alkohol ist eher so ein gesellschaftliches Ding... bei mir. Ich meine, natürlich, ich habe schon manchmal mit meinem Freund ein Glas Wein getrunken, zum Essen oder so, aber eher wenn noch mehr Menschen dabei sind.”

[590] Some public health advocates would not agree with the inclusion of *any* substance use (e.g., rare cigarette use) within this pattern. However, in this study context, the joint consideration of ‘no’ and ‘rare’ substance use was the most appropriate option, not least methodologically (as explained in section 7.3).

alcoholic) drink, watch the other participants engage in the sport and chat. She reported rare use of wine and cigarettes for this space:

> *Interviewer: How often do you drink beer here in the typical situation?*
> *Participant: Beer never… ((going through supplied constructs)) wine rarely?… Then, spirits and mixed drinks never. And cigarettes rarely, because you are also allowed to smoke inside there but… yes.. well, there is one friend […] who smokes and when she is there, then.. yes.. it can happen that I smoke a [cigarette] with her but rather… very rarely.*
> *I: OK so when she is there and smokes, then you always smoke with her, or not necessarily?*
> *P: Also not always but… every now and then. (IP15)*[591]

The above example shows how rare substance use can be part of a situation that is overall characterised by no substance use. Later on, the participant went on to describe the space further, which illustrated how 'sense of time' might be construed in such spaces:

> *P: […] well, I'd say that you go there briefly. You want to drink a coffee, you want to watch the others [engage in the sport], but still… you don't stay there for three hours. Instead you're there… fifteen minutes, maybe a half or three quarters of an hour but it is somehow a … coming and going.. […] this is not a space where you stay long. […] (IP15)*[592]

The second example is provided in the following excerpt, where a daily smoker (IP8) reflected on her use of cigarettes when spending time with her dog in the forest. This example shows a relationship between 'sense of time' and substance use that differs from the trend reported earlier. Here, a space with a longer duration was characterised by no or very rare use, while a space with a shorter duration was characterised by more frequent substance use[593]:

> *Interviewer: OK, erm, when you go for a walk with the dog, then…?*
> *Participant: I don't drink any alcohol.*
> *I: ((simultaneously)) you drink nothing, ok. And cigarettes?*
> *P: Very rarely… so, it has happened but really very very rarely.*

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[591] German original: "I: Wie oft trinkst du da Bier in der typischen Situation? B: Bier nie,.... Wein selten? ... Dann Spirituosen und Mixgetränke nie. Und Zigaretten selten, weil da darf man auch drinnen rauchen, aber.. ja.. also es gibt eine Freundin […], die raucht und wenn die da ist, dann.. ja, ...kann es sein, dass ich eine mitrauche aber eher ...sehr selten. I: ok, also wenn sie da ist und raucht, dann rauchst du immer mit, oder auch dann nicht? B: Auch nicht immer, aber ...hin und wieder."

[592] German original: "B: […] also ich würd sagen, dass du da kurz hingehst. Du willst einen Kaffee trinken, du willst beim [Sport] zuschauen, aber halt.. du bleibst jetzt dort keine drei Stunden. Sondern du bist.. fünfzehn Minuten da, vielleicht so eine halbe, dreiviertel Stunde, aber es ist irgendwie so ...Kommen und Gehen.. […] das ist kein Raum in dem du dich lange aufhältst. […]"

[593] As noted earlier, quantitative 'sense of time' data were not available for spaces associated primarily with cigarettes. The finding that 'sense of time' differed in spaces of no or rare substance use was based on comparisons with spaces associated primarily with alcohol or associated with cigarettes *and* alcohol. It is possible that the relationship between 'sense of time' and substance use differed depending on the kind of product/substance (e.g., alcohol use associated with a longer time duration but cigarette use associated with a shorter duration). The available quantitative data did not allow insights regarding this question.

I: Mhm ((signals understanding)) […] So this means you are not somebody who sits on the bench and lights up a [cigarette] while the.. dog-
P: No… my dog wouldn't allow that either. When I go for a walk with her, I have to engage with her. At least I have to move. […] ((later, toward the end of the interview)) […] regarding the walks, it also differs for me… I go… either, going for a walk in the evening for example is at our place around the house, at the same time that's also a break [from studying] for me … but when I go at the weekend in the morning for example, or in the afternoon, I do a big lap with her in the forest … and for me that is really time where I want to do something with her so to speak, so we play ball and… I don't know, run around and that is really where I say "I do nothing else except to play with her" […] … and this [walk] in the evening quickly around the house, the last… small round so to speak, there it is the case… every now and then.. that I also… that it also occurs that I smoke a [cigarette] (IP6)[594]

Besides illustrating what a space of no or rare substance use may look like for a daily smoker who generally smokes over 10 cigarettes per day, the above excerpt highlights a different meaning of 'rare' substance use than before. In this case, even though substance use was reported as 'rare', it appeared to play virtually no role in the chosen situation. The participant specifically distinguished her chosen typical situation[595] (playing with the dog in the forest, only very rare cigarette use) from another dog-walking situation (evening walk) with more frequent cigarette use. It was not discussed under what circumstances the 'very rare' substance use occurred in the forest, but it did not appear to be as characteristic of the typical situation as the rare cigarette use described by IP15 in relation to the sports facility[596].

The third example illustrates a space of no or rare substance use that is part of a substance use-related routine and whose allocation to this pattern may be questioned. One occasional smoker (IP15) reported on the bathroom at her relatives' house as a space of rare wine use:

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[594] German original: "I: Ok, .. ahm, wenn du mit dem Hund spazieren gehst, da...? B: trink ich keinen Alkohol I: trinkst du nichts, ok. ((gleichzeitig)) Und Zigaretten? B: Sehr selten …also es ist schon vorgekommen aber wirklich sehr sehr selten. I: Mhm ((verstehend)) […] also, du bist dann nicht jemand der sich auf die Bank setzt und sich eine anzündet während der .. Hund- B: nein… das würde auch mein Hund nicht zulassen. Wenn ich spazieren gehe mit ihr, dann muss ich mich mit ihr beschäftigen. Zumindestens muss ich mich bewegen. […] B: ((zum Ende des Interviews)) […] mit dem Spazieren gehen ist bei mir halt auch unterschiedlich, ich gehe halt ...entweder dieses Abend spazieren gehen zum Beispiel ist bei uns ums Haus, das ist halt auch gleichzeitig für mich Pause [vom Lernen] ...und wenn ich aber jetzt am Wochenende in der Früh zum Beispiel, oder am Nachmittag gehe ich mit ihr eine große Runde im Wald ...und das ist für mich aber wirklich Zeit wo ich mit ihr was machen will sozusagen also da spielen wir Ball und... weiß ich nicht, rennen umeinander und das ist wirklich so wo ich sage 'da mache ich nichts anderes außer mit ihr spielen', […] … und dieses am Abend' halt so schnell ums Haus das letzte ... Ründchen sozusagen, da ist dann schon ...immer wieder... dass ich auch... dass es auch vorkommt dass ich eine rauche".
[595] As described in Chapter 6, participants were asked to focus on one typical situation to represent each space. Only the dog-walking situation in the forest was chosen by the participant for the repertory grid interview.
[596] This suggested that, in some spaces described as representing 'rare' substance use, the typical situation was actually characterised by no substance use, but participants reported additional substance use that occurred in the same place. This happened frequently in relation to the workplace, where participants reported 'rare' substance use to account for special occasions (e.g., office Christmas party, company outing/'away day').

Participant: Erm, there I'd say, everything "never", except wine "rarely" because… when my [relative] and I […] are at [that] home, every now and then, and are [..] getting ready for … going out or so then … we put… a glass of wine next to the [mirror] ((laughs a bit)) […] So rather rarely… and everything else, cigarettes… spirits, all never.
Interviewer: And that is also… rather the typical situation that you thought of? […] this "getting ready for going out with the [relative]"?
P: Exactly ((laughs)) (IP15)[597]

This suggests (in contrast to the previous example) that, in some cases, 'rare' substance use may have been reported even though the chosen typical situation was characterised by more frequent use. In other words, participants may have underreported substance use frequency by also considering situations of no substance use that occurred in the same place[598]. A review of the spaces representing rare substance use suggested that this kind of constellation was the exception rather than the rule for the spaces allocated to this pattern.

The final example presents an office space described by a daily smoker (IP6):

Participant: […there I use] nothing [alcoholic]… except when it's the Christmas party, but […] that is once per year […] so just "smoking" [..] "always".
I: OK. So is that.. in the workplace or do you have to go out?
P: I have to go out.. clock out.. so-
I: OK. I'm just wondering because of the typical situation. Does it fit there? Is it better [to say] "never" or "always"? What would you say?
P: Oh, for the typical situation… no, in that case not, because then I sit in the office […] I don't go for a smoke often because we have so much… work-related stress […] I'd say I go smoking once in [..] four hours or so […]
I: aha, ok, that means it is also not an integral part [of the typical situation] or so? Because after all, there are also offices where the colleagues are all chatting with each other outside.. so it's not really like that-
P: ((simultaneously)) no, no (IP6)[599]

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[597] German original: "B: Ahm, da würd ich sagen, alles 'nie', außer Wein 'selten', weil.. wenn meine [Verwandte] und ich [... dort] zuhause sind, hin und wieder, und uns [..] fertig machen fürs ...Fortgehen oder so dann ...stellen wir uns ...so neben [den Spiegel] ein Glas Wein hin. ((lacht etwas)) […] Also eher selten ..und alles andere, Zigaretten,.. Spirituosen, alles nie. I: Und das ist auch.. eher die typische Situation an die du gedacht hast? […] dieses 'zum Fortgehen fertig machen mit der [Verwandten]'? B: Genau ((lacht))".

[598] As noted in section 13.4, although participants were instructed to choose one 'typical situation' for each space, this was not always easily done, and participants sometimes (inadvertently) switched between different situations and levels of abstraction over the course of their interview. While in some cases the interviewer was able to address this on the spot, in other cases (such as the one presented here) this only became apparent during data analysis. Thus, it was not clarified during this interview what the indication of 'rare' substance use referred to in this instance (i.e., all situations in the bathroom or only the chosen typical situation with the relative).

[599] German original: "B: nichts [kein Alkohol]… außer wenn Weihnachtsfeier ist, aber […] das ist ein Mal im Jahr

In this case, the participant acknowledged alcohol use during the Christmas party but dismissed it herself as being too rare for inclusion ("*that is once per year*"). Although she initially indicated 'always' using cigarettes at her office, a prompt by the interviewer clarified that cigarette use was not part of the typical situation as imagined by the participant. As a consequence, the office (as represented by the typical situation rather than as a place) was captured as being associated with no substance use, albeit acknowledging that this was an example of how spaces of no or rare substance use (e.g., working in the office) may relate to spaces of substance use (e.g., smoking breaks during office hours).

More generally, the participant described this space as follows, which illustrated how work-related spaces could be associated with (rather) positive feelings:

> *Interviewer: And when you think of the work?*
> *Participant: "Rather positive" [feelings]… because actually I enjoy it and I also get on with the work colleagues. But nevertheless you still have to- we do have a lot of stress and overtime […] ((later in the interview)) I like work […] because there is no stress. Even […] if we <u>have</u> stress, but it is no… pressure, or I get on with everyone. […] It doesn't weigh me down, because I enjoy it. (IP6)*[600]

This was noteworthy because work-related contexts were typical of spaces of no or rare substance use associated with *ambivalent or (rather) negative* feelings (see next section). A comparison of spaces of no or rare substance use associated with (rather) positive feelings and such spaces associated with ambivalent or (rather) negative feelings (Figure 19 middle, p. 402) showed that although the substance use patterns (C1-9) were almost identical, the construal on the remaining constructs was very different. In fact, a comparison of all patterns (Figure 17 left) showed that spaces of no or rare substance use associated with ambivalent or (rather) negative feelings differed *the most* from spaces of no or rare substance use associated with (rather) positive feelings. This confirmed the importance of considering these two types separately in this analysis. The following section explores further those spaces of no or rare substance use associated with ambivalent or (rather) negative feelings.

[…] also nur rauchen, [..] <u>immer</u>. I: ok. Ist das dann ...<u>im</u> Arbeitsplatz oder musst du da rausgehen? B: Ich muss rausgehen..ausstempeln ..also- I: ok. Ich überleg jetzt nur wegen der typischen Situation. Passt das dann dazu? Ist das dann besser 'niemals' oder 'immer'? Was würdest du sagen? B: Achso, zur typischen Situation..<u>nein</u>, dann nicht, weil dann sitz ich im Büro […] ich geh nicht oft rauchen, weil wir halt soviel ...Arbeitsstress haben […] Ich sag ich geh ein Mal rauchen in [..] vier Stunden oder so […] I: aha, ok, das heißt es ist auch kein wichtiger Bestandteil oder so? Es gibt ja auch Büros wo die Kollegen alle draußen tratschen zusammen.. also es ist nicht wirklich so- B: ((gleichzeitig)) nein, nein".

[600] German original: "I: und wenn du an die Arbeit denkst? B: Eher positiv, ...weil es mir eigentlich viel Spaß macht und mit den Arbeitskollegen taugt es (halt auch). Nur muss man halt trotzdem- wir haben halt viel Stress und Überstunden. […] ((später)) Ich mag Arbeit […], weil da kein Stress vorhanden ist. Auch […] wenn wir Stress <u>haben</u>, aber es ist kein... Druck, oder ich versteh mich mit allen. […] Mich belastet es nicht, weil es mir Spaß macht".

11.4.2. No or rare substance use, ambivalent/negative feelings

Among the 144 spaces of no or rare substance use, 42 (29%) were associated with ambivalent or (rather) negative feelings[601] (labelled 'NSU neg' in Table 28, p. 393). This justified the consideration of these spaces as a separate pattern[602]. Almost all participants (20; 83% of 24) included such spaces in their maps: mostly one to three spaces, though one participant (IP7) reported nine such spaces (of which six were included in the interview)[603]. Participants construed these spaces mostly as ambivalent (C13 in Figure 19 left, p. 402).

Substance use was marginally less common in these spaces than in spaces of no or rare substance use associated with (rather) *positive* feelings (as noted in the previous section). It was also noteworthy that spaces associated with *rare* substance use and ambivalent or (rather) negative feelings referred to alcoholic beverages only (C1-6 in Figure 19 left)[604].

On average, these spaces were visited/occurred on a weekly basis (ranging from 'monthly' to 'daily') (C14 in Figure 19 left). Considering the settings and situations, study and work contexts dominated. Spaces were mostly associated with university settings (38%), workplace (10%) and participants' own home (19%) (Appendix J.3.2), which included studying at home. Another typical situation at home or elsewhere involved being with other people (e.g., parents, flatmates). Though these differences in setting and situation resulted in some divergent ratings (e.g., on 'Togetherness', C18 in Figure 19 left), their common potential for stress appeared to set the tone for these spaces. Ambivalent feelings appeared to stem from how participants felt about their studies/work or the people present in those situations. The following interview excerpts regarding two different situations illustrate this:

> *Interviewer: You just associated the [university] reading room with "negative" feelings […]*
> *Participant: […] because after all, it is also always associated with stress, when I end up sitting there and thinking "I still have to thoroughly study fifty pages" […] and everyone is sitting and you know, they are all stressed and they will all have an exam soon.. I mean,*

[601] As measured by a single supplied construct (C13).
[602] For example, this was not the case for spaces associated primarily with alcohol (described in section 11.5.1), where ambivalent or (rather) negative feelings were uncommon.
[603] Considering all participants, 51 such spaces were elicited but nine (18%) were dropped prior to the repertory grid interview, resulting in 42 spaces included in this analysis. These spaces were most likely to be excluded before construct elicitation if a participant had listed more than 12 spaces, as the other patterns were more important for the analysis (as described in section 6.2.4).
[604] Spaces representing rare cigarette use (with no or rare alcohol use) were associated only with (rather) positive feelings (five elicited spaces, data not shown).

somehow this also creates a sense of community but… I don't like being there. It's a rather negative space for me ((speaks quieter towards the end of the sentence)) (IP15)[605]

Interviewer: [What feelings do you have] when you think of your home?
Participant: Ambivalent. Sometimes good, sometimes bad. I don't get on so well with the parents. I mean, I would like to move out, but they don't let me move out because I am still a student ((she describes arguments she has had with her parents; later on in the interview she summarises the situation at home as follows)) Actually, I am almost never at home. I get up and I come back home sometime at night. […] I don't talk with them at all anymore because I think they won't understand me anyway. (IP6)[606]

This ambivalence was mirrored in the ratings on the elicited constructs (see Figure 19 left). On average, these spaces were construed negatively on almost every dimension. In particular, participants were likely to construe them as monotonous (C19), extremely stressful (C22), highly structured in terms of time (C28) and to construe the relationship with the people in these spaces as rather distant (C15). The comparison with participants' hypothetical ideal spaces (Figure 19 middle) showed a similar picture. The comparison of all spaces relative to the ideal space (Figure 17 left, p. 401) showed that, out of all patterns, spaces of no or rare substance use associated with ambivalent or (rather) negative feelings differed the most from the ideal space. This pattern can therefore be understood to have been construed most negatively overall.

Figure 19 (left) shows that substance use was not expected (C24) in these spaces. This might suggest that expectations against substance use led to ambivalent or negative feelings toward these spaces. A comparison with spaces of no or rare substance use associated with (rather) *positive* feelings (Figure 19 middle) found no notable differences regarding these expectations. Instead, 'relaxation' appeared again as the main distinguishing dimension, as spaces associated with ambivalent or negative feelings were construed as considerably more stressful (C22) (pathway analyses in Chapter 12 will show, however, that expectations against substance use can also produce stress). An additional analysis of individual responses (Appendix K.2.7) showed that participants construed this difference similarly: all eight participants who contributed a 'relaxation'-themed construct in this comparison construed

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[605] German original: "I: ...Beim Lesesaal war jetzt das 'negativ' [...] B: [...] weil es halt auch immer mit Stress verbunden ist, wenn ich dann dortsitze und mir denke 'Ich muss jetzt noch ... fünfzig Seiten durch lernen'. [...] und alle sitzen und du weißt, alle haben einen Stress und alle haben bald eine Prüfung.. ich mein, das macht auch irgendwie ein Gemeinschaftsgefühl, aber... ich bin nicht gerne dort. Das ist so eher ein negativer Raum für mich. ((leiser))"

[606] German original: "I: wenn du an Zuhause denkst? B: Ambivalent. Manchmal gut manchmal schlecht. Ich versteh mich nicht so mit den Eltern. Also, ich würd gern ausziehen, aber sie lassen mich nicht ausziehen, weil ich halt noch Student bin ... [...] Ich bin eigentlich fast nie zuhause. Ich stehe auf und komme aufd' Nacht heim irgendwann. [...] Ich rede gar nicht mehr mit ihnen, weil ich mir denke, dass sie mich eh nicht verstehen".

spaces of no or rare substance use associated with ambivalent or (rather) negative feelings as more stressful than spaces of no or rare substance use associated with (rather) positive feelings (on average by 2,8 points on a 5-point scale). It was also notable that this type was construed as most dissimilar from (rather) positively associated spaces of no or rare substance use (Appendix K.4.3), despite almost identical substance use patterns.

11.5. Spaces of alcohol or cigarette use

Of the 273 elicited spaces included in the interviews, 127 (47%) were associated with at least occasional use of alcohol or cigarettes (labelled 'Alc/cig' in Table 28, p. 393). All participants were asked to include such spaces on their maps. On average, there were six such spaces per map (ranging from one to 13 per map). The proportion of spaces associated with alcohol or cigarette use ranged from 9% (1 out of 11; IP1) to 88% (7 out of 8; IP16) of all spaces on a participant's map[607].

Within the 127 spaces associated with alcohol or cigarettes:

- 61 spaces (48% of 127) were associated primarily with alcoholic beverages (further described in section 11.5.1),
- 35 spaces (28%) were associated primarily with cigarettes (see section 11.5.2),
- 21 spaces (17%) were associated with alcohol *and* cigarettes (see section 11.5.3), and
- 10 spaces (8%) were associated with alcohol or cigarettes *as well as* other products/ substances, namely waterpipe or medicines (not included in the analysis due to small number of spaces).

This variety was mirrored in diverse ratings on the supplied substance use constructs for this broad pattern (C1-9 in Figure 18 middle, p. 402; for medicine use, see Appendix K.1.6).

Figure 18 (middle) suggested that spaces associated with alcohol or cigarettes were construed positively on the whole, with most ratings (averaged per participant) located on the side of the preferred poles. As a broad pattern, these spaces were included in one comparison to contrast them with spaces of no or rare substance use (Figure 18 right). This comparison was described in section 11.4 in relation to spaces of no or rare substance use. On average, spaces associated with alcohol or cigarette use emerged as more positively construed on almost all constructs. In particular, they were enjoyed more (C21), construed as more relaxed (C21),

[607] Of 133 elicited spaces representing alcohol or cigarette use, 6 (5%) were dropped prior to the repertory grid interview (as per section 6.2.4), resulting in 127 spaces included in this analysis.

associated with expectations in favour of substance use (C24), and were not associated with time pressures (C28), compared with spaces of no or rare substance use[608].

The next sections explore these 'alcohol or cigarette' spaces in greater detail.

11.5.1. Alcohol as primary substance

Within the 127 spaces associated with alcohol or cigarettes, most spaces (61; 48% of 127)[609] were associated with at least occasional use of alcohol but no or rare use of other substances/ products (labelled 'Alc' in Table 28, p. 393). Most participants (19; 79% of 24) included such spaces on their maps: three spaces on average (ranging from one to eight spaces per map).

Of the 61 spaces associated primarily with alcohol, 34 spaces were associated with wine or beer use (but no or rare use of other alcoholic beverages), and 16 spaces were associated with the use of spirits or mixed drinks (often in addition to other alcoholic beverages). The 11 remaining spaces were associated with cider (3 spaces) or sparkling wine (8 spaces) but not spirits or mixed drinks. These spaces were too few for further analysis[610], but the number of spaces associated with wine or beer and with spirits or mixed drinks was sufficient to allow a more detailed review of these spaces, presented in later sections.

A general question concerned what might set 'alcohol' spaces apart from spaces associated with other substances. In the present study, this meant contrasting spaces associated primarily with alcohol with those spaces representing cigarette use, namely spaces associated primarily with cigarettes (Figure 20 left, p. 403; see also section 11.5.2) and spaces associated with alcohol *and* cigarettes (Figure 20 middle; see also section 11.5.3). In both comparisons, the spaces associated primarily with alcohol were characterised by a closer relationship with the people (C15), construed as extremely novel (C20), more self-determined (C25), requiring less self-monitoring (C26) and as representing more pleasant environments (C27) (Figure 20 left and middle). Spaces associated primarily with alcohol were mostly linked to home settings (e.g., at home with the family), while spaces associated primarily with cigarettes and spaces associated with alcohol *and* cigarettes were mostly linked to public settings (e.g., café, bar).

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[608] However, as section 13.5.2 will show, considering whether spaces of no or rare substance use were associated with positive or with ambivalent/negative feelings allows a more nuanced interpretation of these data.
[609] Of 64 elicited spaces associated primarily with alcohol use, three (5%) were dropped prior to the repertory grid interview (as per section 6.2.4), resulting in 61 spaces included in this analysis. In addition, four spaces associated with alcohol were not included in the analysis because they were also associated with waterpipe or medicine use.
[610] Spaces associated with cider or sparkling wine were included in the broader alcohol pattern (i.e., as spaces associated primarily with alcohol) but were not allocated to any detailed pattern.

However, only smokers could be considered for these direct comparisons[611], and given the composition of the overall sample (as described in section 5.1), the participants included in these direct alcohol-cigarette comparisons were very few and heterogeneous[612].

Due to the heterogeneity of the data, these differences were reviewed at the individual level. This suggested that the setting or context for substance use appeared to be important. In relation to physical pleasantness (C27), for example, one occasional smoker (IP24) construed a café with an indoor smoking area (a space associated primarily with cigarettes) extremely negatively as being stuffy, while a dining room (a space associated primarily with alcohol) was construed as less stuffy due to the availability of a balcony.

Differences between occasional and daily smokers were also considered. The finding that spaces associated primarily with alcohol were construed as more self-determined (C25) was based on data from occasional smokers only, and it is reasonable to assume that daily smokers might have construed these spaces differently. Conversely, the construal of alcohol spaces as extremely novel (vis-à-vis construal of cigarette spaces as extremely familiar; C20 in Figure 20 left and middle) represented data from a single daily smoker (IP6). In this case, the space associated primarily with alcohol (a bar visit in New York) was construed as adventurous and novel because it was seen as an example of being abroad and travelling. In the interview, the participant referred less to the chosen typical situation (the bar visit) but described her general perceptions of travelling abroad. However, given that she reported no spaces associated primarily with alcohol in Austria, the construal of this type of space as novel appeared particularly fitting, with the smoking ban being both a possible marker for being abroad and resulting in the unfamiliar experience of drinking without smoking.

The following two sections return to include non-smokers (as well as the smokers mentioned above) to explore how participants construed spaces associated with wine or beer and spaces associated with spirits or mixed drinks (but not cigarettes), respectively.

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[611] Comparisons only included those participants who had *all* spaces required for a comparison, to avoid conflating differences between spaces with differences between participants (as described in section 7.4). Correspondingly, non-smokers were not included in alcohol-cigarette comparisons, as they did not report spaces associated with their own cigarette use. Non-smokers were, however, considered in a subgroup comparison (Appendix M.6.3 right).

[612] Only three participants (one daily, two occasional smokers) reported spaces associated primarily with alcohol *as well as* spaces associated primarily with cigarettes. Five participants (one daily, four occasional smokers) reported spaces associated primarily with alcohol *as well as* spaces associated with alcohol *and* with cigarettes. The five *daily* smokers in this sample did not generally report spaces associated primarily with alcohol. Though one participant did not drink alcohol in general (hence could not report such a space), the main reason for this appeared to be the lack of a general smoking ban for cafés, bars and restaurants at the time of data collection. Only one daily smoker (IP6) reported a space associated primarily with alcohol – on holiday where a smoking ban was in place (see section 11.5.1) – and was included in these alcohol-cigarette comparisons. Conversely, the five *occasional* smokers were less likely to report spaces associated primarily with cigarettes (further explored in section 11.6).

Wine or beer

Among the 61 spaces associated primarily with alcoholic beverages, 34 (56%) were associated primarily with wine or beer (labelled 'Wine/beer' in Table 28, p. 393)[613]. Most participants (15; 63% of 24) included such spaces in their maps: mostly one to three spaces per map. Most of these were associated primarily with wine[614]. On average, participants used wine or beer more frequently in these spaces than in their hypothetical ideal spaces (Figure 22 right, p. 404; see also section 11.3). Methodologically, spaces were allocated to this pattern only if products/substances other than wine or beer were used no more than rarely. Within the limits set by this definition, sparkling wine (C4 in Figure 22 left) emerged as the product most likely to be used in these spaces besides wine and beer[615].

Considering settings and situations, spaces associated primarily with wine or beer use were found in almost all settings, but they were associated most with participants' own home (24%), cafés, bars or restaurants (15%) and holidays (12%) (Appendix J.3.2). Typical situations frequently referred to being in company (e.g., friends, family) or going out (Appendix J.4.2), also in relation to other settings, as the following interview excerpts illustrate:

> *Interviewer: […for the space "nature"] you said "occasionally" for … wine, what are you … thinking of there, just so I can understand the situation better? [...]*
> *Participant: Well, I .. like being in nature.. generally, not just for hiking, also … to sit outside with friends .. in nature […] just in the evening, instead of going to a bar to go into nature […] sometimes in a park, sometimes just that we.. played volleyball during the day and then in the evening we drank and it became more of a get-together. (IP4)*[616]

> *Interviewer: For the [sports grounds where you play] you thought more of the preparations for the game?*

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[613] Of 35 elicited spaces representing wine or beer use, one (3%) was dropped prior to the repertory grid interview (as per section 6.2.4), resulting in 34 spaces included in this analysis. One additional space associated with wine and beer was not included in the analysis because it was also associated with waterpipe use.
[614] Of the 34 spaces included in the analysis, 20 spaces were associated primarily with wine (i.e., wine used at least occasionally and beer used never or rarely), eight spaces were associated with beer *and* wine (though not necessarily used on the same occasion), while only six spaces were associated primarily with beer. Figure 22 left also shows that, on average, wine (C2) was used more frequently than beer (C1).
[615] Cluster analysis suggested that (at least occasional use of) sparkling wine should not be included in the same pattern as wine or beer use (as described in section 7.3.3).
[616] German original: "I: [...] weil du beim ...Wein gesagt hast 'manchmal', nur damit ich die Situation besser versteh, was hast du da ...im Sinn? [...] B: Also, ich ....bin generell ...gern in der Natur, also nicht nur wandern, auch ...sich draußen, in die Natur ... sich mit den Freunden hinsetzen, [...] am Abend einfach, anstatt in eine Bar in die Natur zu gehen. [...] Manchmal im Park, manchmal einfach, also dass wir ....tagsüber Volleyball spielen gegangen sind und am Abend dann getrunken haben und eher so eine Runde draus geworden ist."

Participant: Yes, that too, [but] rather that… sometimes there is this… after… the game in the changing rooms, a shandy beer or so (IP16)[617]

All elicited wine/beer spaces but one were associated with positive or rather positive feelings (data not shown). At the level of participants, almost all associated this pattern with positive feelings (C13 in Figure 22 left). Spaces associated primarily with wine or beer use were also construed positively on the other constructs. A notable exception was 'changeability' (C19-20), where this pattern was construed toward the less preferred pole (as static by participants who preferred excitement, and as dynamic by participants who preferred reliability).

Comparisons with participants' hypothetical ideal spaces and (rather) positively associated spaces of no or rare substance use (see earlier sections) showed a similarly positive picture. On the whole, spaces associated primarily with wine or beer were among the closest spaces to these two reference spaces (Figure 22 right; Figure 17, p. 401). Consequently, spaces of wine/beer use appeared to represent a cross between (rather) positively associated spaces of no or rare substance use and participants' hypothetical ideal spaces. In other words, it could be hypothesised that if a positively construed space of no or rare substance use transformed to become more similar to the ideal space, it would finally be construed similar to a space associated primarily with wine or beer.

A comparison with spaces associated with spirits or mixed drinks (Figure 29 left, p. 407; to be described in the next section) showed that spaces characterised by the use of wine or beer were associated with cosier forms of get-togethers (C23), construed as requiring less self-restraint (C26) and as less outward-oriented by those preferring inward-orientation (C17). They were also construed as representing a more pleasant environment (C27) and as less varied (C19-20). These differences in construal might have related to differences in setting, as spaces associated with spirits or mixed drinks were linked mostly to bars and restaurants, while spaces associated with wine or beer were more likely to be linked to home settings (e.g., resulting in greater privacy). The following interview excerpt illustrates well the cosy, yet structured nature of a home-based situation associated only with frequent use of wine:

Participant: […] in the room of my flatmate … that's where we watch [a reality TV show] ((laughs)) together every week. <u>And</u>, there we also drink wine or talk and watch [the show] […]
Interviewer: And when you watch TV- so is that <u>everyone</u> from the flat sitting in the flatmate's room and watching [the show]?

[617] German original: "I: Am [Teamsportplatz] hast du eher gedacht an die Vorbereitungen (aufs Spiel)? B: Ja auch, also dass… man hat halt manchmal dieses... nach ...dem Match in der Kabine noch ein Radler oder so".

P: Mhm ((simultaneously))… exactly, sometimes even other friends come, too.
I: And the conversations… do you also talk then or is there a rule that you mustn't speak?
P: Yes [we talk] but it's a very… low intellectual level, it's like, you gossip about the people on TV, .. so it's nothing that I would do now of my own accord but it's still good fun (IP22)[618]

Considering participants who used cigarettes or other nicotine products, spaces associated primarily with wine or beer differed from their hypothetical ideal spaces in that the ideal spaces were more likely to feature products such as cigarettes or waterpipe (Figure 22 right). However, none of the five daily smokers in the current sample reported a space in Austria associated primarily with wine or beer but not cigarettes[619]. As noted earlier, only one daily smoker (IP6) described such a space, located *outside* Austria:

Interviewer: And for "abroad/travel", what did you think of there?
Participant: For "abroad/travel" I thought of that I … go for a casual drink, sometimes when I have time in the evening … for example now in New York we were also in a … bar […] but [in those situations] I only drink beer and wine, if I do drink. So thinking of the typical situation I would say <u>that</u> is "always" […] and cigarettes, well, it depends if you are allowed to smoke or <u>not</u>. Now in New York [you were] not [allowed to smoke] […] So I would say [cigarettes are] "never" because, after all, you have to go outside to smoke. (IP6)[620]

The analysis suggested that the equivalent of a 'wine/beer' space for smokers was rather spaces associated with beer or wine *as well as* cigarettes (to be described in section 11.5.3).

Spirits or mixed drinks

Of the 61 spaces associated primarily with alcoholic beverages, 16 (26%) were associated with spirits or mixed drinks (often with other alcoholic beverages) (labelled 'Spirits/mixers' in

[618] German original: "B: [...] bei meiner Mitbewohnerin im Zimmer..da schauen wir jede Woche gemeinsam [eine Reality TV Sendung] ((lacht)). <u>Und</u>, da trinken wir auch einen Wein oder ratschen und schauen das halt an. [...] I: Und wenn ihr fernschaut- also ist das dann die <u>ganze</u> WG sitzt bei der Mitbewohnerin im Zimmer und schaut sich [die Sendung] an? B: Mhm, ((gleichzeitig))... genau, manchmal sogar noch andere Freunde die kommen. I: Und die Gespräche...also wird dann auch gesprochen oder gilt da die Regel 'man darf nicht reden'? B: Ja aber das ist ganz ....niedriges Niveau, das ist halt so, man lästert über die Leute im Fernsehen, ...also das ist jetzt nichts was ich von mir aus machen würde, aber ist doch ganz lustig. […]"

[619] To contextualise this finding, there was not yet a general smoking ban in place for cafés, bars and restaurants in Austria at the time of data collection. Consequently, although it would have been interesting to make a further comparison with spaces associated with cigarettes *and* with beer or wine use (see section 11.5.3), this was not done because only two participants reported both types of spaces.

[620] German original: "I: Und bei 'Ausland/Reisen', an was hast du da gedacht? B: 'Ausland/Reisen' hab ich mir gedacht, dass ich.. wenn ich dann am Abend einmal Zeit hab, halt, ab und zu, was gemütlich trinken gehen, ...zum Beispiel in New York waren wir jetzt auch in einer ...Bar und ja [...] da trink ich aber auch nur Bier und Wein, wenn dann. Also <u>das</u> würd ich sagen, an die typische Situation angepasst, 'immer' [...] und Zigaretten, ja kommt darauf an, ob man rauchen darf oder <u>nicht</u>..In New York war jetzt nicht.. [...] also ich würd jetzt sagen 'niemals'.. weil da muss man ja rausgehen rauchen".

Table 28, p. 393)[621, 622]. Nine participants (38% of 24) included such spaces on their maps: mostly one or two (up to four spaces in the case of IP5). The distinction between 'spirits' and 'mixed drinks', initially adopted based on existing survey research, did not make sense to all participants, so the two categories were considered together in this analysis[623].

Spaces were allocated to this pattern if cigarettes and other nicotine products were used no more than rarely (the use of spirits or mixed drinks *and* cigarettes is covered in section 11.5.3) and medicines never. There were no restrictions on the use of other alcoholic beverages, as spaces were typically associated with spirits or mixed drinks *as well as* other alcoholic beverages. Although there was great variety among participants, spaces associated with spirits or mixed drinks were also typically associated with beer or wine and, to a lesser degree, with sparkling wine or cider (C1-4 in Figure 23 left, p. 404). A comparison with spaces associated primarily with wine or beer (Figure 29 left, p. 407; see previous section) suggested that cider (C3) and sparkling wine (C4) were more frequently used in spaces associated with spirits or mixed drinks. A comparison with participants' hypothetical ideal spaces (Figure 23 right; see section 11.3) suggested that participants used spirits or mixed drinks (C5-6) considerably more frequently than what they considered their general ideal.

In terms of settings and situations, this pattern was most strongly associated with bars and restaurants (56%), holiday locations (25%) and the homes of friends or acquaintances (19%) (Appendix J.3.2). Typical situations in these spaces referred mostly to parties, celebrations (e.g., birthday) and one-off events. The following interview excerpts illustrate the latter:

> *Interviewer: […] you indicated before… "cider" and "spirits", … but they did not feature <u>here</u> [on your map], <u>where</u> was that?*
> *Participant: Well, "cider" was with […] my friend's sister… and that was just one time, but it was in the last six months. And "spirits", erm, probably also with this.. sister of my friend ((laughs a bit)) […] but that was just once, that's why it is not here [on the map]. […] it is not*

[621] Of 18 elicited spaces representing spirits or mixed drinks use, two (11%) were dropped prior to the repertory grid interview (as per section 6.2.4), resulting in 16 spaces included in this analysis. In addition, three spaces associated with spirits or mixed drinks were not included in the analysis because they were also associated with (at least occasional) waterpipe use or (any) medicine use. Waterpipe or medicine use was most commonly reported for spaces that were also associated with spirits or mixed drinks (with or without cigarettes).
[622] Five spaces were associated primarily with spirits (i.e., spirits used at least occasionally and mixed drinks used never or rarely), six spaces were associated with spirits *and* with mixed drinks, and five spaces were associated primarily with mixed drinks. However, participants did not use the two categories consistently.
[623] Even though examples of specific beverages were provided, participants did not use the categories consistently (e.g., including rum and coke under 'spirits' and under 'mixed drinks'). It was decided to analyse the two categories jointly rather than to correct participants during the interviews.

important to me […] ((participant subsequently agreed to add this space to her map[624])) (IP20)[625]

Interviewer: What were you thinking of for "spirits"?
Participant: Well, last time actually where I really drank one was… in London, erm… we met a friend who… […] he is from [another country], he brought a traditional beverage and invited us to try it ((laughs)) (IP17)[626]

However, spirits or mixed drinks were not always specifically mentioned. For example, one participant only mentioned beer when describing her dining room, while additional data collection (through supplied constructs) found that this space was also associated with the use of wine, spirits and mixed drinks[627]:

Interviewer: […] "Dining room" … what [typical situation] did you choose here now? Rather the eating or rather the studying? ((referring to earlier conversation in the interview))
Participant: Erm… the… neither of the two, actually ((laughs)) erm but rather the… beer drinking, because most of the time we invite people there and I have an image in front of my eyes that we've turned up the music, erm and we're just sitting together with a good circle of friends and drinking a beer ((laughs)) (IP24)[628]

On average, these spaces were considered less important than (rather) positively associated spaces of no or rare substance use (C12 in Figure 23 right; see also section 11.4). However, as suggested by the excerpts above, participants' ratings regarding the importance of these spaces varied greatly (C12 in Figure 23 left). While the excerpt from IP20 portrayed a space rated as 'not at all important', other spaces of this pattern (e.g., referring to a holiday or a special occasion with the partner) were rated as 'very important'. It was noteworthy that despite those differences in importance, participants reported similarly positive feelings (Figure 23 left

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[624] In other instances, a space described like this by a participant would not have been added to the map. In this case, the interviewer suggested adding the space to the map because the map only contained two substance use spaces otherwise, both associated only with occasional use of wine. It seemed relevant to explore how a space representing such a vastly different pattern (cf. the participants' other spaces) would be construed.
[625] German original: "I: [...] du hast vorher angekreuzt .. 'Cider' und 'Spirituosen', ...die sind jetzt da nicht vorgekommen, wo war das? B: Also Cider war mit [...] Schwester von meiner Freundin, ... und das war nur ein Mal, aber das war in letzten sechs Monaten. Und Spirituosen äh, ...wahrscheinlich auch mit dieser ...Schwester von meiner Freundin. ((lacht etwas)) [...] aber das war nur einmalig, deswegen es ist nicht hier [auf der Karte]. [...] es ist nicht wichtig für mich […]".
[626] German original: "I: Woran hast du bei 'Spirituosen' gedacht? B: Also letztes Mal, eigentlich wo ich wirklich eine getrunken habe, war... in London, ahm...da hatte ein Freund den wir getroffen haben [...] aus [einem anderen Land] kommt er, er hat ein traditionelles Getränk mitgebracht und uns eingeladen es zu kosten ((lacht))".
[627] Despite the emphasis on beer in this excerpt, the classification of this space as one associated with spirits or mixed drinks appeared to be consistent with the participant's overall construal of the space, as she also described it (later in the interview) as a space for pre-loading prior to going out elsewhere in Vienna.
[628] German original: "I: [...] 'Esszimmer' .. was hast du dir da jetzt ausgesucht? Eher das Essen oder das Lernen? B: Ah .. das .. keines von beiden, eigentlich ((lacht)) ah sondern eher das .. eben das Biertrinken, weil wir dort meistens die Leute einladen und da habe ich ein so ein Bild vor Augen, dass wir die Musik aufgedreht haben, ah und einfach nur mit einem guten (Freundeskreis) zusammen sitzen und ein Bier trinken ((lacht))".

and right, C13). No participant reported (rather) negative feelings regarding such a space, and only few spaces were associated with ambivalent feelings (data not shown).

This type of space was similar to spaces of no or rare substance use associated with positive feelings or to participants' hypothetical ideal spaces on several dimensions, including closeness to people (C15) and togetherness of activity (C18) (Figure 23 right). Considering this pattern on its own (Figure 23 left) as well as in relation to the two reference spaces (Figure 23 right) and spaces associated with wine or beer (Figure 29 left), spaces associated with spirits or mixed drinks could be characterised overall as representing outward orientation (C16-17), novelty (C19-20), fun (C21), party and excess (C23) and freedom of choice (C25). Compared with spaces associated with wine or beer (Figure 29 left), participants reported a *greater* need to restrain themselves (C26), although this might have also reflected differences in setting (e.g., bars vs. own home). Overall, spaces associated with spirits or mixed drinks were construed as somewhat less preferred than spaces associated primarily with wine or beer (located on or much closer to the unpreferred pole on several dimensions, as shown in Figure 29 left), and they were less similar to the two reference spaces than spaces associated with wine or beer (Figure 17, p. 401; Appendix K.4).

An interesting question with regard to this pattern was how its outward orientation (C17), novelty (C20) and focus on party and excess (C23) were perceived by those participants who preferred inward orientation, familiarity and cosy get-togethers. These spaces were nevertheless associated with positive feelings (as noted earlier), suggesting that general preferences might not apply to this type of space. In other words, participants construed these spaces positively even though they contradicted some of their preferences. One possible explanation is that these spaces had an exceptional status (where deviations from the general preference were perhaps even welcomed) because they were relatively rare, being one of the least frequently visited/occurring spaces in this study[629]. Another explanation could be that correspondence with preferences on other dimensions (e.g., extremely positive ratings on enjoyment; C21 in Figure 23 left) outweighed the negative aspects for the overall construal.

11.5.2. Cigarettes as primary product

The remaining sections focus on the subgroup of smokers (five daily and five occasional smokers, as described in section 5.1.2) to understand how spaces associated with cigarettes were construed. Within the 127 spaces associated with alcohol or cigarettes, 35 spaces

[629] Though reported frequency varied, this type of space occurred less than monthly overall: far less frequently than spaces of no or rare substance use (Figure 23 left and right, C14).

(28%)[630] were associated with at least occasional use of cigarettes but no or rare use of other substances/products (labelled 'Cig' in Table 28 p. 393). Seven participants (29% of 24) included such spaces on their maps: five spaces on average (one to eleven spaces per map).

As a broad pattern, these spaces were included in two comparisons to contrast them with spaces associated with alcohol use. The first comparison – with spaces associated primarily with alcohol – was already described in section 11.5.1. The second comparison included five participants (three daily smokers and two occasional smokers) and compared spaces associated primarily with cigarettes with spaces associated with alcohol *and* cigarettes (Figure 20 right, p. 403; see also section 11.5.3). In both comparisons, spaces associated primarily with cigarettes were visited/occurred more frequently (on average, weekly as opposed to monthly) (C14). They were also construed as less relaxed (C22). Other than that, no consistent image emerged across both comparisons, suggesting that spaces associated primarily with alcohol (see section 11.5.1) and spaces associated with alcohol *and* cigarettes (see section 11.5.3) were too different to serve as a joint reference point.

Focussing on the comparison with spaces associated with alcohol *and* cigarettes (Figure 20 right) as the more meaningful comparison for smokers (as noted in section 11.5.1), spaces associated primarily with cigarettes emerged not only as more frequent (C14) and less relaxed (C22), but also as more inward-oriented (C16-17), as representing a greater feeling of togetherness (C18), more enjoyment (C21) and as being more self-determined (C25). On average, spaces associated primarily with cigarettes were construed as 1,8 points more inward-oriented and as 0,9 points less relaxed on a 5-point scale than spaces associated with alcohol *and* cigarettes. An additional analysis of individual responses (Appendix K.2.6) showed that these differences on 'orientation' (C16-17) and 'relaxation' (C22) were not only relatively great but were also construed very similarly by participants.

Although participants generally reported rather positive feelings when thinking of spaces associated primarily with cigarette use (C13 in Figure 24 left, p. 405), in-depth analyses found that nine spaces (26% of 35) were associated with ambivalent or rather negative feelings. Spaces associated primarily with cigarette use were therefore distinguished by valence, further explored in the next two sections. The examples given in these and later sections also help to contextualise the differences reported above.

[630] Of 38 elicited spaces associated primarily with cigarette use, three (8%) were dropped prior to the repertory grid interview (as per section 6.2.4), resulting in 35 spaces included in this analysis. One additional space associated with cigarettes and positive feelings was not included because it was also associated with waterpipe use.

Cigarettes, positive feelings

Among the 35 spaces associated primarily with cigarette use, 26 (74%) were connected to (rather) positive feelings[631] (labelled 'Cig pos' in Table 28, p. 393)[632]. Seven participants (29% of 24) included such spaces in their maps: mostly one to four spaces per map, though one participant (IP13) listed ten such spaces. This subsample included two occasional smokers and five daily smokers. In these spaces, cigarettes were mostly used 'always' (C7 in Figure 24 middle, p. 405). Compared with participants' hypothetical ideal spaces (Figure 24 right; see also section 11.3), cigarette use (C7) was somewhat more frequent than what was considered ideal (which was between 'occasionally' and 'often' on average).

Considering settings and situations, spaces associated primarily with cigarettes and (rather) positive feelings were found mostly in urban public spaces (e.g., pedestrian walkways) (23%), participants' own home (19%), and cafés, bars and restaurants (19%) (Appendix J.3.2). Correspondingly, typical situations referred to being in company, going for a walk and/or (taking breaks from) studying. The following interview excerpts exemplify these spaces:

> *Interviewer: Okay… and [what did you think of] for the Mariahilfer Straße [major shopping mile in Vienna]?*
> *Participant: That's where I always meet up with my best friend […] at the top of Mariahilfer Straße and [we] always stroll down the street and then we sit down by the Museumsquartier [centre for contemporary art and culture] and that is somehow … the weekly meet-up where we can chat and update each other on what has happened. That's always part of a [typical] week. (IP14)*[633]

> *Participant: ((thinking aloud while preparing her map)) […] what else do I do? ((mumbling)) … Yes, studying of course ((writes on her map)) […]*
> *Interviewer: Where is that?*
> *P: At home, actually […] otherwise I'm at home relatively little anyway, so I'm glad when I am at home ((laughs a bit)) I don't drink alcohol nor do I smoke there, actually … since I do not- not want anyone to smoke in my flat, I also don't do it … except when I take <u>breaks</u> somehow … in that situation I often speak with a fellow student on the phone ((writes on her map)) erm… that is our coffee break so to speak […] we make ourselves a coffee and*

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631 As measured by a single supplied construct, not specifically in relation to substance use (C13).
632 Of 28 elicited spaces representing cigarette use and (rather) positive feelings, two (7%) were dropped prior to the repertory grid (as per section 6.2.4), resulting in 26 spaces for this analysis. One additional space associated with cigarettes and positive feelings was not included because it was also associated with waterpipe use.
633 German original: "I: Okay .. und bei der Mariahilfer Straße? B: Da treffe ich mich immer mit meiner besten Freundin […] oben bei der Mariahilfer Straße und spazieren halt immer so die Mariahilfer Straße entlang und setzen uns dann unten beim Museumsquartier halt hin und das ist irgendwie so .. das wöchentliche Treffen wo wir uns eben so austauschen können, was alles passiert ist. Das ist immer in einer Woche dabei."

we speak with each other on the phone about the exam or so, in that case I'm usually on the balcony and smoke a [cigarette] ((writes)) … (IP8)[634]

On average, these spaces were perceived as rather important (C12), associated with positive feelings (C13), and they were visited/occurred weekly (C14) (Figure 24 middle). Overall, participants construed these spaces as being on the preferred side of the poles on almost all dimensions. Comparisons with participants' hypothetical ideal spaces (Figure 24 right; Figure 17, p. 401; see section 11.3) confirmed that spaces associated with cigarette use and positive feelings were construed extremely positively. Overall, they were construed most similarly to participants' ideal spaces (out of all patterns of situated substance use considered in this analysis). While earlier excerpts implied positive feelings toward this pattern, the following two excerpts describe these explicitly and thus help to better understand this positive construal:

Participant: […] "before work", I chose that as [the typical] situation because I find it so beautiful. It's between [the subway stop and my work], 15 minutes' walk, nobody is there, I forgot the street, what it's called, but there I usually walk totally alone through the alleyway and it's super bright in the morning and then … I often think, "ha, this is so beautiful right now" ((whispering)) I don't know, it's just, [I smoke] when I'm relaxed […] (IP13)[635]

Interviewer: […] what is this [landmark]? ((laughs, surprised))
Participant: That is a kind of hiking path to the top, there you have the whole view over all the little villages […] but we don't go up often … because you still have to go up two, three hours … and we're also all not very sporty, so ((laughs)) … but actually I would really like to be there often […] because there is no one there actually and you just have some peace and quiet. (IP6)[636]

The space referred to in the second example above emerged when the participant was asked to think of an ideal space. The data suggested that other participants may have also modelled

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[634] German original: "B: […] was mache ich sonst so? ((gemurmelt)) ...Ja, lernen natürlich ((schreibt)) […] I: Wo ist das? B: Zuhause eigentlich […] ich bin sonst eh relativ wenig zuhause, also bin ich froh, dass ich mal zuhause bin ((leicht lachend)) […] da trink ich weder Alkohol noch rauch ich eigentlich...nachdem ich bei mir in der Wohnung nicht- nicht will dass geraucht wird, tue ich es auch nicht... außer ich mache irgendwie Pausen...da ist oft so dass ich mit einer Studienkollegin telefoniere ((schreibt))...ahm...das ist so unsere Kaffeepause sozusagen […] wir machen uns einen Kaffee und telefonieren miteinander über die Prüfung oder so, da bin ich dann meistens am Balkon und rauch eine ((schreibt))...".

[635] German original: "B: […] 'vor der Arbeit', ich habe das deshalb als Situation genommen, weil ich die ur schön finde. Das ist zwischen [der U-Bahn Station und meiner Arbeit], 15 Minuten Fußweg, keiner ist da, ich habe die Gasse vergessen, wie sie heißt, aber da gehe ich meistens ganz alleine durch die Gasse und sie ist super hell in der Früh und dann .. 'ha, das ist gerade so schön' ((flüsternd)) (denk ich mir oft) Ich weiß nicht, das ist einfach, [ich rauche] wenn ich entspannt bin […]"

[636] German original: "I: […] was ist dieser [Naturschauplatz]? ((lacht)) B: Das ist so ein Wanderweg rauf, da hast du die ganze Aussicht über die ganzen Dörferln […] und wir kommen halt nicht oft rauf ... weil da gehst halt trotzdem 2, 3 Stunden rauf ... und unsportlich sind wir auch alle also ((lacht)) ... aber ich wäre halt ur gern oft dort eigentlich.. […] weil dort eigentlich niemand ist und da hast einfach deine Ruhe."

their hypothetical ideal space on spaces associated with cigarette use and (rather) positive feelings (whether knowingly or not). The above quotes also show how, in these spaces, relative solitude was construed positively as representing peace rather than loneliness.

This pattern was also among those most similar to spaces of no or rare substance use associated with (rather) positive feelings (Figure 24 right; Figure 17; see also section 11.4). The main differences were that spaces associated with cigarette use and positive feelings were construed as more inward-oriented (C16-17), as representing a greater sense of togetherness (C18) and much stronger expectations pro substance use (C24). Though Figure 24 (right) suggests that these spaces were construed as physically unpleasant (C27), Figure 24 (middle) shows that this was due to one extremely negative rating: an indoor smoking space (a café) was rated negatively due to being stuffy. This highlighted that ratings on this dimension depended also on setting characteristics (e.g., indoors/outdoors).

A further comparison with spaces associated with cigarette use and *ambivalent or (rather) negative* feelings (Figure 25 right, p. 405) showed that the two types of spaces, albeit representing the same substance use pattern (C1-10), were construed very differently. Spaces associated with cigarettes and positive feelings were construed toward the preferred pole on almost all constructs. These differences are described further in the next section, which explores cigarette spaces associated with ambivalent/negative feelings in more detail.

Cigarettes, ambivalent/negative feelings

Among the 35 spaces associated primarily with cigarette use, nine (26%) were connected to ambivalent or rather negative feelings[637] (labelled 'Cig neg' in Table 28, p. 393). Six participants (25% of 24) included such spaces in their maps (ranging from one to three), and of these, five participants (four daily smokers and one occasional smoker) were included in the analysis; the descriptions of this pattern are therefore based on very small subgroups[638].

On average, these spaces were visited/occurred on a weekly or (almost) daily basis (C14) and cigarettes were mostly used 'always' (C7) (Figure 25 left, p. 405). Considering settings and situations, spaces associated primarily with cigarettes and ambivalent or rather negative

[637] As measured by a supplied construct, not specifically in relation to substance use (C13).
[638] Of the spaces associated primarily with cigarette use, nine were linked to 'ambivalent' feelings and one space with 'rather negative' feelings (none with 'negative' feelings). Of these ten spaces (elicited from six participants: five daily smokers, one occasional smoker), one space (10%) was dropped prior to the repertory grid (as per section 6.2.4), resulting in nine spaces for this analysis (representing five participants: four daily smokers, one occasional smoker). This small sample size translated into even smaller construct-level sample sizes; in this case, the construct-level sample size was n=1 or n=0 for most master constructs derived from elicited constructs (i.e., latent dimensions for space construal) (Appendix K.1.12).

feelings were overwhelmingly linked to university settings (56%) and cafés or restaurants near the university (22%) (Appendix J.3.2). All typical situations referred to study or work. Mostly, participants thought of studying or other activities in a university context (e.g., taking breaks, eating, socialising with fellow students). Some also thought of their workplace or going to their workplace. The excerpts below illustrate different situations:

> *Interviewer: […] And "Starbucks"?*
> *Participant: That is also always, before I go to [the university], I am … I specifically take enough time beforehand, so that I can still go to Starbucks, sit down for a coffee, work on my last study assignments, that is also a kind of a ritual […] ((much later in the interview she describes the space further)) […] when I sit at Starbucks, then I always think about Uni […] that [kind of thinking] is rather stressful […] So goal-oriented, as in "I'm about to have a seminar and I still have to prepare for that now" […] So the coffee is nice, [but] that what I do there is not so nice. (IP14, reported smoking in Starbucks' outdoor area)*[639]

> *Interviewer: What are you thinking of there [at the university]? ((asking about a midscale-rating on one of the elicited constructs))*
> *Participant: … Yes, well, I do like being at [the university] also with the fellow students, in this situation […] after the course but … it … I am also often glad when I go back home afterwards ((laughs)) […] it is nice but finally it is not so nice that I regret it very much when I leave again or so. Or it is, after all, also a bit of a … kind of social obligation, sometimes. (IP11)*[640]

> *Participant: ((whilst preparing her map)) Yes, so usually I work [in an office] in the mornings.. and I drive to work with the car for example ((notes this on her map)) […] actually I usually smoke while I'm driving. And that is actually something that rather bothers me and that I would actually like to stop doing, that I smoke in my car.*
> *Interviewer: OK, why does that bother you?*
> *P: Because the car stinks. (IP8)*[641]

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[639] German original: "I: […] Und 'Starbucks'? B: Das ist auch immer, bevor ich [auf die Universität] fahre, bin ich .. da nehme ich mir extra so viel Zeit vorher, dass ich noch extra zum Starbucks gehen kann, mich hinsetzen kann, auf einen Kaffee noch, so die letzten Hausaufgaben ausarbeiten kann, das ist auch irgendwie so ein Ritual […] ((viel später im Interview)) […] wenn ich im Starbucks sitze, dann denke ich halt immer an die Uni […] das ist halt eher so stressig […] So zielorientiert so, 'Ich habe jetzt gleich Übung und auf die muss ich mich jetzt noch vorbereiten' […] Also der Kaffee ist schön, das was ich dann dort mache, ist halt nicht so schön."
[640] German original: "I: An was denkst du da? B: ... Ja also ich bin schon gerne [an der Universität] auch mit den Kommilitonen in dieser Situation […] nach der Lehrveranstaltung, aber ...es ..ich bin auch immer wieder froh, wenn ich dann wieder nach Hause gehe ((lacht)). […] es ist eh nett, aber es ist jetzt nicht so nett, dass ich es sehr bedaure, wenn ich dann wieder gehe oder so. Oder es ist dann halt doch ein bisschen so ....eine Art soziale Pflicht auch, hin und wieder."
[641] German original: "B: Ja ich gehe meistens eben am Vormittag arbeiten...und fahre mit dem Auto in die Arbeit zum Beispiel ((schreibt während sie spricht)) […] beim Autofahren rauche ich eigentlich meistens. Und das ist

The examples above also show that even though these spaces were linked to study and work contexts, it was not always (or not only) the study or work as such that led to an ambivalent or negative construal of this type of space.

To understand this pattern, a comparison with spaces associated primarily with cigarette use and *positive* feelings (Figure 25 right, p. 405; see previous section) was considered key. This showed overall identical patterns in terms of substance use (C1-10), but major differences on the remaining constructs. Compared with spaces associated with cigarette use and positive feelings (Figure 25 right), cigarette spaces associated with ambivalent or rather negative feelings were construed toward the less preferred pole on almost all elicited constructs[642]. Overall, this type was construed as representing a more distant relationship with the people present (C15), greater outward-orientation by those who preferred inward-orientation (C17), less enjoyment (C21), more stress (C22), expectations opposed to substance use (C24), limited freedom of choice (C25) and a less pleasant environment (C27). An additional analysis of individual responses (Appendix K.2.8) showed that the differences on 'relaxation' (C22) and 'freedom of choice' (C25) were not only relatively great but were also construed very similarly by participants. The greatest average difference (3,1 points on a 5-point scale, see Figure 25 right and Appendix K.2.8) between cigarette spaces associated with positive feelings and those associated with ambivalent or rather negative feelings was reported regarding 'freedom of choice' (C25), suggesting that perceived freedom of choice may play a role in determining whether a space is associated with positive or negative feelings.

Comparisons with the two reference spaces (i.e., participants' hypothetical ideal spaces and spaces of no or rare substance use associated with positive feelings, see Figure 25 middle; also sections 11.3 and 11.4) also suggested a negative construal of this pattern. Spaces associated with cigarette use and ambivalent or rather negative feelings were the most other-determined (C25) and among the most stressful (C22) spaces relative to spaces of no or rare substance use associated with positive feelings. For this group of participants, this pattern was among the most similar to both reference spaces in terms of substance use (C1-10) but among the most different in terms of the remaining constructs (data shown in Appendix K.4).

The identical substance use patterns in the two types of cigarette spaces suggested that it was not the substance use pattern as such which determined how a space was construed. However, as the following interview excerpt shows, even though the reported frequency of

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eigentlich etwas was mich eher stört und was ich eigentlich damit aufhören will, dass ich in meinem Auto rauche. I: Ok, warum stört es dich? B: Weil das Auto stinkt."

[642] The two cigarette patterns were construed similarly only on two dimensions: orientation ('outward' preferred) and changeability ('the same' preferred) (C16 and C20 in Figure 25 right).

substance use did not differ between the two types of spaces, other aspects of substance use could still differ:

> *Participant: Because for me, for example, there are two different kinds of smoking. That is smoking when I absolutely have to smoke, otherwise I get a headache, just quickly, one [cigarette] for three minutes. That is the case at work for example, often. Or smoking to enjoy it so to speak, for example sitting in the café with the friends, that I'm drinking something and I can smoke whilst I'm doing that. (IP12)*[643]

This interview excerpt highlights two aspects. Firstly, it highlights that differences in construal may result from differences in setting and situation ("at work" vs. "café with the friends"). A comparison of the settings typical of cigarette spaces associated with positive feelings (see previous section) and the settings typical of cigarette spaces associated with ambivalent or rather negative feelings (described earlier) confirmed that the two patterns were associated with different settings. Secondly, the excerpt shows that different construals of a space on the elicited constructs may reflect differences in substance use which are difficult to capture using broad indicators such as use frequency (further noted as a limitation in section 13.4).

A further comparison with spaces of *no or rare substance use* associated with ambivalent or negative feelings (Figure 19 right, p. 402; see section 11.4.2) was undertaken to understand how negatively construed spaces representing different substance use patterns might differ. Cigarette spaces associated with ambivalent or rather negative feelings were found to be construed more positively on several of the identified dimensions for space construal, including as more enjoyable (C21) and as less stressful (C22). They were only construed notably more negatively as being less physically pleasant (construed as rather hectic in two cases) (C27). This might have again mirrored situational differences, as spaces of no or rare substance use associated with ambivalent or negative feelings were more likely to refer to actual studying and working, while spaces of cigarette use associated with such feelings also included other study and work-related activities (e.g., study breaks). For both patterns associated with ambivalent or (rather) negative feelings, study and work-related spaces dominated.

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[643] German original: "Weil es gibt für mich zum Beispiel zwei verschiedene Arten von Rauchen. Das ist Rauchen, wenn ich unbedingt rauchen muss, sonst bekomme ich Kopfschmerzen, so schnell, für drei Minuten eine. Das ist zum Beispiel in der Arbeit so, oft. Oder Rauchen, um es quasi zu genießen, zum Beispiel im Café mit den Freunden zusammen sitzen, dass ich irgendetwas trinke und dabei rauchen kann."

11.5.3. Alcohol and cigarettes

The final sections focus on spaces associated with alcohol *and* cigarettes as possible examples of poly-substance use patterns. Within 127 spaces representing alcohol or cigarette use, 21 spaces (17%)[644] were associated with at least occasional use of alcohol as well as at least occasional use of cigarettes but no or rare use of other substances/products (labelled 'Alc&cig' in Table 28, p. 393). Eight participants (33% of 24) included between one and four such spaces on their map.

Of the 21 spaces associated with alcohol *and* cigarettes, 11 were associated with the use of beer or wine (but no or rare use of other alcoholic beverages), and nine were associated with spirits or mixed drinks (in addition to other alcoholic beverages). The number of spaces associated with wine or beer and with spirits or mixed drinks was sufficient to allow a more detailed review of these spaces, presented in subsequent sections. One additional space was associated with sparkling wine but not spirits or mixed drinks[645].

As a broad pattern, these spaces were included in two comparisons to contrast them with spaces associated primarily with one substance (i.e., alcohol or cigarettes, respectively). Across both comparisons (Figure 20 middle and right, p. 403), spaces associated with alcohol *and* cigarettes were construed as more outward-oriented (C16-17), less enjoyable (C21) and as more other-determined (C25), as the following paragraphs show.

Compared with spaces associated primarily with *alcohol* (Figure 20 middle; section 11.5.1)[646], spaces representing alcohol *and* cigarette use were construed toward the less preferred pole on most constructs[647]. An additional analysis of individual responses highlighted differences on 'closeness to people' and 'freedom of choice' as particularly noteworthy. On average, the relationship with the people (C15) was construed as 1,9 points more distant, and freedom of choice (C25) was construed as 1,1 points less self-determined (on a 5-point scale) in spaces representing alcohol and cigarette use. These differences were not only relatively great but were also construed very similarly by participants (Appendix K.2.5). Further differences vis-à-

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[644] All 21 elicited spaces associated with alcohol *and* cigarettes were included in the repertory grid interviews and this analysis (i.e., no spaces 'dropped' as per section 6.2.4). Five additional spaces associated with alcohol and cigarettes were excluded because they also represented (at least occasional) waterpipe use or (any) medicine use.
[645] The space associated with cigarettes and sparkling wine was included in the broad pattern (i.e., spaces associated with alcohol and cigarettes) but was not allocated to any detailed pattern.
[646] This comparison included one daily and four occasional smokers.
[647] As noted in section 11.5.1, general preferences may not always apply, and a socio-spatial aspect which is not preferred in general might still be welcomed under certain circumstances. It is possible that this was the case for these spaces (i.e., that they were construed positively even though construct ratings were closer to the unpreferred poles). Nevertheless, reported feelings regarding spaces associated with alcohol and cigarettes were less positive than for spaces associated primarily with alcohol (C13 in Figure 20 middle).

vis spaces associated primarily with alcohol included that spaces associated with alcohol *and* cigarettes were construed as representing less cosy types of social gathering (C23) and as involving somewhat more frequent use of spirits or mixed drinks (C5-6). These findings referred mostly to occasional smokers, and possible differences between occasional and daily smokers are further discussed in the following sections.

Compared with spaces associated primarily with *cigarettes* (Figure 20 right; section 11.5.2)[648], an analysis of individual responses highlighted differences on 'orientation' and 'relaxation' as particularly noteworthy. On average, spaces associated with alcohol and cigarettes were construed as 1,8 points more outward-oriented (C16-17) and as 0,9 points more relaxed (C22) (on a 5-point scale). These differences were not only relatively great but were also construed very similarly by participants (Appendix K.2.6), and they were consistent with the differences in context between these patterns (as evident from their descriptions above and below).

The following two sections deepen the analysis by exploring how participants construed spaces associated with cigarettes *and* wine or beer as well as spaces associated with cigarettes *and* spirits or mixed drinks.

Cigarettes and beer or wine

Among the 21 spaces representing alcohol and cigarette use, 11 (52%)[649] were associated with at least occasional use of cigarettes *and* at least occasional use of beer or wine but no other alcoholic beverages (labelled 'Cig&beer/wine' in Table 28, p. 393). Seven participants (29% of 24) included such spaces on their maps (mostly one space, up to three). This subsample included four occasional smokers and three daily smokers. Beer played a greater role in these spaces[650] than in spaces associated primarily with wine or beer (section 11.5.1), reflecting a greater preference for beer among smokers in this sample.

On average, these spaces were visited/occurred less than weekly (C14 in Figure 27 left, p. 406). Importance ranged from 'rather unimportant' to 'very important' (C12), and feelings ranged from 'ambivalent' to 'positive' (C13), suggesting that participants thought of a range of spaces. Correspondingly, spaces associated with cigarettes and beer or wine were found

[648] This comparison included three daily and two occasional smokers.
[649] All 11 elicited spaces associated with cigarettes *and* beer or wine were included in the repertory grid interviews and in this analysis (i.e., no spaces 'dropped' as per section 6.2.4). One additional space associated with cigarettes and beer or wine was not included in the analysis because it was also associated with waterpipe use.
[650] Of the 11 spaces representing this pattern, four spaces were associated primarily with wine (i.e., wine used at least occasionally and beer used no more than rarely), two spaces were associated with beer *and* wine (though not necessarily used on the same occasion), and five spaces were associated primarily with beer. Figure 27 left also shows that, on average, beer (C1) was used more frequently than wine (C2).

across a variety of settings, though they were most frequently linked to the home of friends (18%) or to cafés, bars or restaurants (18%) (Appendix J.3.2). Typical situations all referred to being in company, albeit in different contexts, as the following excerpts illustrate:

> *Interviewer: […] what did you think of for the flat of your partner? What kind of situation?*
> *Participant: Erm, that we are eating together … Because we really always eat together. […] He has this big table and we always sit there and spread ourselves out and all our study things lie there … (IP14)*[651]

> *Interviewer: ((during construct elicitation)) And what would you say is … different on the balcony? […]*
> *Participant: Balcony is usually not so- …. Well, in the flat […] that's where I sit together with the closest people, [whereas] the balcony is rather that you- that's where other … people can come more often, who I might not have so much to do with. So it is not as close … in terms of the- the people. […] Of course [they are] also friends, who I might not see so often or, or or, … […] well not, yes, just not as often as my flatmates for example, or my family. […] Yes, not so often, and therefore usually also not in the close circle for me. (IP10)*[652]

> *Interviewer: […] what did you think of [for "work"]?*
> *Participant: My colleagues, actually, well… because… at [work] for example I'm very often in different places actually, but the colleagues are actually always the same […] ((later in the interview she describes this space further)) well, at work it is usually rather so… a quick cigarette in the break or so, or… maybe afterwards a quick beer […] (IP16)*[653]

Generally, this type of space was construed toward the preferred construct poles (Figure 27 left, p. 406)[654], and it was construed as relatively similar to participants' hypothetical ideal spaces (Figure 27 right; Appendix K.4.2). Counter to what might be expected, out of the

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[651] German original: "I: […] woran hast du gedacht bei der Wohnung von deinem Freund? An was für eine Situation? B: Ahm, dass wir zusammen essen … Weil wir halt wirklich immer zusammen essen. […] Also er hat so einen großen Tisch, und da sitzen wir immer und breiten uns aus und unsere ganzen Lernsachen liegen da .."

[652] German original: "I: Und was würdest du jetzt sagen, was ist am Balkon .. anders? […] B: Balkon ist oftmals nicht so- .. also in der Wohnung […] da sitze ich eben mit den engsten Leuten zusammen, der Balkon ist mehr dass man- da kommen öfters dann mal andere ..Leute, mit denen ich jetzt vielleicht nicht so oft was zu tun habe. Also das ist jetzt nicht so das Enge .. also von den, von den Leuten her. […] Also natürlich auch Freunde halt, die ich vielleicht jetzt nicht so oft sehe oder, oder, oder ... […] also nicht, ja, einfach nicht so oft wie meine Mitbewohnerinnen jetzt, oder meine Familie. […] Ja, nicht so oft, und meistens deswegen auch nicht so eng im Kreis für mich jetzt."

[653] German original: "I: […] an was hast du [bei der Arbeit] gedacht? B: An meine Kollegen eigentlich, also... weil... in der [Arbeit] zum Beispiel bin ich eigentlich sehr oft an wechselnden Orten, aber die Kollegen sind eigentlich immer dieselben […] ((später im Interview)) also in der Arbeit ist es meistens eher so, ...schnelle Zigarette in der Pause oder so, oder... danach vielleicht noch auf ein schnelles Bier […]."

[654] The notable exception was IP16 who thought of a situation with work colleagues which she construed toward the unpreferred construct poles. IP16 was the participant reporting the 'heaviest' substance use patterns in this sample (including waterpipe and medicine use), suggesting that spaces associated *only* with cigarettes and beer or wine may have played a different role for her than for the other participants in this comparison.

patterns considered in this analysis, it was one of the patterns most similar to (rather) positively associated spaces of no or rare substance use (Appendix K.4.3); it was striking that two types representing such different substance use patterns (C1-8 in Figure 27 right) could be construed so similarly[655]. This mirrored some of the earlier findings regarding spaces associated with wine or beer (section 11.5.1).

A further comparison with spaces associated with cigarettes and spirits or mixed drinks use (Figure 29 middle, p. 407; see below) found that spaces associated with cigarettes and beer or wine were visited/occurred more frequently (C14), represented a closer relationship to the people present (C15), cosier forms of get-togethers (C23) and a more structured sense of time (C28). Similarly to the spaces associated primarily with alcohol (see section 11.5.1), spaces associated with cigarettes and beer or wine were more likely to be linked to home and other settings, while spaces associated with cigarettes and spirits or mixed drinks were linked mostly to bars and restaurants. However, both of the 'alcohol and cigarettes' patterns were construed as outward-oriented (C16-17). Further details on spaces associated with cigarettes and spirits or mixed drinks are provided in the next section, while spaces associated with cigarettes and beer or wine are revisited in section 11.6 below.

Cigarettes and spirits or mixed drinks

Among the 21 spaces representing alcohol and cigarette use, nine (43%) were associated with at least occasional use of cigarettes *and* at least occasional use of spirits or mixed drinks (in addition to other alcoholic beverages)[656] (labelled 'Cig&spirits/mixers' in Table 28, p. 393). Five participants (21% of 24) included such spaces on their maps (mostly one or two). This subsample included four occasional smokers and one daily smoker.

On average, cigarettes were used 'often' in these spaces, and spirits or mixed drinks were used 'occasionally'[657] (C5-7 in Figure 28 left, p. 407). Compared with the other patterns considered in this analysis, this pattern was characterised by the most frequent substance use overall (Figure 17 left, p. 401; Appendix K.4.3). A comparison with participants' hypothetical

[655] The main difference on the elicited constructs was that one participant who preferred inward-orientation construed this type of space as extremely outward-oriented (C17).
[656] All nine elicited spaces associated with cigarettes *and* with spirits or mixed drinks were included in the repertory grid interviews and in this analysis (i.e., no spaces 'dropped' as per section 6.2.4). Four additional spaces associated with cigarettes and spirits or mixed drinks were not included because they were also associated with (at least occasional) waterpipe use or (any) medicine use. Waterpipe or medicine use was most commonly reported for spaces that were also associated with spirits or mixed drinks (with or without cigarettes).
[657] Of nine elicited spaces representing this pattern, four spaces were associated with spirits *and* with mixed drinks, three spaces were associated primarily with mixed drinks (i.e., mixed drinks used at least occasionally and spirits used never or rarely), and two were associated primarily with spirits. However, participants did not use the two categories consistently, as noted earlier.

ideal spaces (see section 11.3) also showed that substance use was considerably more frequent in this pattern than what participants generally considered ideal[658] (Figure 28 right; Figure 17 right).

For this pattern, there were no restrictions on the use of other alcoholic beverages (as described in section 7.3). On average, beer and wine were used 'often' (C1-2 in in Figure 28 left). These values for beer and wine were the highest reported for any of the patterns considered in this analysis (Appendix K.4.3), suggesting that spirits or mixed drinks were used in spaces where beer or wine were also used more frequently (see also C1-2 in Figure 29 middle, p. 407). However, a similar trend was not found when comparing spaces associated with wine or beer and spaces associated with spirits or mixed drinks *but not cigarettes* (C1-2 in Figure 29 left). This suggested that cigarette use played a role in the relationship between spirits or mixed drinks use and beer or wine use.

On average, these spaces were visited/occurred on a monthly basis (C14 in Figure 28 left), making this type one of the least frequent ones (C14 in Figure 17 left). Spaces associated with cigarettes and spirits or mixed drinks were linked mostly to bars and restaurants (67%) or participants' own home (22%) (Appendix J.3.2). Typical situations all referred to partying or going out. However, participants did not necessarily construe the spaces within this category homogeneously. For example, one occasional smoker (IP10) reported at least occasional use of cigarettes and of spirits or mixed drinks for two bars and a nightclub, but as the following interview excerpts show, she construed the three spaces rather differently:

> *Participant: <u>This</u> [bar] is- ((points to the map)) this one is rather the cosy one where you sit at the table and drink something and <u>here</u> [in the other bar] you can… dance […]*
> *Interviewer: ((later in the interview)) […and] in the [club]? How often do you drink beer there in the typical situation?*
> *P: … Well, in the club itself it's rather "3" [occasionally]… mostly at the moment, yes.*
> *I: Erm, why do you say, "in the club itself"?*
> *P: […] well, for me, beer is rather that where I sit in the bar, cosy with my friends and then drink the beer and… well, often it is so- well, you drink <u>beforehand</u> and then you go to the club or- that's how it is with us. And … in the club itself I drink- so if I drink something there, then it's usually rather… spirits or so, therefore not- not-, it is not typically the beer. […] ((during construct elicitation, she describes the spaces further)) well, [the two bars] are definitely more similar to each other because .. […] you can talk better there and so. And*

[658] It should be noted that this subsample consisted mostly of occasional smokers. A comparison of occasional and daily smokers showed differences in frequency of cigarette use reported for the 'ideal' space, with occasional smokers construing their ideal cigarette use frequency as 'never' or 'rarely' (Appendix M.6.1 right).

[the club] is just […] I have the image in front of me how I'm standing on the dance floor […] I'd say there might also be more- well, people I don't know … […] And… in the club it is also rather that feeling of letting loose (IP10)[659]

The above excerpt suggests that within this pattern, spaces construed as 'spirits or mixed drinks' spaces by users themselves (the club in the above example) could be distinguished from spaces that were associated with at least occasional use of spirits or mixed drinks but *not* construed as 'spirits or mixed drinks' spaces by users (the two bars in the above example). The following excerpt from a different participant also highlights that spaces representing this pattern were not necessarily construed as spaces of 'spirits or mixed drinks' use:

Interviewer: […] OK and then some… bars, restaurants, something like that..?
Participant: Mmh.. yes, I can also think of something where we are often.. namely… […] it is rather a beer bar.. […] … and there we often go just for one drink or so.. […]
I: […] OK when you think of the bar [how often do you drink beer there]?
P: Erm.. then beer… "often"? […] Then wine… "always" ((laughs)) in the typical situation there. Erm.. Then we have … ((reads the list of supplied constructs)) spirits, I'd say "occasionally".. mixed drinks actually.. "rarely".. because this is a beer bar, and so that… is not really available and cigarettes… "often". (IP15)[660]

Furthermore, the earlier quote by IP10 points to the potential relational ordering of spaces representing this pattern, whereby some spaces are visited/occur earlier in the evening (in a pre-loading context) and other spaces are visited/occur later during the same evening.

On average, participants reported rather positive feelings when thinking of these spaces (C13 in Figure 28 left), and none of the individual spaces were associated with (rather) negative feelings (data not shown). Nevertheless, these spaces were among the most negatively construed overall, as the comparison of all patterns relative to participants' hypothetical ideal

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[659] German original: "B: Die [Bar] ist- ((zeigt auf die Karte)) die ist eher die Gemütliche, wo man am Tisch sitzt und was trinkt und da [bei der anderen Bar] kannst du .. tanzen […] I: […] Im [Club]? Wie oft trinkst du dort Bier in der typischen Situation? B: ... Also im Club selber ist eher 3 [manchmal] .. jetzt überwiegend, ja. I: Ahm, warum sagst du "im Club selber"? B: […] also Bier ist eher so das für mich, wo ich eben in der Bar sitze, gemütlich mit meinen Freunden und dann das Bier trinke und .. also oft ist es so, also man trinkt zuvor und geht dann in den Club oder- so ist es bei uns. Und .. im Club selber trinke ich- also wenn ich dort etwas trinke, dann trinke ich meistens eher .. Spirituosen oder so, also jetzt nicht- nicht, es ist nicht klassisch das Bier. […] ((später beschreibt sie die Räume noch mehr)) also [die zwei Bars] sind sich eindeutig ähnlicher, weil .. […] da kann man besser reden und so. Und [Club] ist einfach, […] da habe ich jetzt das Bild vor mir, wie ich auf der Tanzfläche (bin/stehe) […] da sind jetzt vielleicht auch noch mehr- also... fremde Leute, sag ich jetzt mal .. […] Und .. im Club ist es auch eher halt das Ausgelassene".

[660] German original: "I: […] ok und dann irgendwelche... Bars, Restaurants, irgend sowas.. ? B: mmh.. ja, würd mir jetzt auch was einfallen, wo wir oft sind.. und zwar.. […] es ist eher eine Bierbar.. […]... und da gehen wir halt oft nur auf ein Getränk oder so hin. .... […] I: […] Ok, wenn du denkst an die Bar? B: Ähm.. dann Bier... oft? […] Dann Wein.. immer ((lacht)) in der typischen Situation dort. Ähm. Dann haben wir.. Spirituosen, würd ich sagen "manchmal".. Mixgetränke eigentlich... selten.. weil das ist so eine Bierbar, das ...gibt es dann halt auch wenig und Zigaretten.. oft".

spaces showed (Appendix K.4.2). In particular, considering the pattern on its own as well as in comparison with the two main reference spaces (Figure 28 right) and with spaces associated with cigarettes and *beer or wine* (Figure 29 middle; previous section), spaces associated with cigarettes and spirits or mixed drinks emerged as notably less important (C12), less frequent (C14), representing a more distant relationship with the people present (C15), less enjoyable (C21), a greater feeling of party and excess (C23), and as requiring more self-control (C26). They were also construed as more outward-oriented (C16-17 in Figure 28), though they had this in common with spaces associated with cigarettes and beer or wine (C16-17 in Figure 29 middle). The following two excerpts illustrate why spaces allocated to this pattern might have been construed more negatively:

> *Interviewer: And when you think of going out?*
> *Participant: […] It's always nice but it is also a bit of a … social obligation, that I really … go out in the evening or that I … have to stay out long- longer so to speak ((quieter)). Which is lovely, but I'm also happy when I am back in bed afterwards ((laughs)) (IP11)*[661]

> *Interviewer: ((during mapping)) […] bar, restaurant, something like that..?*
> *Participant: ((writes on her map)) […] it's in our village. It is […] a restaurant and a bar. So… actually most of the people from the village are always there at the weekend. That's where you go- If you are bored, you go there to drink something and see everyone. […] ((later on she describes space further)) And that is … hard work sometimes ((laughs)) […] because in our village, they all get really drunk, so that is- ((laughs))… […] I just find it un-… because I can also have fun just so, also when I'm sober (IP6)*[662]

Despite these negative aspects, spaces associated with cigarettes and spirits or mixed drinks also had aspects in common with participants' hypothetical ideal spaces (Figure 28 right). Specifically, some participants construed them as representing a familiar situation (C20), relaxation (C22) and an unstructured sense of time (C28), similarly to how they imagined their ideal space.

Finally, the construal of this pattern differed notably from that of positively construed spaces of no or rare substance use (Figure 17 left, p. 401; Appendix K.4.3). This was noteworthy, given

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[661] German original: "I: Und wenn du denkst ans Ausgehen? B: […] Es ist immer nett, aber es ist eben auch so ein bisschen ...soziale Pflicht, dass ich dann wirklich am Abend ...ausgehe oder lange- länger weg sein... muss unter Anführungszeichen ((leiser)). Was schön ist, aber (ich finde es) auch schön wenn ich dann wieder im Bett liege zu Hause. ((lacht))".

[662] German original: „I: […] Bar, Restaurant, irgend sowas in der Art? B: ((schreibt)) […] das ist bei uns im Dorf. Das ist […] ein Restaurant und eine Bar. Also ...da sind eigentlich die meisten vom Dorf immer am Wochenende. Da gehst- Wenn dir fad ist, gehst dahin was trinken und siehst alle. […] ((später beschreibt sie den Raum näher)) Und das ist halt dann schon ....mühsam manchmal ((lacht)) […] weil bei uns im Dorf, die saufen sich echt alle an, also das ist ((lacht)).. […] ich finds halt un..weil ich kann so auch Spaß haben halt, auch wenn ich nüchtern bin".

that spaces associated with cigarettes and with beer or wine (but *not* spirits or mixed drinks) were among those most *similar* to positively construed spaces of no or rare substance (as noted in the previous section). This suggested that the two 'alcohol and cigarettes' types, although both representing potential poly-substance use patterns at first glance, might be construed very differently by substance users. Furthermore, it suggested that differences in situated substance use patterns may need to be relatively large to be mirrored in different construals on socio-spatial aspects such as the latent dimensions explored here (further discussed in section 12.3).

11.6. Potential differences between daily and occasional smokers

Although participant differences were not a focus of this study, this section outlines tentative insights to account for the heterogeneity of the sample at least in part. In particular, the comparisons between 'alcohol' spaces, 'cigarette' spaces and 'alcohol and cigarette' spaces (see earlier sections) stimulated reflections about how the construal of these spaces might have differed between occasional and daily smokers in the present study. The aim of this section is thus not to give population estimates but to contextualise the earlier findings and offer potential pointers for future research.

Key data by participant subgroup are shown in Appendix M. Here, some of the differences between occasional and daily smokers in this study are highlighted. Occasional smokers were notably more likely to report spaces associated *primarily with alcohol* (daily smokers did not report any such spaces in Austria). Conversely, daily smokers were more likely to report spaces associated *primarily with cigarettes*, particularly spaces associated primarily with cigarettes and ambivalent feelings. With regard to spaces representing *alcohol and cigarette* use, occasional smokers in this sample were notably more likely to report spaces representing the use of cigarettes and spirits or mixed drinks (Appendix M.5).

Comparisons of how occasional and daily smokers construed selected patterns suggested that – although data were very scarce – the two groups construed spaces rather differently:

- For spaces associated *primarily with cigarettes* (Appendix M.6.3 left), daily smokers reported more frequent cigarette use (C7) but less frequent use of wine (C2) than did the occasional smokers. Compared with the occasional smokers, the daily smokers construed these spaces as representing a closer relationship with the people present (C15) and a more pleasant environment (C27).

- For spaces associated with *alcohol and cigarettes* (Appendix M.6.3 middle), the daily smokers again reported more frequent cigarette use (C7) but less frequent use of alcoholic beverages (C1-6) than did the occasional smokers. Compared with the occasional smokers, the daily smokers construed these spaces as considerably more important (C12), associated with more positive feelings (C13), as representing a closer relationship with the people present (C15), as more relaxed (C22), representing cosier forms of get-togethers (C23) and a more pleasant environment (C27).

These data were highly fragmented (e.g., high proportion of missing data), and a review of individual responses showed that differences in construal may have also reflected (coincidental) differences in settings (rather than group differences). Due to the small sample sizes and the fragmented nature of the grid ratings, potential differences are sketched out further using illustrative quotes rather than through quantitative analyses.

Spaces associated with cigarettes and beer or wine

As noted in section 11.5.1, daily smokers did not report any spaces located in Austria that were associated primarily with alcoholic beverages (i.e., if spaces were associated with alcohol, they were also associated with cigarettes). This suggested that for this group, spaces associated with cigarettes and alcohol might be the equivalent of what spaces associated with alcohol were for non-smokers. The corresponding group comparison (Appendix M.6.3 right) showed that daily smokers indeed appeared to construe spaces associated with alcohol and cigarettes more similarly to how non-smokers construed spaces associated primarily with alcohol. In other words, for the daily smokers in this sample, cigarette use could be understood to form a baseline to which alcoholic beverages were 'added'.

An implication of this might be that these spaces were not necessarily perceived as 'poly-substance use' spaces by daily smokers but rather as spaces of alcohol use. This appeared to be the case, for example, for a holiday space described by a daily smoker. Throughout the interview, this participant referred only to alcohol when describing this holiday situation; she only indicated that she always smoked in this situation when explicitly asked about it by the interviewer. This suggested that she construed this space as an alcohol space rather than one representing alcohol and cigarette use:

Participant: Yes, in summer I was … erm… in [Southern Europe] for two weeks […] And… Yes, there it was so, that we always sat together in the evening and … drank something, but also not [much], don't know, maybe two drinks maximum per person or so (IP8)[663]

There were, however, also instances where daily smokers construed such spaces explicitly as spaces representing alcohol *and* cigarette use:

Participant: We smoke most at his place ((points at her friend's place on the map)) because his [relative] is also a heavy smoker, he also still lives at home… and they are allowed to smoke everywhere in the kitchen, so, and so it is extremely bad there. When you have a games night there or so, then you smoke… one after the other… especially if you also drink something, then you want, well, for me it is so, I long- long… actually for more of the- ((stutters)) then I have a stronger cigarette consumption, let's say it like that.
Interviewer: Ok, when you … have had something to drink.
P: Yes (IP6)[664]

The above quote might appear to contradict the earlier proposition that 'alcohol and cigarette' spaces are not perceived as such by daily smokers. However, this participant appeared to construe this space as one of poly-substance use because she smoked *even more* cigarettes *in addition to* drinking alcohol. Therefore, this excerpt supports the earlier suggestion that daily smokers might not perceive their regular cigarette use as 'substance use' in these situations.

The above excerpt also highlights that, in such instances, cigarettes were perceived to be 'added' to alcohol (rather than alcohol to cigarettes). This way of construing cigarette use might be even more typical of occasional smokers, given that they have no baseline of daily cigarette use. Consequently, smoking might play a greater role in how occasional smokers construe spaces associated with alcohol and cigarettes, and these spaces may be construed more readily as spaces of cigarette or of poly-substance use. This appeared to be the case, for example, for this occasional smoker who explicitly spoke of combining alcohol and cigarettes and using cigarettes "in addition" to alcohol:

Interviewer: […] do you ever smoke without drinking something? Or did you ever smoke without drinking something?

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[663] German original: "B: Ja ich war im Sommer zwei Wochen...ähm...in [Südeuropa] […]. Und...Ja da war es schon so, dass wir immer am Abend uns halt zusammen gesetzt haben und noch ...was getrunken haben, aber jetzt auch, weiß ich nicht, vielleicht pro Person maximal zwei Getränke oder so".

[664] German original: "B: Am meisten rauchen wir bei ihm, ((zeigt auf Karte)) weil [sein/e Verwandte/r] ist auch [starke/r Raucher/in], er wohnt auch noch zuhause.. und die dürfen in der Küche überall rauchen also, und da ist es dann halt ur schlimm. Wenn du da halt einen Spieleabend oder so machst, rauchst halt ....eine nach der anderen ..vor allem, wenn du dann noch was trinkst, willst ja, halt bei mir ist es so, verlang- verlange ich.. eigentlich mehr von die- ((stottert etwas)) dann habe ich ein stärkeres Rauchkonsum, sagen wir es so.. I: ok, wenn du ...was getrunken hast. B: ja".

Participant: I have, too, yes. […] well, I- in principle for the smoking it is so, I only smoke- so I really smoke only in the evening, I have never… that I smoke during the day or so, I only ever do that- well, that is always only in the evening for me, and … I have [smoked without drinking], too but really rarely. So it is then usually the combination, so it is always beer and cigarettes. That's how it is, that it belongs together.
I: That means, you did not- on the balcony, during the day, you don't sit down and smoke one while you-
P: No, no, so if [I do that] then as I said, during a beer on the balcony, then a cigarette in addition or so (IP10)[665]

However, there were also occasional smokers who reported spaces associated with alcohol and cigarettes but did not emphasise the cigarette aspect of these spaces. In the following example, an occasional smoker seemed to be preoccupied with the role of beer in the chosen situation and did not appear to construe this as a space of cigarette use. The interview as a whole suggested that this participant did not identify as a smoker, so that assumed substance user identity may also play a role in how spaces of alcohol and cigarette use are construed:

Interviewer: […] then, when you think of your partner's living room […] how often do you drink beer there? ((during supplied constructs))
Participant: Since his parents are away quite often, sometimes he also invites friends and then we sit in this room because it is so… big […] […and we play a computer game or just chat …] and there I would say… beer seldom? Because he likes beer and therefore… they always have beer at home and … he does not like wine so much ((mumbling)) …and …((speaks up again, going through list of supplied constructs)) wine… occasionally? Then spirits never […] mixed drinks never. And cigarettes... occasionally... in the typical situation. [...] sometimes I manage to drink a beer but I am not that big a fan of beer and when I … if there is just … beer and I don't fancy a beer and there is no wine, then I drink a juice ((laughs)) (IP15)[666]

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[665] German original: "I: […] rauchst du jemals, ohne, dass du etwas trinkst? Oder hast du jemals geraucht ohne, dass du was trinkst? B: Habe ich auch, ja. […] also, ich- prinzipiell beim Rauchen ist es so, ich rauche nur- also ich rauche wirklich nur am Abend, ich habe jetzt nie .. dass ich am Tag oder so rauche, ich mache das immer nur- also das ist immer nur am Abend für mich, und .. habe ich auch, aber echt selten. Also es ist dann meistens die Kombination, also es ist immer Bier und Zigaretten. Das ist so, dass das zusammen gehört. I: Das heißt, du hast dich nicht- also am Balkon, tagsüber, setzt du dich nicht hin und rauchst eine während du- B: Nein, nein, also wenn dann eben bei einem Bier am Balkon, dann noch eine Zigarette dazu oder so".

[666] German original: "I: […] dann wenn du denkst an das Wohnzimmer vom Freund […] Wie oft trinkst du da Bier? B: Dadurch, dass seine Eltern oft weg sind, lädt er auch dann hin und wieder Freunde ein und dann sitzen wir halt in dem Raum, weil der so... groß […] ist […ist […] und wir spielen ein Videospiel oder reden nur…] und da würd ich sagen... Bier selten? Weil der mag halt Bier gerne und deswegen... haben die immer Bier zuhause und ...(er mag halt Wein) nicht so gerne ((murmelnd)).. und ... ((wieder lauter)) Wein.. manchmal? Dann Spirituosen nie […] Mixgetränke nie. Und Zigaretten ...manchmal… in der typischen Situation.. […] hin und wieder schaff ich es ein Bier zu trinken, aber ich bin nicht so der große Fan von Bier und wenn ich dann.. wenn es nur ...Bier gibt und ich hab keine Lust auf Bier und es ist kein Wein da, dann trink ich einen Saft ((lacht))".

Spaces associated with cigarettes and spirits or mixed drinks

The observations so far were based on spaces associated with cigarettes and with beer or wine. The final paragraphs in this section widen the scope to include the use of other alcoholic beverages, in particular spirits or mixed drinks.

A further notion that emerged from the data was that for some of the occasional smokers in this sample, spaces associated with alcohol and cigarettes might have been more focussed on partying and intoxication than for the daily smokers. Two kinds of comparisons were relevant in this regard: firstly, how occasional or daily smokers reported on spaces associated with alcohol and cigarettes; and secondly, how occasional smokers reported on spaces representing different patterns of situational substance use.

With regard to differences between occasional or daily smokers, occasional smokers in this sample were more likely than daily smokers to report spaces representing the use of cigarettes and *spirits or mixed drinks*. All of the five occasional smokers in this sample reported spaces associated with at least occasional cigarette use and at least occasional spirits or mixed drinks use, whereas of the five daily smokers in this sample, only two reported such spaces[667]. The settings and typical situations differed as well. Spaces associated with alcohol or cigarettes reported by occasional smokers were more likely to refer to situations of partying and going out (e.g., home party, visit to a bar or nightclub)[668]. Correspondingly, there were differences in how the occasional and daily smokers in this sample construed spaces associated with alcohol and cigarettes in general. For spaces associated with alcohol and cigarettes, occasional smokers reported more frequent use of alcoholic beverages (C1-6); they construed the relationship with the people as more distant (C15) and saw the spaces as associated with a more active mind (C22) and as more representative of party and excess (C23) than daily smokers (Appendix M.6.3 middle).

With regard to occasional smokers' construal of different patterns, the picture was not as clear-cut: the key comparison here was between spaces associated with alcohol and cigarettes and spaces associated primarily with alcohol (see also section 11.5.1).

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[667] The other three daily smokers reported drinking no or little alcohol and reported no spaces associated with at least occasional use of spirits or mixed drinks.

[668] All of the five *occasional* smokers reported spaces representing alcohol and cigarette use (16 spaces total). Of these, 11 spaces (69%) could be classified as representing partying or going out. Four of the five *daily* smokers reported spaces representing alcohol and cigarette use (10 spaces total). Of these, five spaces (50%) could be classified as partying or going out. On average, occasional smokers in this sample reported two party-type spaces each associated with alcohol and cigarette use, whereas daily smokers reported only one such space each.

There were four occasional smokers who reported on both types. For three of these (IP10, IP11 and IP16), spaces associated with alcohol and cigarettes were more likely to refer to partying and going out, whereas spaces associated primarily with alcohol referred to, for example, everyday meals with family or friends. For example, IP10 reported on her flat (dinner with flatmates) as a space associated primarily with alcohol, and on her balcony, two bars and a nightclub as spaces associated primarily with alcohol *and* with cigarettes. However, this participant did not construe the difference between 'alcohol' and 'alcohol and cigarette' spaces as related to partying and intoxication per se. Instead, she highlighted social/physical aspects (e.g., "talk more easily", "cosiness") and setting characteristics (e.g., private/public, indoor/ outdoor), as this interview excerpt shows:

> *Participant: What's very important for me is, the sitting together and so, and for the smoking it is also […] for going out as well, after all, that's where I usually also smoke occasionally and there it was often exactly also… this social aspect somehow. So that you… when you go out and start to smoke, then… somehow you also start to talk more easily. [..] Then you ask, "have you got a light?" and I don't know, that's how it starts, somehow. […] the smoking is that for me, […] it is often part of the cosiness, that you sit together and then you drink something and then you also smoke a cigarette and so. So, I know that it's bad, but it is something cosy for me […]*
> *Interviewer: […] And the … cigarettes, you never … smoked them in the flat?*
> *P: In the flat not, no. That's on the balcony. […] none of us do that [smoking in the flat], we don't like it in the- in the flat. […] Because it stinks. […] the smoke would remain in the, I don't know, in the curtains and everywhere. (IP10, currently on a smoking break for lent)*[669]

The fourth occasional smoker who reported both patterns (IP24) reported on her flat (inviting friends over in the evening) as a space associated primarily with alcohol. Similarly to IP11 cited above, the main reason for not smoking in this space appeared to be concerns regarding cigarette smoke. In her case, spaces associated with alcohol and cigarettes could be distinguished into two groups, as suggested earlier: on the one hand, spaces associated with cigarettes and *beer or wine* in *non-party* settings (e.g., meeting a friend for a leisurely stroll in town), and on the other hand, spaces associated with cigarettes and spirits or mixed drinks

[669] German original: "B: Bei mir ist eben sehr wichtig, das Beisammensitzen und so, und beim Rauchen ist es eben noch, [...] dass beim Fortgehen eben auch, da rauche ich ja auch ab und zu und da war es eben oft auch .. das Soziale irgendwie. Also, dass man sich halt ... wenn man raus geht und anfängt zu rauchen, dann ... fängt man irgendwie (leicht) auch an zu reden. […] Dann fragt man, 'hast du ein Feuer?' und keine Ahnung, so fängt das dann an, irgendwie. […] das Rauchen ist eben das für mich, […] das gehört oftmals zur Gemütlichkeit dazu, eben dass man beisammensitzt und dann was trinkt und dann noch eine Zigarette raucht und so. Also, ich weiß, dass es schlecht ist, aber es ist was Gemütliches für mich [...] I: […] Und die... Zigaretten hast du in der Wohnung nie .. geraucht? B: In der Wohnung nicht, nein. Das ist auf dem Balkon. […] das [in der Wohnung rauchen] machen wir alle nicht, also das mögen wir nicht in der, in der Wohnung. […] Weil es stinkt. […] da setzt sich der Rauch ja in den, keine Ahnung, im Vorhang und überall fest."

when partying and going out. Consequently, the practices of this occasional smoker appeared to mirror those of the daily smokers in this sample, in that 'alcohol and cigarette' spaces were not limited to situations referring to partying and going out[670].

The above descriptions provided a more in-depth perspective on potential group and individual differences between participants. Chapter 12 will further explore how the construal of spaces representing different situated substance use patterns may also depend on general substance use patterns and characteristics of the users.

11.7. A network view on situated substance use patterns

The previous sections presented patterns of situated substance use and abstinence, one by one, to identify similarities and differences between patterns. A different question concerns how such patterns relate to each other *within a person's life* (inspired by Albrow's concept of "sociosphere", as noted in Chapter 3). In other words, which patterns tended to co-occur on participants' maps? This section therefore considers the patterns as parts of broader socio-spatial arrangements or networks. Three approaches were used, as outlined below[671].

Networks as combinations of patterns at the level of individual participants

For the first approach, the maps produced by study participants during the mapping task (as described in Chapter 6) were translated into more abstract maps to reflect the typology of situated substance use patterns proposed above. The resulting maps showed the number of elicited spaces allocated to each pattern of situated substance use, per participant[672]. These individual maps were then compared to each other to identify those that were similar.

As a result, nine network compositions were distinguished, reflecting different combinations of the patterns presented earlier. Table 31 below gives an outline of the nine networks, starting with networks representing 'heavier' substance use (see Appendix K.6.1 for further data).

[670] The present research did not systematically collect data on participants' substance use biographies, and it is possible that observed differences among occasional smokers could be explained via past substance use practices (e.g., that some of the occasional smokers had a past of daily smoking).
[671] This 'network' perspective was not a focus of this research in its final form, and so the chosen approaches were highly exploratory and the methodologies and results are described only briefly.
[672] Consequently, in this section, the term 'map' still refers to the collection of spaces formally elicited from a single study participant but not in the literal sense of the maps produced during the interviews.

Table 31: Combinations of situated substance use patterns at the level of individual participants

Nr.	Network description	General substance user profile	Number of participants
1	No spaces associated with no substance use; substance use spaces also associated with additional substances/products (waterpipe, medicines)	Occasional smoker (overall the 'heaviest' user in this sample)	1
2	Spaces associated primarily with cigarettes, with a high number associated with ambivalent or rather negative feelings	Daily smoker	1
3	Spaces associated primarily with cigarettes, mostly associated with (rather) positive feelings	Daily smokers	2
4	Variety of spaces representing no or rare substance use and different combinations of alcohol and cigarettes	Daily smokers	2
5	Relatively high proportion of substance use spaces associated with alcohol and cigarettes	Occasional smokers	2
6	Notably high number of spaces associated with spirits or mixed drinks	Two 'heavier' users, one 'lighter' user (all non-smokers)	3
7	High proportion of spaces associated with no or rare substance use; substance use spaces associated primarily with wine or beer	Five 'lighter' and two 'heavier' users (non-smokers), one occasional smoker	8
8	Spaces associated with no or rare substance use, mostly associated with (rather) positive feelings	Three 'lighter' users, one occasional smoker	4
9	Spaces associated with no or rare substance use, with a high number associated with ambivalent or rather negative feelings	'Lighter' user	1

Even in this small sample of 24 substance users, there was a wide variety of how situated substance use patterns were combined[673]. Participants' general substance user profile shaped the network composition to a large extent (Appendix K.6.1). For example, networks dominated by spaces associated primarily with cigarettes (networks 2 and 3 in Table 31) were only found among daily smokers in this sample. However, the variety of networks among participants with (ostensibly) similar substance use profiles was noteworthy (e.g., three different network compositions identified for daily smokers).

These data also gave indications for how different patterns of situated substance use related to each other. Relations between patterns were explored further using additional approaches, as outlined below.

[673] Although participants' maps were not an exhaustive or representative depiction of their everyday lives, the contexts through which the maps were produced during the interviews (e.g., through interviewer prompts) were similar enough to assume that differences between the maps reflected actual differences between participants' (construal of their) everyday lives rather than being methodological artefacts.

Pairwise co-occurrence of patterns

The second approach considered two patterns at a time, repeating this for all possible pairwise combinations of patterns. One table showed the number of participants who had elicited at least one space for each of the two patterns (see Appendix K.6.2). A higher number of participants was interpreted to mean that the two patterns were more likely to co-occur in a network. To consider also the number of spaces, a second set of tables showed how many elicited spaces of one pattern corresponded to one elicited space of the other pattern (see Appendix K.6.3)[674]. Selected results are highlighted below.

Distribution of situated patterns within networks

The third approach standardised data across participants to assume an equivalent map size of 10 elicited spaces for each participant. The corresponding data table (Appendix K.6.4) shows how the various patterns of situated substance use were distributed in maps containing a specific pattern.

These analyses showed that, although spaces of no or rare substance use were present on almost all maps, their number differed depending on what other patterns were present on a map. For example, there were fewer spaces of no or rare substance use on maps that also contained spaces associated primarily with cigarettes (illustrated in Table 32 below; see Appendices K.6.3 and K.6.4 for further data). One interpretation of Table 32 could be that 'cigarette' spaces replace spaces of no or rare substance use more strongly.

Table 32: Example distribution of situated patterns within networks

Indicator	**Map type**	
	Maps containing spaces associated with *cigarettes and positive feelings*	Maps containing spaces associated with *wine or beer* use
Average number of spaces representing *no or rare* substance use	3,2	5,7
Average number of spaces associated primarily with *alcohol*	0,6	2,8
Average number of spaces associated with *cigarettes* (alone or in combination with alcohol)	5,4	0,6

Note. The above data are based on standardised maps assuming 10 elicited spaces per participant. Spaces associated with waterpipe/medicine use were excluded from this overview.

[674] Ideally, these data would have been weighted to account for differences between participants. A weighted option was also trialled but the unweighted approach was found to be easier to interpret.

Furthermore, spaces of no or rare substance use associated with *ambivalent or (rather) negative* feelings were more characteristic of maps that contained fewer substance use spaces overall or that had a higher proportion of spaces associated primarily with spirits or mixed drinks. This was more difficult to interpret but might hint at the influence of other psychological or sociological factors on people's construal of spaces and substance use.

Considering the other patterns of situated substance use, as noted earlier, maps in this sample did not usually contain spaces associated primarily with alcohol *and* spaces associated primarily with cigarettes. The analyses also highlighted the co-occurrence of 'cigarette' spaces associated with (rather) positive *and* with ambivalent or rather negative feelings. Due to the necessary brevity of this section, readers interested in further possible conclusions are invited to inspect the data tables provided in Appendix K.6.

In summary, Chapter 11 presented a typology of situated substance use patterns and provided a characterisation for each pattern. Final sections highlighted that patterns (and corresponding spaces) do not exist independently of each other or of the substance users. It is thus useful to view spaces of substance use or abstinence as situated within socio-spatial networks and as shaped by a range of influences, including the individual's general substance user profile.

The next chapter reviews the earlier findings to identify which construed socio-spatial aspects related to differences in situated substance use. The chapter then turns to explore, based on an analysis of interview transcripts, how target populations may themselves explain or understand situated substance use or abstinence in everyday spaces.

12. Pathways to situational substance use or abstinence

12.1. Introduction

The previous chapter presented a typology of situated substance use patterns (with a focus on alcohol and cigarettes). It built upon Chapter 9 by showing what settings and situations these patterns were associated with, and upon Chapter 10, by showing how spaces representing the patterns were construed on the proposed latent dimensions. The quantitative analysis was limited to describing co-occurrence: a particular substance use pattern tended to be construed in a certain way. Possible explanations as to *why* situated substance use patterns were associated with certain settings or certain values on the latent dimensions were offered rather anecdotally in the form of interview excerpts.

This final chapter shifts the focus from *describing* differences to *explaining* differences. The following observations are reported not in an attempt to make statistical generalisations but in an effort to integrate all analyses and develop an understanding of situational substance use pathways. To this end, three different routes are pursued. To begin, section 12.2 examines to what extent situated substance use patterns can be predicted based on *setting* or *general type of everyday situation*. Then, section 12.3 examines which *latent dimensions for space construal* distinguished best between different situated substance use patterns. Finally, section 12.4 moves away from considering factors in isolation to examining them as part of *webs of influences*. These show how the juxtaposition of a *specific situation* and a person's *general substance use position*, together with a range of other influences, affects how spaces are interpreted and, subsequently, if and what substances are used. This is also the core of this chapter, as it presents results from the qualitatively oriented analyses (see section 7.5) which were not covered thus far[675].

Both this and the previous chapter address the overall question of *how* socio-spatial aspects relate to situated substance use. In Chapter 11, this meant exploring how spaces representing different situated substance use patterns were interpreted differently. In the present chapter, it means exploring *how different situated substance use patterns come into being*: 'how' thus

[675] As noted in section 7.5, there were several ways in which the findings from the qualitative data analyses could have been presented. One possible focus was the classification and detailed description of socio-spatial influences mentioned in the interview transcripts, in order to contextualise the elicited socio-spatial aspects and eventually develop a catalogue of socio-spatial influences on substance use that environmental preventionists could consult during intervention design. At the same time, environmental preventionists also need to know *how* socio-spatial aspects can affect substance use outcomes, and given the better possibilities for generalisation as well as its importance for the research question, this was chosen as the final focus for this chapter.

refers to the mechanisms and processes through which socio-spatial aspects relate to situated substance use patterns. To identify such mechanisms, section 12.4 reconstructs individual pathways to situated substance use or abstinence based on the interview transcripts. The previously presented situated substance use patterns are – for heuristic purposes – re-conceptualised as *outcomes* to enable an analysis of how the dimensions presented in Chapter 10 may affect substance use[676]. The chapter concludes with key assertions based on the pathways regarding the interplay of socio-spatial and other influences (section 12.5).

12.2. Setting and situation as predictors of situated substance use patterns

This section examines setting and situation as potential 'causes' of situated substance use: how much can be explained through setting or situation alone? Put differently, to what extent is it possible to predict situated substance use patterns based only on setting or situation?

These questions were explored through a series of calculations regarding the existence and strength of a statistically significant relationship between setting or situation and the situated substance use pattern. Section 7.3.4 describes these analyses including their methodological limitations in the current application. 'Setting' was operationalised in line with the settings shown in section 9.2, and 'situation' in line with the typology of everyday situations from section 9.3. Besides its analytical aims, this section can also be read as a descriptive overview of what substance use patterns were reported for each setting (thereby complementing Chapter 9). Appendices J.3 and J.4 offer a more detailed breakdown of the data, while Appendix J.5 includes data on additional analyses not reported here.

12.2.1. Setting

Considering all 17 settings from Chapter 9 in relation to the two broadest patterns of situated substance use from Chapter 11 ('NSU': no or rare substance use; 'Alc/cig': at least occasional use of alcohol or cigarettes), the relationship between setting and situated substance use was found to be significant ($\chi^2_{(2)}$= 65,59; p < 0,05) and moderate to strong (Cramer's $V_{(df=1)}$ = 0,46; λ_r= 0,39). Most settings were more likely to be associated with no or rare substance use, while

[676] Although it would have been equally valid to focus on how substance use may affect the construal of spaces on the latent dimensions (i.e., inverting cause and effect), the 'environmental prevention' perspective in the present study suggested positioning substance use as the outcome. This was also found to generally mirror the causal logic of the pathways as narrated by study participants but where this was not the case, the pathways were flexible enough to explore socio-spatial aspects as effects rather than causes (e.g., Pathways 6 and 7).

partner's home, homes of friends, relatives or acquaintances, café, bar, restaurant, nightclub and holiday settings were more likely to be associated with the use of alcohol or cigarettes (data not shown). However, results differed depending on how the data were categorised, hence necessitating multiple calculations to consider different options[677].

Table 33: Situated substance use (NSU vs. Alc/cig) by setting (three settings)

Situated substance use pattern	Setting			Row total
	University	Own home	Café/Bar/Restaurant	
No or rare substance use	30 (77%)	29 (59%)	9 (20%)	68 (51%)
Alcohol or cigarettes	9 (23%)	20 (41%)	37 (80%)	66 (49%)
Column total	39 (100%)	49 (100%)	46 (100%)	134 (100%)

Note. Proportions of over 50% are highlighted.

For example, Table 33 shows 133[678] elicited spaces (representing all 24 study participants) according to three key settings (university; own home; café/bar/restaurant) and the two broad patterns (NSU vs. Alc/cig). When limited to these three settings, the relationship between setting and situated substance use was found to be highly significant ($\chi^2_{(2)}$= 29,98; p < 0,01) and moderate to strong (Cramer's $V_{(df=1)}$ = 0,47; λ_r= 0,42)[679]. Specifically, there was a strong tendency for cafés, bars and restaurants to be associated with use of alcohol or cigarettes and for the university to be associated with no or rare substance use.

Limiting the analysis only to nightclubs and shopping settings resulted in a perfect relationship between setting and situated substance use (albeit based on very small sample sizes: eight spaces from five participants), as the reported clubs were always associated with alcohol or cigarette use, while there was no substance use reported for shops. In other words, in these two cases, the settings seemed to completely determine the situated substance use outcomes. This may be explained by considering the limited flexibility and changeability of these settings, in the sense that they are highly institutionalised and associated with very few situations (cf. settings such as 'own home') (see also Table 25, p. 363 in Chapter 9).

[677] Selected results are highlighted here; a more complete display of results can be found in Appendix J.5.
[678] The table shows 134 spaces total because one of the elicited spaces represented two settings and is thus counted twice in the table.
[679] The λ_r value can be interpreted to mean that knowledge of the setting (and how settings relate to situated substance use) improves the ability to accurately predict the substance use pattern with a single guess by 42%.

Table 34: Situated substance use (8 detailed patterns) by setting (17 settings)

Situated substance use pattern	Setting																	Row total
	Own home	Parents' home	Partner's home	Home of friends/ acquaintances	Home of relatives/ family acquaintances	University	Workplace	Café/Bar/Restaurant	Nightclub	Sports facilities	Other leisure facilities	Nature	Urban spaces	Shopping	Public transport	Car	Holiday/Work trip	
NSU[a] pos	20 (43%)	10 (59%)	5 (42%)	3 (23%)	2 (33%)	12 (31%)	8 (50%)	6 (16%)	0 (0%)	11 (69%)	6 (67%)	10 (53%)	11 (50%)	2 (50%)	1 (14%)	2 (50%)	7 (44%)	116 (40%)
NSU[a] neg	9 (20%)	3 (18%)	0 (0%)	1 (8%)	1 (17%)	18 (46%)	5 (31%)	3 (8%)	0 (0%)	3 (19%)	0 (0%)	1 (5%)	0 (0%)	2 (50%)	5 (71%)	1 (25%)	0 (0%)	52 (18%)
Wine/beer	8 (17%)	3 (18%)	4 (33%)	2 (15%)	1 (17%)	2 (5%)	0 (0%)	5 (13%)	2 (67%)	1 (6%)	1 (11%)	3 (16%)	2 (9%)	0 (0%)	0 (0%)	0 (0%)	4 (25%)	38 (13%)
Spirits/ mixers	1 (2%)	0 (0%)	1 (8%)	3 (23%)	0 (0%)	0 (0%)	0 (0%)	9 (24%)	0 (0%)	0 (0%)	1 (11%)	1 (5%)	1 (5%)	0 (0%)	0 (0%)	0 (0%)	4 (25%)	21 (7%)
Cig pos	5 (11%)	0 (0%)	1 (8%)	2 (15%)	2 (33%)	2 (5%)	1 (6%)	5 (13%)	0 (0%)	1 (6%)	0 (0%)	4 (21%)	6 (27%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	29 (10%)
Cig neg	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	5 (13%)	1 (6%)	2 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (14%)	1 (25%)	0 (0%)	10 (3%)
Cig&beer/ wine	1 (2%)	1 (6%)	1 (8%)	2 (15%)	0 (0%)	0 (0%)	1 (6%)	2 (5%)	0 (0%)	0 (0%)	1 (11%)	0 (0%)	1 (5%)	0 (0%)	0 (0%)	0 (0%)	1 (6%)	11 (4%)
Cig&spirits/ mixers	2 (4%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	6 (16%)	1 (33%)	0 (0%)	0 (0%)	0 (0%)	1 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	10 (3%)
Column total	46 (100%)	17 (100%)	12 (100%)	13 (100%)	6 (100%)	39 (100%)	16 (100%)	38 (100%)	3 (100%)	16 (100%)	9 (100%)	19 (100%)	22 (100%)	4 (100%)	7 (100%)	4 (100%)	16 (100%)	287 (100%)

Note. Highest proportions per column are highlighted for increased readability (1st rank or 1st and 2nd rank, depending on values). The first double line separates spaces of no or rare substance use from spaces associated with at least occasional use of alcohol or cigarettes.

[a] NSU = no or rare substance use. For descriptions of each situated substance use pattern, see Chapter 11.

Table 34 shows 270[680] elicited spaces (representing all 24 participants) according to all 17 settings from Chapter 9 and the eight detailed situated substance use patterns from Chapter 11. The relationship between setting and situated substance use was again highly significant ($\chi^2_{(df=112)}$= 207,77; p < 0.05)[681]. Results regarding the strength of the relationship differed depending on the measure of association. As most elicited spaces were associated with no or rare substance use and positive feelings (i.e., located in the top row), knowledge of how setting and situated substance use pattern were related did not particularly improve the ability to predict the substance use pattern (λ_r= 0,09)[682]. However, considering how much the observed data deviated from what would have been expected in case of statistical independence suggested a strong relationship (Cramer's $V_{(df=7)}$ = 0,32). Specifically, there was a tendency for settings such as the parents' home, sports and other leisure facilities to be associated with *no or rare substance use* and *(rather) positive feelings*, while university, public transport and shopping settings were more likely to represent *no or rare substance use* and *ambivalent or (rather) negative feelings*. For the detailed substance use patterns, the trends were less clear, as the same setting could be associated with several substance use patterns (e.g., see 'café/ bar/restaurant' in Table 34).

These results suggest that there *is* a significant relationship between setting and situated substance use pattern, even if the specifics of this relationship vary depending on the settings and patterns being considered. This begs the question as to *how* setting influences situated substance use: what are the mediating influences? A behaviouristic view might emphasise factors such as (lack of) availability of alcohol or cigarettes or (formal) expectations pro or contra use, which might moreover be understood to determine substance use outcomes without requiring interpretation by substance users (stimulus-response model, see Chapter 2). However, the perspectives underpinning the present study invite us to consider how specific socio-spatial arrangements are interpreted by individuals, which opens up the possibility for a different set of mediating influences. This is further explored in later sections of this chapter.

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[680] Out of the 296 spaces elicited total in this study, 17 were not considered because they could not be allocated to any setting (defined through other means) or because they were associated with other products (e.g., sparkling wine, waterpipe). The total number of spaces as per the table was 287 due to some spaces being allocated to more than one setting.

[681] Although 88% of cells in Table 34 had an expected frequency below 5, the use of chi-square was appropriate in the present study as a nonparametric test statistic (as explained in section 7.3.4).

[682] Section 7.3.4 comments on the test statistics and measures of association used in this section.

12.2.2. Situation

Whilst the previous subsection showed a significant relationship between setting and situated substance use pattern, the relationship was *not* perfect (i.e., measures of association did not generally equal 1). This points to the existence of moderating influences which affect the relationship between setting (e.g., university) and substance use outcome (e.g., no substance use, alcohol use, cigarette use). Section 9.3 highlighted that situations can be defined not only by the setting but also by aspects such as activity, people, and time. These could be considered as moderators or mediators; or the perspective could be shifted altogether to consider not settings in isolation but broader situations as the starting points ('causes') of situated substance use pathways. Section 9.3.2 presented a suggestion for a general typology of everyday situations (mostly based on activity) as a possible alternative to an exclusively setting-focussed approach with the idea that this may be a better predictor than setting alone. The relationship between setting and situated substance use might then be understood better by considering whether a setting is associated with few or many types of situations (i.e., its flexibility) (as evident from Table 25, p. 363, in Chapter 9).

Table 35: Situated substance use (NSU vs. Alc/cig) by everyday situation (nine types)

Situated substance use pattern	**Everyday situation**									**Row total**
	At home	Study/work	Pauses	In company	Going out/party	Hobbies/leisure	Eating/food-related	In transit	Holiday/travel	
No or rare substance use	40 (70%)	48 (87%)	5 (42%)	22 (32%)	3 (7%)	47 (72%)	7 (37%)	8 (62%)	8 (42%)	188 (54%)
Alcohol or cigarettes	17 (30%)	7 (13%)	7 (58%)	46 (68%)	40 (93%)	18 (28%)	12 (63%)	5 (38%)	11 (58%)	163 (46%)
Column total	57 (100%)	55 (100%)	12 (100%)	68 (100%)	43 (100%)	65 (100%)	19 (100%)	13 (100%)	19 (100%)	351[a] (100%)

Note. Proportions of over 50% are highlighted for increased readability.
[a] The table shows 351 spaces total because 51 elicited spaces were allocated to several types of everyday situation and are thus included multiple times in the table.

Table 35 shows 294[683] elicited spaces (representing all 24 study participants) according to the nine types of everyday situations as suggested in section 9.3 and the two broadest situated substance use patterns discussed in Chapter 11. The relationship between situation and

[683] Out of the 296 spaces elicited total in this study, two could not be considered because they represented other situated substance use patterns (i.e., waterpipe or medication but no use of alcohol or cigarettes).

situated substance use was found to be highly significant ($\chi^2_{(8)}$= 94,61; p < 0,01) and strong (Cramer's $V_{(df=1)}$ = 0,52; λ_r= 0,44). Specifically, there was a tendency for 'in company' and 'going out/party'-type spaces to be associated with the use of alcohol or cigarettes, while 'at home', 'study/work', and 'hobbies/leisure'-type spaces were more likely to be associated with no or rare substance use. Compared with predictions made based on setting (considering 17 settings), the improvement in predicting situated substance use patterns was small (λ_r= 0,44 vs. λ_r= 0,39; see also Appendix J.5). However, Table 35 highlights important nuances which were not evident when referring to setting alone, for example, between study/work and pauses (the latter being more likely to be associated with substance use).

The emphasis on activities in the proposed typology of everyday situations may prompt us to ask whether substance use is simply part of some activities but not others. Yet, if activity (broadly categorised) cannot fully explain situated substance use outcomes, as suggested above, then what other influences should be considered?

The calculations in section 12.2.1, which considered broad as well as detailed patterns of situated substance use, suggest that settings may 'prompt' *whether or not* substance use occurs, but that additional influences determine *exactly which substances or products* are used. Section 12.4 therefore turns to examining in detail how situation and participants' *general position on substance use* (e.g., whether they were daily or occasional smokers) interplayed to produce specific situated substance use outcomes. Before that, the next section focusses on another important element of situational substance use pathways: the construal of space along latent dimensions.

12.3. Latent dimensions for space construal as predictors of situated substance use patterns

This section shows which of the latent dimensions for space construal from Chapter 10 could differentiate between substance use patterns and which may therefore be of interest for future research. To this end, the data presented in Chapter 11 are revisited and now *summarised by dimension* (rather than by situated substance use pattern). This section therefore complements Chapter 11 by offering a concise summary overview of those data. Although the data only allow statements on co-occurrence (not causality), the dimensions can still be understood as potential predictors in the following sense: is it possible to predict the situated substance use pattern based on how a space was construed on the dimensions? Dimensions identified here may point toward possible explanations regarding situated substance use and play a key role

in situated pathways. Section 12.4 will then show how they can be causally related to situated substance use or abstinence.

Table 36: Latent dimensions for space construal as potential predictors of situated substance use

1	2	3	4	5	6
Dimension[a]	**Which dimensions were most relevant …**				n_{max} (IP[c])
	… to distinguish between situated SU[b] patterns *overall*?	… to distinguish *alcohol/cigarette use* from no or rare substance use?	… to distinguish *specific* patterns of situated SU[b]?	… to distinguish *negative* from positive feelings?	
Closeness to people (C15)			✓ 'Cig' and 'Alc&cig' represent less closeness (cf. 'Alc')	✓ (-)	16
Orientation (C16/17)	✓	✓ (+/-)[d]	✓ 'Alc&cig' more outward-oriented (cf. 'Alc', 'Cig'); 'Cig pos' more inward-oriented (cf. other SU patterns)		15
Togetherness of activity (C18)		✓ (+)		✓ (-)	3
Changeability (C19/20)	✓			✓ (-)	9
Enjoyment (C21)	✓	✓ (+)	✓ 'Cig neg' and 'Cig&spirits/mixers' enjoyed less (cf. other SU patterns)	✓ (-)	5
Relaxation (C22)	✓	✓ (+)	✓ 'Alc&cig' represents resting mind (cf. 'Cig')	✓ (-)	11
Type of gathering (C23)	✓	✓ (-)	✓ 'Spirits/mixers' and 'Cigs&spirits/mixers' (cf. other SU patterns), 'Alc&cig' (cf. 'Alc') all represent party/excess		4
Substance use expectations (C24)	✓	✓ (+)	✓ 'Cig neg' associated with expectations against substance use (cf. other SU patterns)		3
Freedom of choice (C25)	✓		✓ 'Cig' and 'Alc&cig' (cf. 'Alc'), 'Spirits/mixers(&cig)' (cf. 'Wine/beer(&cig)'), 'Cig neg' (cf. other SU patterns) all represent less freedom of choice	✓ (-)	7
Self-presentation (C26)		✓ (+)	✓ 'Spirits/mixers(&cig)' requires more self-restraint (cf. 'Wine/beer(&cig)')		5
Physical pleasantness (C27)			✓ 'Cig' represents less pleasant environment (cf. 'Alc')	✓ (-)	10
Sense of time (C28)	✓	✓ (+)	✓ 'Cig&spirits/mixers' represent more open-ended/ unstructured sense of time (cf. other SU patterns)	✓ (-)	5

[a] The 'C' numbers in parentheses are included to facilitate comparisons with results in Chapter 11. [b] SU = Substance use. [c] IP = Interview participant. [d] Compared with spaces of no or rare substance use, alcohol spaces were more outward-oriented, whereas cigarette spaces were more inward-oriented.

This section also complements the previous subsection which, with its focus on settings and situations, encapsulated space in a more *objective* manner. By contrast, the socio-spatial aspects discussed here represent much more the *subjective* construal of spaces. The two sections can thus be understood to explore two sides of the same coin. However, in the context of pathways to situated substance use, the *interpretation* of situations along latent dimensions

can also be understood to *mediate* between 'cause' (situation) and 'effect' (situated substance use). The present section therefore moves one step further into such pathways. Finally, the previous section noted the importance of considering additional influences. The construal of space emerges from the interplay between a specific situation and such additional influences: the proposed dimensions of space construal may therefore be better predictors of situated substance use than setting or situation alone.

Section 7.4.4 describes the methods used to summarise the quantitative data by dimension. Briefly, different indicators (e.g., distances between spaces, standard deviations, percentages of study participants) and sources (e.g., comparisons between spaces, ranking of elicited constructs by participants) were triangulated to obtain a comprehensive overview of which dimensions distinguished best between situated substance use patterns in this study sample and in what way. The results are summarised in Table 36 above, with further details available from Appendix K.5.

In Table 36, column 1 lists the 12 dimensions from Chapter 10; their 'predictive' role is then indicated for four areas in columns 2 to 5:

- Column 2 shows on which dimensions there was most variability between the eight detailed situated substance use patterns (NSU pos, NSU neg, Wine/beer, Spirits/mixers, Cig pos, Cig neg, Cig&beer/wine, Cig&spirits/mixers[684]) in relation to a reference space (the participant's own hypothetical ideal space[685]). The eight dimensions indicated using checkmarks can be understood to distinguish best between patterns of situated substance use or abstinence in general, without considering any specific comparison between spaces. The next columns focus of such comparisons.

- Column 3 compares spaces associated with at least occasional alcohol or cigarette use with those representing no or rare substance use. There were notable differences on eight dimensions. A plus symbol (+) indicates that spaces associated with alcohol or cigarette use were typically rated closer to the preferred pole (e.g., as more enjoyable, more relaxed) than spaces of no or rare substance use, while a minus symbol (-) indicates a rating further away from the generally preferred pole. For 'orientation', substance use spaces differed from spaces of no or rare substance use but not necessarily in the same direction (i.e.,

[684] NSU = No or rare substance use; Cig = cigarettes; pos or neg = positive or ambivalent/negative feelings. The "/" means 'or', while the "&" symbol stands for 'and' (i.e., "Cig&beer/wine" means that a space was associated with the use of cigarettes as well as beer or wine) (see also Table 28 in Chapter 11).
[685] The 'ideal space' was a hypothetical and subjective 'space of total well-being' that participants were asked to imagine during the interview, as described in section 6.2.6 (methods) and section 11.3 (findings).

cigarette spaces tended to be seen as more inward-oriented, while alcohol spaces tended to be construed as more outward-oriented than spaces of no or rare substance use, as evident from Appendix K.4.3.

- Column 4 focusses on differences between detailed situated substance use patterns only (i.e., not in relation to spaces of no or rare substance use). Ten dimensions emerged as relevant, and the information in parentheses details what differences were observed between patterns (see Table 28, p. 393, for a definition of each pattern).

- Column 5 shows on which dimensions the situated substance use patterns associated with positive feelings (i.e., NSU pos, Cig pos) differed the most from patterns associated with ambivalent/negative feelings (i.e., NSU neg, Cig neg). The latter were construed notably more negatively on eight dimensions.

The number of participants who contributed elicited constructs to a particular dimension is shown in column 6. It is important to note that most comparisons were based on much smaller sample sizes (as low as n=1; details can be obtained from Appendices K.2 and K.3) and the results must be viewed in this context (as discussed in section 7.4).

Table 36 shows that all 12 dimensions were found to distinguish between substance use patterns in one way or another. In addition, all dimensions but ‘changeability’ were found to distinguish either between situated substance use and abstinence (column 3) or detailed patterns of situated use (column 4). This suggests a notable relationship between the latent construal of a space and its situated substance use pattern.

‘Enjoyment’, ‘relaxation’ and ‘sense of time’ emerge as key dimensions for space construal, as they helped to differentiate between patterns in each of the four areas shown in Table 36. This is not to imply that they affect situated substance use more strongly, but rather that we might expect them to play a role in a range of pathways. The remaining dimensions were relevant to some areas but not others. For example, ‘closeness to people’ did not help to distinguish between patterns overall or between spaces of no or rare substance use and those representing alcohol or cigarette use. It was, however, found to play a role with respect to the detailed patterns, such as whether a space was experienced more positively or negatively.

Although these data can provide insights for environmental prevention, they are limited in several respects. Specifics of the present dataset mean that a latent dimension for space construal may still relate to situated substance use or abstinence even if it is not highlighted

as such in Table 36[686]. More importantly though, the causality and mechanisms underpinning the observed relationships remain unclear. The above data point at potential explanations (e.g., that spaces will be associated with abstinence if they represent a 'limited' sense of time), but either direction of a relationship can be plausible (e.g., was there no substance use because time was too short and structured, or was there no time devoted to a particular situation *because* there was no substance use?). The potential role of intervening variables must also be considered[687]. Moreover, while the previous section showed that setting and situation relate to substance use, and this section shows that the latent dimensions relate to substance use, the relationship between setting/situation and the dimensions has not yet been addressed. Also, the above data show that patterns of situated substance use or abstinence differ not on a few but on many dimensions. This suggests there may be singular influences that affect a space on multiple dimensions and/or that dimensions may influence each other[688].

To overcome these limitations, a different approach to the data is required, focussed on mechanisms and details. The remainder of this chapter therefore embraces a more qualitative perspective on the data to map out pathways to situated substance use or abstinence.

12.4. Example pathways to illustrate complex mechanisms

The previous two sections highlighted that it is not sufficient to consider settings, situations or latent dimensions in isolation. The data implied that there must be more complex mechanisms at play which involve additional influences and which, although sketched out at various points in the previous chapters, were not systematically addressed in the results thus far. The following sections fill this gap by offering *an analysis of how socio-spatial aspects interplay with other influences* to produce situated substance use outcomes.

For this purpose, pathways were extracted from interview transcripts, and a subset was selected for visualisation and further analysis, as described in section 7.5. These referred to 14 spaces formally elicited and rated on the repertory grid as well as to additional spaces described in the narrative interview parts as per section 6.2.8. Similar or related pathways were

[686] For example, while the table shows no checkmark for 'changeability' in relation to specific substance use patterns, participants often mentioned special occasions (an aspect of 'changeability') in relation to drinking sparkling wine. Available data did not, however, allow the inclusion of a pattern focussed on sparkling wine (see section 7.3). For other dimensions such as 'togetherness of activity', data were limited due to the small number of participants who reported relevant constructs, so that it was not possible to draw conclusions.
[687] For example, 'setting' may explain the apparent relationship between use of spirits or mixed drinks and greater need for self-restraint, as spaces associated with use of spirits or mixed drinks were more likely to be located in less private settings such as bars.
[688] The descriptions of the latent dimensions in Chapter 10 already noted such interrelationships.

re-conceptualised as 'streams' and integrated into broader pathways. Although it was considered to integrate streams across individuals, finally this was only possible in one case where the streams were sufficiently similar (Pathway 1 below). In all other cases, integrated streams within a pathway refer to the same individual[689].

Table 37: Characterisation of seven example pathways

Pathway[a]	Nr of streams	Substance use pattern	Feelings	Setting	Apparent conflict between general position & situation
1 (Anna/ Barbara)	2[b]	No substance use	Positive[c]	Own home	Daily smoker faces informal smoking ban
2 (Carina)	3	No substance use	Positive (Stream 2) Ambivalent/negative (Streams 1 and 3)	University, fitness centre, workplace	Daily smoker faces formal smoking ban
3 (Dani)	2	No substance use	Positive	Bedroom, garden	No apparent conflict (all in favour of abstinence)
4 (Ela)	3	Wine	Positive	Own home, relatives' home, holiday	No apparent conflict (all in favour of use)
5 (Flora)	3	Cigarettes	Positive	Urban spaces, university	Wish to quit smoking vs. situations associated with smoking
6 (Gabi)	2	Beer (Stream 1) Cigarettes (Stream 2)	Positive[c]	Restaurant, café	Personal dislike of beer, wish to quit smoking vs. others drink/smoke
7 (Helena)	2	Spirits/mixed drinks (Stream 1) Cigarettes and beer, spirits/mixed drinks (Stream 2)	Positive[c]	Public transport, bar	Alcohol use at odds with preferences against spirits/mixed drinks and excessive intoxication. Smoking despite formal ban.

[a] For anonymisation purposes, names are pseudonyms only. [b] Pathway 1 refers to two participants; in all other cases, streams allocated to the same pathway represent the same person. [c] Descriptions of the spaces in the interview transcripts suggested a more differentiated construal of the spaces.

The seven resulting pathways represent variety on several characteristics (see Table 37)[690]. They cover the main situated substance use patterns, namely no or rare substance use (Pathways 1-3); alcohol as primary substance (Pathways 4, 6, 7); cigarettes as primary product

[689] Integration across participants would have made the analysis and pathway displays too complex (if all details included) or too superficial (if limited to common denominators).
[690] Nevertheless, due to the limited number of pathways that could be selected for visualisation, it was not possible to represent all scenarios. Certain settings (e.g., home of friends) were not represented in the final selection. Also, in almost all pathways representing apparent conflicts, the outcomes were finally determined by the *situation* rather than by the general substance use position, even though data extraction identified instances where the general position shaped the outcomes more strongly (briefly covered in key assertion #5, see section 12.5).

(Pathways 5-6); and alcohol *and* cigarettes (Pathway 7), as well as diverse settings such as home, university or workplace, cafés, bars or restaurants. The high proportion of pathways relating to situational abstinence reflects the 'prevention' lens of the present study, and diversity was sought also there (e.g., formal or informal smoking ban, leisure or work context, positive or negative experiences). The pathways represent a variety of feelings: spaces in Pathways 3 to 5 were associated with (rather) positive feelings, spaces in Pathway 2 were associated with ambivalent or (rather) negative feelings, and spaces Pathways 1, 6, 7 received positive ratings on the supplied repertory grid but were construed negatively in the details. Special attention when selecting pathways was given to the juxtaposition of the participant's general substance use position and the specific situation, as it was assumed that this might highlight the role of socio-spatial aspects particularly well. The pathways thus include examples where the general position and specific situation are both in favour of abstinence (Pathway 3) or in favour of use (Pathway 4). They also include instances where the general position is in favour of use but the situation is not (Pathways 1 and 2), as well as instances where the situation is oriented toward a substance use pattern that the person would rather not engage in (Pathways 5-7).

The pathways illustrate mechanisms[691] through which the latent dimensions presented in Chapter 10 may affect substance use related outcomes. Importantly, this is not limited to the relationships shown in Table 36 of the previous section. The pathways thus complement that table by highlighting further ways through which socio-spatial aspects may affect substance use outcomes. Table 38 below indicates which dimensions are discussed for each pathway. Additional markers ('X') guide the interested reader to those pathways which illustrate the relevance of selected dimensions (and involved mechanisms) particularly well[692].

The example pathways thus offer case studies showing different constellations of socio-spatial aspects, of influences pro and contra substance use and therefore different mechanisms and outcomes. To ensure anonymity, specific details were omitted or generalised, which further transformed the example pathways from being highly idiosyncratic to being more general and therefore more widely applicable[693]. Therefore, even though the identification of types was *not* a focus of this analysis and would have required a different approach, the pathways can also

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[691] Although the pathways illustrate potential mechanisms, the term 'pathway' is preferred in this text as it points to the existence of a *person* that follows the pathway (cf. an impersonal 'mechanism') and also highlights the possibility of multiple paths merging or diverging dynamically along the way (cf. a clear 'mechanism').

[692] The exception is 'sense of time', which is highlighted in Pathway 4 but not as a major aspect. Although the data extraction identified pathways in which 'sense of time' played a more prominent role, these could not be included in the final selection of pathways due to resource limitations.

[693] Although decoupling from specific circumstances can give a false impression of generalisability (e.g., Walford, 2018: 522), similar pathways were in fact also reported by other participants and consequently, although each example refers to one or two participants only, its applicability is not necessarily limited to these individuals.

be read as initial sketches of pathway types, hinting at what might constitute typical pathways to different patterns of situated substance use or abstinence[694]. At the same time, and more in line with the aims of the present study, they allow insights into how the ex-ante defined conceptual model (see section 4.2.4) can be applied in practice and how it may be refined (further explored in Chapter 13). Generalisations are therefore made in the form of assertions regarding *interplay between socio-spatial aspects and other influences* in mechanisms related to situated substance use and abstinence (see section 12.5).

Table 38: Latent dimensions in the example pathways

Dimensions for space construal (as identified in Chapter 10)	**Pathway**						
	Pathway 1 (Anna and Barbara)	Pathway 2 (Carina)	Pathway 3 (Dani)	Pathway 4 (Ela)	Pathway 5 (Flora)	Pathway 6 (Gabi)	Pathway 7 (Helena)
Closeness to people	X		O	O	O	O	X
Orientation			X	O		O	O
Togetherness of activity					O	O	X
Changeability				O	X		
Enjoyment			O		O	X	
Relaxation	O	X	O		O		O
Type of social gathering			O	O			X
Substance use expectations	O	O	O	X	O	O	O
Freedom of choice	X	O				X	O
Self-presentation				O	O		X
Physical pleasantness		X	X				
Sense of time				(X)			

Note. O/X = Relevant dimensions for space construal. X = Pathway illustrates relevance of a dimension particularly well.

While it would have been possible to present only the key assertions derived from the analysis, presenting the supporting data (i.e., the pathways) in detail adds to the transparency of findings and allows readers to draw their own conclusions. The next section gives guidance on how to

[694] This is *not* to imply in any way that the pathways shown here represent the most common pathways to situational use or abstinence. The purpose of this analysis was not to identify which mechanisms or constellations are more common than others, but to understand how socio-spatial aspects can affect substance use outcomes. Therefore, even though pathways were more likely to be included if they represented themes mentioned by several participants, this was not the only criterion that guided the selection of pathways, and some commonly mentioned pathways were not included (see section 7.5). Therefore, no attempt is made to 'quantify' the identified mechanisms (e.g., to state how many participants reported similar mechanisms).

read the pathway displays before showing all displays in section 12.4.2, which are then supplemented with descriptions from section 12.4.3 onwards.

12.4.1. Explanatory notes

The next section shows the pathway displays resulting from the qualitative data analyses, as described in section 7.5. The influences identified through the content analysis of interview transcripts were arranged visually into flow diagrams to illustrate the processes through which spaces of substance use or abstinence come into being. For layout purposes, all displays are shown first, followed by accompanying text in subsequent sections. Seventeen streams are presented in seven broader pathways. Thus, 'stream' refers to a specific narrative related to a particular situation, while 'pathways' as presented here imply a greater level of generalisation. Within each pathway, labels are provided to distinguish streams (e.g., by setting, activity). Pathways are numbered for ease of reference and are ordered similarly to Chapter 11, starting with spaces of no or rare substance use and ending with spaces representing alcohol *and* cigarette use. There is one display for each pathway; for Pathway 7, a supplementary display provides further detail on the main display. Pathway titles (e.g., "Pathway 2: Smoking as an un/welcome distraction") highlight the essence of each mechanism.

Pathway elements

Each pathway consists of five major pathway elements, displayed in large boxes with headings in bold font. These elements are based on the ex-ante conceptual model (see section 4.2.4) but were finalised *after* (and based on) the data analysis as a way of displaying the pathways in a structured and comparable way. They are conceptualised as follows.

General substance use position: Usually located at the top of the display, this box summarises the individual's general views, preferences, rules and beliefs regarding substance use, which they hold independently of any specific situation and which can therefore be regarded as the starting point of each situational pathway. Thus, it serves as the key frame of reference from which a specific situation (see below) is interpreted with regard to substance use. The summary reflects participants' answers to the opening interview questions (e.g., about substance use preferences, as described in section 6.2.1) as well as later statements about substance use in general. For layout purposes, and because the general position does not differ by stream, the text is all placed in a single oval shape.

Situation: Located in the bottom left corner, this box describes the tangible arrangements of a specific situation (see also definition of 'situation' in section 3.2.3). Based on participants'

descriptions of the spaces, separate shapes highlight (where relevant) the setting, activity, people and time (as proposed key components of any situation, see section 9.3) as well as further material and immaterial conditions (e.g., formal smoking ban). In other words, this box sketches the factual conditions as they could be 'objectively' observed and described by any present person[695]. They resemble the socio-spatial aspects generally covered in prior literature (as discussed in Chapter 4). Information in shapes with dashed borders highlights influences that produce the specific arrangement.

Interpreted space: Located in the middle of the display and highlighted through shading and bold font to emphasise its role as the conceptual core of the pathways, this box identifies those latent dimensions which appear most relevant to how the space is construed in the given pathway, based on the 12 dimensions presented in Chapter 10. These differ from the points highlighted under 'situation' in that they represent how the individual 'subjectively' *interprets* the situation. The contents of this box were developed (often inferred) based on participants' descriptions of the spaces in the transcripts, either specifically in relation to substance use or in general[696]. Each dimension is placed in a separate shape, with the specific value added where it differs from the general label[697]. The order of dimensions does not reflect the order in Chapter 10 but is tailored to the specifics of the pathway display, and clusters of interrelated dimensions are indicated using lines.

Key mediating events: Located between interpreted space and outcomes, this box describes mediating events, actions, thoughts or feelings, or, as Saldaña (2013: 164) puts it: "the details of what happened between the cause and the outcome". These were either inferred from study participants' narratives or made explicit by participants. Although the visual flow of the diagram suggests a linear order in which the mediators emerge from the preceding pathway elements (in particular the dimensions for space construal), this was not always the case. In some cases, a more complex display (e.g., placing mediators in front of the dimensions, using circular flows)

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[695] Though it must be acknowledged that certain information was included under 'situation' which may not be directly observable in the narrowest sense (e.g., type of relationship between individuals, laws).

[696] As a result of this, they did not necessarily match the data obtained through the repertory grid. Firstly, the socio-spatial aspects discussed in the pathways were not necessarily the same as those elicited in the repertory grid, for example because elicited constructs were not relevant to the pathway, or because an aspect was mentioned in the transcript but not elicited on the grid. Secondly, even where an aspect was mentioned in the transcript and also elicited on the grid, the value on the aspect was not necessarily the same. For example, in Pathway 1, 'Barbara' rated her home as representing 'freedom of choice' in general but additional data from the transcript suggested that she construed this freedom more limited with regard to being able to smoke.

[697] This occasionally produced confusing constellations because dimensions are labelled to reflect the generally preferred pole. Consequently, for example, for 'Relaxation: active mind' (Pathway 1), the first part identifies the relevant dimension ('relaxation'), while the second part describes the actual value on this dimension ('active mind').

might have represented pathways better. However, to keep the displays simple, all mediators were placed in a single box, with arrows or lines used to hint at interrelationships.

Outcomes related to substance use: Located at the right side of the display, this box shows the endpoint of the pathway. Outcomes were not limited to substance use patterns but – in line with the data – were conceptualised more broadly (e.g., to include experiences of spaces). They were developed based on what participants themselves appeared to construe as outcomes or how participants described the spaces referred to in the streams. Separate shapes distinguish different outcome types.

In addition to the five major pathway elements described above, each pathway includes *other (not socio-spatial) influences* which are neither part of the situation nor the general substance use position in the narrower sense but affect these or other pathway elements[698]. They are identified through dashed borders and dashed lines, and where appropriate, similar or related influences are grouped in a box to make the display clearer[699].

A *default* element referring to *substance characteristics* is not included. To simplify the displays, substance characteristics were treated as a matter of fact and were only highlighted if they played a prominent role (e.g., Pathway 2). Similarly, (lack of) *availability of or access to substances* is not included as part of the situation by default, but it was included in the pathways when specifically emphasised by participants (e.g., Pathways 4, 6, 7).

General notes on visualisation and use of pathways

The pathway displays consist of shapes connected by lines and arrows. Each box stands for a variable (factor, influence). To make the displays more accessible, boxes do not generally list a variable label only (e.g., “parents’ smoking status”) but rather describe the specific value on the variable (e.g., “both parents non-smokers”). The displays have been set up so that they

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[698] As socio-spatial and other influences interrelate, the distinctions were not always clear-cut. For example, in Pathway 1, the informal smoking ban imposed by parents appears only as ‘other influences’ (e.g., “inability to smoke when opposed parent is at home”), as it emerged rather from the parents’ general stance on cigarettes and the participant’s relationship with the parents in general (and would have not been directly observable to an outsider). Similarly, in Pathway 4, it could be argued that the cultural rule was part of the situation; however, again, this rule was not limited to this specific situation and would not have been directly observable. The most critical example was Pathway 7, where the level of enforcement and access to alcohol could have been considered part of the situation. Finally, it seemed more appropriate to capture them as ‘other influences’: in the case of enforcement, because it referred to broader *perceptions* of norms; in the case of access to alcohol, because it referred to friends’ general substance use preferences (not limited to the specific situation) and because the participant described how access to alcohol was already planned earlier in the day (i.e., before the situation itself). It was considered to list these influences twice (once as ‘other influences’ and once under ‘situation’) but to keep the displays visually clear, finally they were included only once.

[699] It was initially attempted to present these influences in a standardised format (with a view to developing a possible classification scheme), but finally a more idiosyncratic display was found to be most appropriate.

narrate up to three streams *concurrently*. Therefore, each line or arrow represents *all* streams included in a pathway. Consequently, multiple arrows pointing to a single box do not represent different streams but indicate that there are multiple influences shaping the variable in that box. Moderating relationships are not emphasised, but where multiple arrows point to a single box, this implies the existence of moderating relationships. *Oval shapes* denote influences that were (likely) the same across all streams, while *rectangular shapes* denote influences that were (likely) different between streams (this was particularly relevant where these prompted further differences later on in the pathways)[700]. In these cases, the value for each stream is noted separately (where possible), in the same order as the streams are numbered (i.e., Stream 1 listed first); superscripted numbers help to identify streams in case of doubt.

Major pathway elements (as per above) are shown in large boxes, as are other influences that could be grouped together. *Continuous borders and lines* are used for major pathway elements to offer a common structure across pathways, while other influences are distinguished using *dotted borders and lines*. *Arrows* indicate that one factor precedes and affects (e.g., contributes or leads to) another*,* while *lines without arrow heads* indicate more complex relationships without a clear causal direction (e.g., where two factors influence each other)[701]. To ensure visual clarity, lines are limited to key flows only (rather than depicting every relationship present in a pathway). The *size, length and width* of boxes, lines and arrows was determined by layout considerations (e.g., fitting displays on a single page) and holds no special meaning.

Although the *positioning* of boxes, lines and arrows was also determined by layout constraints, attention was given to position major pathway elements similarly across pathways (for comparability) as well as to create a unidirectional flow (from left to right) which represents *chronological order*. The idea underlying the development of the pathways was that a person with a certain general substance use position would 'find' (or put) herself in a specific situation (in line with or at odds with her general position on substance use) and thus face a 'decision' (whether perceived as such or not) regarding situational substance use or abstinence. The pathways hence seek to reconstruct the events between the point of 'entering' the situation and substance use related outcomes. These events may unfold over months (e.g., Pathway 6) or over the course of a single evening (e.g., Pathway 7). In either case, the displays must be understood *as a heuristic tool* intended to illustrate mechanisms underlying situational

[700] It should be noted that some shapes displayed as rectangular could have also been displayed as ovals (and vice versa), namely where specific values differed in the details but had something in common at the abstract level. For example, in Pathway 5, the two settings 'near former school' and 'outside the university' are shown in a rectangular shape, but in the accompanying text they are conceptualised as similar ('near educational settings').
[701] To increase the clarity of the displays, and following guidance by Miles et al. , double-headed (bidirectional) arrows are not used. Where two factors influence each other, this is indicated by a line instead.

substance use or abstinence, as, in reality, the substance use related 'decision' will often be already part of the situation (especially if considering routinised spaces and practices).

The *constructed nature of the pathways* is particularly evident in the core element ('interpreted space') which is structured according to the study author's suggestion for 12 dimensions. Similarly, the orderly separation of pathway elements and different kinds of influences likely reflects the ex-ante conceptual model more strongly than how participants themselves might have classified influences. However, while some order and structure have been imposed to support analytical insight, this does not mean that the pathways violate or deviate from the participants' original narratives, especially as the pathway template was developed based on the data (i.e., after data extraction). In addition, frequent confrontation with the original data and adaptations to the template ensured that the original narratives were upheld (see section 7.5). Overall, the pathways show the mechanisms as they were made explicit by participants during the interviews. Where inferences were essential, they are denoted using brackets (exception: latent dimensions for space construal[702]) and (in the case of speculation) question marks (only Pathway 5). Moreover, the constructed nature of the pathways means that the classification, labelling and positioning of influences is not definite and other ways of arranging the data could have been equally justifiable. There were numerous occasions where the same influence could have been placed under different headings but was generally included only once to avoid repetition; the final choice was then guided by what seemed most appropriate in the overall context of a pathway. Thus, the simplified and ordered representation of data within pathways is both a strength and a weakness: by disentangling an intricate web of influences, pathways help to visualise how this web affects substance use, yet they cannot depict the actual mechanisms accurately or completely. As Saldana notes, albeit in relation to causation coding: "the method should not be considered a foolproof algorithm for deducing the 'correct' answers. Instead, it should be used as a heuristic for considering or hypothesizing about *plausible* causes of particular outcomes, and potential outcomes from particular causes" (Saldaña, 2013: 165, original emphasis).

The accompanying description

Each pathway is supplemented with a description which guides the reader through the display but offers also additional details, including possible conclusions and interview excerpts. Each

[702] Brackets were not used for the 'interpreted space'. Interpreted space was frequently inferred from the data and it was not straightforward to distinguish between implicit and explicit contents. Participants could not explicitly refer to the 12 dimensions because these had not yet been developed at the time of the interviews, but their interpretation of the spaces could be reasonably inferred from how they described them during the interviews.

description starts by highlighting unique aspects of the pathway, followed by a summary of grid ratings on elicited spaces related to the streams. All streams are then treated together, as this supported the discussion of similarities and differences best. Each of the major pathway elements is described in turn, with information on other influences interspersed as appropriate. In the section on 'mediating events', the latent dimensions for space construal are highlighted in italics to show how they affect pathways. While the step-by-step movement through the display necessitates some repetition in the text, it was considered to offer the most accessible guide to the displays. Each pathway description ends with a summary statement which aims to offer a generalised assertion regarding the mechanisms underlying the specific pathway.

In addition, the latent dimensions for space construal are discussed as *possible conditions for substance use or abstinence*. Gläser and Laudel (2010: 251) distinguish five types of conditions: necessary (required for an effect); sufficient (produces an effect regardless of other conditions); supporting (increases the likelihood or magnitude of an effect); impeding (decreases the likelihood or magnitude of an effect); and hindering (precludes an effect regardless of other conditions). In line with the focus on environmental prevention in this thesis (described in Chapter 2), this 'conditions' perspective was applied, particularly when assessing the role of substance use expectations in shaping substance use outcomes.

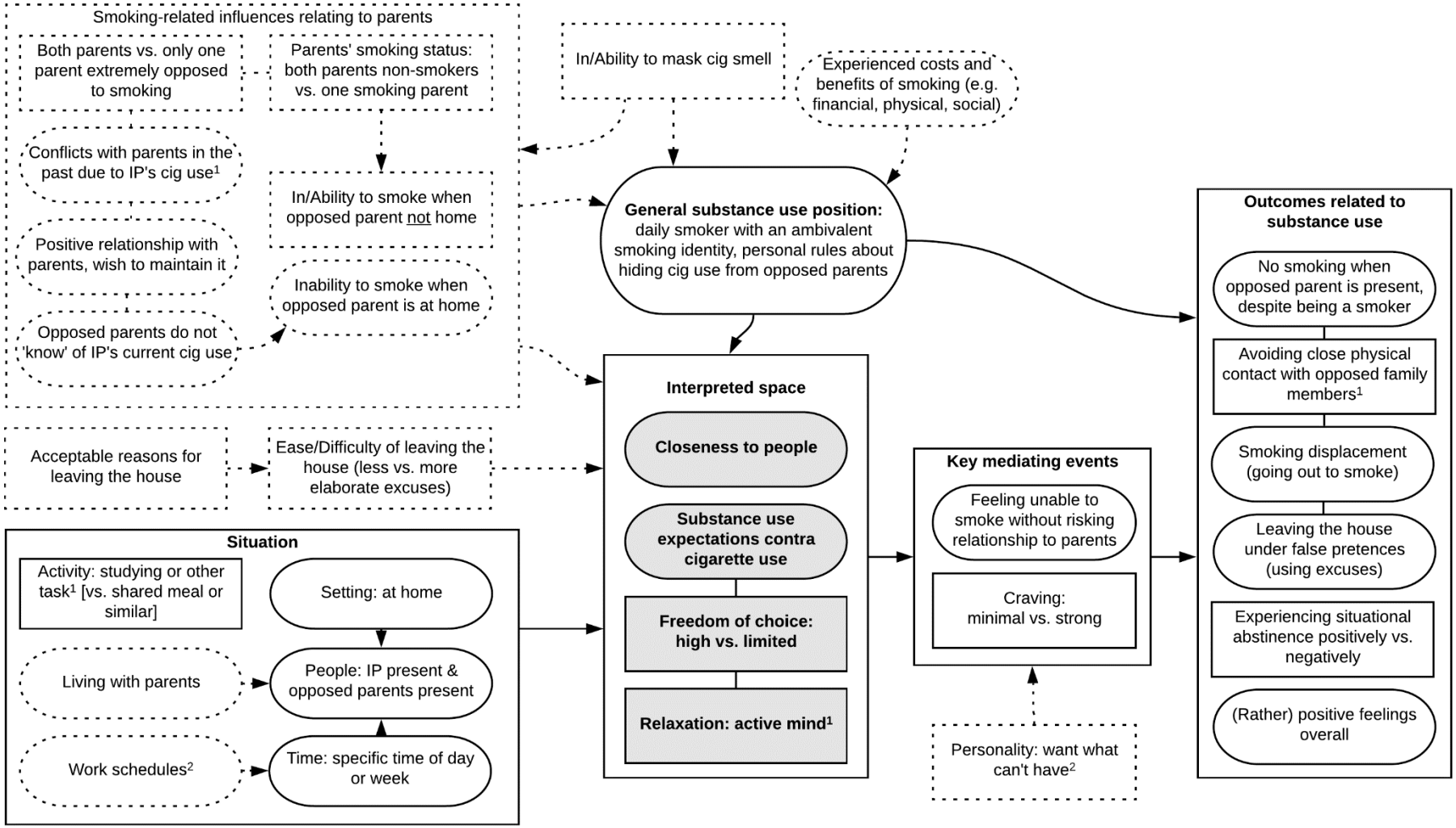
The descriptions generally mirror the perspective of study participants (as reconstructed based on the interview transcripts). Strictly speaking, most sentences should therefore have included phrases such as 'according to the participant' or 'appeared to be construed by the participant as'. However, such phrases were generally omitted to increase the legibility of the text. Instead, distancing phrases such as 'may', 'could', 'likely', 'suggests' or 'seems' highlight the study author's own perspectives and hypotheses.

Finally, readers will recognise certain moments in the pathways as reflecting phenomena that are described in the broader substance use literature (e.g., functional substance use, peer pressure, norms, habits, memories, associations, identity). The pathway descriptions and subsequent discussions acknowledge these but do not explore them in detail, as the present study focussed on the implications of the data in terms of socio-spatial theorising (further explored in section 12.5 and Chapter 13).

12.4.2. Pathway displays

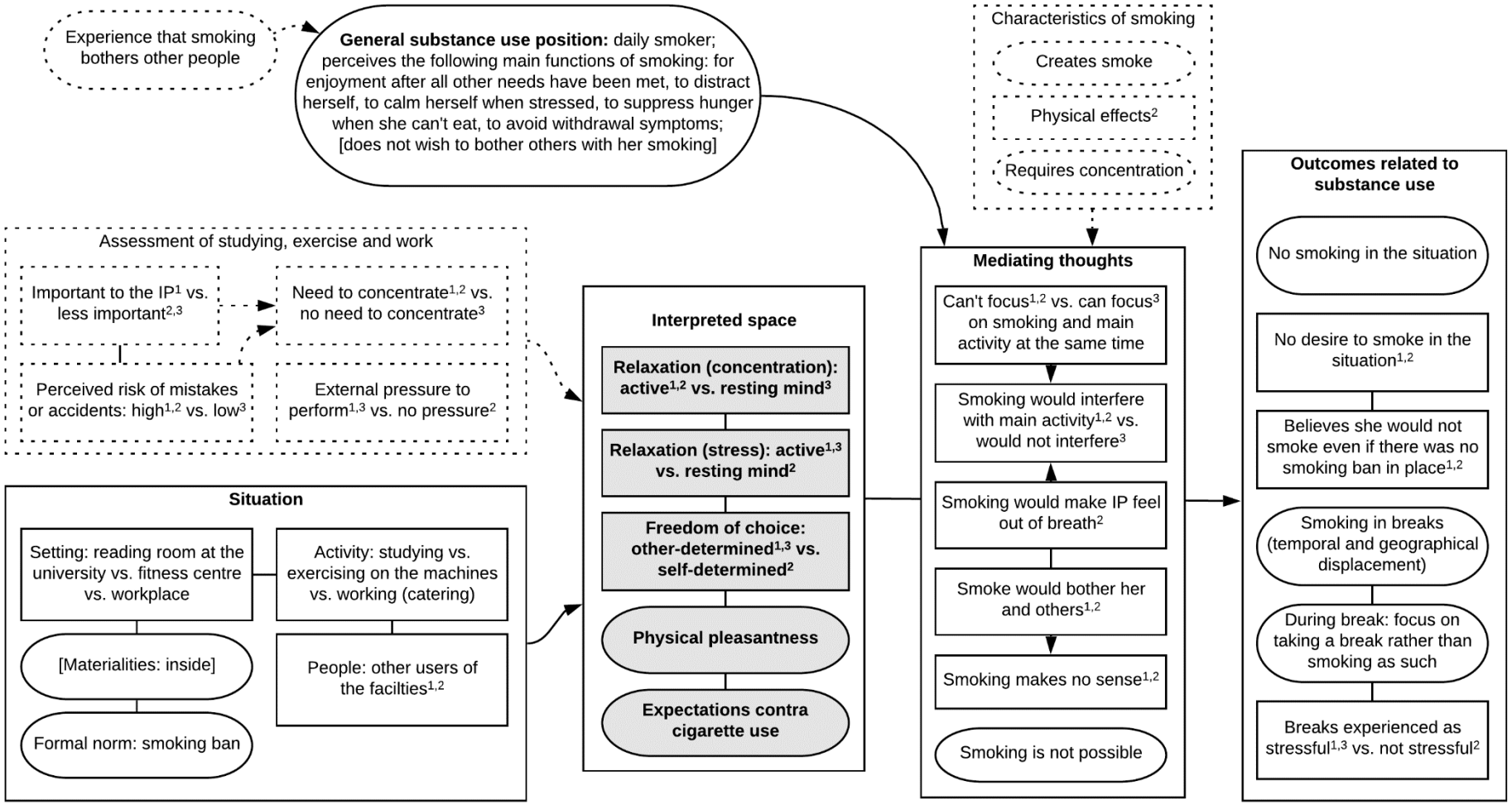
The following pages present the seven pathways in the form of visual displays, as described above. Sections 12.4.3 to 12.4.9 then describe each pathway further.

Figure 30: Pathway 1 – Forced abstinence as indifference or limitation ('Anna' and 'Barbara')



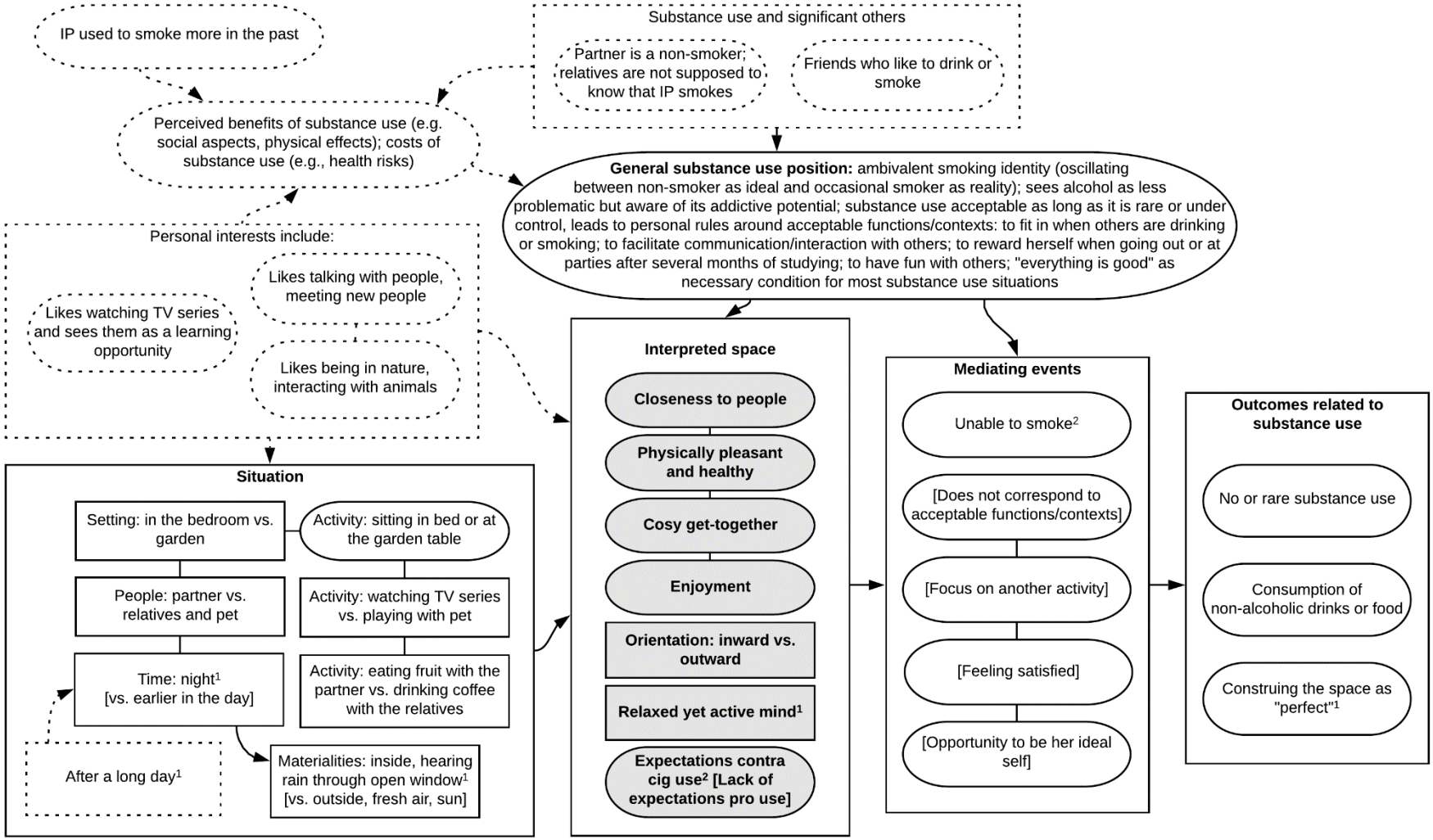
Note. Stream 1: complete abstinence at home ('Anna'); Stream 2: partial abstinence at home ('Barbara'). Source: Author's own, created in Lucidchart.

Figure 31: Pathway 2 – Smoking as an un/welcome distraction ('Carina')



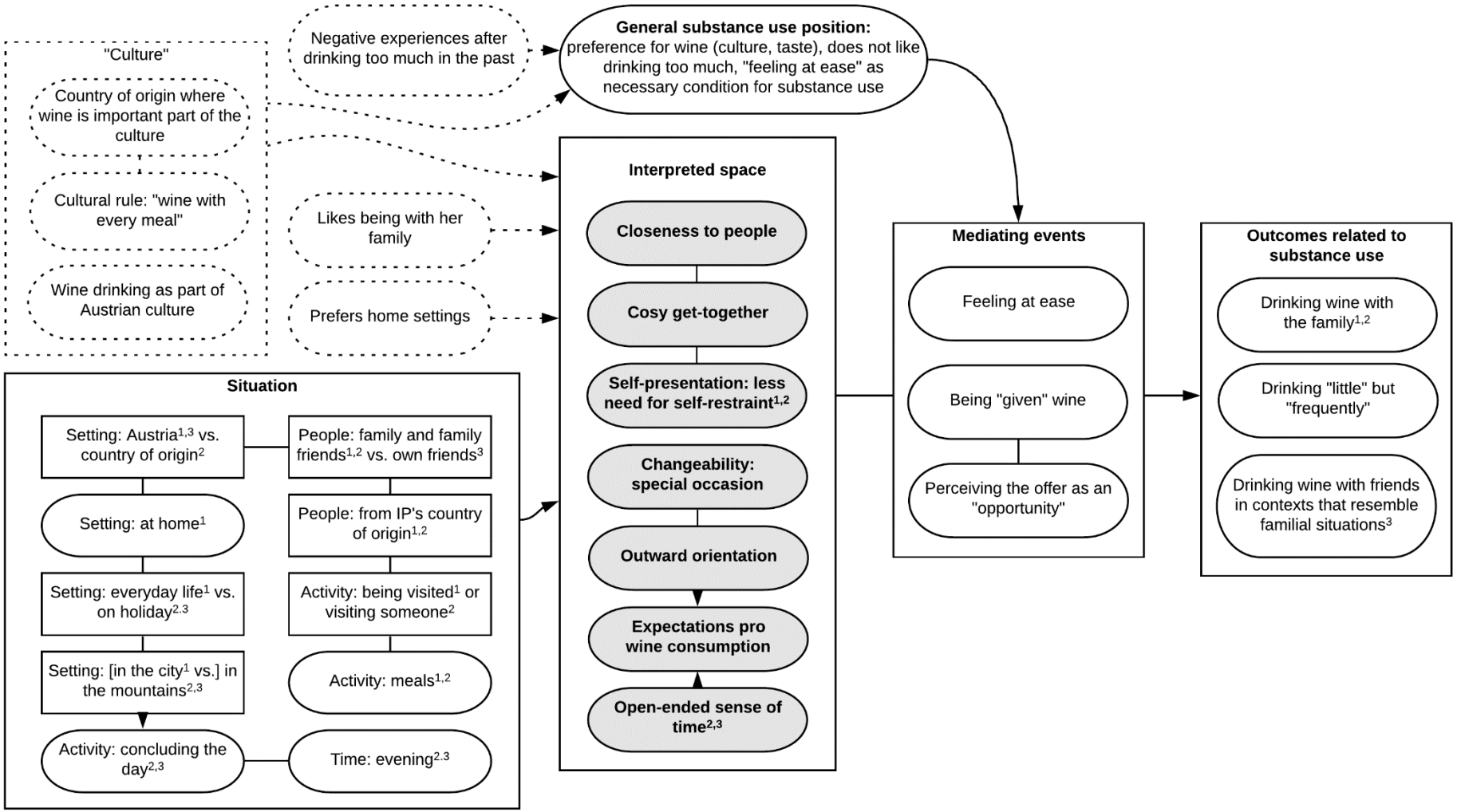
Note. Stream 1: studying at the university; Stream 2: working out at the fitness centre; Stream 3: at work (catering). Source: Author's own, created in Lucidchart.

Figure 32: Pathway 3 – Abstinence as an opportunity to achieve ideal self ('Dani')



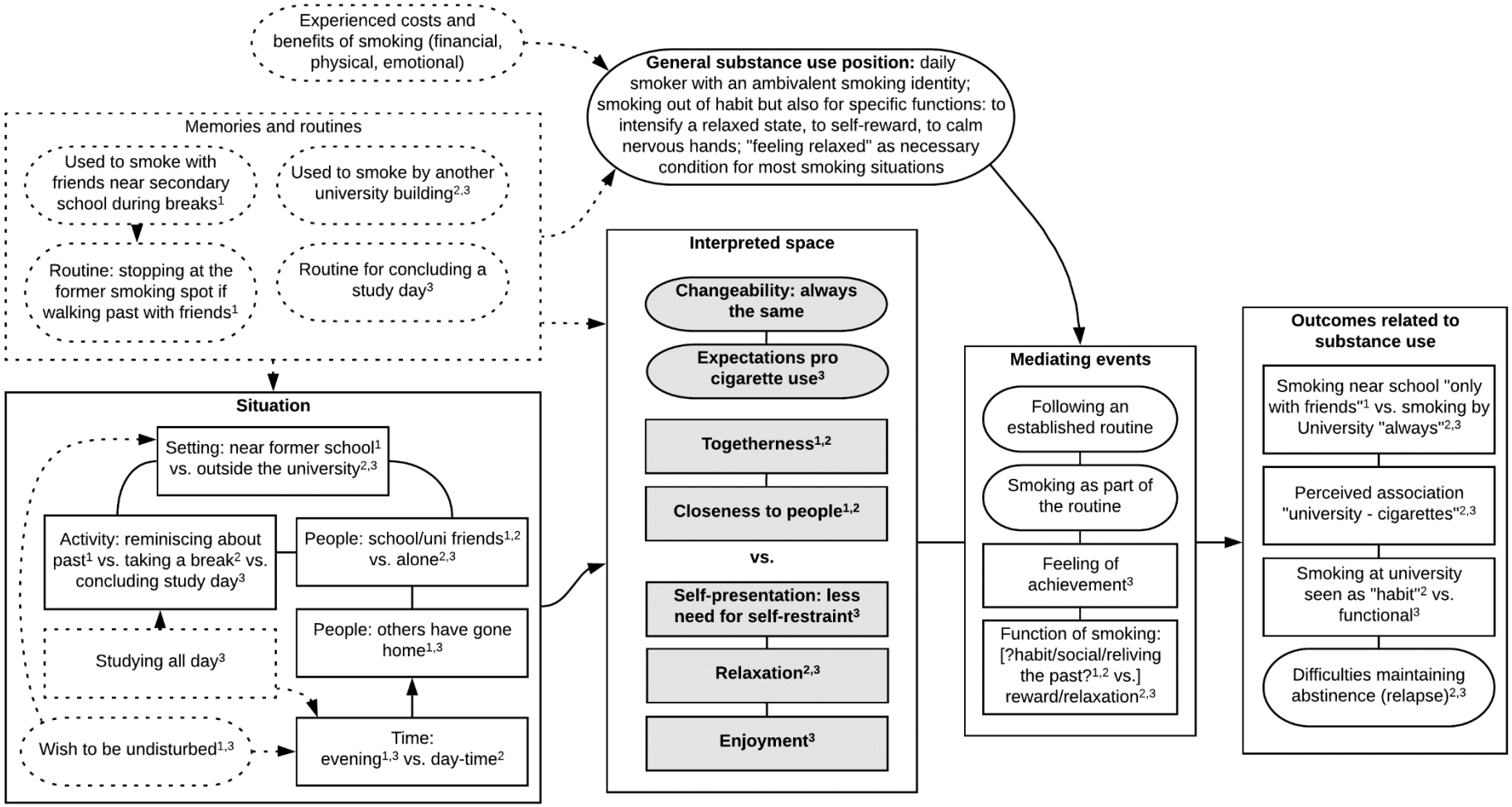
Note. Stream 1: watching TV series in the bedroom; Stream 2: playing with pet in the garden. Source: Author's own, created in Lucidchart.

Figure 33: Pathway 4 – Drinking wine as a cultural necessity ('Ela')



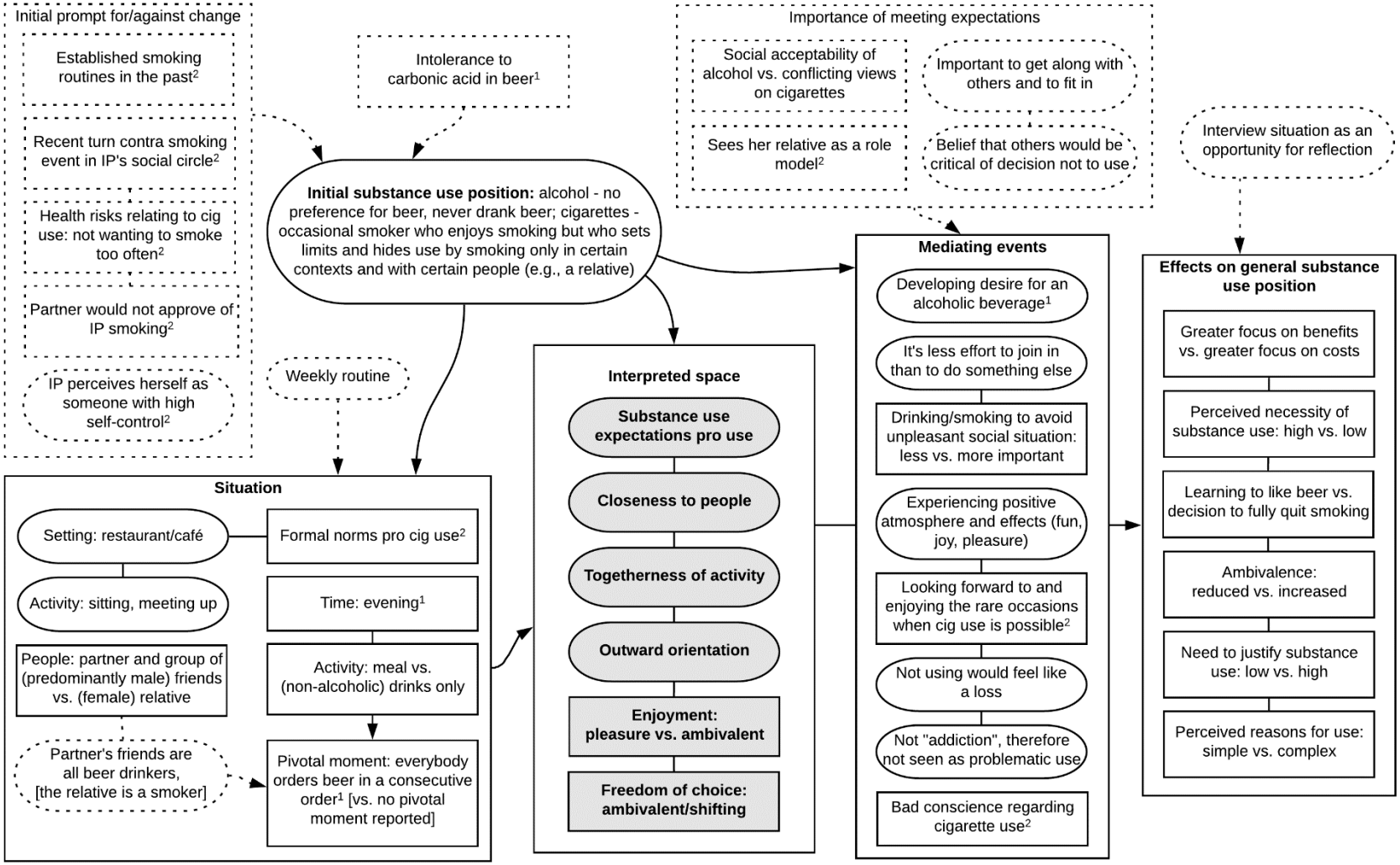
Note. Stream 1: family meal at home in Vienna; Stream 2: visiting extended family in country of origin; Stream 3: mountain holiday in Austria. Source: Author's own, created in Lucidchart.

Figure 34: Pathway 5 – Smoking as lived memories and routines ('Flora')



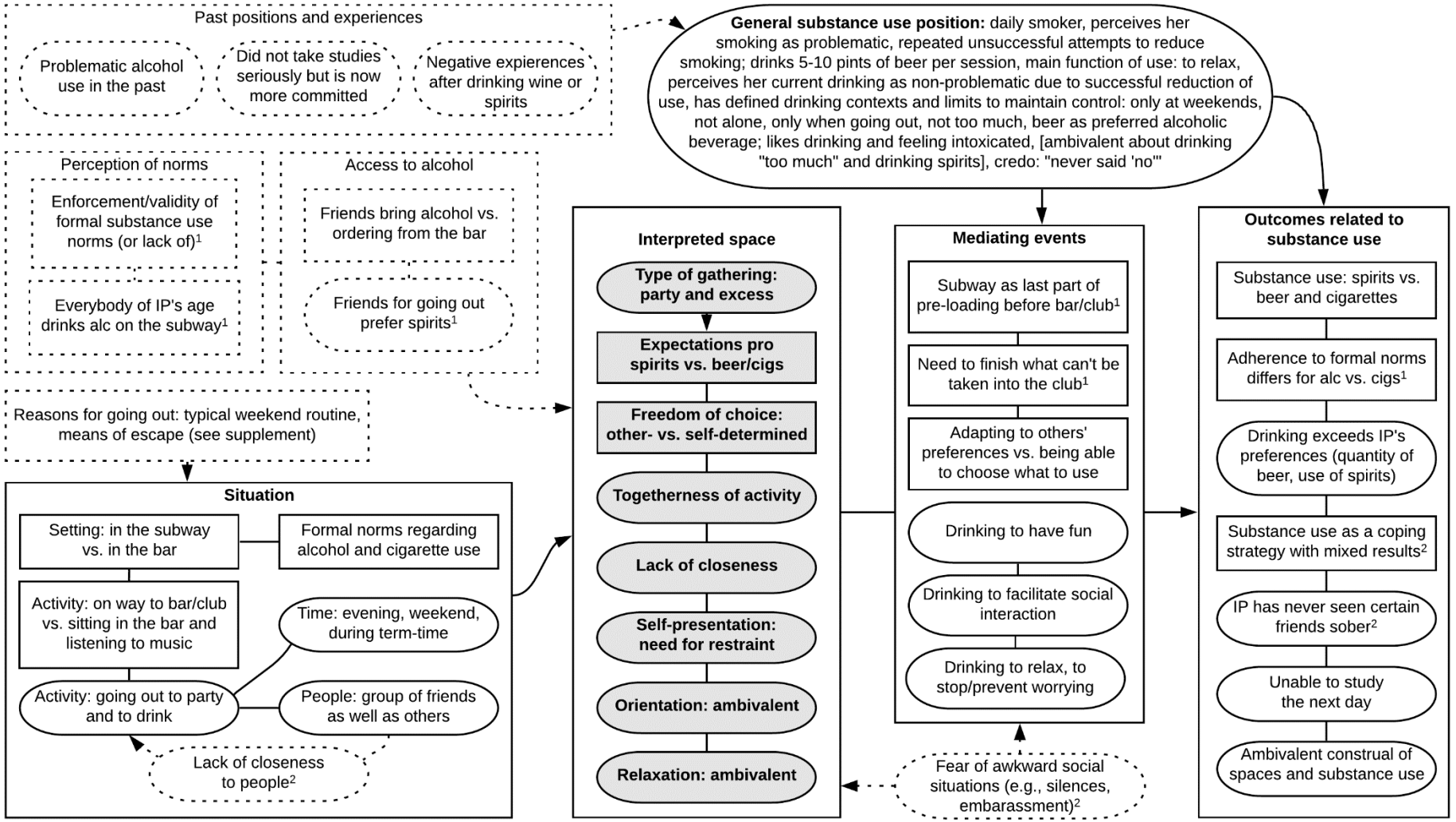
Note. Stream 1: smoking near former school; Stream 2: smoking near university (day-time); Stream 3: smoking near university (evening). Source: Author's own, created in Lucidchart.

Figure 35: Pathway 6 – Changing one's substance use position to overcome ambivalence ('Gabi')



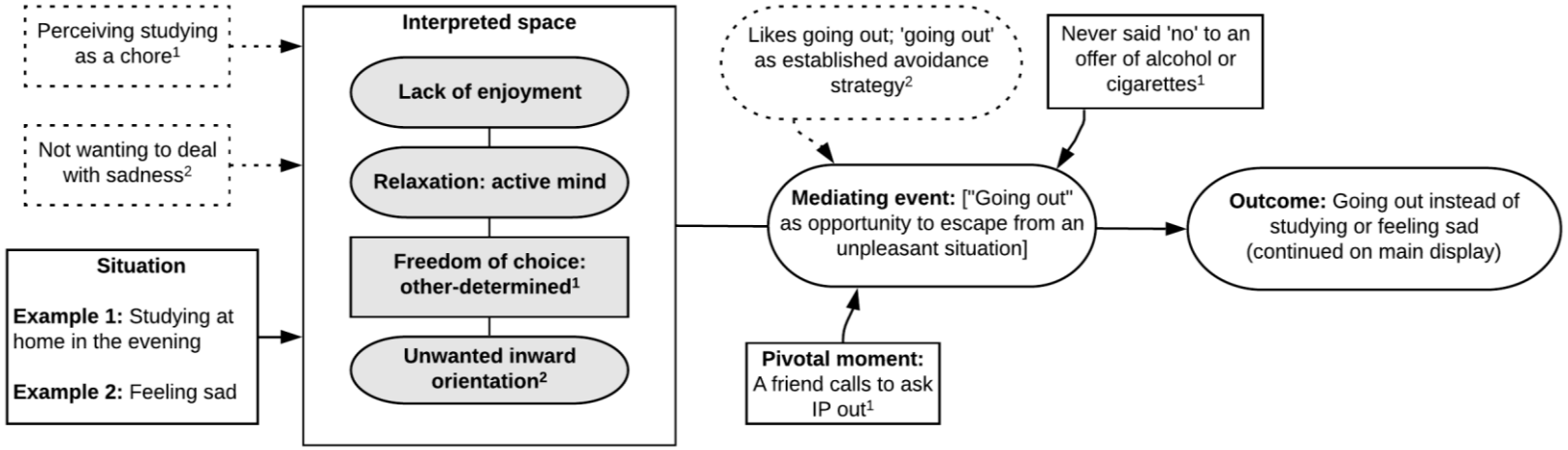
Note. Stream 1: drinking beer with 'the boys' in a restaurant; Stream 2: smoking cigarettes with a female relative in a café. Source: Author's own, created in Lucidchart.

Figure 36: Pathway 7 – Drinking to excess as a means of escape ('Helena') (main display)



Note. Stream 1: taking the subway to a bar or nightclub; Stream 2: going out in a bar area. Source: Author's own, created in Lucidchart.

Figure 37: Pathway 7 – Drinking to excess as a means of escape ('Helena') (supplement)



Source: Author's own, created in Lucidchart.

12.4.3. Pathway 1: Forced abstinence as indifference or limitation

The first example illustrates how spaces with an *informal smoking ban* can be experienced differently by daily smokers. By doing so, it also addresses the conflict between a general position *pro* cigarette use and situational expectations *contra* use. The pathway summarises two streams reported by two participants ('Anna' and 'Barbara'):

- Stream 1: complete abstinence at home ('Anna')
- Stream 2: partial abstinence at home ('Barbara')

Several spaces formally elicited in the interviews related to these streams. The pathway focusses on spaces of no substance use due to parental expectations contra smoking[703]. Both women construed the respective spaces as very important. Anna associated her space with rather positive feelings, while Barbara associated hers with positive feelings (despite negative aspects, discussed below). The pathway therefore refers to positively construed spaces of no or rare substance use (see section 11.4.1). Both women also reported spaces characterised by smoking at home. Anna qualified this as extremely rare (few times per year) and not at all important; by contrast, Barbara reported a space associated with smoking at home which was frequent (weekly) and very important. Both women described multiple spaces where they went to smoke when they could not smoke at home, in various settings and construed heterogeneously. Based on the transcripts, the following narrative was constructed to explore how informal home smoking bans may affect substance use outcomes and daily smokers' construal of the home as a space of no substance use (see Figure 30, p. 480).

Smoking-related influences relating to parents: This pathway starts with Anna's and Barbara's parents. In Anna's case, both parents are non-smokers and extremely opposed to smoking. Barbara's case is different, as only one parent is a non-smoker and extremely opposed to smoking, whereas the other parent is a smoker who would merely prefer that Barbara smokes less. In both cases, the opposed parents do not formally know that their daughter smokes (Anna suspects her parents might only pretend not to know, while Barbara trusts her smoking parent to guard her secret), because both women anticipate, based also on past experience, that an exposure of their smoking would damage the otherwise good and important relationship with their parents. In other words, it is *not* the case that the parents know of their daughter's smoking and ban smoking at home: rather, the informal smoking ban emerges indirectly from the parents' general opposition to smoking. As a result, Anna generally never smokes at home,

[703] Both women also reported no alcohol use in these spaces, but this was not further explored in the interviews as both women reported no or only infrequent alcohol use in general.

even when her parents are out (as thirdhand smoke odour would expose her), while Barbara is able to smoke whenever the opposed parent is absent.

General substance use position: Anna's and Barbara's experiences of smoking daily (as a practice that is physically taxing, expensive and a source of conflict with others, yet meets important needs relating to relaxation and enjoyment) mean that they both report frequent attempts to reduce or cease smoking but also identify strongly as "smokers", wishing to smoke often (Anna) or always (Barbara) in their hypothetical ideal spaces. Both explicitly speak of a "love-hate" relationship with cigarettes. A difference between the two women is that Anna does not generally smoke to cope with stress, whereas this is a key function of cigarette use for Barbara. In view of their parents' opposition to smoking, both report strategies to conceal their use (e.g., masking cigarette smell, not smoking before meeting opposed parents).

Situation: The pathway examines situations at conflict with the general substance use position. Stream 1 in Figure 30 refers to Anna going about her daily routines at home, while her parents and siblings are also there. Stream 2 refers to Barbara spending time with her parents and siblings at home, for example in the context of a dinner. Thus, the two situations are similar but differ in terms of the typical activity. Both situations emerge from the fact that the two young women live with their parents. Barbara notes that work schedules also influence when and for how long she and the opposed parent are both at home.

Interpreted space: As a result of the above, Anna and Barbara construe the space at home as representing expectations contra cigarette use but also as representing closeness. Their construal of the space differs notably on other dimensions. An important additional influence in this pathway is how easy it is for them to leave the house. Both women provide their parents with acceptable reasons when leaving the house. Anna finds this easy:

> *I: OK and how do you feel at home when you can't smoke?*
> *P: Oh, actually surprisingly great, .. if I want to smoke, then… I ask someone of those ((points at map)) [my friends] if they want to meet up […] Or I go out all by myself. […]*
> *I: OK and what do you tell your parents then?*
> *P: Hm… "I'm going for a walk", "okay" ((imitating parent's voice)) ((laughs))… walking around for two hours. ('Anna')*[704]

[704] German original: "I: Okay, und wie geht es dir zu Hause, wenn du nicht rauchen kannst? B: Achso, eh eigentlich super, ..wenn ich rauchen möchte, dann.. frage ich irgendwen von denen [meinen Freunden], ob sie sich treffen wollen. […] Oder ich gehe ganz alleine raus. […] I: Okay und was sagst du dann deinen Eltern? B: Hm.. 'Ich gehe spazieren', 'okay' ((Elternstimme nachahmend)) ((lacht)) …Zwei Stunden rundherum spazieren."

By contrast, Barbara finds it difficult to leave the house to smoke, perceiving it as a search for credible excuses:

> *P: […] when my [opposed parent] is at home, then I also can't smoke and then I absolutely have to find something that enables me to go smoke now. […]*
> *I: You mean, so that you can leave the house then?*
> *P: Yes, exactly. So, for example, I say- I mean, going out normally, that's not a problem, but … if I suddenly say now, "yes, I'm going out for five minutes", then that is so… then [my parent] will also figure it out. And therefore I mostly go [to visit someone]. ('Barbara')*[705]

This impacts on their perceived freedom of choice (e.g., to leave the house) which is consequently high for Anna but more limited for Barbara. Finally, differences in activity (tasks vs. family time) likely translate into differences on the 'relaxation' dimension, with Anna's mind likely to be more occupied than Barbara's in the typical situation at home.

Key mediating events: The *parental expectations contra cigarette use*, together with *closeness* to the parents (which, however, is perceived to presuppose abstinence) and a wish to maintain this closeness, results in both women feeling unable to smoke. This could be assumed to create craving. However, for Anna, feeling free to leave the house (*freedom of choice*) and having an active mind (dimension: *relaxation*), together with no habit of smoking due to stress, results in minimal craving:

> *P: ((continued from earlier quote)) […] anyway, at home I always have something to do and if not, then I study. But it's not that I … permanently think of cigarettes, that I think "I have to go outside right now", again and again, [it's] not [like] that. ('Anna')*[706]

By contrast, for Barbara, not being able to smoke (*expectations contra substance use*) or to easily go outside (*limited freedom of choice*) increases her urge to smoke. She explains this with reference to her personality ("that kind of a person"), highlighting also how greater freedom of choice reduces craving:

> *P: Well, I'm that kind of a person, I absolutely want to smoke when you- when it just doesn't fit with the situation. For example, when [my opposed parent] is there, then I have this absolute urge to smoke, then I could… smoke the whole pack. But when [my parent] is not*

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[705] German original: "B: […] wenn [mein Elternteil] zu Hause ist, dann kann ich auch nicht rauchen und dann muss ich unbedingt irgendwas finden, wo ich jetzt rauchen gehen kann. […] I: Also, damit du dann das Haus verlassen kannst? B: Ja, genau. Also, da sage ich zum Beispiel- Ich meine, normal rausgehen, das ist kein Problem, aber .. wenn ich jetzt auf einmal sage, 'ja, ich gehe für fünf Minuten raus ', das ist dann so .. dann wird [mein Elternteil] das auch checken. Und deswegen, gehe ich meistens [zu jemandem auf Besuch]."

[706] German original: "B: […] zu Hause habe ich eh immer irgend etwas zu tun und wenn nicht, dann lerne ich. Aber es ist nicht, dass ich ...permanent an Zigaretten denke, dass ich mir denke 'ich muss sofort jetzt raus', wieder und wieder, also das nicht."

there, for example, then… I don't have to necessarily smoke one after the other. That is… this stressful situation a bit. […] That it is not within my decision whether I can smoke or not. ('Barbara')[707]

The comparison between Anna and Barbara suggests a further possible explanation for the reported differences in craving: Anna generally never smokes at home and therefore has no established association between being at home and smoking. Barbara, however, smokes at home when the opposed parent is absent. This likely translates into an established association of smoking with the home setting for Barbara, which would also increase craving.

Outcomes: Even though Anna and Barbara are frequent smokers, the knowledge that their parents are strongly opposed to smoking, together with a wish to maintain a positive relationship with the parents, prompts both of the young women to not smoke at home. While Barbara feels able to mask thirdhand smoke odour successfully, Anna feels unable to do so, which leads her to avoid close physical contact with family members. However, the need or wish to smoke (part of their general substance use position) produces *smoking displacement* rather than full abstention, as both women report purposefully leaving their home under false pretences to smoke elsewhere.

Anna reports minimal craving but still goes out to smoke. The extent of craving does not appear to greatly affect the overall smoking outcome; in fact, craving is minimal in Anna's case *because* she can go out to smoke whenever she wishes. However, the socio-spatial analysis found that craving affects the experience of the situation. While Anna construes the situation at home as "great" (see earlier quote), Barbara construes it as stressful and problematic:

I: […] during sign-up, there was a question "have you ever had problems [relating to substance use]?" and you indicated "yes, approximately once a month". […] so I wanted to follow up and ask, can you give an example of problems? […]
P: Well, "problems", for example if I've got the weekend off [from work] and am at home and my [opposed parent] is also at home, then I can't smoke. And then I'm aggressive relatively quickly, have outbursts of anger and I really start to cry then, because the situation really annoys me so, and I get headaches, very strong ones… and these are the kind of problems when I happen to have time off. ('Barbara')[708]

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[707] German original: "B: Naja, ich bin so eine Person, ich will unbedingt rauchen, wenn man- wenn es gerade in dieser Situation nicht passt. Wenn zum Beispiel [mein Elternteil] da ist, dann habe ich unbedingt diesen Drang dazu, zu rauchen, da könnte ich ...die ganze Schachtel ausrauchen. Aber wenn [der Elternteil] zum Beispiel nicht da ist, dann .. muss ich jetzt nicht unbedingt eine nach der anderen rauchen. Das ist eben… diese Stresssituation ein bisschen. […] Dass es jetzt nicht in meiner Entscheidung liegt, ob ich rauchen kann oder nicht."
[708] German original: "I: […] bei der Anmeldung gab es eine Frage 'hattest du schon einmal Probleme?' und du hast

Even though this pathway illustrates a conflict between the general substance use position and a specific situation, Anna does not seem to experience this conflict, while Barbara does. Her strong craving may be interpreted as a manifestation of this conflict. Counter to what might be expected, both women rate the no-smoking space at home as associated with (rather) positive feelings, explaining that being unable to smoke is the only negative aspect in the relationship with their parents. 'Closeness' to their parents thus emerges as a stronger influence on their overall construal of the space (cf. the expectations contra cigarette use).

To summarise, parental opposition to smoking indirectly establishes the home as a no-smoking zone, while closeness to the parents establishes a felt need to meet this expectation. A general substance use position that attaches great importance to smoking means, however, that smoking continues in other settings or at other times. The ease with which these other settings can be accessed impacts on the perceived freedom of choice, which in turn, possibly in combination with place-based smoking associations, influences craving and defines whether the home as a space of no substance use is experienced more positively or more negatively. This suggests that perceived freedom of choice may be a necessary (or at least supporting) condition for daily smokers to construe spaces of no substance use positively.

12.4.4. Pathway 2: Smoking as an un/welcome distraction

The second example illustrates a pathway to spaces of no substance use (see section 11.4) in *work* contexts with *formal smoking bans*. It illustrates that formal bans are sufficient but not always seen as necessary conditions for situational abstinence, as other factors may also promote abstinence. The pathway summarises three streams from one participant ('Carina'):

- Stream 1: studying at the university
- Stream 2: working out at the fitness centre
- Stream 3: at work (catering)

Spaces related to these streams were formally elicited and rated in the repertory grid. Two spaces each were elicited for the university and the fitness centre, to represent study/work-out situations and break situations, respectively. For the workplace, only one space was elicited, as the breaks were perceived as intertwined with the work situation. While cigarettes were

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gesagt 'Ja, circa ein Mal im Monat'. […] also ich wollte nachfragen, kannst du ein Beispiel geben für Probleme? […] B: Naja, 'Probleme', zum Beispiel wenn ich am Wochenende frei habe und zu Hause bin und [mein Elternteil] auch zu Hause ist, dann kann ich nicht rauchen. Und da bin ich dann relativ schnell aggressiv, bekomme Wutausbrüche und beginne dann wirklich zu weinen, weil mich die Situation wirklich so nervt und ich bekomme dann Kopfschmerzen, sehr starke... und das sind halt eben die Probleme, wenn ich mal frei habe."

always used in the breaks, there was no substance use in the study/work-out/work situations themselves. This pathway focusses on the latter. Studying at university was considered to be rather important, working out at the fitness centre was seen as rather unimportant, and the work as not at all important. The university was associated with ambivalent feelings, the fitness centre with positive feelings, and the workplace with rather negative feelings. Based on additional data from the transcript, the following narrative was constructed to explore aspects promoting situational abstinence in work contexts (see Figure 31, p. 481).

General substance use position: Carina smokes circa 25 cigarettes daily and identifies strongly with being a "smoker". For her, smoking fulfils a range of functions: as a strategy to intensify pleasant feelings (e.g., when she is already completely relaxed), to cope with stress or take time out (e.g., in work contexts), or to address physical needs (e.g., withdrawal symptoms, hunger). Due to past experiences, she is very aware that smoking bothers other people, either because they do not want to be exposed to smoke or because they do not approve of smoking as such. This affects her decision-making relating to smoking.

Situation: This pathway examines three streams apparently in conflict with Carina's general position pro cigarette use (see also Figure 31). In Stream 1, Carina is studying in the reading room at the university, surrounded by many other students. In Stream 2, she is exercising on the machines at a fitness centre. In Stream 3, she is at work in the catering industry. The three situations have in common that they are all located indoors, with formal smoking bans in place, and that they emphasise mental or physical work.

A key influence in this pathway is how Carina assesses the main activity. As her studies are important to her, she must memorise the study contents, which translates into a perceived need to concentrate. Although the physical exercise itself is not as important (it is a possibility to take time out rather than to achieve an ideal body), she perceives a risk of injuring herself on the machines, which also necessitates a high degree of concentration. By contrast, her work is not at all important to her ("*they are kind of side jobs that I do not want to do forever, therefore it also doesn't interest me much*"[709]) and can be carried out even without full attention, hence she sees no great need to concentrate. Nevertheless, she feels under pressure at work and when studying, as she has to meet her supervisor's and her parents' expectations.

Interpreted space: On the 'relaxation' dimension, the reading room and the fitness centre (but not the workplace) are construed as requiring an active mind in terms of having to focus, while

[709] German original: "das sind jetzt so Nebenjobs, die ich jetzt nicht für immer machen will, deswegen interessiert es mich auch nicht so".

the perceived pressure to perform creates a feeling of stress in the reading room and at the workplace (but not in the fitness centre)[710]. The pressure to perform also affects the construal of the spaces on the 'freedom of choice' dimension, with the university and workplace construed as (rather) other-determined and the fitness centre as self-determined. In terms of 'substance use expectations', the quote below suggests that formal smoking bans contribute to expectations contra cigarette use at the workplace, but only in enclosed spaces:

> *No-one pays attention to it [the smoking ban] at our workplace… well, that is… actually, so, it's considered really by no-one at our workplace, the smoking ban, well- I mean, inside […] in the rooms we cannot smoke of course ((continues talking about smoking in the courtyard))*[711]

At the university and in the fitness centre, however, expectations contra cigarette use are not attributed to formal bans. Rather, they stem from other conditions (see below).

Mediating thoughts: A further influence on this pathway relates to cigarette smoking itself, specifically three of its characteristics as perceived by Carina: it creates smoke; it has physical effects; and it requires attention. These characteristics make smoking unattractive for Carina when she is studying at the university or working out at the fitness centre:

> *I would <u>not</u> necessarily smoke […] In the reading room when studying… I would forgo smoking there. It is not just because of the smoking ban but… when I'm studying, I can't smoke, that's not possible. […] I can't focus so-to-speak ((laughs a bit)) on two things at the same time then and […] it wouldn't make any sense for me when I'm studying. […] I prefer to concentrate really completely <u>on</u> the studying… and then I'll smoke later. And also it wouldn't be a pleasant situation if 50 people smoke in the reading room and 50 sit there… completely surrounded by fog and… that would also not be pleasant for the people.*[712]
>
> *[…] if I were allowed to smoke in the fitness centre, I would also not do it then. Exactly because of the other people, it would bother everyone after all… and secondly, I would also*

[710] See section 10.2.6 on the different facets of the aspect 'relaxation'.
[711] German original: "Das [Rauchverbot] beachtet niemand bei uns .. also, das ist .. eigentlich, also das beachtet wirklich niemand bei uns das Rauchverbot, also- ich meine, drinnen […] in den Zimmern können wir ja natürlich nicht rauchen ((spricht weiter über Rauchen im Innenhof))".
[712] German original: "B: Ich würde […] im Lesesaal beim Lernen <u>nicht</u> unbedingt rauchen .. da würde ich auf das Rauchen verzichten. Es ist nicht nur wegen dem Rauchverbot, sondern .. beim Lernen kann ich nicht rauchen, das geht nicht. […] Da kann ich mich nicht auf zwei Sachen gleichzeitig quasi konzentrieren ((lacht etwas)), und […] das würde für mich keinen Sinn machen beim Lernen. […] da konzentriere ich mich lieber wirklich komplett <u>auf's</u> Lernen ...und werde halt dann später rauchen. Und es wäre jetzt auch keine angenehme Situation, wenn jetzt 50 Leute im Lesesaal rauchen und 50 sitzen da .. komplett benebelt da, und... das wäre auch nicht angenehm für die Personen."

not do it because of my own person, because during training I gain nothing from it. I would be out of breath then and… wouldn't get ahead with the training.[713]

Smoking would thus impede Carina mentally or physically and interfere with her needs for an *active mind* and a *supportive physical environment*. Even though Carina smokes to cope with stress, if the stressful activity requires her full attention, she defers smoking until after the activity. This suggests that smoking does not "make any sense" to her in those situations also because it would not correspond to any of the functions she attributes to smoking (see general substance use position). In addition, the enclosed nature of the spaces, combined with a wish to avoid fog that would bother her or others (*physical pleasantness*), contributes to *expectations contra cigarette use*. Consequently, necessary conditions for smoking are not met, while multiple factors encourage situational abstinence. This leads Carina to argue that these factors would suffice to produce situational abstinence even in absence of a formal smoking ban.

The situation differs at work, where an activity that is stressful but does not require full attention (*stressed yet unengaged mind*) would not be impeded by smoking but prompts smoking as a distraction or a way to cope with stress. Consequently, Carina would smoke if it were allowed:

[…] For example, if I could smoke in this workplace, during the work, I would smoke. I am honest. […] I also used to work [in a café …] and there we were allowed to smoke.. during the work and there I did also smoke. […][714]

Hence, it is the formal smoking ban, in combination with an indoors setting, that establishes *expectations contra use*. These prompt the notion that smoking is not possible and are therefore sufficient to preclude use. In contrast to the university or the fitness centre, Carina does not seem concerned that cigarette smoke would bother anyone. This suggests that smoke may be evaluated differently (e.g., as contributing to a pleasant or an unpleasant environment) depending on the setting; the setting may consequently moderate whether the mechanism 'abstinence to avoid unpleasant smoke' (described earlier) occurs.

Outcomes: As a result of the above, Carina does not smoke when working but defers smoking until a break. However, while she has no desire to smoke in the reading room or in the fitness centre, this is not the case for her workplace. Consequently, the role of formal smoking bans

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[713] German original: "B: […] wenn ich im Fitnessstudio rauchen dürfte, dann würde ich es auch nicht machen. Eben wegen den anderen Leuten, das stört ja jeden ....und zweitens würde ich es auch wegen meiner eigenen Person nicht machen, weil beim Training bringt es mir nichts. Da bin ich dann außer Atem und .. komm mit dem Training nicht weiter."

[714] German original: "B: […] Wenn ich zum Beispiel in dieser Arbeit rauchen könnte, während der Arbeit, würde ich rauchen. Ich bin ehrlich. […] ich habe auch einmal [in einem Café …] gearbeitet, und da durften wir rauchen... während der Arbeit und da habe ich auch geraucht. […]".

to produce abstinence is assessed differently: as minor in the reading room and in the fitness centre but as decisive in the workplace. While the above analysis excluded the 'adjacent' breaks, the pathway affects their construal as well[715]. In all three cases, Carina smokes primarily to distract or to calm herself, so that the emphasis is on taking a break rather than on smoking as such. However, the high level of stress and lack of freedom of choice in the reading room and at the workplace mean that the breaks adjacent to those spaces are experienced as stressful, whereas the breaks by the fitness centre are not.

In conclusion, if smoking is seen as a distraction, then activities that (subjectively) require full attention can establish spaces that appear incongruent with smoking, even for daily smokers. Similarly, materialities in which smoking would create an unpleasant environment can establish such spaces. Such conditions suffice to produce a perception of voluntary and self-determined abstinence from cigarettes that does not rely on a formal ban. In such contexts, formal bans on smoking are de facto observed but not seen as the main reason for abstention. Moreover, situational abstinence is not seen negatively, as it allows the smoker to achieve another aim relevant to that space. Thus, although the situation may seem to be in conflict with a general position pro cigarette use, such a conflict is not experienced. Inherent to this mechanism is an anticipation that smoking would worsen the space on a personally important aspect, highlighting that *imagined* spaces may also shape substance use outcomes.

12.4.5. Pathway 3: Abstinence as an opportunity to achieve ideal self

The third example illustrates a pathway to *positively* construed spaces of no or only rare substance use (see section 11.4.1) in *leisure* contexts *without* formal bans on smoking or drinking. It is also an example of a pathway where *all factors support situational abstinence*, not least because the individual experiences additional benefits from situational abstinence. The pathway summarises two streams reported by one participant ('Dani'):

- Stream 1: watching TV series in the bedroom
- Stream 2: playing with her pet in the garden

The spaces referred to in these streams were formally elicited during the mapping exercise and rated in the repertory grid. No substance use was reported for the bedroom, and only rare

[715] The breaks by the university and by the fitness centre represent geographical displacement of smoking, as Carina must leave the building to be outdoors, and also temporal displacement, as Carina delays smoking until the activity requiring her concentration is completed. By contrast, the indoor/outdoor boundary at the workplace is perceived as permeable, so that Carina does not construe the breaks by the workplace as separate from the main work situation.

use of beer for the garden (which, however, was not discussed during the interview). Both spaces were construed as very important and associated with positive feelings. Dani even described the bedroom as a “perfect space”, highlighting its value to her. Based on additional data obtained from the transcript, the following narrative was constructed to help understand how these outcomes are produced (see Figure 32, p. 482).

General substance use position: Dani’s own varied experiences of smoking and drinking, together with divergent views expressed by her significant others (some pro, others contra substance use), contribute to a strong awareness regarding the potential social and health-related costs and benefits of substance use. This translates into an ambivalent smoking identity, in which Dani sees her ideal self as a non-smoker but continues to smoke in practice. To reconcile this discrepancy, she tries to smoke only rarely, which allows her to position herself closer to a non-smoker than to a daily smoker. She understands alcohol as a less risky but still potentially addictive and harmful substance. Therefore, she has defined for herself acceptable functions and contexts of smoking and drinking (to fit in when others are using; to facilitate interaction with others; to reward herself in party contexts after several months of studying; or to have fun with others) which are intended to minimise potential costs whilst still allowing her to enjoy the benefits of substance use. It is important to her that she smokes and drinks only when “everything is good”, so as to avoid use patterns that might be construed as more problematic.

Situation: This pathway examines two streams of no alcohol or cigarette use. Stream 1 in Figure 32 refers to a typical situation in Dani’s bedroom. It is night-time, after a long day, and she and her partner are sitting in bed, eating fruit whilst watching TV series. Through the open window, they can hear rain outside. Stream 2 refers to a typical situation in the garden. Dani is sitting at the garden table, drinking coffee with her relatives and playing with her pet. Both of these situations emerge from Dani’s personal interests, which include watching TV series as well as experiencing nature. They both refer to leisure contexts in which Dani sits and drinks or eats with people she has a close relationship to.

Interpreted space: As a result of the above, Dani feels close to the people, she appreciates the environment, the space represents a cosy form of get-together, and she is engaged in an activity she enjoys. A key difference between the two spaces lies in their orientation: she construes the situation in the garden as outward-oriented but perceives the situation in the bedroom as inward-oriented (although there is external stimulation from the TV, she is not actively communicating with anyone). Another potential difference lies in her level of relaxation. She does not reflect on this during the interview, but it can be inferred that her state of mind in the bedroom is likely both relaxed (“after a long day”) as well as active (“I usually watch series

[…] where you can learn something"[716]). Finally, the expectation (Dani's as well as that of the other people present) is that cigarettes will not be used. Dani specifically explains that she would not smoke with or in front of her relatives, and at another point in the interview, she implies that she would not smoke in front of her partner because he is a non-smoker.

Mediating events: In principle, the expectations contra cigarette use would be sufficient to preclude any cigarette use. However, as Dani does not mention such expectations in relation to the bedroom or in relation to alcohol use, this model asserts that it is rather the *lack* of expectations *pro* substance use, in combination with additional factors, that supports situational abstinence.

To start with, necessary conditions for substance use are not met, as neither situation corresponds to the acceptable functions or contexts for smoking or drinking that Dani has defined for herself. Neither her relatives nor her partner are smoking or drinking in these situations, thereby *not establishing expectations pro substance use*, so there is no need for Dani to smoke or drink to fit in. Substance use as a means to facilitate interaction with people is also not necessary because both situations focus on other activities (watching TV or playing with her pet) rather than social interaction. In other words, her *inward-orientation* in the bedroom is sufficient to preclude any substance use, and while she is *outwardly oriented* in the garden, this is directed at her pet and nature rather than her relatives. It can also be argued that the TV, coffee or the pet already help to facilitate the social interaction (hence alcohol or cigarettes are not needed). Lastly, these *cosy get-togethers* do not represent the party contexts during which Dani would reward herself for an intense study period. In other words, Dani's general substance use position translates into necessary or supporting socio-spatial conditions for substance use, such as expectations pro substance use, outward orientation directed toward other people, or party contexts, which are not met in this case.

The only possible function of substance use (in line with those expressed by Dani) would be to increase the sense of fun and enjoyment. However, based on Dani's description of the spaces (e.g., referring to the bedroom as a "perfect space"), it can be argued that Dani's need for *enjoyment* has already been met, making a further increase through substance use unnecessary (but see Pathway 5 for a contrasting narrative). In addition, due to her personal interest in the activities and her construal of watching TV as a "learning" opportunity, she is likely to want to focus on those activities (*active mind* as a hindering factor) rather than being distracted by substance use (see also Pathway 2).

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[716] Original: "ich schau meistens Serien die halt irgendwo- ja halt auch was, wo man ein bisschen was lernt".

Finally, the descriptions of the two spaces ("fruit" in the bedroom; "fresh air" in the garden) suggest that these spaces are construed as *healthy environments*. During the interview, Dani repeatedly shows concern for her health. Her hypothetical ideal space features no cigarette use and mostly only rare alcohol use, which she explains afterwards as follows:

> *I like beer, and I like cigarettes, but ideally I know that of course, if I were entirely without that, I'd be better off*[717]

A key mediator in both streams may therefore be that the situations present Dani with an opportunity to achieve her ideal healthy and non-substance-using self. It could hence be hypothesised that the lack of expectations pro substance use offers her relief, as it means that Dani does not have to worry about using substances and their negative consequences.

Outcomes: Even though the necessary condition "everything is good" (as defined by Dani) is met in these situations, this does not translate into regular substance use (i.e., it is a necessary but not a sufficient condition). Instead, the food and drink consumed are healthy options (fruit) or at least not construed as harmful during the interview (coffee). Moreover, Dani does not report any craving for alcohol or cigarettes for these situations (although she does so for other situations discussed in the interview, such as when she sees others use substances).

In this case, socio-spatial arrangements that speak to the person's personal interests without creating expectations pro substance use, together with a general substance use position that is ambivalent about use, create spaces of no or only rare substance use which are construed as extremely positive. It is important to note, however, that this participant did not hold strong views pro substance use; this allowed her to abstain from substance use without experiencing this as stressful or potentially causing conflict.

12.4.6. Pathway 4: Drinking wine as a cultural necessity

While the pathways so far focussed on spaces of no substance use, the following pathways explore spaces associated with regular use. The first of these pathways highlights positively construed spaces associated with drinking wine (see section 11.5.1), where the use is framed as *drinking in moderation* and includes *family* contexts. This pathway also illustrates how a seemingly simple *cultural* rule to drink wine translates into complex socio-spatial arrangements

[717] German original: "ich mag Bier, und ich mag Zigaretten, aber idealerweise weiß ich, dass natürlich, wenn ich ganz ohne dem wäre, besser dran wäre".

to take effect. Furthermore, it is an example where *all factors support situational substance use*. The pathway summarises three streams reported by one participant ('Ela'):

- Stream 1: family meal at home in Vienna
- Stream 2: visiting extended family in the country of origin
- Stream 3: mountain holiday in Austria

Spaces related to Streams 1 and 2 were formally elicited and rated during the interview, while the mountain holidays in Austria were not formally elicited but emerged in the narrative interview parts. The family meal at home in Vienna (Stream 1) was construed as very important and associated with positive feelings, occasional wine use and rare use of sparkling wine (though wine use in the specific situation of Stream 1 was more frequent, see below). Visiting family in the country of origin (Stream 2) was construed as rather important and associated with rather positive feelings, and with always drinking wine. No other substance use was reported for these spaces. Based on additional data from the transcript, the following narrative was constructed to help explore the socio-spatial implementation of cultural rules as well as circumstances that may promote regular drinking with the family (see Figure 33, p. 483).

"Culture": The starting point to this pathway is Ela's country of origin which assigns great cultural importance to wine, which in turn translates into a cultural rule linking wine use to meals. In fact, it is the first thing Ela mentions in the interview:

> *I: [...] what, would you say.. do you consume most often [and why, for what reason]?*
> *P: Er, wine […] Generally speaking, firstly because of the culture. Among [people from my country of origin] there is wine with every meal, actually.*[718]

General substance use position: Ela's cultural background, coupled with the fact that she also likes the taste of wine, establishes a clear preference for wine, to the extent that she will drink wine even if her friends are drinking something else. However, negative experiences after drinking too much in the past (e.g., feeling sick) mean that Ela is now mindful to stay within her personally defined limit of one bottle of wine per drinking occasion, so as to avoid diminishing her enjoyment through negative experiences. Reflecting on her substance use at the end of the interview, she highlights that feeling at ease in the company she is in ("Wohlfühlen") is an important necessary (but not sufficient) condition for her drinking.

[718] German original: "I: [...] was, würdest du sagen... konsumierst du am öftesten? B: Äh, Wein. I: Und, also ich hab jetzt eine Frage, warum, aus welchem Grund Wein? B: Generell, erstens wegen der Kultur. Es gibt unter [Menschen aus ihrem Herkunftsland] eigentlich zu jedem Essen Wein".

Situation: This pathway is based on three streams in which cultural influences shape the substance use outcomes. Stream 1 in Figure 33 refers to a typical situation at Ela's home in Vienna, where she is having a meal with her family and visitors to the family. Stream 2 refers to Ela visiting her extended family in the mountains in her country of origin. Though she does not describe the situation in detail, it appears to refer to having a meal with the extended family and concluding the day in the evening. Though the settings differ, the situations are similar in that they both refer to meal-times with family and people from Ela's country of origin in a context of visiting each other. Stream 3 refers to hiking with a friend in the mountains in Austria. Although set in Austria, it is similar to Stream 2 in that it refers to drinking wine to conclude the day in a mountain setting. It differs from Streams 1 and 2 in that the cultural background of her friend does not seem to play a role (it was not described at the interview). Nevertheless, 'culture' defines this situation due to it being set in Austria, as is shown below.

Interpreted space: Even though the situations differ, Ela construes the spaces similarly. Her positive stance toward her family, together with her preference for home settings where it is cosier and where she can feel at ease more readily, leads to a construal of the spaces in Stream 1 and Stream 2 as representing closeness to people, cosy get-togethers and as not requiring self-restraint. Similarly, in Stream 3, being with a friend after a day of hiking is likely to contribute to feelings of closeness and cosiness.

With regard to substance use expectations, although the initial formulation of a cultural rule "wine with every meal" suggests that such expectations would be in favour of drinking wine in any situation in which people from her country of origin share a meal (interaction of specific people present and specific activity), Ela later qualifies this statement:

> *I: ok and then at home with- with the family? […how often do you drink] wine [there]?*
> *P: […] Well, in everyday life, with- if it's <u>just</u> us, we don't drink wine every day but if- if you have visitors, then you <u>get</u> wine, that's…. part of it*[719]

Therefore, the substance use expectations pro wine in these contexts depend also upon the construal of the spaces as representing special occasions (cf. "everyday life") that are outward oriented ("have visitors", cf. "just us") – which is the case for all streams in this pathway. However, Stream 3 shows that the presence of people representing her own culture is not actually a requirement. For Stream 3, rather than commenting on the cultural background of

[719] German original: "I: ok und dann zuhause bei der- mit der Familie? […wie oft trinkst du da] Wein? B: […] So jetzt im Alltag, mit- <u>nur</u> unter uns, trinken wir jetzt nicht jeden Tag Wein, aber so- wenn man Besuch hat, <u>kriegt</u> man Wein, das ...gehört dazu".

her friend, Ela explicitly describes Austria as resembling her country of origin in that wine is ubiquitously available, which establishes expectations pro wine use in this setting.

Another aspect that contributes to feelings of cosiness as well as to expectations pro substance use is the open-ended sense of time which emerges from the notion of "concluding the day":

> *Actually I've never drunk so much in the mountains, just … you enjoy it, after the day as a kind of… close… to conclude the day*[720]

Mediating events: The correspondence of the cultural rule "wine with every meal" and the socio-spatial arrangements (*people present, activity, special occasion, outward orientation*) results in *shared expectations pro substance use*, which in turn lead to Ela being "given" wine. Expectations pro substance use are, however, not sufficient to result in use. The experienced *closeness to people, cosiness, limited need for self-restraint* and *open-ended sense of time* establish that sense of "feeling at ease" which Ela regards as a necessary condition for her drinking. Finally, her preference for wine can be seen as the third necessary condition in this pathway, as it likely contributes to Ela accepting the offer as an "opportunity":

> *I: […] then, the situation in the mountains? How often do you drink wine there?*
> *P: […] in [country of origin], when I am in… the mountains, then you get to do it more often, I mean you don't drink much but… you just get wine [with the meal], … yes […] actually you drink there every day ((laughs)) […] So you get… the opportunity every day so to speak*[721]

Outcomes: Despite differences in setting, the same mechanisms operate in Streams 1 (family meal at home in Vienna) and 2 (visiting extended family in country of origin) to result in regular use of wine with the family, in quantities construed as small. A comparison with other streams reported by Ela in relation to drinking with her friends (not discussed here) highlights, however, that these mechanisms (e.g., cultural justification, special occasion) are necessary to produce drinking with the family, but they are not necessary when drinking with friends.

Furthermore, although Ela does not reflect on this in the interview, the consideration of Stream 3 (mountain holiday in Austria) suggests that, through Streams 1 and 2, Ela has established an association between 'being in the mountains' and 'drinking wine as a cultural practice', which leads her to drink wine in ways that resemble her drinking in Stream 2 (small quantities

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[720] German original: "B: eigentlich in den Bergen hab ich noch nie soviel getrunken, einfach... man genießt es, nach dem Tag so als... Ausklang.. um den Tag ausklingen zu lassen".
[721] German original: "I: [...] dann die Situation bei den Bergen? Wie oft trinkst du dort Wein? B: [...] in [Herkunftsland], wenn ich in... den Bergen bin, dann kommt man öfters dazu, also man trinkt nicht viel, aber ...man kriegt einfach Wein [zum Essen], ... ja [...] eigentlich trinkt man täglich dort (was) ((lacht)) [...] also man bekommt jeden Tag ... die Gelegenheit quasi".

to conclude the day) even if the context only partially resembles the situation in Stream 2. In absence of being "among [people from her country of origin]" (a key part of the cultural rule stated at the beginning), Ela still establishes cultural significance of drinking in Stream 3 by referring to the wider drinking culture in Austria. This suggests that Ela's understanding of drinking as a cultural practice shapes the way she interprets a range of everyday spaces.

To conclude, this model asserts that similarity in drinking outcomes despite different settings or different socio-spatial arrangements is achieved *by construing the spaces similarly*, which in turn is facilitated by established ways of interpreting spaces (e.g., a cultural lens).

12.4.7. Pathway 5: Smoking as lived memories and routines

This pathway illustrates positively construed smoking spaces (see section 11.5.2). It is an example where, despite quit attempts, *all factors support substance use*, though the substance use serves different functions. It adds to Pathway 4 by highlighting more explicitly how streams developed in one context may, through *memories and routines*, influence streams in other contexts. The pathway summarises three streams reported by one participant ('Flora'):

- Stream 1: smoking near the former school
- Stream 2: smoking near the university (day-time)
- Stream 3: smoking near the university (evening)

The two spaces related to Streams 2 and 3 were elicited and rated as a single space in the repertory grid, with Stream 3 given greater emphasis. The space near Flora's former school was also formally elicited. It was construed as neither important nor unimportant, while the spaces near the university were regarded as very important. All were associated with positive feelings and with always smoking cigarettes (but no other substance use). Flora's most recent relapse event was by the university, highlighting the importance of this setting for her smoking. Based on additional data from the transcript, the following narrative was constructed to explore different situations representing smoking near educational settings (see Figure 34, p. 484).

General substance use position: Flora smokes circa 10 cigarettes daily but has conflicting experiences of smoking and thus ambivalent views on smoking. Although she occasionally refers to "habit" to explain her smoking, she also describes intentional use, such as here:

> *Only when everything is somehow done, when I have had a wonderful … hour of studying, or <u>two</u> hours of studying, then I think to myself, "well, now I can treat myself to one*

[cigarette]" […] as a beautiful reward.[722]

Flora sees the following key functions of smoking for herself: to intensify feelings of relaxation and enjoyment; to reward herself after studying; and to give her hands something to do. During the interview, she realises that she generally smokes only when she is already relaxed, hence establishing "feeling relaxed" as a necessary condition for smoking.

Situation: This pathway examines three current streams of smoking near educational settings. Stream 1 in Figure 34 refers to a typical situation near Flora's former secondary school, which emerges from a past smoking stream. As pupils, Flora and her friends smoked in a sheltered location near the school during breaks. Now, she and her friends stop at the former smoking spot when walking past to reminisce about their schooldays, but only in the evenings so as to avoid contact with the teachers. Stream 2 refers to a typical day-time situation of smoking by the university, during a study break or before/after a lecture, alone or with friends. By contrast, Stream 3 refers to a typical evening routine behind the university, when Flora concludes her study day. Flora appreciates that she can be by herself, as the other students have left by this point. Flora attributes the streams by the university to a past stream of smoking by another university building. Thus, the current streams explicitly represent *routines* that relate to *memories* of past smoking streams in the same or similar settings.

Interpreted space: The spaces are highly routinised, as they are "always" like that, with a long history of existence, and routinised at a detailed level (see quotes below). This lack of changeability, together with being based on past streams involving cigarette use, establishes strong expectations pro cigarette use. However, differences between the socio-spatial arrangements (e.g., in terms of activity and people present) affect how Flora construes the spaces. Smoking by the former school is characterised most by feelings of togetherness and closeness, as the friends joke about their shared past:

Well, I would <u>not</u> do it [stop at the school] alone, if [I do it] then just with friends, because alone… it doesn't really matter, but if we are together then we can always make jokes, about how the time at school was in the past or all that we did on this spot ((chuckling))[723]

By contrast, smoking alone by the university in the evening is characterised more by relaxation, a low need for self-restraint, and enjoyment (see also the earlier quote on smoking as reward):

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[722] Original: "Erst wenn alles irgendwie fertig ist, wenn ich eine wunderschöne ...Lernstunde gehabt habe, oder <u>zwei</u> Lernstunden, dann denke ich mir so, 'ah, jetzt kann ich mir eine gönnen'. […] Als wunderschöne Belohnung".
[723] Original: "B: Alleine würde ich das halt <u>nicht</u> machen, wenn dann nur mit Freunden, weil alleine... ist es so relativ egal, aber wenn wir zusammen sind können wir dann immer wieder Späße machen, wie die Schulzeit früher war oder was wir alles an diesem Platz gemacht haben ((schmunzelnd))".

Sometimes I'm here [at the university] until the evening… then I just manage to go quickly to the [supermarket] before it closes, get a bread roll and then I sit, usually alone… there, because most [students] have already gone home. And then it feels somehow more liberated. When there are not strangers everywhere […] In the café and in the bar, there.. you have to- ok, it's not as if I'm a mad person who can't control herself but… here [in the evening at the university] I feel calmer. […it] feels more relaxed.[724]

Smoking in front of the university during the day (Stream 2) emerges as a hybrid of the two other spaces, as it is sometimes shared with friends but also serves as a break from studying:

I: How is it with your breaks [at university], are you rather alone or with other people then? P: Fifty-fifty, actually. I am… half of the time I'm alone but… for the other half, I tell…. a few of the friends to come with for studying, [that] they mustn't be lazy ((laughs)). Then we study together and take a break together.[725]

Mediating events: The static nature of the spaces with their embeddedness in wider routines (i.e., of meeting friends or going to the university) (*low changeability*), together with the positive construal on other dimensions (i.e., *togetherness* and *closeness* or *low self-restraint*, *relaxation* and *enjoyment*), prompts Flora to follow her established routines. At the same time, *low changeability*, in combination with *expectations pro cigarette use*, creates and perpetuates the role of smoking as part of these routines. It could hence be argued that the expectations pro substance use are neither a key dimension here nor a sufficient condition for use: they work only in combination with the low changeability of the routines from which they stem.

The function of smoking appears to differ as a result of the differences in construal. By the university, *relaxation* and *enjoyment* stem also from a feeling of achievement and translate into smoking in line with the functions described by Flora: to intensify an already relaxed state and to reward herself for studying. By contrast, the function of smoking by the former school is unclear[726]. In fact, the repertory grid excepted, Flora does *not* mention smoking in the situation by her former school, other than in relation to the *past* (i.e., that they used to smoke there).

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[724] German original: "B: manchmal bin ich bis am Abend da .. da gehe ich gerade noch schnell zum [Supermarkt], bevor er schließt, hole mir eine Semmel und sitze meistens dann alleine .. dort, weil die meisten sind schon heimgegangen. Und da fühlt es sich irgendwie befreiter an. Wenn nicht überall fremde Leute sind […]... Im Café und in der Bar, da... muss man sich- okay, es ist nicht so, als ob ich eine Verrückte bin, die sich nicht kontrollieren kann, aber... da bin ich gelassener. […es] fühlt sich entspannter an".

[725] German original: "I: wie ist das bei deinen Pausen, bist du da eher alleine oder bist du mit anderen Leuten? B: Fifty-fifty eigentlich. Ich bin .. die eine Hälfte bin ich alleine, aber .. bei der anderen Hälfte, da sag ich .. paar von den Freunden, sie sollen mitkommen zum Lernen, sie sollen nicht faul sein. ((lacht etwas)) (Da) lernen wir zusammen und machen gemeinsam Pause."

[726] This was not discussed during the interview and this part of the analysis is therefore based also on speculation. Dimensions such as 'togetherness' and 'closeness' suggest a social function, but this does not match the functions described by Flora and there is no statement from Flora to support this.

This suggests that although smoking had an important function in the past, this function (or Flora's perception thereof) has since changed and is no longer important to her.

Outcomes: Although Flora smokes near her former school as well as by the university, the correspondence of the university spaces with the key functions of smoking described by Flora means that smoking is much more personally important to her in the university setting. As a result, she does not stop to smoke by the school when she is by herself (only with her friends) but smokes always by the university (regardless of whether she is alone or not). In other words, in absence of a personal reason to smoke, 'being with friends' is a necessary condition for smoking by the school, but it is not a necessary condition by the university. In fact, Flora perceives a strong association between university settings and smoking, which makes it difficult for her to resist smoking, even after a longer period of abstinence:

> *P: Last summer, I had stopped [smoking] for… two months and I thought, "Hallelujah, now [I'll] never [smoke] again". But immediately when the term started, I think… on the second day or on the first day when I was here, I went to the newsagent's [to buy cigarettes] ((mumbling)) and that was a big mistake. ((quickly, embarrassed?))*
> *I: OK and what … triggered that? Or what- how, what happened?*
> *P: I guess, habit. […] That's it, I think. Because I didn't really feel the need to smoke, but… [… my department used to be in a different building] … and there was- I always smoked one in front of [it]. And probably therefore also here. Because I didn't really feel the need to smoke.. so, hands didn't shake, I just thought "I'm standing in front of a university, …well,.. I really fancy a cigarette now", and yes, since then I have been smoking again.*
> *I: Ok, that means, your …habit is that you come to the uni and then you smoke one before you go in?*
> *P: Yes… or when the class is over, or …*[727]

Flora attributes this association to a past habit of smoking by another university building. However, given the commonality of school and university as educational settings, it could be argued that the association of smoking and university was formed earlier than Flora realises. An additional analysis of the past stream 'smoking in the school breaks' (not shown in Figure 34) found that it was very similar to the current stream of day-time smoking by the university.

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[727] German original: "B: letzten Sommer habe ich für ...zwei Monate aufgehört und habe gedacht "Halleluja, jetzt nie wieder". Aber gleich wo die Uni begonnen hat, ich glaube ...am zweiten Tag oder am ersten Tag wo ich hier war, bin ich (zur Trafik gegangen) und das war ein großer Fehler. ((schnell, beschämt)) I: Okay, und was war der... Auslöser da? Oder was- warum, was ist da passiert? B: Ich schätze mal, Gewohnheit. […] Das, glaube ich, ist es. Weil ich hatte nicht wirklich das Verlangen jetzt, zu rauchen, aber .. [… mein Institut war davor in einem anderen Universitätsgebäude] und dort war- habe ich immer [davor] eine geraucht. Und deshalb wahrscheinlich auch hier. Weil ich hatte nicht wirklich das Verlangen .. Also Hände haben nicht gezittert, ich habe mir nur gedacht 'Ich stehe vor einer Uni,.. mah, ...eine Zigarette wäre es' und ja, seitdem rauche ich wieder I: Okay, das heißt, deine ...Gewohnheit ist, dass du zur Uni kommst und dann bevor du rein gehst, eine rauchst? B: Ja …Oder wenn der Unterricht vorbei ist, oder ...".

Moreover, the construal of smoking as a way to self-reward and elevate relaxation may have developed during those smoking sessions in the school breaks. That past stream may thus be understood as the source of all current streams of smoking near educational settings. Although Flora does not reflect on this in the interview, it could be hypothesised that her friends played a role to develop a routine of smoking near educational settings, but that, through repetition and transference to new contexts, the setting has now taken on the role of those friends, 'prompting' Flora to smoke.

To conclude, this model asserts that a routine formed in a specific context (e.g., a school) may, through the development of associations between certain socio-spatial arrangements and substance use, be transferred to other contexts that resemble the initial context in some way (e.g., educational settings in general). However, the initial function of substance use may be transformed and lost in the process, especially if the initial and the new context are construed differently on key aspects due to different socio-spatial arrangements. These processes may leave substance users with only a vague or conflicted understanding regarding the reasons for (and function of) their substance use and compel them to attribute their use merely to "habit".

12.4.8. Pathway 6: Changing one's substance use position to overcome ambivalence

The sixth example differs from the others, as it illustrates how socio-spatial arrangements can encourage practices not in line with a person's general substance position *and thereby also affect this position*. It also highlights how peer pressure can be interpreted differently as either an opportunity or an obligation. The pathway summarises two streams reported by one participant ('Gabi'), representing alcohol or cigarette use, respectively:

- Stream 1: drinking beer with 'the boys' in a restaurant
- Stream 2: smoking cigarettes with a female relative in a café

Gabi focussed on these streams in her final interview reflections. The space in Stream 2 was formally elicited and rated in the repertory grid. It represented a space of cigarette use and positive feelings (see section 11.5.2), as Gabi reported never drinking alcohol but always using cigarettes. By contrast, the space in Stream 1 was associated primarily with alcohol (see section 11.5.1), as Gabi spoke of regular beer use and implied that cigarettes were never used. This space was not formally elicited or rated during the interview, which included a related gathering with the same friends at her home instead (see 'situation' below). The formally elicited spaces were construed as rather important and associated with positive feelings.

Based on additional data from the transcript, the following narrative was constructed to explore and contrast alcohol use and cigarette use in contexts of ambivalence (see Figure 35, p. 485).

Initial substance use position: The two streams begin in their respective pasts, when Gabi still holds a different position on substance use. With regard to alcohol, Gabi's lack of tolerance for carbonic acid means that beer is not her alcoholic beverage of choice at that time. In fact, she has never yet drunk beer. With regard to cigarettes, Gabi used to smoke more frequently but a recent turn contra smoking in her social circle prompts a greater awareness regarding smoking-related health risks and the notion that her partner would disapprove of her smoking. However, she has established enjoyable smoking routines and perceives herself as someone with high self-control, so she decides to continue smoking but limit her use to key routines (e.g., with a female relative), thereby also hiding her cigarette use from her partner.

Situation: This pathway examines streams in conflict with the initial substance use position. Stream 1 refers to an evening routine: first, Gabi's closest friends meet up at her home, in part to pre-load alcohol ("Vorglühen"), and then they always go out for a restaurant meal (the space in Stream 1). Although the group includes women, Gabi construes it as mostly male, referring to it at one point as "the boys" ("die Burschen"). Importantly, these friends all drink beer, which results in consecutive beer ordering by the group as follows:

> *And there it's often… one person says, "a beer please", and then all say, "three", "four", "five", going round.*[728]

By contrast, Stream 2 refers to meeting up with a favourite female relative in a café. No pivotal moment relating to substance use is reported here; however, Gabi remarks that they purposefully choose a café that allows indoor smoking[729]. Both situations are part of Gabi's weekly routine of meeting friends or family in café/restaurant settings.

Interpreted space: Gabi construes both of these spaces as representing expectations pro substance use as well as closeness to people, togetherness, outward orientation (i.e., toward social interaction) and enjoyment. This construal emerges in part from the situations themselves, but it is also a result of her substance use position (e.g., enjoyment of smoking) as well as the further events that occur in those situations (see 'mediating events' in Figure 35). For example, Gabi experiences substance use in these contexts as pleasant and fun, which also leads to the spaces being associated with enjoyment (although health concerns,

[728] German original: "Und da ist es halt meistens, ... sagt einer "Bitte ein Bier" und alle sagen "drei", "vier", "fünf" dann (in der) Runde."
[729] Smoking in cafés was still legal in Austria at the time of conducting the fieldwork in 2017/2018.

coupled with the view that cigarettes are more dangerous than alcohol, diminish her enjoyment of smoking spaces somewhat compared with spaces of alcohol use).

An interesting aspect in this pathway is 'freedom of choice', as both spaces are construed as self-determined *and* other-determined. The space with her relative is self-determined insofar that Gabi enjoys smoking in the company of others and looks forward to the meet-ups with her relative as a kind of rare treat. Counter to what might be expected, the space with the boys is also construed as self-determined insofar that Gabi finds she *wants* to drink a beer:

> *Of course I could say, I don't have to drink something and I could also order a juice but … for some reason.. then I also feel like having a beer anyway and then I also order a beer.*[730]

Nevertheless, the space with the boys is also other-determined insofar that Gabi does not actually tolerate beer and orders it because of the others. With regard to cigarettes, Gabi does not mention this aspect to begin with, but as the interview unfolds, she increasingly emphasises that her continued smoking is also due to her not wanting to tell her relative that she has quit smoking. Reflecting on both situations at the end of the interview, Gabi comments:

> *I think maybe that is also important to mention, that I don't do either [smoking or drinking] because I'm being pressured or coerced into it but … nevertheless with an ulterior motive somewhere… that doesn't come a hundred percent from me, but has admittedly to do a bit with… coping with confrontation ((chuckling)) or let's say everything that somehow avoids all of this, I don't want to have a confrontation, I don't want to explain why I am not [using], why I am [using], I just want to… be able to do what I want.*[731]

Mediating events: The mediating events in this particular pathway, albeit displayed in a linear fashion, show what happens *before, during and after* Gabi's own substance use, in an attempt to reconstruct not only why Gabi acts at odds with her initial substance use position but also how the repeated experience of these situations affects her substance use position over time.

In the situation with the boys, as shown above, Gabi develops a desire to order beer when the others order it. However, she also qualifies it as a "matter of fitting in" ("Anpassungsding"), as it is easiest to order whatever everybody else is ordering: not only does it mean that she does

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[730] German original: "ich könnte natürlich sagen, ich muss nicht irgendwas trinken und ich könnte auch einen Saft bestellen, aber ....aus irgendeinem Grund ...habe ich dann trotzdem auch Lust auf ein Bier und dann bestelle ich auch ein Bier."

[731] German original: "Ich glaube, das ist vielleicht auch wichtig zu erwähnen, dass ich beides nicht auf Druck oder aus Zwang mache, aber ..trotzdem (mit einem) Hintergedanken irgendwo, ...der nicht hundert Prozent von mir stammt, sondern schon noch ein wenig mit .. Konfrontationsbewältigung ((schmunzelnd)) oder halt alles was, irgendwie dem ganzen aus dem Weg geht, ich möchte keine Konfrontation haben, ich möchte nicht erklären, wieso ich nicht, wieso ich schon, ich möchte einfach ...machen können, was ich will."

not have to justify her decision to the others, but it also saves her having to make a choice about *what* to drink. Therefore, she also orders beer. As a result, she experiences the benefits of beer-drinking, to the extent that they outweigh her intolerance to carbonic acid:

> *A beer is tasty, I'm sitting together with my friends, I can drink beer with anyone … and then afterwards I am, I don't know, slightly drunk ((laughs)) I mean, a little bit tipsy.*[732] *[…]*
> *I had never before drunk beer in my life, I can't tolerate carbonic acid and all that, ..but then I started drinking beer because- and… now it is pleasant anyway and I like beer a lot now.*[733]

Beer is subsequently understood as integral to the *enjoyment* of the space, so that not using it would now feel like a loss, establishing personal *expectations pro beer use*. Importantly, this enjoyment is untarnished, as Gabi experiences beer as a socially accepted, rewarding and relatively harmless product, as long as the use is under control.

Although the situation with the relative is similar, it differs in important ways. Gabi looks forward to smoking with her relative, but she *cannot enjoy* the space as much: the knowledge that her partner would not approve of her smoking and of smoking-related health risks leads to a bad conscience. Yet the *closeness* to her relative increases her need to "fit in". Rather than smoking purely out of enjoyment, she now smokes to avoid an unpleasant situation with her relative (e.g., having to explain abstinence). Through these processes, Gabi increasingly construes the choice to drink beer as her own but the choice to smoke cigarettes as *not* her own (shifting 'freedom of choice' toward being more *self-determined* versus more *other-determined*).

Effects on general substance use position: In both cases, expectations pro substance use, in combination with a belief that it is important to meet expectations, are sufficient to produce substance use. However, Gabi now understands beer as far less risky, yet much more socially accepted and rewarding than cigarettes. Moreover, she construes beer drinking as important for her emotional well-being but reframes cigarettes as "not necessary". As a result, her initial substance use position changes: beer is now her preferred alcoholic beverage and more preferred than cigarettes. It is important to note that Gabi becomes fully aware of these changes (or develops these notions of change) only *during* the interview carried out for this study, while she reflects on difference between beer and cigarettes. This culminates in a complete renunciation of cigarettes after one interview hour:

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[732] German original: "Ein Bier ist lecker, ich sitze mit meinen Leuten zusammen, ich kann mit jedem Bier trinken ....und ich bin dann nachher, ich weiß nicht, leicht betrunken ((lacht)) ganz wenig beduselt halt."
[733] German original: "ich habe davor in meinem Leben noch nie Bier getrunken, ich vertrage keine Kohlensäure und alles, ..aber ich habe dann angefangen Bier zu trinken weil- und .. jetzt ist es eh angenehm und ich mag jetzt Bier ur gerne".

[…] if one talks about it for a longer period of time, I start to think, I think I would really like to quit, entirely, if I'm honest, when I talk about it for a longer period of time[734]

To summarise, this model suggests that for a person who attaches importance to meeting social expectations, the repeated experience of drinking beer, supported by (what is perceived as) an overwhelmingly positive construal of beer by significant others and society in general, contributes to an understanding of beer as unequivocally positive, making it easy to construe beer drinking as one's own choice. The initial ambivalence between a general position opposed to beer and the (situational) expectation to drink beer is thus resolved by adjusting the personal preferences in favour of beer. Due to the positive construal of beer, this process is seen as relatively unproblematic.

By contrast, the repeated experience of smoking, amidst conflicting viewpoints on cigarettes, contributes to an increasingly ambivalent construal of cigarettes and finally to a renunciation of cigarette use as other-determined. The initially established position of a (self-determined) "occasional smoker" is brought into question, replaced by a (ostensibly) decreased preference for cigarettes and a greater felt need to elaborately justify to oneself (and the interviewer) any remaining cigarette use. This suggests that the construal of substance use spaces as representing 'freedom of choice' and 'enjoyment' may be a key necessary condition to develop and maintain a strong position pro substance use over time (and when questioned about it).

12.4.9. Pathway 7: Drinking to excess as a means of escape

While the previous pathways explored spaces construed as representing no substance use or use in moderation, the final pathway focusses on spaces construed as representing excessive substance use. It thus complements Pathway 6 in that it presents a different account of a 'night out', and it aligns most closely with the focus on *excessive substance use in night-time environments* that characterises some of the literature on socio-spatial aspects of substance use. This pathway focuses on two streams reported by one participant ('Helena')[735]:

- Stream 1: taking the subway to a bar or nightclub
- Stream 2: going out in a bar area

[734] German original: "[…] wenn man so länger drüber redet, denke ich mir schon, ich würde am liebsten, glaube ich, aufhören, ganz, wenn ich ehrlich bin, wenn ich so länger drüber rede".
[735] 'Going out' was a recurring theme in this interview and the qualitative content analysis identified several related streams. This pathway focuses on two streams which were also formally represented on Helena's map, but integrates additional streams where appropriate to allow a more complete understanding.

The spaces representing these streams were formally elicited and rated in the repertory grid. The space in the subway was rated as neither important nor unimportant and associated with rather positive feelings, while the space in the bar area was rated as rather important and associated with positive feelings. The situation in the subway was most strongly associated with spirits and mixed drinks use (see section 11.5.1), as Helena reported no cigarette use, rare use of wine, occasional use of beer, but frequent use of spirits or mixed drinks. By contrast, the bar area was associated more with beer and cigarettes, as Helena reported occasional use of wine, spirits or mixed drinks but always using beer and cigarettes (see section 11.5.3). Based on additional data from the transcript, the following narrative was constructed to explore the various spaces comprising a 'night out' and example circumstances under which substance use may exceed one's personal limits (see Figure 36, p. 486, and Figure 37, p. 487).

General substance use position: Helena smokes circa 15 cigarettes daily and drinks up to 10 pints (half litres) of beer per drinking session on a weekly basis. She perceives her smoking as problematic, insofar that she smokes many cigarettes because she "needs" them (rather than because she enjoys them) and has so far not managed to reduce her use. By contrast, she perceives her drinking as not problematic because she has successfully addressed a more problematic pattern of alcohol use in the past. Nevertheless, Helena concludes at the end of the interview that she would in fact prefer to stop drinking after five pints of beer. To maintain control and avoid negative effects (e.g., on her studies), she has defined acceptable drinking contexts and limits for herself: only from Thursday onwards ("at the weekend or pre-weekend"), in the company of others and when going out, preferably beer (due to negative experiences with wine or spirits in the past) and only enough to feel "slightly tipsy". In her hypothetical ideal space, she would never drink spirits or mixed drinks, as she prefers to drink for relaxation:

> *[…] for me, that [drinking spirits or mixed drinks] isn't- that is… no relaxation for me when I drink something like that. So, I rather drink such ((stuttering)) hard alcohol only when I want to be really drunk.. so when I want to go out, I mean, want to really go out dancing, then I drink that.. because my friends drink it. […]*[736]

Thus, Helena seems conflicted about not drinking "too much" and avoiding spirits, as she perceives them as something she does because of her friends yet also as integral to a 'proper' night out. This conflict likely arises from the fact that, despite setting limits, Helena does like partying and uses intoxication also purposefully as a coping strategy (described below). In

[736] German original: "[…] das ist für mich nicht- das ist .. für mich keine Entspannung, wenn ich sowas trinke. Also ich trinke halt eher nur so ha-ha-harten Alkohol, wenn ich wirklich betrunken sein will.. also wenn ich fortgehen möchte, also wirklich so tanzen gehen möchte, dann trinke ich das halt, weil meine Freunde das trinken. […]".

addition, Helena has never said 'no' to an offer of a drink or a cigarette, which defines how she sees herself and how she believes that others see her.

Situation: This pathway examines the 'going out' spaces on Helena's map. In Stream 1 (see Figure 36), Helena and her friends are on the subway on a weekend evening, en route to a bar or club. In Stream 2, Helena and her friends are sitting in a bar and listening to live music. The streams thus form two parts of a wider 'going out' routine, and Helena exceeds her drinking limits in both. They differ on the formal norms regarding alcohol and cigarette use, as such use is not permitted on the subway. Both situations mirror a lack of closeness to the friends involved (acquaintances rather than best friends): going out to party is Helena's preferred activity for people she is not very close to, as cosier forms of get-together (e.g., sharing a meal) require a greater degree of familiarity in her view. Both situations are part of Helena's weekly routine of going out at the weekend. However, they may also occur spontaneously as a kind of escape from an unpleasant situation. Figure 37 complements Figure 36 by illustrating two such initial spaces of a 'night out'. In the first example, Helena intends to study at home but goes out instead after a friend invites her out. In the second example, Helena purposefully goes out to party as a strategy to distract herself from feeling sad.

Interpreted space: The above context establishes the subway and bar as oriented toward party and excess, which in turn creates expectations pro substance use. In the subway, the formal ban on substance use appears to impede cigarette use but does not affect expectations relating to alcohol. Rather, the anticipated enforcement of a *different* ban, namely on bringing alcohol *into the nightclub*, coupled with limited enforcement of the alcohol ban on the subway, establishes expectations pro alcohol use in the subway, which are reinforced by the perception that this is a typical practice among young adults:

> *[…] to be honest, I also don't know anyone, well, of my age, who does <u>not</u> do that [drinking alcohol on the subway on a night out], so… the subway ride is somehow like the last station of pre-loading… so, that's where you finish what you… can't take anymore into the club*[737]

Thus, strict enforcement of a ban in one setting (the club) invalidates the (not enforced) ban in another setting (subway), thereby displacing use. Access to alcohol on the subway is ensured by Helena's friends, whose own preferences establish expectations in favour of spirits[738]. This

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[737] German original: "[…] ich kenne auch, um ehrlich zu sein, niemanden, jetzt so in meinem Alter, der das <u>nicht</u> macht, so .. die U-Bahn Fahrt ist irgendwie so die letzte Station des Vorglühens .. so da trinkt man noch so das aus, was man .. nicht mehr mitnehmen kann in den Club".

[738] Enforcement of bans and access to alcohol (availability, supply) could have been included as part of the situation in this pathway. It was decided to list them separately, as Helena refers rather to the anticipated enforcement of a ban in the club (i.e., a space succeeding the subway) as well as ex-ante decision-making regarding what alcohol to bring (i.e., a space preceding the subway) (see quote under 'Mediating events').

limitation shapes the situation in the subway as other-determined (cf. the bar where everyone can order individually). In both spaces, shared expectations regarding the type of gathering and substance use relate to feelings of togetherness, which are, however, at odds with the lack of closeness that characterises Helena's relationship with these friends. This discrepancy, together with other factors (e.g., fear of awkward social situations, going out to avoid sadness), leads Helena to feel self-conscious, inward *and* outward oriented, and stressed (see below).

Mediating events: The previous paragraphs showed how the interplay of formal and informal *substance use expectations* across settings establishes the subway as the last opportunity to drink (and finish) one's own store-bought alcohol. In this context of *partying* and *togetherness*, this produces a requirement to drink whatever is available. Helena's credo of 'never said no' means that she does not construe this *limited freedom of choice* negatively but accepts it as a matter of fact. As a result, she adapts easily to others' substance use preferences:

> *[…] I mean, in a bar it doesn't matter anyway who drinks what, because everybody orders individually there, but then for going out it's like ((imitating friend)) "Yes, I'll take this with, is that fine with everybody?" and then I just have to adapt myself, so I'm like "Yes, okay, the vodka is fine with me" ((laughs))*[739]

Helena's general substance use position and the streams in Figure 36 highlight the importance of drinking to have fun. However, *lack of closeness,* in a context of *togetherness*, produces disruptive states on '*self-presentation'*, '*relaxation'* and '*orientation'*, which encourage drinking to facilitate social interaction, stop worrying and thereby help Helena achieve relaxation:

> *P: […] the more I feel at ease with a person, the … less fear I also have of silence […] with a person I don't know, I find it uncomfortable […] and then alcohol does help […] I mean, it's not that I absolutely have to drink in order to speak with people I don't know so well but it… is easier then and it is not so […] tense, everything. […]*
> *I: Okay […] why it is not so tense for you anymore then? […]*
> *P: Because I stop then, somehow, to think, but I just start to talk.. I just talk a lot and then it's somehow easier to find a topic for conversation, especially if the other one is also rather… reserved […] compared with if you … don't drink, because then you think too much, like "Well, can I bring that up already now or… is it inappropriate now if I ask that?" If you drink and are slightly… tipsy, then you just ask it and… you just start talking […] so I think,*

[739] German original: "[…] ich meine, in einer Bar ist es eh wurscht, wer was trinkt, weil da bestellt jeder einzeln, aber halt so zum Fortgehen ist es dann so 'Ja, ich nehme das mit, passt das allen?' und da muss ich mich halt anpassen, und bin so 'Ja, okay, der Vodka passt mir' ((lacht))".

you don't have so much of a distance when both are somehow tipsy […] So it's always like this… the distance shrinks… with the level of intoxication ((laughs))[740]

In other words, drinking emerges from the socio-spatial aspects but is also a way to change them: to establish closeness where this is lacking, to suspend unhelpful inward orientation, stressful thoughts and self-censorship; thereby also reinforcing expectations pro use.

Outcomes: Although the subway and bar are both characterised by the use of beer and spirits, through these processes, Helena is more likely to drink spirits in the subway, whereas the bar is associated more strongly with beer and cigarettes. Consequently, the smoking ban is observed de facto[741] in the subway, but the ban on alcohol is not. In both the subway and the bar, Helena's drinking exceeds her personal preferences, in part because she adapts to her friends' preferences, but also because she uses substances as a coping strategy. She applies this strategy successfully to establish closeness and create more comfortable spaces during a 'night out', remarking that she has never seen some friends sober. This perception of drinking as a successful and enabling strategy may explain why Helena views her alcohol use as excessive in these spaces yet as non-problematic. She acknowledges, however, that drinking is not an effective strategy to avoid feeling sad and that it affects her studying. This ambivalent construal of drinking alcohol (as functional and enjoyable, yet a potential source of problems) is mirrored in an ambivalent construal of the spaces associated with excessive alcohol use, as Helena gives conflicting accounts of going out. While she enjoys partying and readily accepts an invitation to go out, she also construes these get-togethers as alienating:

[…] this [in the bar] is not so much with close persons and there I don't really feel good […] also in company you can be alone, especially if it's somehow so many people, then it's like… there are too many people to have a conversation somehow and… it is rather a kind of… "I'll rather keep to myself now" and then it is also sometimes a bit boring after all"[742]

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[740] German original: "B: […] je mehr wohl ich mich mit einer Person fühle, desto .. weniger Angst habe ich auch vor der Stille .. […] mit einer Person, die ich nicht kenne, finde ich es unangenehm, […] und da hilft dann Alkohol schon .. […] Ich meine, es ist nicht so, dass ich unbedingt trinken muss, um mit Leuten zu sprechen, die ich jetzt nicht so gut kenne, aber es .. geht halt dann leichter und es ist jetzt nicht so .. […] angespannt alles. […] I: Okay […] warum ist es dann nicht mehr so angespannt für dich? […] B: Weil ich dann aufhöre, irgendwie, nachzudenken, sondern einfach anfange zu reden .. so ganz viel einfach rede und dann findet man sich irgendwie leichter ein Gesprächsthema, als .. vor allem, wenn der andere dann auch so eher .. reserviert ist […] als wenn man .. nicht trinkt, weil dann denkt man zu viel nach, so 'Ja, kann ich das jetzt schon ansprechen, oder .. ist es jetzt unpassend, wenn ich das frage?' Wenn du halt trinkst und leicht .. angeheitert bist, dann fragst du es einfach und .. redest halt einfach drauf los […] also ich finde, da hat man nicht so eine Distanz, wenn man dann beide irgendwie angeheitert ist .. […] Also es ist immer so... die Distanz schwindet... mit dem Betrunkenheitslevel ((lacht))".

[741] The subway smoking ban was not discussed in the interview and it is thus unknown whether Helena purposefully observes the smoking ban or whether other factors support situational abstinence (as in Pathway 2).

[742] German original: "[…] das [in der Bar] ist halt nicht so mit vertrauten Personen und da fühle ich mich nicht wirklich wohl, […] auch in Gesellschaft kannst du alleine sein, gerade wenn es irgendwie so viele Leute sind, dann ist es halt so .. es sind zu viele Leute, um sich mit denen irgendwie zu unterhalten und .. es ist halt eher so ein .. 'ich bleibe jetzt eher für mich' und dann ist es ja auch manchmal langweilig […]".

To summarise, this pathway asserts that, for a person who fears awkward social situations and who tends to avoid (rather than confront) unpleasant situations, lack of closeness in a context of partying and togetherness may create unsettling ambivalence which can, however, be resolved at least momentarily through intoxication and by adapting to other people's preferences. This highlights 'closeness to people' as a key determinant for the function (and thereby the quantity) of substance use[743]. Although Helena does not reflect on this during the interview, it can be hypothesised that the successful application of drinking as a strategy to establish momentary closeness may result in the acceptance of drinking in excess of one's own preferences as a necessary evil[744]. Thus, in such a context, limited freedom of choice, which was construed more negatively and prompted action in Pathways 1 and 6, may be construed not as a limitation but as an opportunity to absolve oneself from responsibility.

12.5. How socio-spatial aspects interplay with other influences to produce situated substance use outcomes: a summary in eight assertions

The pathways in the previous section illustrated different constellations of socio-spatial and other factors and how these contributed to situated substance use or abstinence. This final section summarises the above through eight assertions which focus on how socio-spatial aspects *interplay* with each other as well as other factors as part of these mechanisms[745]. This focus supported best a reflection on *how* (in the sense of mechanisms) construed socio-spatial aspects may relate to situated substance use.

Assertion 1: Interpreted space initially emerges from the invisible interplay of a specific situation, a general substance use position and other factors.

It is reasonable to assume that the construal of a space emerges primarily from the socio-spatial arrangement of a specific *situation* (i.e., setting, activities, people, time and additional material or non-material aspects such as smoking bans). For example, Pathway 1 showed how an active mind ('relaxation') was linked to a specific activity such as studying. However, Pathway 2 suggested that additional factors are involved in such mechanisms, such as the

[743] This finding was corroborated through a contrast with streams in which Helena drinks with people she feels close to (not shown): drinking in these occasions was characterised by smaller quantities and served a different purpose.
[744] It is thus questionable whether Helena's drinking, even though construed as being in excess of her preferences, really exceeded these preferences. This would further explain why she perceived her drinking to be under control.
[745] To maintain the focus on the latent dimensions for space construal, interplay *among* the additional factors (i.e., situation, general substance use position and other factors) is not discussed here.

personal importance of studying. Similarly, although a smoking ban may be thought to translate directly into expectations contra cigarette use ('substance use expectations'), Pathways 2 and 7 showed that bans are not necessarily perceived as such by users. Consequently, even though the situation may strongly affect how a space is construed, the pathways confirmed (in line with the tentative findings in section 12.2) that socio-spatial arrangements do not take effect on their own, but that additional factors moderate how the situation is *interpreted* by the user and thus *translated* into a specific construal along latent dimensions. Thus, the interpretation of a situation (e.g., as representing 'relaxation') is related to situational aspects (e.g., activity) but they are not the same. As a consequence, spaces are not always construed as might be expected based on the situation alone.

A further complication in this regard is that such additional factors may play a greater role than the situation. With regard to the general substance use position[746], several pathways highlighted how personal rules on substance use in certain contexts can establish strong 'expectations' pro or contra use. With regard to other factors[747], in Pathway 3, 'enjoyment' emerged from an activity (watching TV) *in combination with* the person's personal interests, while in Pathway 4, 'expectations' in favour of alcohol use emerged from a specific socio-spatial arrangement *in combination with* culturally derived rules on alcohol use. Pathway 1 also showed how a seemingly minor factor (i.e., ease or difficulty of leaving the house) can significantly affect a pathway. In Pathway 5, 'changeability' became relevant through the memories and routines *related to* the situation rather than through the situation itself[748]. A particular challenge of gaining a complete understanding of pathways to situational substance use or abstinence stems therefore from the fact that additional factors can greatly affect outcomes yet are difficult to observe or estimate.

Assertion 2: Latent dimensions for space construal interact with each other to produce interpreted space.

While the ex-ante conceptual model (shown in section 4.2.4) anticipated the relationships described above, the pathways highlighted another kind of relationship that had not been anticipated, namely *among the latent dimensions*. For example, in Pathway 7, 'substance use

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[746] In the pathways, the user's *general substance use position* (as the conglomerate of views, preferences, rules and beliefs a person holds regarding their own use) was distinguished from other factors to highlights its key role in the construal of space.

[747] Other factors shown in the pathways typically referred to additional knowledge, views or beliefs that the user held *about* this type of situation (and could be categorised, for example, as personal, social, biographical, cultural or societal) (see also section 12.4.1).

[748] This example also highlights that it was at times difficult to distinguish whether additional factors (in this case the memories and routines) moderated the relationship between the situation and the latent construal, or whether they influenced the construal of space as if they were *part of* the situation itself.

expectations' were not just the result of the situation, general substance use position and other factors, but were also inherent to the 'type of gathering' as understood by this participant. Moreover, in this case, interplay between 'togetherness' and (lack of) 'closeness' (alongside a personal fear of awkward social situations) increased self-awareness ('self-presentation'), which in turn created ambivalence on 'orientation' and on 'relaxation'. Such causal relationships were already noted during the content analysis of elicited constructs, as multiple aspects were sometimes reported within a single construct (see section 10.3). To summarise, as the latent dimensions are interrelated, they can – individually or in combination (typically together with other factors) – affect the construal of a space on further dimensions. This interdependence may also explain why differences between situated substance use patterns were observed on many rather than few dimensions in section 12.3.

Assertion 3: Interpreted space is another kind of mediator and interacts with mediating events.

The pathways confirmed the value of conceptualising interpreted space as an intermediary between the situation and more traditionally conceptualised mediating events. Latent socio-spatial aspects are not part of the situation as an 'objective' socio-spatial arrangement, because they rely on an interpretation of that arrangement. At the same time, they *are* part of that situation as it is construed by the individual, and the pathways showed that interpreted space does not affect outcomes directly. Latent socio-spatial aspects may thus be too related to the situation to be considered as mediators. Nevertheless, the act of interpreting the situation is itself a mediating event. It is therefore useful to distinguish socio-spatial interpretation from other kinds of mediating events. In the pathways, such mediating events were then generally conceptualised as emerging from the interplay between socio-spatial aspects and the general substance use position or other factors.

Although in principle it would have been possible to develop pathways without reference to the latent dimensions for space construal, the consideration of these dimensions allowed a much more complete understanding of the relationship between situation and mediating events. For example, in Pathway 3, considering latent dimensions allowed the inferral of likely mediating events, while in Pathway 7, their inclusion helped to conceptualise the detailed mechanism through which drinking to facilitate social interaction resulted in excessive drinking. In the present study, the use of a consistent set of dimensions had the added benefit of supporting integration of and comparisons between different streams. In Pathway 1, considering how the same dimension ('freedom of choice') was construed across streams highlighted differences in the mechanisms that helped explain why outcomes differed despite similar situations.

While the ex-ante conceptual model assumed that socio-spatial aspects produce mediating events but not vice versa, Pathways 2, 6 and 7 showed that mediating events can also shape how a space is construed. Though this could not be fully visualised for layout reasons, this highlighted that the construal of spaces is dynamic and can change through interplay with mediating events. This was further evidenced in Pathway 7, in which mediating events (e.g., drinking to facilitate social interaction) were *purposefully used* to affect how the space is construed (e.g., on 'self-presentation' and 'relaxation').

Assertion 4: Effects typically result from the interplay of multiple latent dimensions for space construal, but a single dimension can define an entire pathway.

In all pathways, mediating events (and thus outcomes) resulted from the interplay of multiple latent dimensions. In some cases, different dimensions worked in the same direction. For example, in Pathways 1 (Anna's stream), 2 and 3, the fact that multiple dimensions supported situational abstinence likely contributed to a more positive experience of situational abstinence. In Pathway 4, multiple dimensions interplayed to produce the conditions under which wine would be offered *and* accepted. In other cases, effects resulted from frictions between dimensions. For example, in Pathway 1, the friction between closeness to parents and parental expectations contra use contributed to outcomes such as leaving the house under false pretences. In Pathway 7, the friction between togetherness of activity and lack of closeness to the friends *disrupted* the mechanisms through which an activity such as 'going out to party and drink' might otherwise translate into outward-orientation, resulting in an ambivalent inward-/outward-orientation instead. In the pathway description, the term 'disruptive states' was used for socio-spatial aspects which were at odds with the desired construal of the space, thus prompting action in the form of mediating events to 'rectify' the space.

This also highlighted that interplay between several dimensions was often necessary to produce certain outcomes. For example, Pathways 2 and 4 indicated that substance use expectations were not sufficient to produce specific outcomes but worked rather in combination with other dimensions. Consequently, dimensions that may not affect situated substance use on their own may do so in combination with other dimensions (e.g., a sense of 'togetherness of activity' may not in itself produce substance use, but, in combination with other dimensions supporting substance use, it may further increase the likelihood of substance use).

At the same time, the pathways exemplified how a single dimension can define an entire pathway. Table 38 (p. 473) indicated which pathways illustrated the relevance of selected dimensions particularly well. While the markers ('X') were placed to identify at least one representative pathway for each dimension, they also show which dimensions determined

each pathway the most. For example, in Pathway 1, 'freedom of choice' emerged as the key distinguishing dimension to explain differences between Anna's and Barbara's streams, while in both cases, 'closeness' was decisive in how the two women dealt with their parents' rejection of smoking. Pathway 7 also showed how a single dimension such as 'type of gathering' can dominate the pathway by affecting the space construal on several other dimensions.

The conceptualisation of the dimensions as different types of conditions, as suggested by Gläser and Laudel (2010) (see section 12.4.1), further showed how single dimensions can define pathways, namely if they represent 'necessary' or 'sufficient' conditions for situational substance use or situational abstinence. For example, in Pathway 2, the need for an active mind ('relaxation') was a sufficient condition to produce situational abstinence, while in Pathway 3, situational abstinence resulted because necessary conditions for substance use (e.g., on 'orientation') were not met. Pathways 1 and 6 highlighted 'freedom of choice' as a necessary condition for a positive construal of spaces, regardless of whether they represented abstinence or use. However, this was not the case in Pathway 7 (i.e., limited freedom of choice did not lead to a negative construal). The conditionality of socio-spatial aspects is not absolute but depends upon the individual's general substance use position and other (idiosyncratic) factors. This was further evidenced through Pathway 6, in which expectations pro substance use were sufficient to produce use, but only in combination with a strong personal belief that it is important to meet expectations. Thus, the pathways also showed how the general substance use position can be understood as defining various conditions (e.g., necessary, sufficient, supporting, hindering) for situational substance use or abstinence, with effects resulting from how a specific situation meets these conditions.

Assertion 5: Apparent conflicts between a situation and the general substance use position can 'disappear' when the situation is translated into interpreted space.

Pathways were chosen to represent different constellations of factors, including apparent conflicts between the general substance use position and specific situations[749]. However, even though Pathways 1 and 2 were intended to examine conflicts between a general position in favour of substance use (i.e., daily smoker) and a specific situation oriented against use (i.e., smoking ban in place), they showed that daily smokers may not actually experience such conflicts. Similarly, although Pathways 5, 6 and 7 were intended to examine conflicts between a general position opposed to (certain patterns of) substance use (e.g., opposed to beer/spirits)

[749] Although this was not a focus at the beginning of the research, the potential role of conflicts became apparent during data extraction.

and a specific situation oriented toward use (e.g., get-together with friends who prefer beer/spirits), conflicts were not always 'found' in the data as expected. Instead, the analysis showed that when participants interpreted these situations, additional aspects[750] shaped their construal of the space, meaning that they did *not* experience it as being in conflict with their own substance use preferences, overall or at least in that moment[751]. This also suggested that the general substance use position typically includes (explicit or implicit) exceptions to justify deviations from the general preference in certain contexts (further addressed in assertion #8). Consequently, participants acted in line with the situation *without* experiencing this as a true deviation from their general substance use position. It also means that it can be difficult to distinguish clearly between the influence of setting or situation and the influence of the general substance use position on situated substance use (as implied in section 12.2), as the general position includes rules relating to setting.

In the above examples, the *situation* (rather than general substance use position) determined the final outcome (i.e., no smoking despite being a daily smoker in Pathways 1 and 2; drinking beer/spirits despite personal dislike in Pathways 6 and 7). The qualitative content analysis identified additional pathways with apparent conflicts in which the *general substance use position* (rather than the situation) determined the outcome. For example, 'Ela' (Pathway 4) had a strong preference for wine and reported drinking wine even when her friends drank something else. Other participants (not included in section 12.4) reported drinking alcohol when studying for exams (i.e., a situation commonly associated with abstinence). In both cases, as above, these spaces were construed in a way that made them appear congruent with the own substance use preferences. This was also the case for Pathway 7 (Stream 1), where the situation in the subway was in principle oriented against use but was construed differently by the participant. Hence, even though these study participants acted *counter to* what might be expected based on the situation, conflicts were again not experienced.

Nevertheless, Pathways 1 (Barbara's stream) and 6 showed that conflicts *were* experienced by study participants, namely when additional dimensions deepened the conflict rather than

[750] The following aspects seemed most relevant: freedom of choice was not limited, able to go outside anytime to smoke (Pathway 1, Anna); need for an active mind, own abstinence not attributed to smoking ban (Pathway 2); construing the space as unchangeable (Pathway 5); strong sense of enjoyment (Pathway 6, Stream 1); accepting the situation as other-determined (Pathway 7, Stream 1); unwanted states on 'self-presentation', 'orientation' and 'relaxation' (Pathway 7, Stream 2).

[751] Pathway 5 and Pathway 7 (Stream 2) differed from the others in that the study participants perceived a conflict between the situation and their preferences when they were removed from the situation but seemingly experienced no or little conflict when they were in the situation itself.

help to resolve it[752]. In these cases, the experienced conflicts resulted in unpleasant states which prompted action (or at least intent) to leave or change the situation.

To summarise, the situation defined the outcomes when the general substance use position included relevant (explicit or implicit) exceptions. However, whether or not a conflict between the situation and general substance use position was at all experienced (and could thus prompt action) depended on how the space was construed overall. Therefore, assumptions (e.g., by researchers) about when substance users may view a situation as ambivalent may not reflect how substance users themselves experience these spaces.

Assertion 6: Through past experience and imagination, latent dimensions can shape the general substance use position as well as the interpretation of specific situations.

The ex-ante defined conceptual model anticipated that the outcomes of one specific pathway could affect future pathways by influencing a person's general substance use position. This was exemplified in Pathway 6, where the experience of 'enjoyment' in relation to substance use stimulated changes to the general substance use position (e.g., increased preference for beer), which in turn affected future occurrences of the same situation (e.g., the data suggested that drinking with 'the boys' was initially construed as other-determined, but over time became construed as self-determined). Considering the earlier notes on how conflicts are experienced (assertion #5), it can be hypothesised that socio-spatial experiences at odds with the general substance use position may lead to the successive addition of 'exceptions' to the general substance use position, in some cases until the original position (e.g., personal dislike of beer) is no longer tenable and must be revised (e.g., newly established 'beer drinker' identity).

The pathways revealed further mechanisms through which socio-spatial aspects can affect future pathways. Pathways 4 and 5 in particular showed that, through associations based on past experiences, pathways developed in one setting can be transferred to another setting if the two settings were construed as *similar* in some way. These pathways also showed that, depending on whether this resemblance was limited to socio-spatial arrangements (e.g., educational settings in Pathway 5) or included also similar interpretation of the spaces (e.g., as culturally relevant cosy get-togethers in Pathway 4), the original characteristics of substance use (e.g., its function) could be either lost/changed or retained in this process.

[752] The following aspects seemed most relevant: freedom of choice was limited, unable to go outside anytime to smoke (Pathway 1, Barbara); limited enjoyment (Pathway 6, Stream 2).

The above examples highlight the role of past experiences, and these were found to support another mechanism through which socio-spatial aspects can affect pathways: *imagining hypothetical and future spaces*. Situational substance use or abstinence emerged then as a reaction or pre-emptive action relating to such imagined spaces. For example, in Pathway 6, substance use was the result of the participant expecting that she would have to explain herself if she abstained while others were drinking or smoking as well as imagining that life might be less enjoyable without substance use. These and further examples in the pathways[753] all refer to imagined socio-spatial states (on 'self-presentation', 'enjoyment' and so on), and it was noteworthy that certain dimensions became relevant to the construal of the spaces *only through* this imagination (i.e., they did not emerge from the actual situation). For example, this was the case in Pathway 2, where physical/materials aspects ('physical pleasantness') did not define the reading room in the university as such, but still contributed to situational abstinence via the image of a reading room filled with smoke.

Assertion 7: Socio-spatial aspects affect a range of substance use related outcomes in ways that can be difficult to generalise.

While the ex-ante conceptual model focussed on substance use outcomes in the narrowest sense (what substance used and how much), the pathways showed that socio-spatial aspects affect a greater range of outcomes related to substance use, either directly or in combination with the general substance use position or other factors. Types of affected outcomes included:

- Patterns of situational use or abstinence: substance/product, frequency, quantity of use (e.g., only non-alcoholic drinks in Pathway 3, excessive alcohol use in Pathway 7)
- Negative consequences from use (e.g., not meeting study schedule in Pathway 7)
- Settings or contexts for substance use or abstinence (e.g., no use when studying in Pathway 3, use in educational settings in Pathway 5 or with the family in Pathway 4)
- Function of substance use (e.g., as a coping strategy in Pathway 7, as a reward in Pathway 5) or abstinence from use (e.g., to maintain closeness to parents in Pathway 1, to enable concentration on another activity in Pathway 2)
- Experience of spaces representing substance use or abstinence (thus also associations with use or abstinence) (e.g., substance use associated with enjoyment in Pathway 6, spaces of no substance use construed as "perfect" in Pathway 3)

[753] E.g., Pathway 1 was defined by participants' concerns that exposure of their smoking status would damage the relationship with their parents. In Pathway 2, beliefs that smoking would impede the participant's ability to study/train and create unpleasant fog were decisive. In Pathway 7, drinking resulted from anticipating situations that would be difficult to master without intoxication (e.g., talking with certain people, dancing in a club). Also in Pathway 7, drinking in the subway was prompted by anticipated enforcement of a ban of bringing alcohol into the club to be visited later.

- Substance use in or construal of 'adjacent' spaces (e.g., smoking displaced from home in Pathway 1, breaks from studying/work experienced as stressful in Pathway 2)
- Substance use in or construal of similar situations (e.g., spaces with cultural rules on alcohol use in Pathway 4) or settings (e.g., mountains in Pathway 4, educational settings in Pathway 5)
- General substance use position (e.g., changed assessment of beer and cigarettes in Pathway 6)

Whilst the earlier paragraphs outlined the general mechanisms through which socio-spatial aspects affect such outcomes, it is difficult to make simple generalised statements about which specific socio-spatial aspects will 'result' in *what* outcome. This difficulty stems from the complexity of pathways (i.e., effects result from interplay of multiple pathway elements) as well as their idiosyncrasy (i.e., constellations of influences are specific to the individual) but also the many different possible substance use outcomes. The latter point refers not only to the range of outcomes shown above but also to the multiple options on each single outcome type: for example, for 'pattern of situated use', the typology presented in Chapter 11 hints at the many possible outcomes even when limiting the analysis to alcohol and cigarettes. Generalisation at the outcome level was, however, finally not a focus of this analysis (as explained in section 7.5) and future research may explore this further.

Assertion 8: Substance users' understanding of these mechanisms can be incomplete, which likely affects their ability to change their substance use practices unaided.

The analysis of pathways suggested that substance users' understanding of the mechanisms shaping their own substance use practices can be incomplete. For example, study participants were more likely to make explicit reference to manifest socio-spatial arrangements when describing causalities (e.g., settings, people, activities), but gave less attention to latent socio-spatial aspects and mediators that contributed to final outcomes[754]. Similarly, although participants sometimes attributed outcomes to a particular socio-spatial arrangement or socio-spatial aspect, the analyses showed that additional factors also played a key role. Pathway 4 exemplified this, as the participant initially attributed substance use to a simple rule ("*among*

[754] Though this highlights that the pathways were constructed by the study author for the purposes of this analysis, it does not invalidate them. Firstly, Saldana (2013: 164) also notes that study participants may narrate events in a non-chronological order and may leave out mediating events, in which case researchers may need to reorder the narrations into a new sequence and plausibly infer missing details. Secondly, it rather confirmed that the elicitation procedures used during the repertory grid interviews successfully tapped into implicit knowledge (i.e., it was not expected that participants would ordinarily emphasise socio-spatial aspects, as these represent implicit knowledge).

[people from my country of origin] there is wine with every meal"), while the pathway showed an array of influences that shaped how this rule affected substance use in practice.

While substance users' understanding of the mechanisms influencing their situational use or abstinence was not a focus of this study, it was found to shape the analysis of pathways as well as the pathways themselves. A key point concerned the general substance use position. To reconstruct this, the analysis of interview transcripts summarised views, preferences, rules and beliefs that participants expressed about substance use. For example, for Pathway 7, this statement served as an indication of the participant's position on spirits:

> *I drink such ((stutter)) strong alcohol rather only when I want to be really drunk… so when I want to go out, really want to go dancing, then I drink this, because my friends drink it […]*

This participant did not specifically discuss spirits again, but the corresponding repertory grid suggested that use of spirits and strong intoxication occurred also in contexts not captured by this statement. Thus, the analysis occasionally identified substance use practices that appeared to be at odds with the position expressed by study participants. Instances where an apparent conflict was not experienced by participants (see assertion #5) also provide examples of such discrepancies. This raised the question whether such 'exceptions' were part of the general substance use position (e.g., participants accepted them as exceptions to the rule) or were independent from it (e.g., participants understood them as true deviations from their general position)[755]. Moreover, while some exceptions were made explicit by participants, others were not commented upon (or were described only late in the interview). Although it is possible that participants simply did not verbalise them (earlier) in the interview, it may suggest that participants were not fully aware of them (i.e., exceptions as 'blind spots'). This highlights that a general substance use position may also include implicit elements and thus be more ambivalent (or flexible) than the individual realises.

This is important because the general substance use position plays a key role in substance use pathways, as it defines relevant socio-spatial conditions for situational use or abstinence (assertion #4). Moreover, the way substance users understand their own position determines whether they perceive situations as being in conflict with this position, which also influences pathways (assertion #5). Therefore, whether substance users have an accurate understanding of their own position on substance use (i.e., general preferences, acceptable exceptions, true deviations) affects their ability to understand the mechanisms shaping their own practices.

[755] Methodologically, this was resolved in the analysis by considering what appeared to reflect the study participant's narrative best and by acknowledging the ensuing ambivalence.

Such an understanding is, however, likely to be beneficial for substance users who are attempting to change their substance use practices. In the present study, several participants reported frequent unaided attempts to quit or reduce use. In some of these cases (e.g., Pathway 6), the interview was used as an opportunity for reflection. These participants reported developing a better understanding of their own position and the mechanisms shaping their substance use as part of the interviews, and formulated intentions or ideas to modify their use based on these insights.

PART 4: DISCUSSION

The discussion is presented in six sections:

- Section 13.1, “Summary of thesis approach”, summarises Parts 1 and 2. The two main reference points for this thesis were socio-spatial theory and environmental prevention of substance use. The study sample and interview methodology are briefly described.

- Section 13.2, “Possible elements of a socio-spatial theory”, integrates the thesis findings into a proposal for a novel middle-range theory on socio-spatial aspects of substance use, presented as a visual model. Section 13.2.1 offers a summary description of the proposed theory. Subsections then summarise and discuss each of the results chapters from Part 3.

- Section 13.3, “Comparison with similar approaches”, identifies similarities and differences between the proposed theory and selected other approaches from Part 1. On this basis, strengths of the proposed theory as well as of the existing approaches are highlighted. Parallels are drawn with Papies et al.’s grounded-cognition theory of desire.

- Section 13.4, “Strengths and limitations”, discusses the extent to which the present study was able to answer the research question. An overview of key strengths and limitations is offered alongside reflections on unique design features and unexpected challenges.

- Section 13.5, “Implications for research, practice, theory”, shows how colleagues in substance use, prevention, and socio-spatial theory could utilise the study results. Following on from Chapter 2, preliminary ideas for strengths-based prevention strategies are developed. Potential avenues for follow-up work are identified, in particular relating to substance users’ own positively construed spaces of no or rare substance use.

- Section 13.6, “Conclusion”, summarises the thesis in three pages and answers the overall research question (*‘how do construed socio-spatial aspects relate to situated substance use?*’). The newly developed visual theory, the concept of ‘interpreted space’, and the proposal for 12 ‘latent dimensions for space construal’ are put forward as the most original features of the present thesis.

13. Outline of a socio-spatial theory for substance use prevention

13.1. Summary of thesis approach

This thesis pursued two aims. As outlined in Chapter 3, one aim was *to revisit socio-spatial theory* from an empirical point of view, in particular Löw's (2001, 2016) 'sociology of space'. In this perspective, spaces are understood as "relational arrangement[s] of living beings and social goods" (Löw, 2016: ix), and Löw suggests various aspects to characterise such arrangements. This was the initial focus of the present project, following up on the author's master's thesis (Kurtev, 2008). The master's study had found that theories such as Löw's are useful for sociological analysis of everyday spaces but may not reflect how people themselves construe such spaces. To this end, the present study sought to generate empirical data on the categories that people refer to when thinking about everyday spaces, to contrast these with Löw's proposed aspects. Kelly's (1963/1955) personal construct theory and the associated repertory grid technique offered a possibility to conceptualise such categories as 'personal constructs' and to elicit and present them in a structured manner.

The second aim, which gained momentum as the thesis progressed, was *to contribute to substance use research with a 'sociology of space' perspective*, thereby also demonstrating and increasing the societal and scientific relevance of this work. A particular point of interest was how the immediate 'environment' could be conceptualised in the substance use field. The focus on substance use emerged from the author's own background (see section 1.2.1). Two areas were chosen as points of reference: environmental prevention of substance use; and empirical research into micro-contextual factors of substance use. In Chapter 2, the thesis used a recent key report on environmental prevention (Oncioiu et al., 2018) as an example to explore the theoretical basis of environmental prevention, identifying a range of mostly psychological theories. These theories usefully highlight that human action (including substance use) is often *not* the result of conscious deliberation, and that environmental aspects can effect action via embodied processes as well as mental processes below conscious awareness. To advance the field further, the present thesis suggested that sociological theories on space – which consider more explicitly the symbolic aspects of environment and processes of interpretation – may allow new insights regarding possible intervention points and mechanisms. In addition, the thesis drew on critical sociology perspectives and philosophical pragmatism (as described in Chapter 1) to highlight a focus on restrictive and coercive

interventions in environmental prevention as an issue worthy of discussion. The present 'sociology of space' perspective was thus also framed as an opportunity to explore possible alternatives. In Chapter 4, the thesis identified shortcomings in the existing literature on micro-contextual factors of substance use, such as: multiple socio-spatial aspects, settings and substances were not usually considered in a theoretically integrated and systematic way; socio-spatial aspects were typically researcher-defined (in quantitatively oriented research) or not generated/presented in a structured format (in qualitatively oriented research); spaces of no or rare substance use were not typically researched; and only limited consideration was given to mechanisms that may explain associations between environment and substance use, especially in terms of mediating steps.

Against this background, the overall research question guiding the present study was: *how do construed socio-spatial aspects relate to situated substance use?* The former part of this question required the identification of 'construed socio-spatial aspects' in line with the initial aim outlined above, while the second part of this question established a link between socio-spatial theory and substance use, thus addressing the second aim.

Study participants were 24 female students of business/economics, statistics, mathematics or law at the University Vienna, aged 18 to 26 years, who reported alcohol or cigarette use in the three months prior to study sign-up (and no use of illegal substances in the past 12 months). Individuals reporting poor mental or physical health or frequent problems associated with substance use were not eligible to take part. Sampling was purposive and criterion-based to obtain a relatively homogeneous sample, which was desirable given the multitude of spaces included in the study. Participants were recruited in person on campus, via social media and referral. Sample, sampling strategy, criteria and justifications are detailed in Chapter 5. Fieldwork proceeded with institutional ethics approval from the University of Vienna. Chapter 8 described measures taken to protect participants. It was an institutional ethics requirement to limit the study to legal substances.

An interview-based mixed-methods approach (described in Chapter 6) was used to address the research question as well as shortcomings of prior research. Participants first developed a comprehensive list of spaces, places and situations that had featured in their life at least once in the past six months, including spaces that were part of weekly routines, personally important spaces, as well as substance use spaces (e.g., last use occasion, subjectively heavy use, subjectively typical use). Participants were asked to choose a typical situation to represent each space. Information about substance use frequency was collected for each space, with a focus on alcoholic beverages and nicotine products. The spaces were then compared using the repertory grid technique (Jankowicz, 2004): participants reflected on similarities and

differences between spaces, and responses were translated (in a dialogue between interviewer and participant) into short, bipolar statements which were noted in a table (so-called ‘repertory grid’). Participants then rated all spaces numerically in relation to the statements (similarly to a Likert-type scale or semantic differential). The repertory grid technique is thus inherently mixed-methods, generating qualitative as well as quantitative data. In the present study, the repertory grid technique was enhanced with open-ended questions to allow a deeper understanding of the data and the exploration of mechanisms linking socio-spatial aspects and substance use. Data analysis considered the lists of spaces, elicited statements, numerical ratings, and interview transcripts, combining various forms of qualitative content analysis with quantitative sorting (e.g., hierarchical cluster analysis) and other statistical techniques (see Chapter 7).

In repertory grid terms, the bipolar statements produced during the interviews approximate ‘personal constructs’ which participants had (unknowingly) developed to make sense of their everyday spaces. In the present thesis, which drew more heavily on socio-spatial theory than personal construct theory, these ‘personal constructs’ were framed as ‘construed socio-spatial aspects’ (in line with the overall research question) or ‘dimensions for space construal’ (in Chapter 10). The next section continues this thesis summary with a focus on the results.

13.2. Possible elements of a socio-spatial theory

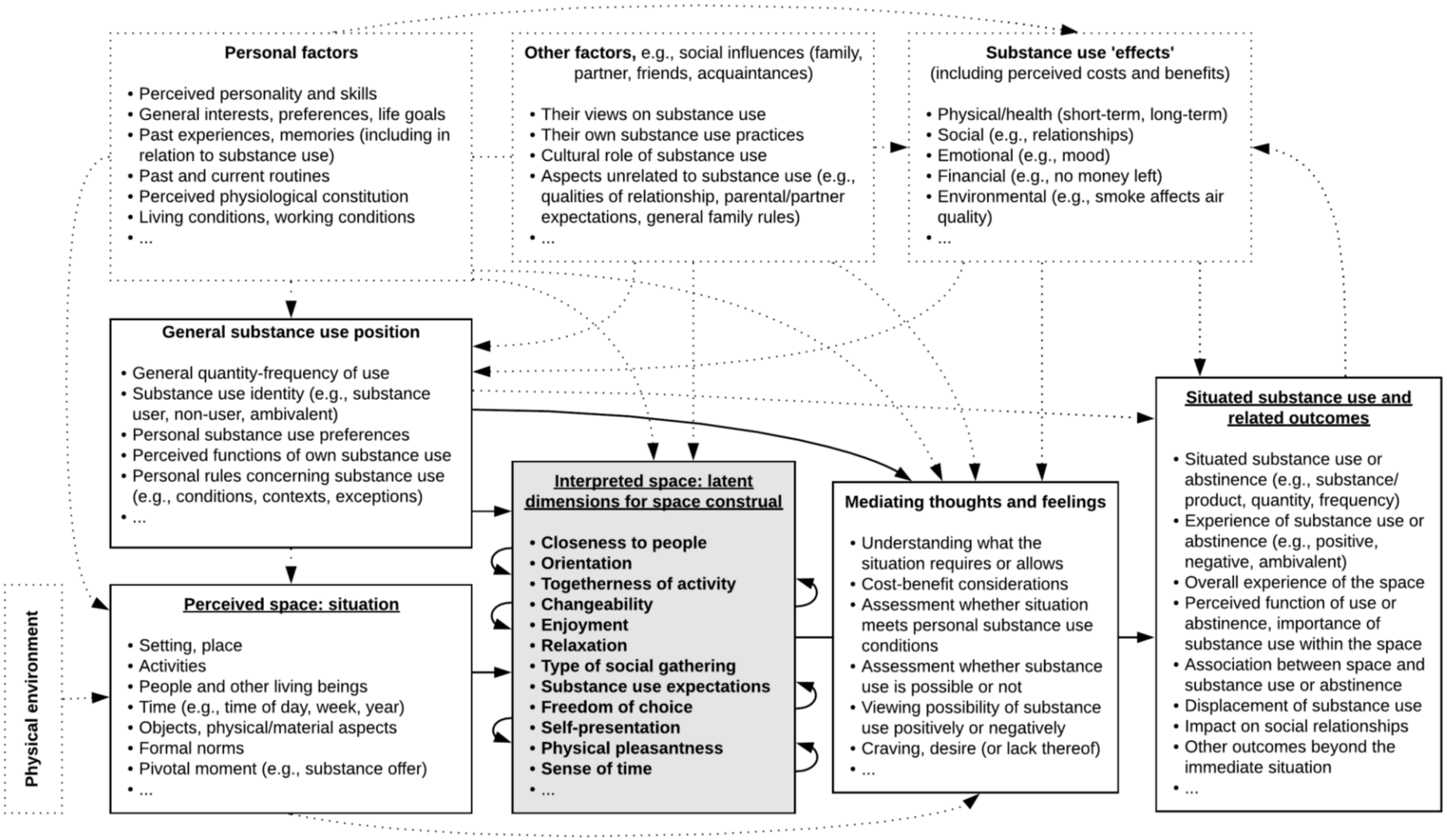
13.2.1. A ‘visual theory’ of situated substance use

The present research produced insights regarding:

- everyday settings and situations (Chapter 9),
- dimensions along which such settings and situations are construed (Chapter 10),
- possible patterns of situated substance use (Chapter 11);
- relationships between socio-spatial aspects and situated substance use and abstinence (Chapters 11 and 12).

This chapter summarises and discusses these results in an integrated way. Based on the draft conceptual model (see section 4.2.4) as well as analyses of interview transcripts and repertory grids, section 12.4 presented seven example pathways of situational substance use and

Figure 38: A 'visual theory' of situated substance use and abstinence



Note. An initial conceptual model was developed based on theory and developed further using empirical data from the present study. Source: Author's own, created in Lucidchart.

abstinence, incorporating 17 streams[756]. Figure 38 (p. 531) shows these pathways merged into a generalised model[757]. This model is presented here as a visual outline of a socio-spatial theory of situated substance use, and as such, it was more appropriate for inclusion in this concluding chapter than in the results.

From environment to substance use via 'interpreted space'

The following paragraphs briefly summarise the theory emerging from the present thesis (shown in Figure 38 above), with further details elaborated in subsequent sections.

The proposed model suggests that physical environment[758] (i.e., what is physically and materially present) is, via processes of perception, imagination and memory (Löw, 2001, 2016)[759], doubly construed by humans: firstly, as a tangible arrangement of living beings and social things[760] ('perceived space' or 'situation'); and secondly, as the overall meanings associated with that arrangement ('interpreted space'). The present study identified 12 dimensions along which space can be interpreted, though additional dimensions may be relevant (further discussed in section 13.4).

The relationship between situation and substance use is (at least partially) mediated by socio-spatial interpretation and additional thoughts and feelings, as follows. 'Interpreted space' emerges from the situation ('perceived space') in combination with additional factors (e.g., a person's general position on substance use, perceived social norms). The dimensions for space construal also interact with each other to produce a specific interpretation[761]. This interpretation affects momentary thoughts and feelings, while also being shaped by such

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[756] In section 12.4, 'streams' represented the flow of events in relation to a *particular* setting and individual, whereas 'pathways' combined 2-3 streams with common characteristics or themes.

[757] To arrive at the generalised model, main boxes and arrows from the first pathway in section 12.4 were transferred onto a blank sheet of paper. Details were generalised to arrive at categories with broader applicability (variables) (e.g., "In/Ability to mask cig smell" became "Perceived skills"; "Avoiding close physical contact with opposed family members" and "Leaving the house under false pretences" became "Impact on social relationships"). Then, the second pathway was added, checking what could be subsumed within the structure resulting from the first pathway and re-arranging or adding further categories and arrows as necessary. This process was repeated for all pathways. Differences between pathways were not understood as contradictions but as different possibilities for how pathways may unfold, hence pathways were 'layered' on top of each other to capture all observed varieties. At the end, the consolidated model was checked against the pathways to ensure that it reflected each pathway accurately. The resulting generalised model was thus *not* limited to the smallest common denominator (i.e., what was common across all pathways) but represented the major aspects of *each* pathway fully.

[758] Figure 38 includes 'physical environment' for conceptual completeness; it was not empirically researched and so only one arrow was included to indicate its influence on perceived space.

[759] Ideally, Figure 38 would have included additional boxes labelled 'perception, imagination, remembering' (as per Löw's "operation of synthesis", included in the draft conceptual model in section 2.4.2) between 'physical environment' and 'perceived space', and again between 'perceived' and 'interpreted' space, but these had to be omitted due to space constraints.

[760] Based on Löw's (2001, 2016) definition of 'space', see Chapter 3.

[761] Indicated in Figure 38 by the curved arrows around the box 'interpreted space'.

thoughts and feelings[762]. The general substance use position also affects momentary thoughts and feelings, for example by specifying conditions for substance use ('personal rules') against which the space is 'judged' (possibly below consciousness). Substance use and related outcomes (e.g., experiences of use) thus relate to construed socio-spatial aspects.

The substance or product (e.g., alcohol, cigarettes) shapes situated substance use outcomes as well, but the physiological effects of the substance are secondary to its perceived 'effects' (physical, social, financial, etc.) which shape the general substance use position as well as a person's rapid assessment of substance use costs and benefits[763] in a given situation.

A variable-based perspective[764]

One contribution of Figure 38 above is to indicate, based on the empirical pathways developed in Chapter 12, what variables may shape situated substance use and related outcomes and how these variables may relate to each other. The model can therefore also be summarised with reference to four types of variables, namely[765]:

- *independent variable:* the specific situation (i.e., micro-context, environment) is considered as a possible 'cause' or starting point in the model (bottom left in Figure 38)[766];
- *dependent variable:* situated substance use, situated abstinence and related aspects are the key outcomes of interest in the model (bottom right in the figure);
- *mediators:* the way a situation is interpreted and related thoughts and feelings are suggested as intermediary steps that establish a relationship between the independent and dependent variable (centre boxes in the figure's bottom row); and
- *moderators:* the general substance use position, perceived substance use 'effects' and other factors affect the strength and direction of the relationship between independent and

[762] This reciprocal relationship is indicated in Figure 38 by the line connecting 'interpreted space' and 'mediating thoughts and feelings'. Relevant guidance discourages the use of double-headed arrows, as noted in section 12.4.1.
[763] This is not necessarily a deliberate cost-benefit calculation in an economic 'rational choice' paradigm but is closer to the intuitive and subjectively rational decision-making described in the situational crime prevention literature (e.g., Cornish and Clarke, 2017: see Box 3 in Chapter 2).
[764] As noted in section 7.5.4, speaking of 'variables', 'mediators' and 'moderators' is associated with quantitatively oriented studies, but it is also possible and advocated in qualitatively oriented research (Gläser and Laudel, 2010; Miles et al., 2014). A difference is that 'variables' are conceptualised more broadly in qualitative studies (Gläser and Laudel, 2010: 78–79). The analysis underpinning the present model was qualitatively oriented (see section 7.5). The presentation of variables and relationships in this chapter must be seen within this qualitatively oriented context.
[765] Keeping in mind that the designation of a variable (e.g., situation) as representing a certain variable type (e.g., independent variable) is not fixed but emerges from specific research interests (Gläser and Laudel, 2010: 80).
[766] The 'physical environment' is of limited relevance to a sociological perspective and the assumed starting point was therefore 'perceived space' (see also section 13.6.1).

dependent variable (centre left and top row in the figure). Figure 38 shows the general substance use position in bold as the moderator of most interest to the present study.

Subsequent sections present the thesis results as possible elements within this theory of situated substance use. Following the structure of the results chapters in Part 3, separate sections are devoted to the *situation* as the conceptual independent variable (section 13.2.2), to *dimensions of space construal* as the mediators of greatest interest to the present study (section 13.2.3), and to *situated substance use patterns* as the conceptual dependent variable (section 13.2.4) (i.e., the three boxes with underlined headings in Figure 38). Section 13.2.5 then ties these elements together to answer the main research question by exploring their *relationships*. Before that, the next section clarifies the meaning of 'theory' as used here.

On proposing a 'theory'

As noted in Chapter 2, 'theory' can be understood in prevention research to refer to "a set of interrelated concepts that are used to describe, explain and predict how various aspects of human behaviour are related to each other" (EMCDDA, 2019: 44). In his article "*The Meaning of 'Theory'*", Abend (2008) describes seven notions of the word 'theory' in sociology, which he labels "theory$_1$", "theory$_2$", and so on. To avoid confusion, authors speaking of 'theory' should clarify which notion they have in mind (Abend, 2008: 192). On this basis, the pathways in Chapter 12 each offer a theory, namely in the sense of Abend's "theory$_2$". Theory in this sense seeks to explain how a *specific* event occurred, and it can therefore be based on a singular case (Abend, 2008: 178, 183). By contrast, "theory$_1$" seeks to offer "a *general* proposition, or logically-connected system of general propositions, which establishes a relationship between two or more variables […] independently of things like time and place" (Abend, 2008: 177, emphasis added). This description echoes the EMCDDA definition cited above, and it reflects conceptions of 'sociological theory' (or 'middle-range theory') from the 1960s onwards as a middle ground between "Grand theory" and "Plain Empiricism" (Swedberg, 2017: 191–192). Figure 38 is a step toward theory in this sense of 'theory$_1$', as it builds upon the specific pathways to offer *a more generalised account of situated substance use*.

The present model is thus located between Abend's (2008) "theory$_1$" and "theory$_2$": the model is more general than the specific pathways in Chapter 12 upon which it is based, but due to the study's limitations (see section 13.4) it is not general in a sense of broad applicability. Phrases such as 'outline', 'a step toward' and 'more generalised' are purposefully used above to highlight this. Future research could build upon this and other models (including from other disciplines) to offer a comprehensive model of situated substance use or broader phenomena (e.g., intention-behaviour gap), but such abstraction was beyond the present scope. Having

clarified how the present text may qualify as proposing theory, the following sections present the socio-spatial elements which are part of the theory emerging from this thesis.

13.2.2. Settings and situations

The starting point in the empirical study was spaces in study participants' lives: places, settings or situations[767] that were part of everyday routines or otherwise personally important or relevant to participants' substance use. The research questions were: *what settings and situations could be part of everyday life;* and *what could be key components of everyday situations, beyond setting?*

In total, 24 study participants listed 296 everyday spaces[768] (12 spaces on average). Content analysis of these specific spaces produced *17 types of setting*: own home; parents' home; partner's home; home of friends or acquaintances; home of relatives or family acquaintances; university; workplace; café, bar, or restaurant; nightclub; sports facilities; other leisure facilities; nature; urban spaces; shopping; public transport; car; and holiday/work trip (see section 9.2). The most commonly mentioned settings in this sample were own home, café/bar/restaurant, university, nature, and workplace. Given the study focus on substance use, it was noteworthy that nightclubs were one of the least frequently listed spaces in this sample, included by only four participants and generally considered unimportant (see section 9.2.9).

The settings in this sample are similar to those in the reviewed literature (shown in Appendix C.4). However, the literature review in section 4.1.4 found that while the existing evidence base *as a whole* cover many settings, *individual* studies typically focus on a limited number and range of settings. The findings thus illustrate the range of settings that can feature in substance users' lives and show how a greater range of settings can be covered in individual studies.

The analysis suggested, however, that the setting was not always the salient feature for study participants, either because the space was not associated with a single setting or because another feature was more prominent (see section 9.3.1). The labels given to everyday spaces by participants (e.g., "My apartment for studying", "Children", "Restaurant in the evening") suggested that salient features of everyday situations can include *setting,* but also *activity,*

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[767] The term 'situation' was used to clarify that situations which are not bound to a place or setting could be included (e.g., meeting the same friend in different locations). Such situations are in line with the relational conceptualisation of 'space' in the present thesis. Section 3.2.3 also suggested that the term 'situation' can make the sociological concept of 'space' more accessible to audiences who are not socio-spatial theorists (e.g., study participants).

[768] Where multiple different situations were associated with the same place or setting (e.g., eating at the university, studying at the university), these were counted as separate everyday spaces: the same place or setting could thus be part of different spaces. This was in line with how 'space' was understood in the present study. Chapter 3 offers further clarifications regarding the terms 'space', 'place' and 'setting'.

people or time (see section 9.3.1). This corresponded to the literature, as people, activities, place and time were found to be the most researched socio-spatial aspects (see section 4.1.4). Setting, activity, people and time have also been used to define types of drinking occasions (e.g., Härkönen et al., 2013; Mustonen et al., 2014; Ally et al., 2016).

Further content analysis of the space labels produced *nine types of everyday situations*: at home[769]; study and work; pauses; in company; going out and party; hobbies and leisure; eating and other food-related situations; holiday and other travel; and in transit (see section 9.3.2). A comparison between the two classifications – i.e., via the setting or the situation – showed that the same kind of situation (e.g., being in company) could be associated with *many* settings, while most settings were associated with *one* particular type of situation. However, the analysis also revealed that settings often 'contained' very diverse situations. Some settings (e.g., own home; café, bar or restaurant) were especially likely to be associated with several different situations, even *within* participants[770]. Settings thus differ in terms of how rigid or flexible they are (i.e., the range of situations they are typically associated with), suggesting that the extent to which a setting determines outcomes may depend on the specific type of setting[771]. 'Setting' should therefore not be regarded by default as a reliable proxy for 'situation'.

This is a departure from the current state of the art, which does not systematically consider such differences. The study thus makes a valuable contribution by highlighting the difference between 'setting' and 'situation' and by suggesting a possible typology of everyday situations. Moreover, the idea that a setting can be flexible or rigid regarding the typical situations it affords may be a useful concept for future research.

The analysis of pathways (see section 12.4) also highlighted physical/material aspects, formal norms and pivotal moments (e.g., other people's actions) as potential key components of everyday situations at a more detailed level. Again, these aspects resemble the socio-spatial aspects generally covered in the existing literature (as noted in section 4.1.4).

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[769] This was less about 'home' as a setting but referred rather to the *state* of being at home (e.g., going about everyday routines, engaging in spontaneous social interactions, doing 'nothing'), as explained in section 9.3.2.
[770] For example, on average, participants reported two different situations for their own home (see section 9.2.1).
[771] For example, the range of typical situations related to a supermarket is very narrow, compared with the range of typical situations related to one's own home. It can thus be argued that in the supermarket, 'setting' determines the specific situation to a large extent, whereas at home, other factors beside the setting (e.g., activity, people, time) are more influential in shaping specific situations (see also section 12.2).

13.2.3. Dimensions for space construal

A key interest of the present study lay in the following question: *what socio-spatial aspects do people refer to when interpreting their everyday spaces?*

As noted in section 13.1, repertory grid technique was used to elicit 'personal constructs' that study participants held concerning their everyday spaces and which, in this context, were understood as 'construed socio-spatial aspects'. The phrase 'construed socio-spatial aspects' expresses that these aspects:

- are related to the environment;
- have a social component, such as being invested with socially produced meaning; and
- are construed as being a part of the space (cf. all the aspects that are objectively present in a given situation but do not feature in a person's understanding of the space).

They are conceptualised as situated neither solely in the environment nor solely in the person. To distinguish them from the aspects described under 'situation' (i.e., setting, activity, people, time), the aspects discussed here are labelled 'dimensions for space construal'.

Across the 24 study participants, 108 personal constructs were generated (4-5 constructs on average). Content analysis and cluster analysis were combined to group similar constructs, resulting in *12 dimensions*: closeness to people; orientation; togetherness of activity; changeability; enjoyment; relaxation; type of social gathering; substance use expectations; freedom of choice; self-presentation; physical pleasantness; and sense of time (see Chapter 10 for detailed descriptions). Elicited constructs most commonly referred to the perceived relationship with the people present ('closeness to people') and to whether study participants were focussed on interacting with others (the outside world) or themselves (their inner world) ('orientation'). Overall, 'closeness to people' appeared as the most important construct for the study participants as a group.

Substance use was directly addressed in the dimension 'substance use expectations' (i.e., whether substance use was considered to be opposed, inappropriate, acceptable, or expected by participants or others in a space, see section 10.2.8). Only two participants referred to substance use related restrictions in their constructs (i.e., not being able to smoke cigarettes because it would bother other people). Constructs relating to alcohol use also featured in the dimension 'type of social gathering', which distinguished 'cosy get-togethers' from 'party and excess'. Neither dimension was frequently elicited; constructs from both dimensions together represented seven participants (29% of 24). This may reflect sample characteristics (e.g., many participants with lighter use patterns). Another consideration is that participants were

asked to consider their spaces in terms of what they "liked or disliked" about them (see section 6.2.5). A different interview prompt, mentioning substance use, would have elicited more constructs referring directly to substance use[772]. However, a neutral prompt was chosen here to avoid producing results that would reflect the interview prompt more strongly than participants' actual construal of everyday spaces. Overall, in this sample, substance use did not appear to be a key dimension for the construal of spaces. An explanation may be that when people think of spaces, they construe them firstly along other dimensions (e.g., how close they feel to the people[773]), with substance use related constructs only of secondary importance.

In terms of prior assumptions, the initial question was whether elicited constructs would mirror the aspects of space constitution proposed by socio-spatial theorist Löw (2001, 2016; see Chapter 3)[774]. The present dimensions correspond to some of Löw's proposed aspects (e.g., 'physical pleasantness', 'changeability' ≈ atmospheres, routines, deviation/change) but they emphasise the personal and emotional nature of spaces and their constituting elements more strongly. For example, while Löw considers 'people', the present dimensions emphasise the *closeness* to people (rather than people as such) as the key aspect. The personal nature of elicited constructs also emerges when applying Gustafson's (2001) 'self-others-environment' triangle (see section 4.1.3), as most of the 12 dimensions map onto the positions of 'self', 'self-others', 'self-environment' or 'self-others-environment' (but not the positions unrelated to 'self').

Considering similar repertory grid studies (see sections 4.1.3 and 4.1.6), the elicited constructs and resulting dimensions were very similar to those of Harrison and Sarre (1975), but differed from those in the other studies, which were rather like objective descriptors of space (Schmidt and Sapsford, 1995; Wan and Shen, 2015; Müller, 2018) or more specifically about substance use contexts, functions and effects (Scriven et al., 1989; Gains and Thomson, 1990; Lynch, 1995; Shek, 2012). The reasons for this are likely methodological, as Harrison and Sarre's study was most similar methodologically to the present study (e.g., types of spaces, researcher interest). The proposed 12 dimensions are more specific and nuanced than Harrison and Sarre's broad categories (shown in Table 5, p. 131) and thus extend this previous work.

Regarding the substance use literature (see sections 4.1.4 to 4.1.6), there is considerable correspondence between the present research and this body of work in terms of socio-spatial aspects. The reviewed literature frequently incorporated a 'closeness to people' dimension by

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[772] This was the case in the pilot study conducted in preparation for the present research (see section 6.2.5).
[773] An analysis of the constructs allocated to 'type of social gathering' found that these were closely related to 'closeness to people' (see section 10.2.7).
[774] A comparison with Löw was the initial focus of the present project, but due to the change in focus (i.e., substance use, see section 1.2.1), it is not appropriate to discuss this question at length in the present thesis. This text therefore only provides some pointers in this regard.

distinguishing, for example, close friends from less well-known people. Socio-spatial aspects in the literature also resembled specific constructs elicited in the present study (e.g., around special occasions, leisure vs. work, partying, drinking games, perceived norms, surveillance, cleanliness, duration of occasion, spontaneity). In terms of differences, the dimension 'freedom of choice' did not seem to be well represented in the existing literature[775], suggesting that this could be included in future research. Conversely, the literature referred to socio-spatial aspects (e.g., entrance fees, staffing, availability of safety measures, fear of crime) which did not feature in the elicited constructs, likely because these were specific to settings which played only a minor role in the present sample (e.g., nightclubs).

Considering how prior reviews categorised socio-spatial aspects (see section 4.1.5), these referred rather to tangible aspects such as those covered under 'situation' in Figure 38 above. However, labels such as 'internal/psychological states' in the literature referred to similar phenomena as those represented by the 12 proposed dimensions[776]. Hence, while the present study positioned aspects such as 'stress', 'loneliness' or 'outward orientation' rather *between* the situation and the individual, existing reviews positioned these rather *within the individual*. This likely reflects different disciplinary approaches (e.g., sociology vs. psychology).

Although this discussion supports the proposed dimensions, they are not a definite list of aspects for space construal. This is partially due to the sample limitations (noted in section 13.4.4). In addition, elicited constructs were frequently complex, referred to tangible features (manifest characteristics of space) *as well as*[777] meanings (latent ways of construing), and they often included miniature causal chains[778]. 'Construed socio-spatial aspects' can hence be defined at different levels, and the present research explored several options (documented in Appendix I.1). The 12 dimensions suggested here were chosen as the most concise solution to categorising the repertory grid data (i.e., smallest number of categories)[779]. To achieve this, the analysis focussed on latent ways of construing space rather than manifest characteristics (see section 10.3). Figure 38 accounts for both types of construed socio-spatial aspects by including one box for the *manifest* aspects (e.g., setting, activity, people, time; 'situation') and

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[775] The dimension 'freedom of choice' as conceptualised here did *not* refer to peer pressure to use substances but to how much influence study participants felt they had over a given situation in general (see section 10.2.9).
[776] Stevely et al. referred to these as 'meaning' in one paper (Stevely et al., 2020b) and as 'psychological states' in another paper (Stevely et al., 2020a).
[777] More than half of 108 elicited constructs referred to intangible *and* tangible aspects (n=58) (e.g., 'people I know well and like vs. people I don't know so well', 'relaxation, fun, merry vs. effortful, work, not fun'), while about a quarter of elicited constructs referred to intangible aspects *only* (e.g., 'doing something for myself vs. doing something for the others', 'voluntary, free choice vs. contents are predetermined') and less than a fifth referred to tangible aspects *only* (e.g., 'older people vs. younger people', 'short time, time-limited vs. longer duration').
[778] See section 10.3 for examples.
[779] With the exception of 'substance use expectations': a dimension which could have been subsumed elsewhere but was left separate due to its relevance to the study topic (see section 10.2.8).

one box for the 12 *latent* dimensions discussed here. To make the difference clearer, the former box is labelled 'perceived space', while the latter box is labelled 'interpreted space'[780].

Through this contrast with tangible aspects, the 12 dimensions for space construal emerge as the conceptual core and key contribution of the present study. In other words, the *interpretation* of a situation (including its tangible and symbolic aspects) is proposed as a key mediator in the relationship between situation and situated substance use or abstinence.

13.2.4. Situated substance use patterns

The outcome of interest in the present study was situated substance use and abstinence[781], especially with regard to alcoholic beverages and cigarettes. The key question was: *what situated substance use patterns could be distinguished in relation to alcohol and cigarettes?*

Theoretical considerations were combined with principal component analysis and hierarchical cluster analysis of situated substance use[782] and other data (e.g., valence[783]) to group study participants' everyday spaces. The resulting typology identified *eight major*[784] *patterns of situated substance use and abstinence*:

- spaces associated with no or rare substance use and positive feelings;
- spaces associated with no or rare substance use and ambivalent or negative feelings;
- spaces associated with wine or beer[785];

[780] This labelling is not ideal, as it may suggest that 'perception' is limited to perception via the bodily senses and introduces a distinction between 'perception' and 'interpretation' (whereas the present thesis understands 'perception' more broadly and as including interpretation, see section 3.2.1). However, it captures the *construed* nature of socio-spatial aspects in both cases, while distinguishing between rather manifest and rather latent aspects.
[781] Although 'abstinence' can be understood as purposeful restraint or as referring to abstinence in situations (e.g., parties) that are commonly associated with substance use (e.g., Parder's, 2018, 'situational abstinence' implies this meaning), the present thesis refers to *de facto* abstinence, i.e., the fact that substances are not used (regardless of motivation or context). To avoid misunderstandings, the thesis generally speaks of 'spaces of no or rare substance use' (rather than 'spaces of abstinence') but occasionally uses the term 'abstinence' for increased readability.
[782] The interview question was: "If you think of your chosen typical situation in this space, how often do you consume [substance/product] in this typical situation: never, rarely, occasionally, often, or always?" (see section 6.2.3).
[783] The interview question was: "If you think of this space and the typical situation, what feelings do you have: positive, rather positive, ambivalent, rather negative, or negative? 'Ambivalent' can mean that it is neither positive nor negative or positive as well as negative" (see section 6.2.3).
[784] The typology was not developed as an end in itself but to allow subsequent quantitative analyses (described in the next subsection); it therefore had to meet certain specifications. The numeric analyses suggested additional situated patterns (e.g., distinguishing spaces associated with spirits and mixed drinks depending on whether they were associated with positive or ambivalent/negative feelings), but these could not be included in the final typology because they represented too few spaces. Section 7.3.3 offers further details in this regard.
[785] Beer and wine spaces could not be distinguished in this sample because spaces tended to be associated with both products; there was, however, a distinct group of spaces associated with spirits or mixed drinks, and these were included in the typology as a separate pattern. As described in section 7.3.3, the data did not suggest the need for a distinction of 'wine/beer' spaces based on feelings.

- spaces associated with spirits or mixed drinks[786];
- spaces associated with cigarette use and positive feelings;
- spaces associated with cigarette use and ambivalent or negative feelings;
- spaces associated with cigarettes *and* beer or wine; and
- spaces associated with cigarettes *and* spirits or mixed drinks.

For a space to be considered 'associated with' a particular product, participants had to have reported at least occasional use of the stated product in that space and no or only rare use of other products[787]. Results from prior repertory grid research on alcoholic beverages (Scriven et al., 1989; Gains and Thomson, 1990) suggest that further distinctions are possible (e.g., between different brands of beer), but this level of detail was not pursued in the present study. While these prior studies considered the perceived "appropriateness" of beverages for different contexts (reviewed in section 4.1.6), the present study considered actual substance use patterns (measured via self-report)[788].

In terms of prior assumptions, valence had only been considered in relation to spaces of no or rare substance use before the analysis[789]. During the numeric analyses, valence emerged as a distinguishing factor in relation to no or rare substance use, cigarette use, and (to a lesser extent) the use of spirits or mixed drinks, but *not* in relation to spaces associated primarily with beer or wine. This finding likely reflects different functions and contexts linked to different substances/products (e.g., beer and wine more likely to be used in positively construed situations in this sample).

Chapter 11 characterises each identified pattern in detail; only a few points can be highlighted here. In this sample of 273[790] everyday spaces from 24 study participants, just over half of spaces represented *no or rare substance use*, and these occurred more frequently than spaces associated with alcohol or cigarette use (on average: weekly vs. monthly). Most spaces

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[786] 'Mixed drinks' includes pre-mixed drinks as well as drinks which study participants mixed themselves, and some participants used the terms 'spirits' and 'mixed drinks' interchangeably. As described in section 7.3.3, the data suggested a distinction of 'spirits/mixed drinks' spaces based on feelings, but it was not possible to implement this distinction in the typology because of the low number of spaces associated with spirits or mixed drinks.

[787] Exception: For 'spirits or mixed drinks' spaces, there were no limits placed on the use of other alcoholic beverages, as spaces associated with spirits or mixed drinks were also typically associated with beer or wine use.

[788] A consideration in this regard is that while beer brands may be construed in a nuanced way in terms of 'appropriateness' (e.g., reflecting their marketing), such nuances may matter less for actual use because 'choice' of brand in real-life situations may be determined by other factors (e.g., personal preference, habit, 'whatever is available', what friends are drinking).

[789] Spaces of no or rare substance use associated with positive feelings (labelled 'NSU pos' in this thesis) were considered as 'ideal' spaces from a prevention perspective and were included as a key reference space in subsequent analyses. The study author did not wish to label spaces associated with *ambivalent or negative* feelings as 'ideal' from a prevention perspective, thus 'valence' was a factor during the theoretical considerations.

[790] Although 296 spaces were elicited, only 273 spaces were considered during the repertory grid interviews (see description of 'dropped' spaces in section 6.2.4), and these analyses were limited to this subset.

of no or rare substance use were associated with positive feelings, and these spaces were similar to participants' hypothetical ideal spaces[791]. These are important findings because abstinence can be viewed negatively (e.g., as 'boring' or something to be mocked about, as shown by Supski et al., 2017, and Parder, 2018), yet the present study found that, at least in this sample, most spaces of no or rare substance use were experienced positively. At the same time, the research found striking differences between spaces of no or rare substance use associated with positive feelings and those associated with ambivalent/negative feelings, highlighting the heterogeneity of situations that can represent no or rare substance use. The research also points to the existence of a large number of spaces of no or rare substance use which are under-researched in the existing literature.

Just under half of all spaces were associated with *alcohol or cigarette use*. Here, spaces associated primarily with alcohol (especially wine or beer) were the most common category. These patterns likely reflected the sample characteristics (e.g., mostly non-smokers under high pressure to perform well academically), and future studies might explore how such situated substance use patterns are distributed in other populations.

The literature review suggested that studies exploring such patterns are currently rare. Existing research typically focusses on groups of *individuals* (e.g., non-smokers vs. daily smokers, lighter vs. heavier drinkers, or in the case of Purshouse et al. (2017), different types of heavier drinkers). To consider the grouping of and distribution of different substance use *situations* is still novel. Section 4.1.6 reviewed one such study (Ally et al., 2016) which focussed on alcohol only, and similar research is reported by Härkönen et al. (2013) and Mustonen et al. (2014). In these studies, drinking occasions were grouped into types based on whether they represented light/heavy drinking and considering the setting, activity, people and/or time they were associated with. The resulting typologies were thus similar to the typology of everyday situations described earlier in section 13.2.2. The present typology of situated substance use patterns differs by including spaces of *no or rare* substance use and by considering *combinations* of alcoholic beverages and cigarettes. Setting, activity, people and time are considered in the overall framework, but as *starting points* for a substance use event ('situation' in Figure 38, p. 531). By contrast, they appear as endpoints in the logic of the works referenced above. Either approach is justifiable; in the present study, treating the situation as the starting point facilitated the exploration of event-level mechanisms.

[791] However, spaces associated with wine or beer, as well as spaces associated with cigarettes and positive feelings, appeared to correspond most strongly to how participants imagined 'an ideal space of total well-being'.

While prior research (e.g., Mustonen et al., 2014; Ally et al., 2016) has considered situated substance use patterns across entire populations, the present thesis also explored the patterning of spaces in relation to each other and within individual participants (see section 11.7). This analysis suggested, for example, that cigarette use reduces the number of spaces of no or rare substance use in a person's life to a greater extent than alcohol use. This finding can be readily explained with reference to typical use contexts and physiological effects, but the analysis tried to quantify this by assuming a standardised individual 'map' consisting of 10 spaces. In the present sample, if such a standardised map contained spaces associated with wine or beer, there were circa six spaces of no or rare substance use on average, but if the map contained spaces associated with cigarettes and positive feelings, it contained circa three spaces of no or rare substance use. Whilst the methods employed for these analyses were highly exploratory, this research may be the first attempt to examine how situated substance use patterns co-occur and how they are distributed within individuals. More sophisticated approaches could be used in the future (e.g., accounting for different substance user profiles).

The literature review showed that existing research typically accounted for only one substance at a time (mostly alcohol) and did not systematically consider combinations of multiple substances/products as outcomes. The typology presented here thus addresses an important research gap by showing that substance users combine multiple substances/products (e.g., alcoholic beverages and cigarettes) in distinct, routinised and socio-spatially embedded ways (e.g., different patterns associated with different settings, see below), and that research can systematically consider various real-life combinations. The typology presented above is specific to the sample included in this study but may serve as an example and starting point for the development of typologies with broader applicability.

The analysis of example pathways in Chapter 12 enhanced the above typology by highlighting additional outcomes. The pathways suggested, for example, that feelings about substance use or abstinence in a space do not necessarily reflect how the space is experienced *overall* (e.g., a space may be construed positively even if the abstinence within that space is experienced negatively). Hence, Figure 38 distinguishes 'experience of substance use/abstinence' from 'overall experience of the space'. It was beyond the present thesis to incorporate such details into the above typology of situated substance use patterns, but Figure 38 lists example outcome categories based on the qualitative data for consideration in future research.

13.2.5. Connecting substance use and space

The previous subsections outlined the main socio-spatial elements of the proposed theory:

- perceived space (situation), based on manifest components (e.g., setting, activity, people, time);
- interpreted space, construed along latent dimensions; and
- situated patterns relating to the use of alcohol or cigarettes or abstinence.

These three elements emerged from a draft conceptual model (shown in section 4.2.4) in combination with the empirical analysis of repertory grid data and interview transcripts. Unanswered thus far is the question of how these are related, in line with this study's overall research question: *how do construed socio-spatial aspects relate to situated substance use?* This question was the focus of Chapter 12, and the following sections summarise that chapter.

To what extent are situated substance use patterns associated with settings or situations?

The existing literature often focusses on setting and other manifest aspects of space. These can also be understood as construed socio-spatial aspects. Therefore, section 12.2 explored relationships between situation and situated substance use, operationalising 'situation' first as limited to setting and then using the draft typology of nine everyday situations developed in the present project (summarised in section 13.2.2).

With regard to setting, the analysis found a *highly significant and moderate to strong relationship* between setting and situated substance use. Most settings were more likely to be associated with no or rare substance use; however, partner's home, homes of friends, relatives or acquaintances, café/bar/restaurant, nightclub and holiday settings were more likely to be associated with alcohol or cigarette use in this sample. Considering detailed combinations of substances and products, the trend was less clear, as the same setting could be associated with several substance use patterns (e.g., 'café/bar/restaurant' in Table 34, p. 463). A strong relationship between setting and situated substance use was expected, as settings were understood as institutionalised arrangements associated with routinised forms of spacing and socio-spatial synthesis (see Chapter 3). It also supports the findings of prior research (see section 4.1.5). At the same time, it was somewhat unexpected, given that analyses in Chapter 9 had found a certain disconnect between setting and situation, particularly in relation to study participants' own home and café/bar/restaurant settings. Such diversity of situations was in fact evident from the substance use data (Table 34, p. 463). A possible conclusion is that, overall, settings are associated with certain situations and substance use patterns, but that a

greater variety of situations and patterns emerge at more detailed levels of analysis. Situated substance use outcomes can be predicted best for settings that are rigid in the sense of being associated with few, highly routinised situations (e.g., supermarket, nightclub).

With regard to 'situation' (using the typology of everyday situations developed in this project), the analysis found a *highly significant and strong relationship* between situation and situated substance use. Studying or working, pursuing hobbies or leisure activities, being at home, and being in transit (e.g., on the subway) were associated with no or rare substance use. By contrast, going out or partying, being in the company of others, eating, taking a break (e.g., from studying), and being on holiday were more likely to be associated with alcohol or cigarette use. Almost all (93%) spaces labelled as 'partying', 'going out', etc. were associated with alcohol or cigarette use. In support of a relationship between situation and substance use, literature reviews have also found that people, activity and time are predictive of substance use (see section 4.1.5), as has research on typologies of drinking occasions (e.g., Ally et al., 2016). The present research adds to the literature by specifying situations associated with no or rare substance use, and by covering a broader range of situations.

Given the critique of an exclusively setting-based approach in section 9.3, a point of interest was whether the broader concept of 'situation' would be a better statistical predictor of situated substance use than 'setting' alone. The results found that considering the broader situation (e.g., including activity) improved the ability to predict substance use patterns, for example, because differences between 'study/work' and 'pause' situations in the same setting could be accounted for. The improvement was only small; the strong relationship between setting and situated substance use likely limited potential for further improvement. Another consideration is that the typology of everyday situations used here was preliminary[792], developed on an ad hoc basis. Future research could seek to develop (or refer to) sophisticated situational typologies to explore how these can 'predict' situated substance use patterns.

Which dimensions for space construal are relevant to distinguish between situated substance use patterns?

While setting and situation refer to manifest aspects of space construal, the core contribution of this thesis lies in the identification of latent dimensions. Section 12.3 considered how these may relate to situated substance use, based on comparisons[793] between the identified situated

[792] For example, the types were overlapping and there was still considerable heterogeneity of situations *within* types.
[793] Spaces of no or rare substance use associated with positive feelings (labelled 'NSU pos' in this thesis) were considered as 'ideal' spaces from a prevention perspective and were included as a key reference space in the

substance use patterns as well as other sources (see 'triangulation' in section 7.4.4). As will be noted in section 13.4, the ability to carry out calculations and draw conclusions was limited by missing data. Nevertheless, the analysis showed that *most of the 12 identified dimensions could distinguish spaces of no or rare substance use from spaces associated with alcohol or cigarette use*.

One prior assumption was that substance use might be linked to a few dimensions in a predictable way, but this was only partially supported by the data (also discussed in section 13.5.2). Overall, in this sample[794], spaces associated with alcohol or cigarette use were associated with a different orientation[795], greater togetherness of activity, more enjoyment, more relaxation, a greater orientation toward party and excess, stronger expectations pro substance use, less need to monitor one's appearance and actions, and a less structured sense of time (compared with spaces of no or rare substance use; Table 36, p. 467)[796]. These findings are in line with the literature, and the present study adds to the literature by offering a structured framework to describe such differences. *Most dimensions could also be used to distinguish between detailed types of situated substance use pattern*. 'Physical pleasantness', which referred most directly to physical/material aspects, did not emerge as a key distinguishing dimension, likely because the spaces included within each pattern were heterogeneous in terms of their material arrangements. The dimensions could also be used to predict whether a space would be experienced positively or negatively.

One way to interpret these data is to see them as indicating (implicit[797]) 'associations', for example, in the context of situated conceptualisations (Papies and Barsalou, 2015; Keesman et al., 2018), and Figure 38 refers to them as 'associations' in the 'outcomes' box. Whilst they could also be conceptualised as 'outcome expectancies' (e.g., as the "explicit or implicit beliefs about the likely results of alcohol consumption", Monk and Heim, 2013: 539), such parallels would have to be drawn with caution. For example, there was a pattern of cigarette use associated with ambivalent/negative feelings and stress, suggesting that the associations

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analysis. Another key reference space was study participants' own 'ideal' space. This was an additional, fictional space which participants were asked to imagine as 'a hypothetical space of total well-being' (see section 6.2.6). All types were compared with these references spaces. Additional comparisons were undertaken, for example, to tease out differences between similar types (see section 7.4.3).

[794] The thesis identified differences between users groups (e.g., lighter versus heavier users, occasional versus daily smokers) in terms of how they construed spaces. Due to very small sample sizes, these differences could not be explored systematically, but section 11.6 and Appendix M offer some pointers.

[795] For 'orientation', substance use spaces differed from spaces of no or rare substance use in that *cigarette* spaces tended to be construed as more inward-oriented, while *alcohol* spaces tended to be construed as more outward-oriented than spaces of no or rare substance use.

[796] Section 13.5.2 will show that a more nuanced picture emerges when spaces of no or rare substance use are distinguished further by valence (i.e., positive/negative feelings).

[797] These associations were explored during data analyses after the interviews, and so it is unknown to what extent study participants held these associations explicitly.

captured here describe the situation that 'prompts' substance use rather than the situation that study participants hope to 'produce' through substance use. Outcome expectancies were rather conceptualised as perceived substance use 'effects' (a separate box in Figure 38).

How do socio-spatial aspects produce specific instances of situated substance use?

A limitation of the above analyses was that causality and underpinning mechanisms remained unclear. Section 12.4 therefore reconstructed seven example[798] pathways (representing 17 situations from participants' lives) to explore the event-level interplay of socio-spatial and other factors. This part of the thesis combined qualitative content analysis, causation coding and network display techniques to analyse the interview transcripts (see section 7.5). A common visual structure was developed to display the findings, which later became the basis for the visual theory shown in Figure 38. The following notes therefore apply to the pathway displays in Chapter 12 and to Figure 38 in this chapter[799]. Sections 12.4.3 to 12.4.9 described each pathway, while section 12.5 summarised the findings through assertions[800].

The main question was how the findings would compare with the ex-ante defined conceptual model (see section 4.2.4)[801]. The empirical analysis *supported some of the prior assumptions* visualised in that model. For example, the data confirmed that a person's general substance use position (e.g., substance user identity) and other factors unrelated to substance use (e.g., general interests) moderate the relationship between 'perceived' space and 'interpreted' space (assertion #1 in section 12.5). The pathways further confirmed the value of conceptualising socio-spatial aspects as intermediaries between the situation and other thoughts and feelings (assertion #3). They also showed that the experience of specific substance use events affects future substance use by influencing a person's general substance use position (assertion #6), though the empirical data suggested that this was not direct but mediated by changes in perceived substance use 'effects' (i.e., outcome expectancies). The data also supported Löw's (2001, 2016) inclusion of 'memory' and 'imagination' as important elements of socio-spatial synthesis, as situational substance use or abstinence occasionally emerged as a reaction or pre-emptive action relating to remembered or imagined spaces (assertion #6).

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[798] The example pathways represented a variety of situated substance use patterns, settings, dimensions for space construal, feelings, and potential conflicts between individual preferences/intentions and situation (overview tables are provided in section 12.4).
[799] For details regarding the graphical display format, see the explanatory notes in section 12.4.1.
[800] Assertions were numbered #1 to #8 and are referenced in this subsection to increase the transparency of the conclusions.
[801] Initially it was intended to revise the draft conceptual model using the empirical data, but finally it was decided to build a new model (shown in Figure 38) integrating the empirically derived pathways. This also allowed for a better comparison between prior assumptions and empirical findings.

Importantly, the empirical data helped to *develop the conceptual model further*, adding more details to the variables included in the model[802]. This was especially noteworthy with regard to the outcomes. The draft model had focussed on the situated substance use pattern in a narrow sense, but the pathways identified a range of other outcomes related to and extending beyond the immediate situation (see section 12.5, assertion #7). Literature reviews (e.g., Stevely et al., 2020b) have identified a need for a broader range of outcome measures to be considered. The present research supports this argument and offers, through the example pathways, illustrative data in this regard.

Another instance where the empirical data added detail to the draft model related to the general substance use position[803]. The draft conceptual model had considered the general use pattern as well as substance use attitudes, intentions, beliefs, and so on. This was in line with existing research which considers, for example, levels of substance use and motives as moderators. The empirical data added to this the importance of subjective *rules* that participants' held concerning their use: an aspect that does not seem to have been covered much in this literature thus far. These rules specified (subjectively) necessary and sufficient conditions for use and abstinence by defining, for example, acceptable functions and contexts of substance use. The rules seemed to reflect public discourse (e.g., about what constitutes 'problematic' use) as well as participants' own experiences (e.g., of negative consequences and how to avoid them)[804]. Importantly, as conceptualised here, these were *de facto* rules that described participants' *actual* substance use practices (cf. intentions). Substance use then depended on how a situation met those conditions (assertion #4). The analyses suggested, however, that such rules also contain exceptions (i.e., certain contexts under which otherwise undesired use becomes desirable, e.g., at special occasions). Therefore, a situation at odds with general substance use preferences and intentions may *not* be experienced as creating an inner conflict, namely if it corresponds to a relevant exception (assertion #5). In some cases, study participants seemed to be aware of those 'exception' rules, in other cases not[805]. One question

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[802] In other cases, the empirical data led to the exclusion of certain elements from the final model. This concerned, for example, the 'decision' box which had been included in the draft conceptual model (see section 4.2.4). The inclusion of this box was questioned from the beginning due to being conceptually problematic (e.g., it could be understood as suggesting a deliberate and fully conscious act). During data analysis, it could also not be clearly distinguished from outcomes, leaving no basis for its inclusion in the final model.

[803] The term 'general substance use position' is introduced in this thesis to refer to an individual's routines, views and attitudes, identity, preferences, intentions, rules and beliefs regarding substance use in general and their own use in particular, which they hold independently of specific situations (though specific situations shape the general substance use position). The term was purposefully chosen as an all-encompassing and theoretically neutral term.

[804] In relation to this, perceived substance use 'effects' were conceptualised in the draft model as part of the general substance use position. Empirically, they emerged rather as an influence on the substance use position, so that they were ultimately placed in a separate box in Figure 38.

[805] This reflected a broader phenomenon, namely that participants could describe what influenced their substance use if they freely talked about situations from their everyday life. However, when asked specifically about such

emerging from the analysis was thus whether behaviours at odds with general preferences and intentions were ever true deviations from the general position or whether they were always in line with acceptable exceptions (assertion #8). The empirical data also showed how, through repetition over time, 'exceptions' may become part of the general substance use position and transform to become the 'standard' rules (e.g., shift from rare to regular user) (assertion #6). Such considerations were not found in the literature reviewed for Chapter 4, and so this may offer useful pointers for future research.

Another set of insights concerned the socio-spatial aspects. The draft model had distinguished 'objective' space from 'subjective' (construed) space, which had helped clarify that 'objective' space would not be studied in the present thesis[806]. The distinction between 'perceived' and 'interpreted' space in Figure 38 does *not* reproduce these two boxes. Rather, 'perceived' and 'interpreted' space represent two different layers *within* 'subjective' (construed) space. Thus, combining theoretical considerations with empirical data suggested that the physical environment (or 'objective' space) is 'perceived' (first construal)[807] and 'interpreted' (second construal). Consequently, the empirical data helped to distinguish two layers of construed socio-spatial aspects: manifest ('perceived') and latent ('interpreted'). The research thus adds to Löw's socio-spatial theory by proposing a second layer of synthesis (further explored in section 13.5.3). It also helps to differentiate between manifest and latent socio-spatial aspects, which are little distinguished in the current substance use literature.

The pathways highlighted that socio-spatial aspects interplay with each other to shape how a space is construed and what actions may result. Such interplay had *not been anticipated* in the draft model which had focussed on relationships between socio-spatial aspects and other factors – but less *among* socio-spatial aspects. The literature review by Stanesby et al. (2019) highlighted the importance of considering sequences and combinations of socio-spatial aspects, but it included mostly manifest aspects and did not offer an overall framework for how aspects interact with each other. In terms of latent dimensions for space construal, the present research found that one dimension (e.g., type of social gathering) could determine how a space was construed on other dimensions (e.g., substance use expectations) (assertion #2 in section 12.5). There were multiple instances where a dimension (e.g., expectations pro substance

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influences, participants produced much simpler explanations, which suggests that they may not perceive relevant factors as such. As a consequence, the pathways developed during the analysis were more complex than participants' own explicit descriptions regarding the mechanisms underpinning their use (assertion #8, section 12.5).

[806] This would have required a different methodological approach (e.g., observations), as well as a different theoretical approach (i.e., not focussed on participants' own synthesis and construing).

[807] 'Perception' means in this context that a person takes in (whether visually or through their other senses) only a selection of what is actually physically available around them (not only because of physical limitations but also because perception is socially structured; see also Löw, 2016: 166). At the same time, it is broader than that because people 'perceive' symbolic relational arrangements (e.g., they see a 'friend', a 'garden'), as per Chapter 3.

use) produced effects (e.g., craving), but only in combination with another dimension (e.g., limited freedom of choice)[808]. Such interrelationships likely explain why section 12.3 found *most* dimensions to be related to situated substance use outcomes. Dimensions could support and strengthen each other (e.g., substance use expectations and closeness to people), but they could also be in conflict with each other (e.g., party as type of social gathering vs. inward orientation) (assertion #4). Dimensions in conflict with each other could prompt participants to take action (including substance use) to resolve such conflicts. In Figure 38, this kind of interplay is indicated using small curved arrows around the box 'interpreted space'[809]. The empirical data also highlighted *circular interplay between the way a situation is interpreted and other mediating thoughts and feelings* (assertion #3)[810], whereas the draft model has assumed a linear relationship. These observations are important because, as literature reviews in Chapter 4 showed, existing research frequently considers socio-spatial aspects in isolation rather than in relation to each other. The present research thus offers some initial data and concepts to help fill this research gap and inspire follow-on work.

Finally, whilst the draft model had anticipated that specific experiences could affect future pathways by changing the general substance use position, the pathways also highlighted the role of associations held by participants. This is a concept also found in the psychological literature (see Chapter 2). The present study found, based on a comparison between two participants, that the details of such associations mattered (e.g., what type of socio-spatial aspect is associated with substance use?). The empirical data led to the hypothesis that substance use associated with and therefore 'prompted' by things (i.e., 'perceived space') may be experienced as less meaningful[811] or be more likely to be assigned new meaning. By contrast, substance use associated with and therefore 'prompted' by the way a space feels (i.e., 'interpreted space') may be more likely to retain its meaning (further explained in assertion #6, section 12.5). A review of the literature on associations was beyond the scope of this thesis, but the literature reviewed in Part 1 did not cover these nuances. For example, Papies et al.'s (2020) grounded-cognition theory of desire, with its concept of situated conceptualisations, does not clearly distinguish different types of socio-spatial aspects, and the present research may help to further develop such theories.

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[808] Substance use expectations were an important factor for situated substance use (e.g., featuring in all example pathways), but the data repeatedly showed that they had to be supported by other dimensions to take effect (further discussed in section 13.5.2).
[809] In principle, such arrows could have also been placed around other boxes (e.g., 'situation') but to keep the figure neat, the curved arrows were limited to 'interpreted space'.
[810] To keep Figure 38 visually simple, this interplay between the two mediating boxes is only indicated using a line without arrows.
[811] For example, it may be attributed merely to 'habit' (see Pathway 5 in Chapter 12).

13.3. Comparison with similar approaches

Part 1 described various theoretical approaches with socio-spatial relevance, including the theories informing environmental prevention (section 2.2), Papies' grounded-cognition theory of desire (Box 2, p. 64), and Duff's assemblages of health (section 3.3.3), amongst others. Section 4.1.6 gave examples of empirical studies using these approaches (Duff, 2014a; Hill et al., 2018a; Hill et al., 2018b; Keesman et al., 2018) and identified additional studies exploring socio-spatial pathways (e.g., Dilkes-Frayne, 2014; Voss, 2015).

Table 39: Similarities and differences between proposed theory and selected other approaches

Approach	Similarities	Differences
Affordances (e.g., Hill, 2014)	• Broad understanding of perception (e.g., not limited to visual perception) • Affordances emerge from relationship between person and environment (≈ 'interpreted space' in present theory)	• Appears to assume relatively unmediated situational pathways (cf. mediated pathways in present theory) • Oriented toward body's physical actions and physical action potentials (e.g., grasping) (cf. opportunities for meaning-making) • Affordances emerge from specific objects (cf. relational arrangements) • Meaning is 'functional' meaning (cf. symbolic, social meaning)
Grounded-cognition theory of desire (e.g., Papies et al., 2020)	• Objects (including substances and products) hold social and symbolic meaning based on individual experience • Objects are remembered and interpreted in context • Mediated pathways via retrieved memories	• Greater focus on detailing cognitive processes that activate memories (cf. socio-spatial interpretation in the present theory) • Key mediators refer to aspects of physical environment and physiological responses (cf. interpretation of the social, symbolic and physical qualities of a space in the present theory)
Assemblages (e.g., Duff, 2014a), actor-network theory (e.g., Dilkes-Frayne, 2014)	• Arrangements as primary units of analysis • Exploring interplay of components within relational arrangements • Emphasis on how substance use is experienced	• Causal model not an aim (cf. factors and visualised pathways in present theory) • Greater focus on material aspects, including specific objects (cf. broader dimensions of space interpretation in present theory)
Hierarchical values (e.g., Voss, 2015)	• Three-part structure (attributes, consequences, values) (≈ perceived space, mediating thoughts/feelings, outcomes in present theory) • Emphasis on how space is experienced	• Activities (e.g., dancing) as part of 'consequences' (cf. as part of 'perceived space' in present theory) • No intermediary step between 'attributes' and 'consequences' (cf. 'interpreted space' as intermediary step in present theory) • Outcomes focus on potential experiences (cf. experiences and behaviours in present study)

A detailed comparison of the newly proposed theory in relation to each approach is not possible here, but Table 39 above identifies similarities and differences with selected approaches. Comparing approaches further highlighted the following strengths of the proposed theory[812]:

- the structured identification and visualisation of potential influences on situated substance use (including relationships among influences);
- the role of interpreted space (e.g., how a space 'feels', its atmosphere, its social and symbolic meaning) as a key mediator (with a suggestion for 12 specific dimensions that can be used to describe how the space is interpreted);
- the inclusion of situational, individual and broader societal influences, with specific examples, and in relation to this, the ability to explain individual and situational differences in outcomes, including why an environmental 'invitation' may be accepted or declined;
- the identification of setting, people, activities, and time as main components of a situation (at least in terms of how it is remembered and construed long-term); and
- the inclusion of a relatively broad range of outcomes (e.g., behaviours, experiences, outcomes beyond the immediate situation).

The comparison also pointed to advantages of existing theories. Existing approaches are more concerned with aspects of the physical environment and thus offer more detail in this regard. In addition, Hill's affordance approach may be better able to explain aspects of substance use below consciousness or aspects that do not hold particular social or symbolic meaning to substance users; Papies et al.'s grounded-cognition theory of desire provides more detail on potential cognitive processes relating to how memories become active in a given situation; and the approaches used by Duff and Dilkes-Frayne (assemblages, actor-network theory) are more suited to capturing how spaces change over the course of a substance use event.

Though there are similarities with all approaches reviewed here, the proposed theory appears to align most closely with Papies et al.'s grounded-cognition theory of desire in terms of explaining how construed socio-spatial aspects may relate to situated substance use. In the grounded-cognition theory of desire, stored 'situated conceptualisations' appear as the key moderator. At first glance, this appears to differ from the 'general substance use position' (and its de-facto rules) included as key moderator in the present theory. However, they are conceptually similar, as both refer to memories of similar situations. The de-facto rules identified in the present study (e.g., 'I only smoke when I'm already relaxed' in Pathway 5) could be understood as the (verbalised) essence of a stored situated conceptualisation (e.g.,

[812] These strengths were also identified in relation to other visual models to explain situated substance use which could not be discussed here (e.g., Rose et al., 2013; Freisthler et al., 2014; Pechey et al., 2020).

alcohol use in company), and the general substance use position can be viewed as the summary of all situated conceptualisations with relevance to substance use. An interesting aspect of the present model is that, if integrated with Papies et al.'s theory, the *interpretation* of a situation in a particular way may also act as a cue to trigger a situated conceptualisation and subsequent action. This was possibly included by Papies and Barsalou (2015: 39) as "internal states", but it may be conceptually clearer in the present model.

13.4. Strengths and limitations

Table 40: Main strengths and limitations of the present study

Aspect	Strengths	Limitations
Situated substance use	• First repertory grid study to examine actual use patterns • Substance use as a meaningful activity • Situated combinations of multiple substances and products ('patterns') • Spaces of no/rare substance use included • Study design to support strengths-based prevention	• Self-report data • Quantitative data collection focussed on substance use frequency (cf. quantity, harm) • Limited to legal substances, especially alcohol and cigarettes
Construed socio-spatial aspects	• Use of sociological theory on space, possibly first substance use study to focus on Löw's 'sociology of space' • Spaces from participants' own life, broad range of settings • Aspects elicited/presented in a structured format	• Certain types of socio-spatial aspects more likely to be identified • Relatively few socio-spatial aspects elicited per participant • Researcher influence on elicitation and categorisation of aspects was greater than planned • Final set of 12 dimensions not reviewed with participants
Relationships between space and substance use	• Mixed-methods study design exploring quantitative and qualitative relationships • Complex relationships between many and varied variables • Tacit relationships considered • Integration of all study findings into a coherent overall model ('visual theory')	• Missing data limited possibilities for quantitative analysis • Established concepts from other literature only implied • Findings not generalised in relation to specific substance use outcomes
Study population	• Sample chosen to represent a potential target population for prevention activities • Self-selection bias reduced through face-to-face recruitment • Study findings likely to be useful for research in other contexts	• Generalisability of findings partially limited by characteristics of study sample • Research with other populations may add further details to theory or suggest additional dimensions • Future research needed to explore transferability of findings beyond sample

The present research has strengths and limitations. This section will focus on those that relate most strongly to the overall research question (i.e., 'how do construed socio-spatial aspects relate to situated substance use?'). The three parts of this question are examined in turn.

Section 13.4.1 considers how the outcome of interest 'situated substance use' was conceptualised and measured, section 13.4.2 considers how 'construed socio-spatial aspects' were developed, and section 13.4.3 addresses how relationships between these variables were established in this study. Section 13.4.4 concludes with a reflection on the transferability of findings beyond the specific study sample. Table 40 above lists key points for each aspect.

13.4.1. Situated substance use

This appears to be the first repertory grid study that has focussed on study participants' actual substance use patterns (cf. perceptions of 'appropriateness', substance use in general, or other people's substance use, see section 4.1.6). A limitation was that substance use was measured via self-report, which can be biased (e.g., retrospective recall, social desirability). However, substance use was measured via broad categories of frequency (i.e., 'never', 'rarely', 'occasionally', 'often', 'always'), which reduced the need for participants to provide detailed information and hence reduced the likelihood of related errors[813]. Ideally, use quantity and related aspects such as levels of intoxication, harms or benefits, or situated reasons or motives would also have been measured, but the study design (including multiple substances and spaces) was already complex, so that it was not practically feasible to address these points systematically. Because of this, the proposed theory may be most suited to explaining whether substance use will occur and, if so, what substances and products will be used. Nevertheless, pathways in Chapter 12 included additional information on quantity, intoxication, harm and benefits, as well as broader outcomes not considered much in the existing literature, such as how spaces are experienced overall. The pathways also described functions and meanings of substance use and abstinence which help to understand why substance users might choose (whether intentionally or not) to re-experience a particular situation.

The thesis conceptualised substance use as a (socially and symbolically) meaningful activity, and consequently, the proposed theory is particularly suited to explaining meaningful aspects of substance use. There may be aspects of substance use that do not hold particular meaning to users or that do not require mediation via interpretation, and these would not be explained well by the proposed theory.

[813] Errors still emerged, for example, from confusion with regard to whether 'substance use frequency' referred to the space overall (including all situations) or to the chosen typical situation only. This was identified as an issue in the first interviews and addressed by emphasising the 'typical situation' in later interviews. Even so, such confusions could not be avoided entirely, owing to the complex nature of spaces and situations (examples in section 11.4.1).

Another strength of the study vis-à-vis existing research is that it considered multiple substances, with detailed product categories and combinations of these, as situated substance use patterns. Spaces of no or rare substance use were also explicitly considered. This was a departure from the existing literature, which typically considers single substances (mostly alcohol) and does not consider specific combinations of substances or products as outcomes, and where no or rare substance use generally features only as a 'silent' reference category. However, although the research question refers to 'substance use', ethical and practical requirements finally limited the study to legal products, in particular alcoholic beverages and cigarettes. It seems plausible to assume that the theoretical model outlined earlier would also apply to the use of illegal substances. Most likely, consideration of illegal substances would add further details to the proposed theory, and this could be explored in future research.

In a recent article entitled *"Doing ontopolitically-oriented research",* Fraser (2020) argues that researchers should carefully consider what kind of conclusions (and therefore, what political projects) they enable or hinder through their choice of questions and methods. The present research was 'ontopolitically-oriented' in this sense, as special attention was given to developing a research design whose findings could support strengths-based approaches more readily than coercive or restrictive ones (based on a critique of current approaches to environmental prevention in Chapter 2). This was pursued, for example, by including spaces of no or rare substance use as 'equals' to substance use spaces; by asking participants to imagine an ideal space of total well-being and including this as a reference category; and by focussing on 'liked or disliked' aspects of spaces during the repertory grid interview (cf. asking participants to specifically focus on factors enabling or hindering substance use, see 'qualifying phrase' in section 6.2.5). It is not possible here to discuss these points, but the chosen approach sought to shift the attention away from the 'usual suspects' (e.g., visual cues, availability of substances, threat of sanctions) to enable broader understandings and novel insights. As a result, certain types of socio-spatial aspects were more likely to be produced through this research than others. This focus was made explicit at the start of the thesis, allowing readers to view the thesis in this context. This ontopolitical approach is a key strength of this study.

13.4.2. Construed socio-spatial aspects

The study draws on sociological, socio-spatial theory and may be the first in the substance use field to use Löw's (2001, 2016) 'sociology of space' as its main point of reference. Löw's concept of 'synthesis' prompted a different perspective on socio-spatial aspects of substance use, focussed on subjective meaning-making and interpretation (cf. prior research informing

prevention[814]). The study sought to elicit socio-spatial aspects *as they are construed by substance users* rather than by researchers. A notable feature of the present study is that it did not provide visual stimuli to participants. Visual stimuli (e.g., images) are frequently used in other studies (repertory grid studies but also e.g., Hill et al., 2018a; Keesman et al., 2018, see section 4.1.6) to understand how products or spaces are interpreted. In the present research, participants were invited to develop their own visual aids (see section 6.2.2), but the main focus was on how participants remembered their spaces. This was assumed to tap better into the meanings these spaces held for them, and the study findings suggest that this was the case. As a result of this, physical and material aspects were considered under 'situation' (see Figure 38) but were not a focus of the present research. This is not considered a major limitation, as manifest aspects of space are covered in the extant literature. Another implication of the chosen approach was that the research considered a broad range of settings (e.g., nightlife, home, work, leisure). Focussing on one type of setting might have elicited more nuanced socio-spatial aspects, as in the pub study by Schmidt and Sapsford (1995; see section 4.1.6), but the present approach was chosen to capture a range of situated substance use patterns and produce socio-spatial aspects with broader applicability.

The repertory grid technique (Fransella et al., 2004; Jankowicz, 2004) made it possible to elicit many construed socio-spatial aspects in a systematic and structured way. The extent to which socio-spatial aspects could be elicited from individual participants was limited by practical (e.g., time, participants' energy levels) and methodological constraints (e.g., aspects depended on the interviewer prompt [i.e., 'qualifying phrase'] and the spaces presented for comparison [i.e., 'triads']; on limitations of repertory grids in general, see e.g., Yorke, 1983). Section 6.2.4 described how triads were set up to compare different situated substance use patterns; constructs relevant to substance use may have therefore been more likely to be elicited, but this was not considered a limitation in the present context. The study complemented the repertory grid technique with a more qualitatively oriented interviewing style. The number of elicited constructs per participant was therefore lower than in comparable studies, but across the sample, a considerable variety of constructs was nevertheless achieved.

Another strength of the repertory grid technique is that data analysis starts during the interview, as participant and interviewer negotiate categories and labels to summarise the conversation ('constructs'). However, whilst the repertory grid technique was chosen to 'capture' socio-spatial aspects as construed by substance users (and thereby overcome the researcher-

[814] Although other studies have also explored meaning-making and interpretation (see section 4.1.6), the extent to which such studies inform environmental prevention appears to be limited (see Chapter 2).

orientation within existing socio-spatial theory, see section 3.4), the final framework of 12 latent dimensions for space construal was developed by the study author rather than the participants. Data analysis developed draft categories that were very close to the original constructs, but finally it was necessary to depart from this close interpretation[815] because further analysis and theory-building required a concise and homogeneous[816] set of categories (see section 7.2). The 12 dimensions proposed in Chapter 10 thus summarise construed socio-spatial aspects in a relatively compact and structured way, but the structure and labelling was influenced more strongly by the researcher than anticipated. To address this, the thesis documents how categories were developed. Practical circumstances (see section 1.2.6) also meant that it was not possible to validate the final set of dimensions with participants. Future research could therefore explore how target populations view the 12 dimensions proposed here.

13.4.3. Relationships between space and substance use

The present study took a mixed-methods approach to studying relationships between space and substance use. The repertory grid technique was used to explore associations between socio-spatial aspects and substance use (quantitatively oriented perspective), while analyses of interview transcripts focussed on mechanisms and pathways (qualitatively oriented perspective). These two approaches were complementary and mutually enriching.

Quantitatively oriented perspective

Repertory grid interviews typically elicit constructs, but they can also *supply* constructs chosen by the researcher. The reviewed repertory grid studies did not frequently use this option. A strength of the present study was that it used multiple supplied constructs (e.g., on substance use frequency, see section 6.2.3) to retrospectively identify situated substance use patterns and link these with the elicited everyday spaces and socio-spatial aspects. This design made it possible to identify associations between what substances participants used and how they construed the spaces overall, including tacit associations that participants did not actively

[815] The closer interpretation grouped constructs containing similar words, which produced 29 categories. To reduce the number of categories, the final analysis also grouped constructs describing different phenomena if they appeared to refer to the same latent dimension of space construal. Thus, the final analyses required a greater degree of interpretation by the researcher (see section 7.2).

[816] For example, some elicited constructs referred to manifest aspects of space, whereas others referred to latent aspects, and most constructs included both types of aspect. The initial draft categories reflected this heterogeneity. If the study had to be repeated, the study author would decide in advance whether to focus on manifest ('perceived space') or latent aspects ('interpreted space') and use laddering techniques (like Voss, 2015, in section 4.1.6) to produce constructs at the desired level. However, the clear distinction between manifest and latent aspects, including the present focus on latent dimensions of space construal, *resulted* from the fieldwork and analysis and so could not have informed the present study a priori. The study by Voss (2015) could have provided important pointers in this regard, but it was only identified after fieldwork had been completed.

report (and of which they may or may not have been aware). A challenge was that participants sometimes struggled to think of *one* typical situation only, so that ratings on the supplied constructs and on the elicited constructs could refer to different situations within the same overall space. Quality checks during data analysis suggested that this affected only a small proportion of the data. Future iterations of such research could ask participants to write down a key word to help them focus on the chosen typical situation.

The strength of the quantitatively oriented analysis was limited primarily by unexpectedly large amounts of missing data[817]. As described in Chapter 5, the sample was more heterogeneous than planned (including non-smokers to daily smokers, non-drinkers to weekly drinkers). Situated substance use patterns were therefore not shared by all participants. In addition, participants varied more than anticipated with regard to their elicited constructs, meaning that dimensions for space construal drew on sample subgroups. Specific combinations of situated substance use pattern *and* dimension for space construal were then available for even smaller subsamples of participants, and in some instances, they were not available at all (see section 7.4). Thus, some calculations could not be carried out and other calculations were based on extremely small sample sizes (e.g., n=1, n=2). While generalisation is a debatable issue already with the overall sample size of 24 participants, these challenges reduced the generalisability of findings further. It is also possible that certain associations between socio-spatial construing and situated substance use patterns could not be identified because of this heterogeneity (e.g., where associations were moderated by substance user profile); a few examples were provided in section 11.6 (e.g., associations found for occasional but not daily smokers)[818].

Data analysis thus explored *if* situated substance use patterns differed in terms of construed socio-spatial aspects among participants and illustrated *how* they might differ. It was also considered that very strong relationships can be identified even with small samples. On this

[817] In retrospect, a two-staged design, comprising an interview stage (to elicit constructs and develop latent dimensions for space construal) followed by a larger-scale survey (to explore associations between identified dimensions and substance use patterns in a larger sample) (similar to the study design used by Wan and Shen, 2015), might have been preferable, but at the time of preparing the present study, the challenges outlined here were not anticipated and thus the disadvantages of a survey-based approach (e.g., limited opportunity for follow-up questions) appeared to outweigh its potential advantages.

[818] This also affected the calculations presented in section 12.2 on the relationship between setting/situation and situated substance use. It could be argued that the heterogeneous study sample weakened the strength of observed relationships, as, for example, daily smokers were likely to smoke in university settings while non-smokers were not. Comparisons limited to smokers suggested that stronger relationships could be observed if controlling for the general substance use position. Setting might have thus emerged as a better predictor in a more homogeneous study sample (e.g., smokers only). However, as the analyses set out to examine the effect of setting regardless of individual preferences, this limitation was not considered to affect the conclusions drawn from that analyses, but rather confirmed the importance of considering the general substance use position when retracing pathways to situated substance use in Chapter 12 and in future work.

basis, the above limitation was addressed by using data analysis techniques that placed lower requirements on the data, by developing custom solutions to making comparisons and establishing significance (see section 7.4.4), and by using display options that showed sample sizes or individual data points in addition to averaged values (see charts in section 11.2).

A further consideration is that, in exploring the relationship between construed socio-spatial aspects and substance use, 'setting' or similar situational aspects might be viewed as potential confounders, as differences in construal could often be explained via setting (as noted in Chapter 11). Future research could seek to tease out these nuances better. In the present research, this did not affect the study's ability to answer the research question, which sought rather to understand how spaces representing different patterns of situated substance use are construed (similar to the concept of "representations" used by Keesman et al., 2018, see section 4.1.6). Thus, the quantitative research part did not postulate a causal relationship between the two variables. The qualitative part in Chapter 12 was explicitly based on the notion that setting or broader situation could be important anteceding factors.

Qualitatively oriented perspective

With regard to the specific pathways in Chapter 12, generalisation was not sought at the level of predicting *specific* situated substance use patterns[819]. Instead, exemplary pathways were chosen for a range of patterns and generalised to a broader model of how situations may influence situated substance use (see section 13.2). A possible limitation of the specific pathways in Chapter 12 is therefore that they are illustrative rather than definitive, and the exploration of typical pathways could be an area for future research, as noted in section 12.5 (assertion #7).

The specific pathways (and Figure 38 in the present chapter) illustrate how different combinations of factors can interplay to produce different experiences of situational substance use or abstinence. Their strength is thus that they depict complex relationships between many and varied variables, exploring possible situational sequences and interactions while also accounting for broader contextual influences. They therefore address research gaps identified in prior reviews (e.g., Stanesby et al., 2019; Stevely et al., 2020b) as well as in broader critiques of quantitative, "successionist" studies of causal mechanisms (e.g., Stevens, 2020). Pathways also incorporated findings from other analyses within this thesis (e.g., dimensions for space construal) to produce a coherent overall analysis. It was beyond this study to integrate insights

[819] For example, Pathways 1 to 3 (section 12.4) may not be the most common pathways to situational abstinence.

from the psychological literature into these models[820]; however, the pathways include relevant concepts and can therefore offer new perspectives on established variables and their possible role in a socio-spatial framework.

While the complexity of pathways (and Figure 38) is a key strength, it could still be argued that they reduce complex and dynamic realities too much, especially where they appear to portray causal mechanisms as a static sequence of distinct steps, with situated substance use as the 'outcome'. This affected the pathway displays in particular, where the simplified portrayal was a practical necessity to allow visualisation[821]. The accompanying texts could accommodate dynamic and complex aspects of the pathways more easily. The pathways and proposed theory should therefore be understood as heuristic tools that can inform future research.

A broader consideration with regard to the interview transcripts was whether they represented 'reality' or participants' (possibly biased or incomplete) construals of reality. Influences were mainly considered insofar as they were described by participants, though practical constraints of this project meant that it was not possible to review pathways with participants. Where analyses by the study author suggested additional or alternative interpretations, these were included in the pathways (and accompanying text) as appropriate and highlighted as such.

The scope of the present enquiry[822]

In considering the study findings, it is important to remember the scope of the present enquiry. While intervention research typically considers outcomes at the population level, the example pathways in Chapter 12 focussed on relationships between space and substance use at the individual level. The proposed theory can thus help to understand individual outcomes, and further considerations may be required when applying a population-based logic. Similarly, the pathways focussed on how space and substance use relate to each other in the short term (i.e., within a distinct substance use event). A longer-term perspective was incorporated in the pathways which showed how past experiences of substance use or abstinence, alongside other personal, social and cultural factors, shape subsequent spaces of substance use or abstinence. Pathway 6 in particular illustrated how spaces may transform over time, and the proposed 'visual theory' also highlights this possibility. However, longer-term developments (in

[820] For example, the box 'mediating thoughts and feelings' in Figure 38 could have been developed further drawing on existing psychological research.
[821] A related issue was that 'space' appeared to be located in distinct boxes in the displays, when in fact, from a theoretical perspective, 'space' would be comprised of *all* the pathway elements.
[822] Thanks to helpful comments by Gregor Burkhart which informed this section.

either direction[823]) were not a focus of this study, and a thorough consideration would have required another methodological approach. Finally, findings represented participants' construals at a given moment in time, and further research could explore how stable or changeable the kind of socio-spatial construing explored here is[824].

The focus on individual short-term effects in the pathways corresponded to the present interest in how spaces are momentarily interpreted and constituted through processes of 'synthesis' (as described in Chapter 3) and the related interest in 'cues and prompts'-based approaches to environmental prevention (as described in Chapter 2). The pathways therefore mostly assumed the existence of certain situations, substance use positions and other factors (e.g., social influences) as givens. However, it is clear that such situations and positions – indeed, the personal constructs used to interpret spaces and attach meaning – do not develop independently of the environments in which people grow up and live (see also Chapter 3). Future research could systematically explore how spaces and substance use interplay over longer periods of time and thus contribute a socio-spatial perspective to a discussion of 'norms'-based approaches to environmental prevention.

13.4.4. Study population

The study sought to take a broad perspective in terms of settings and situations, situated substance use patterns, construed socio-spatial aspects, and types of relationships between space and substance use. Given this breadth, the study population itself was limited to a relatively homogeneous group to avoid an overly complex study design. In line with ethical considerations and the 'prevention' lens of the present study, the study focussed on socially integrated users reporting no or few current problems associated with their use; and within this group, a sample of female university students was selected according to specified criteria (as described in Chapter 5). Most participants were approached by the research team, which reduced possible self-selection bias in the sample.

A counterfactual thought experiment (in this case: imagining different samples and considering whether study findings still seem plausible – e.g., for parents, men, older people, non-students, socially excluded users of illegal substances, people living in rural areas or another country)

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[823] Longer-term developments that *led to* a specific event related to substance use or abstinence (i.e., occurred before it; e.g., socialisation) or longer-term developments that *emerged from* such an event (i.e., occurred after it; e.g., subsequent changes in attitudes and beliefs, effects on other individuals or wider populations).

[824] Kelly's (1963/1955: 72) "experience corollary" foresees that, "[a]s one's anticipations or hypotheses are successively revised in the light of the unfolding sequence of events, the construction system undergoes a progressive evolution".

can help to consider the transferability of findings to other populations[825]. The following paragraphs explore the present research outputs (italicised below) from this perspective.

The *elicited spaces and constructs* (Chapters 9 and 10) would have likely differed with a different sample, but it is plausible to assume that several if not most of the *dimensions for space construal* (Chapter 10) would have nevertheless been reproduced. The unplanned heterogeneity of the sample – noted earlier as a limitation for the quantitative analyses – was a strength in this regard, as the inclusion of 'heavier' and 'lighter' users produced a greater range of dimensions[826]. The proposed dimensions are supported by prior research with similar populations (e.g., students, general population), suggesting that the framework of dimensions is suitable for use in prevention contexts. Some of the dimensions, such as 'type of social gathering', may be more relevant to student populations or young people. The dimension 'relaxation', with its focus on mental stress, may have been a result of sampling (i.e., university students of subjects generally considered to be academically difficult) and/or interview timing and location (i.e., most interviews during exam periods, all in university or work-related settings). However, it also mirrors broader societal discourses, so that it is plausible to assume that constructs relating to mental stress and relaxation would also be identified in research with other samples. It is also possible that some of the proposed dimensions are more relevant to women, and future research could explore the relevance of the proposed dimensions for men. Conversely, interviews with another sample might have identified additional dimensions. This possibility is indicated in Figure 38 by including '…' in the relevant box, and it should be kept in mind when using the 12 proposed dimensions as a framework.

With regard to the eight *situated substance use patterns* identified with this sample (Chapter 11), it seems plausible to assume that similar patterns would emerge for other users of alcohol or cigarettes, and future studies could explore this empirically and extend the typology to include illegal substances. With a different sample, the specifics of the *relationships between situated substance use and setting, situation or dimensions for space construal*, respectively (Chapter 11, sections 12.2 and 12.3), would have likely differed. Still, it seems plausible to assume that the *existence* of such relationships would have been found even with a vastly different sample. Moreover, the specific details of these relationships can be understood as hypotheses: further work could explore if the observed relationships are reproduced beyond

[825] It should be noted that although the proposed theory claims applicability for prevention contexts (not treatment or harm reduction), some of the groups included in the thought experiment were not typical target populations for prevention. The thought experiment thus explored also the possibility of extending the theory beyond prevention.
[826] Subgroup analyses suggested that certain dimensions (e.g., 'changeability) were more likely to be elicited from 'lighter' users, whereas other dimensions (e.g., 'type of social gathering') were more likely to be elicited from 'heavier' users (further details are available from Appendix M.4).

the specific sample and study context in Vienna. One consideration in this regard is that there was no smoking ban in cafés, bars, restaurants and nightclubs at the time of the fieldwork[827], which limits the transferability of the quantitative findings to contexts with a smoking ban in place but also positions them as potential reference points for future research.

Although a different sample might have suggested the inclusion of other *example pathways* (section 12.4), the *summary assertions* (section 12.5) and the *theory* presented in Figure 38 (section 13.2) seem plausible also for other populations. Further support for the suggested theory comes from the literature, as the theory aligns well with models proposed by other researchers. The influences identified as 'other factors' in Figure 38 may reflect the sample profile more strongly, and research with other populations might have led to the inclusion of other or additional points within that box. Comparative research could be used to add further details to the proposed theory which remain invisible when studying groups in isolation. For example, Figure 38 does not include 'gender' as a factor[828], but gender was a key moderating variable in the reviewed literature.

The above considerations suggest that the *identified dimensions for space construal* and the *overall theory* presented earlier might be particularly useful in addressing the relationship between socio-spatial aspects and situated substance use also in other populations. Future research could explore these assumptions empirically.

13.5. Implications for research, practice, theory

13.5.1. Research on contextual factors of substance use

The present study can inform quantitatively as well as qualitatively oriented studies exploring contextual factors of substance use. It is a step toward greater consideration of situated substance use practices involving multiple substances, varied settings, spaces of no or rare substance use, latent dimensions of space construal, and causal mechanisms. More work is needed to develop a strong evidence base in these areas, and the *identification of research gaps* in Chapter 4 can guide future work. Also, while Chapter 12 presented three pathways to situational abstinence, the study author would have liked to explore a greater range of

[827] Such a ban came into force in Austria in November 2019 (i.e., over one year after fieldwork completion).
[828] Section 1.2.3 discusses the role of 'gender' in the present study further.

pathways to situational abstinence. It is hoped that future research will build upon the present work to deepen the exploration of substance users' own spaces of no or rare substance use.

Chapter 3 presented an *existing socio-spatial theory*, namely Löw's (2001, 2016) 'sociology of space'. Researchers are invited to consider using the presented concepts and ideas in their own research. Scholars using related theoretical approaches (e.g., assemblages, actor-network theory, social practices) may find these particularly interesting.

The study developed new *conceptual tools*, including the theory in section 13.2, the proposed dimensions for space construal, as well as draft typologies of settings, everyday situations, situated substance patterns, and outcomes. The literature review also produced lists of settings and socio-spatial aspects as explored in previous research (Appendices C.3 and C.4). Researchers can use these conceptual tools as frameworks to guide their research. For example, researchers using virtual reality, ecological momentary assessment or diary-based techniques may be inspired to collect additional data to reflect the 12 dimensions proposed here. The original constructs elicited by study participants[829] may inform the construction of questionnaire items, and the measurement of the proposed dimensions could be an area for future investigation.

The findings show how 'environment' can be conceptualised beyond basic distinctions such as 'physical' versus 'social'. Instead, the present study suggests to position 'perceived' space (e.g., tangible aspects) and 'interpreted' space (e.g., what the space means for the user) in a relationship to each other, so that 'interpreted' space becomes a *mediator* between 'perceived' space and outcomes such as situated substance use. This could help to advance the field by supporting a move from reporting associations to *exploring mechanisms and offering explanations*. In the substance use field, manifest and latent aspects of space are not usually distinguished or seen in relation to each other, and mediators between context and substance use appear to be little explored. Researchers could consider *where* the socio-spatial aspects and other variables of interest would be situated within the proposed theoretical model, and what this means in terms of data collection and analysis. Such an approach should support greater analytical depth[830].

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[829] Listed in Appendix I.2 in full (German original), with illustrative examples provided in Chapter 10 in English.
[830] To illustrate, referring to the theoretical model and the 12 dimensions could help to clarify *why* a particular socio-spatial aspect is being researched and which presumed mechanisms the underlying hypothesis refers to. For example, if a specific activity (e.g., dancing) is researched, is this aspect hypothesised to affect situated substance use because it affects 'orientation', 'togetherness of activity', 'enjoyment', 'relaxation' and/or 'substance use expectations'? If a study includes 'the presence of other substance users' as a socio-spatial aspect, is this aspect hypothesised to affect situated substance use because it produces perceived closeness, togetherness of activity and/or substance use expectations?

The study findings may also serve as *starting or reference points for further conceptual work*, for example, to propose a more sophisticated typology of everyday situations (e.g., based on how people themselves categorise everyday situations), to extend the typology of situated substance use patterns to include illegal substances, to explore the validity and practical usefulness of the 12 proposed dimensions, to critique and revise the proposed theory and integrate it with other available theories and models, or to explore it in relation to other substance use outcomes (e.g., harms). These research avenues emerged from this study but could not be pursued. In addition, the study author would have liked to develop a reference framework, 'master list' or 'menu' of manifest and latent socio-spatial aspects based on the present findings together with the list of aspects in Appendix C.3 and the frameworks used in the identified reviews (or alternatively to have discussed advantages and disadvantages of different approaches to categorising socio-spatial aspects). This was not feasible within this study but may be a worthwhile future exercise that could also directly inform prevention work.

The study results further include illustrative *empirical data*, for example on how specific substance use patterns are construed on the identified dimensions, how they come into being through the interplay of socio-spatial and other factors, or how the construal of spaces differs between individuals or groups (e.g., occasional and daily smokers). These data can inform hypotheses to be explored in future research or serve as reference points in the discussion of similar research.

The study also has *methodological implications*. It offers a blueprint for quantitative analyses of situated substance use patterns. It also shows how qualitative research can elicit and present socio-spatial aspects in a structured way, and how findings can be integrated within visual models to outline potential mechanisms. Qualitative researchers wishing to contribute to prevention research may adopt similar approaches to increase the accessibility of their research to quantitatively oriented scholars. Presenting qualitative data in a structured way also increases the ease with which it can be considered in systematic reviews[831]. The present study demonstrates – in line with guidance on qualitative research (e.g., Gläser and Laudel, 2010; Miles et al., 2014) – that mechanisms can be explored qualitatively and that qualitative studies should *not* be excluded from future reviews by default.

[831] The preliminary review carried out for the present study found that qualitative studies were often difficult to extract (e.g., socio-spatial aspects not clearly categorised). This may be a reason why some reviews (e.g., Stanesby et al., 2019; Stevely et al., 2020b) limited their searches to quantitative studies.

13.5.2. Health promotion and substance use prevention

The previous section outlined implications for research on contextual factors of substance use, and many of these also apply to health promotion and substance use prevention. The present section highlights additional suggestions for interventions with a view to addressing the points raised in Chapter 2. It thus explores the final research question: *how can the study findings inform prevention interventions?*

Box 5 below highlights key points emerging from this study that may inform the development of environmental interventions, and this section offers example considerations related to these points based on the study findings.

Box 5: Example recommendations for environmental prevention on the basis of this study

Suggested key points to consider in the development of environmental prevention strategies:

- **Specifying the mechanism:** Which latent dimensions of a space does the intervention target? Can we spell out the relationship (assumed mechanism) between tangible or other features of a place or setting, latent dimensions (i.e., the meanings attached by target populations to a place or setting in a given situation), and desired outcomes?
- **Avoiding iatrogenic outcomes:** How will the intervention affect the overall space, including the experience of that space by target populations (e.g., considering broader indicators of well-being, not substance use or abstinence as only outcome)? How can the intervention be designed/enhanced to avoid a 'worsening' of the space from the target population's point of view (e.g., achieve reductions in substance use but maintain enjoyment)?
- **Increasing adherence and effectiveness:** Is the intervention congruent with the meanings already associated with the space (i.e., how target populations interpret the space on latent dimensions)? If not, how can the intervention be designed/enhanced to achieve better congruence between intervention and overall space (e.g., consider modifying additional aspects of the space)? Have we considered the conditions under which target populations are likely to experience the intervention positively (e.g., what are the socio-spatial conditions under which expectations contra use are experienced positively by substance users?)
- **Differentiating between subgroups:** Have we accounted for differences within target populations in terms of mechanisms and likely outcomes, as well as considered other groups potentially affected by the intervention?

The literature review (sections 4.1.5 and 4.1.6) found that some of the existing reviews and most of the example primary studies made recommendations for practice. These could be categorised into three categories: suggestions for specific environmental strategies; for traditional prevention approaches; and general guidance on intervention aims and approaches. This section summarises recommendations from the reviewed literature and adds further implications emerging from the present research.

Specific environmental prevention strategies

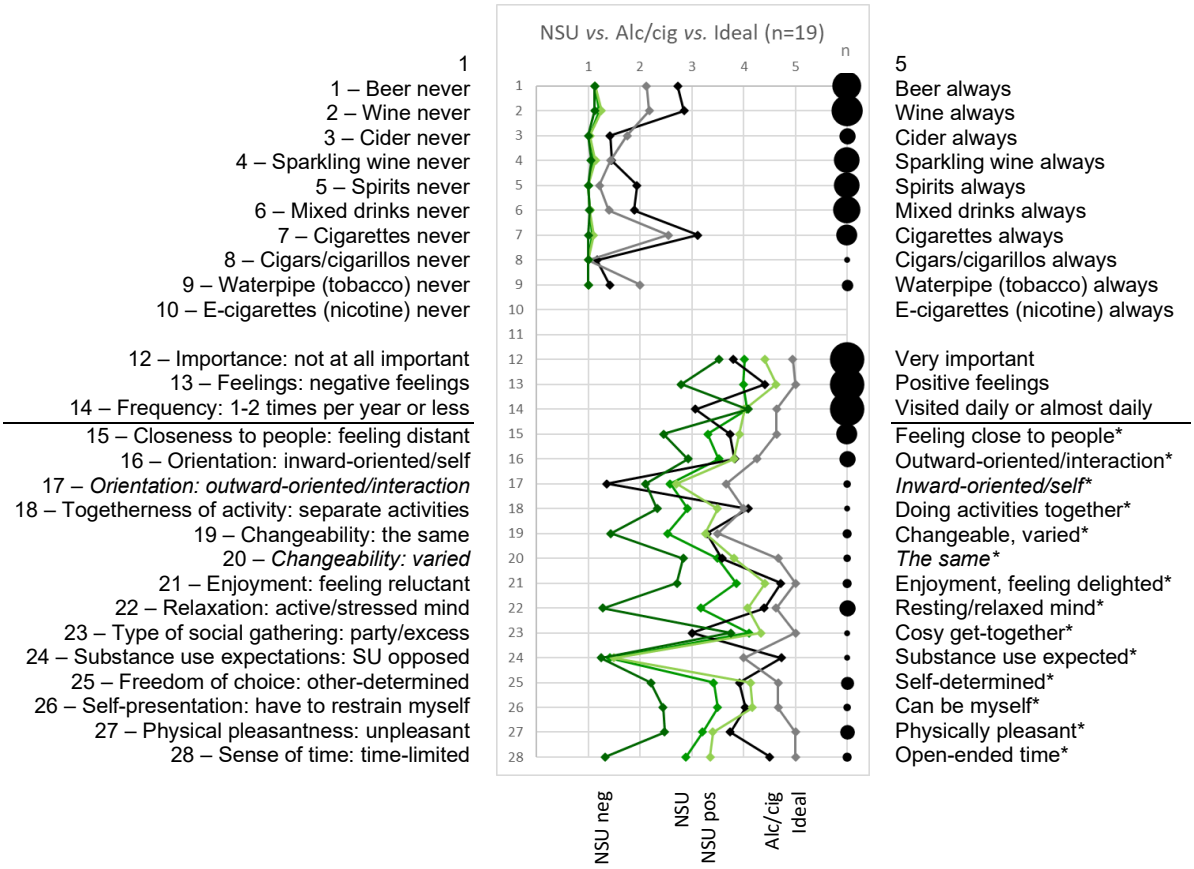
With regard to specific environmental strategies, the existing literature often formulated these by identifying environmental aspects associated with substance use and considering how their influence could be mitigated. As a result, suggestions often referred to increased supervision (e.g., by parents) or other restrictions (e.g., to alcohol access, time duration) (e.g., Anamali, 2013; Supski et al., 2017; Hill et al., 2018b; Cox et al., 2019; Mair et al., 2019; Stevely et al., 2020a; Stevely et al., 2021). Strengths-based suggestions were also made, for example, for drinking establishments to stock smaller glasses and offer opportunities for patrons to put down their drinks (Hill et al., 2018a), to increase the availability of food (Stevely et al., 2020a), to provide targeted support in risky contexts (Mair et al., 2019), or for universities to offer students non-alcohol related opportunities to socialise (Supski et al., 2017). Interventions can thus seek to make substance use practices more difficult or encourage alternative practices (Supski et al., 2017). The present study focussed on meanings – understood here as latent dimensions for space construal – rather than tangible aspects, so the pertinent question is: what meanings could interventions target based on the present research?

In the present study, spaces associated with alcohol or cigarette use differed from spaces of no or rare substance use on most identified dimensions. Spaces of substance use were associated with, for example, unstructured sense of time (C28[832]) and less felt need to monitor oneself (C26). On the surface, these data may seem to support restrictions and increased supervision. However, the data provide reasons to view such conclusions cautiously:

- Spaces associated with no or rare substance use are varied. Analyses suggested that such spaces be split up further depending on whether they were associated with *positive or with ambivalent/negative feelings*. Figure 39 below shows an analysis[833] comparing spaces of no or rare substance use (green lines) with spaces associated with alcohol or cigarette use (black line) and participants' own hypothetical ideal space (grey line). The analysis shows that considering spaces of no or rare substance use *as a single type* (mid-green line) may mask important differences. In the present study[834], spaces of no or rare substance use associated with ambivalent/negative feelings (dark green line) differed

[832] To facilitate cross-referencing, the numbers are the same as in the charts in Chapter 11. The letter 'C' stands for 'construct' and covers supplied and elicited constructs.
[833] This analysis is included here rather than in Chapter 11 because it is more relevant to the present argument.
[834] The quantitative data shown in this chapter are for illustrative purposes only, given that they are based on extremely small sample sizes. Section 13.4.3 discusses the limitations of the quantitative analyses further.

Figure 39: Comparison of 'spaces of no or rare substance use' vs. 'spaces associated with alcohol or cigarette use' vs. 'imagined ideal space'



Constructs: 1-14: Constructs supplied during interview. 15-28: Elicited constructs, summarised as latent dimensions for space construal (*generally preferred pole). 16/17 and 19/20: Participants split into two groups respectively to reflect differences in generally preferred pole.

Types of spaces:

'NSU'	Spaces of no or rare substance use (operationalised as any alcoholic beverage or nicotine product used 'never' or 'rarely', medicines 'never'), arithmetic mean
'NSU pos'	Spaces of no or rare substance use, limited to those associated with 'rather positive' or 'positive' feelings, arithmetic mean
'NSU neg'	Spaces of no or rare substance use, limited to those associated with 'ambivalent', 'rather negative' or 'negative' feelings, arithmetic mean
'Alc/cig'	Spaces associated with alcohol or cigarette use, regardless of other legal substance use (operationalised as at least one alcoholic beverage or cigarettes used 'occasionally', 'often' or 'always', no restrictions on other nicotine products or medicines), arithmetic mean
'Ideal'	Hypothetical ideal space representing total well-being, as imagined subjectively by study participants, arithmetic mean

Sample sizes:

n	Sample size (indicated by marker size, varies by construct because participants did not all elicit the same constructs or use the same products, range in this comparison from n=2 to n=19)

Note. Types of spaces are directly comparable at the construct level (each data point on a construct row refers to the same participant subsample). Section 11.2 contains further charts as well as explanations regarding formatting and analysis.

notably from spaces of alcohol or cigarette use (black line). However, spaces of no or rare substance use associated with positive feelings (light green line) were rated *similarly* to spaces of alcohol or cigarette use. The differences between spaces of substance use and spaces of no or rare substance use may therefore not always be as pronounced as might be assumed.

- In Chapter 11 and section 12.3, the analysis of *detailed substance use patterns* (e.g., distinguishing different alcohol products) also produced a more nuanced picture. Figure 17 (p. 401) showed that, relative to spaces of no or rare substance use associated with positive feelings, some substance use patterns were construed one way (located on the preferred side of a dimension), while other substance use patterns were construed another way (located on the less preferred side of the same dimension). Hence, no general conclusion could be drawn to say which pole of a dimension was clearly associated with abstinence. In the present study, a clear pattern emerged only on two dimensions: substance use expectations (C24) and sense of time (C28) (also evident from Figure 39).

- Even where clear differences emerged in the present study, interventions could not be readily recommended. Figure 39 shows that spaces associated with alcohol or cigarettes (black line) were generally rated toward the *preferred* pole of dimensions (i.e., right side of the chart). Seeking to make them more similar to spaces of no or rare substance use on identified dimensions (e.g., sense of time, substance use expectations) would therefore mean 'moving' them toward the less preferred poles[835]. This might potentially prevent substance use but also worsen how the spaces are experienced, which raises ethical and effectiveness concerns (especially if health is understood as encompassing "mental and social well-being", as per the WHO definition of health; WHO, 2006/1946: 1). To explore these considerations further, future research could collect and report broader well-being outcomes in addition to substance use data. The present study used only a crude indicator by default[836] (a single question on 'feelings'); future research could use more sophisticated instruments.

A challenge arising from a focus on spaces of substance use is that we must imagine the counterfactual to draw prevention conclusions. By contrast, exploring spaces of no or rare substance use within substance users' lives shows how substance users achieve abstinence

[835] For example, Figure 39 shows a difference between spaces associated with alcohol or cigarettes (black line) and spaces of no or rare substance use (green lines) with regard to how time is experienced (C28): a recommendation could therefore be to limit the duration of a particular event or situation in order to produce a sense of limited time (cf. open-ended time). However, Figure 39 also shows that a sense of limited time does not correspond at all to study participants' imagined ideal (grey line).
[836] Pathways in Chapter 12 explored further aspects but not in a standardised way.

in practice. The above analysis highlighted 'substance use expectations' as a potential key distinguishing factor between positively construed spaces of no or rare substance use and spaces associated with alcohol or cigarette use (albeit based on a sample size of n=2). While this would support a norms-based approach to environmental prevention (as outlined in section 2.1.2), it would not mean that expectations are the only aspect to target. An alternative approach would be to study the socio-spatial conditions under which expectations opposed to substance use are experienced *positively*[837]. Chapter 12 explored this via three example pathways (Pathways 1 to 3)[838]. These illustrative data suggested that expectations contra use were more likely to be experienced positively when the spaces were also characterised by:

- perceived 'closeness to people' (e.g., feeling close to those opposing substance use),
- 'freedom of choice' (e.g., not feeling restricted in one's sphere of action),
- 'relaxation: active mind' (e.g., doing other things which were unrelated to or incompatible with substance use), and/or
- 'physical pleasantness' (e.g., 'feeling healthy' as a positive sensation).

While some of these findings are not novel (and displacement of use remains an issue[839]), they suggest a different mechanism to the ones seemingly underpinning the interventions listed in the EMCDDA's report on environmental prevention (reviewed in Chapter 2). Approaches targeting the above aspects would address how a space is experienced, and how acceptance of an intervention may be achieved. They would thus aim to make abstinence a positive experience (cf. making substance use practices more difficult[840]). The approach sketched here may therefore be suited to "constraining the emergence of desire" (Hofmann et al., 2015: 68) rather than hindering people from acting upon desire.

These examples illustrate what may be gained from considering *latent* dimensions of space construal, whilst also pointing to the role of tangible (hence modifiable) aspects, such as people, activities or the built environment. Interventions such as goal priming (e.g., using subtle cues to 'activate', without conscious awareness, life goals incompatible with substance use; see Papies, 2016) would also be in line with this kind of strategy.

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[837] Thus, the present thesis does not argue against restrictions per se but highlights the need to consider how these are experienced by substance users and that environmental interventions must factor this into intervention planning to avoid iatrogenic effects (as discussed in Chapter 2).
[838] The pathways also described aspects associated with use but these are not discussed here because they mostly reflected what is already known (e.g., expectations pro use, social influences, lack of enforcement of restrictions, access) and therefore had limited value to informing alternative perspectives on environmental prevention.
[839] For example, where abstention was the result of, for example, focussing on study or work, displacement to another time or place (including as a 'reward') were themes evident in the empirical data at hand.
[840] Although promoting healthier options is part of the EMCDDA's definition of environmental prevention, section 2.4.2 identified only few strengths-based strategies in the reports' list of example interventions.

Another approach might consider not abstinence as the desired outcome but a 'lighter' use pattern; for example, use of wine or beer instead of spirits or mixed drinks[841]. The data to compare these patterns were very limited (see Figure 29, p. 407), but the available data suggested that the issue raised above (about potentially worsening the experience of a space) may be less of a concern in this case, because spaces that were associated only with wine or beer tended to be construed more positively than spaces that were also associated with spirits or mixed drinks. To avoid iatrogenic effects[842], one approach could be to combine industry restrictions on spirits or mixed drinks (e.g., on sales or promotions) with design interventions that would make the overall environment more aligned with how 'beer or wine' spaces are construed (e.g., in the present sample, 'beer or wine' spaces were associated with greater intimacy). This would increase the coherence between intervention and overall space and may thereby increase acceptance of the intervention among target populations. This also points to potential benefits of involving target populations in the design of environmental interventions.

These are some preliminary ideas; other researchers may draw further inspiration from the presented data and arguments. An attempt was made to outline, based on the empirical data and in line with the review presented in Chapter 2, suggestions for strengths-based strategies that rely less (or not exclusively) on the use of negative affect, restriction and coercion and that seek to avoid undesirable outcomes. The literature review noted that existing studies often recommended interventions without considering ethical implications, potential iatrogenic effects or the existing evidence of effectiveness and implementation. Similarly, it is not feasible to discuss these points in the present thesis, and this is an area that researchers or practitioners wishing to take the proposed ideas forward would need to investigate further.

Traditional prevention approaches

With regard to traditional prevention approaches (e.g., informational, developmental), two studies (Shek, 2012; Keesman et al., 2018) suggested that data on how certain substances or products are construed could be used to tailor information provided to target populations. Both suggested that overly positive construal of substances could be addressed by raising awareness of potential harms. By contrast, Scriven et al. (1989) suggested, albeit in a marketing context, that advertising could be improved by *aligning it with existing* customer

[841] The way the two patterns were construed by study participants suggested that 'spirits or mixed drinks' spaces were associated with greater excess (see Chapter 11). However, situational use quantity and harms were not measured in the present study, so it is not possible to say for sure that 'wine or beer' spaces represented a lighter use pattern than 'spirits or mixed drinks' spaces; thanks to Julian Strizek for pointing this out.

[842] For example, it is possible that changing the 'atmosphere' of a space associated with spirits or mixed drinks would merely lead to a more positive construal of 'spirits or mixed drinks' spaces but no changes to substance use practices.

perceptions (cf. seeking to change perceptions). Transferring this to a prevention context highlights the potential value of studying spaces of no or rare substance use: information provided in a health intervention context could utilise and refer to existing positive construals of spaces associated with no or rare substance use. The data generated in the present study on spaces of no or rare substance use (sections 11.4.1, 12.4.3 to 12.4.5) could inform such strategies, as such or as templates for future research. This can also be of relevance to environmental prevention (as 'situated' information provision) and has some parallels with goal priming (see e.g., Papies, 2016, on situating interventions).

In relation to this, a possible implication of the distinction between positively and ambivalently/ negatively construed spaces of no or rare substance use (noted earlier) could be to increase people's awareness of the positively construed spaces of no or rare substance use already existing in their life. An advantage of the space-focussed approach in the present study was that the captured meanings did not refer to 'substance use' or 'abstinence' as isolated concepts, but as situated within socio-spatial arrangements. Thus, while abstinence as an isolated concept may be perceived as 'boring', *spaces* of no or rare substance use might not be[843]. One notable finding in this regard was that, in the present study, positively construed spaces of no or rare substance use were overall more likely to represent cosy get-togethers, which was the *preferred* pole on the dimension 'type of social gathering' (C23 in Figure 39).

The present research also suggested that substance users may not be fully aware of the various influences shaping their use, and that they may not have a complete understanding regarding their own position on substance use (as noted in assertion #8, section 12.5). Developmental approaches could thus seek to enhance substance users' understanding of their own position on substance use (including areas of ambivalence and 'exceptions' at odds with their overall position) and of situational pathways shaping substance use and abstinence. The data and theory emerging from the present study may inform such efforts.

Exploration of situational pathways may also illustrate mechanisms for how traditional approaches can work. The pathways in Chapter 12 highlighted the role of factors unrelated to a specific situation, such as the person's general substance use position, perceived 'effects' of substance use, or broader social influences. This supports the continued need for traditional prevention approaches alongside environmental interventions. The pathways also showed how informational approaches may affect situational outcomes, mediated through perceived

[843] In relation to this, other studies (e.g., Supski et al., 2017; Parder, 2018) have explored abstinence in spaces commonly associated with use (e.g., at parties). This is likely to produce different narratives regarding abstinence than the consideration of abstinence in spaces commonly associated with limited use.

social norms, but also in ways that were unexpected. Specifically, there were some indications to suggest that informational approaches may help substance users attribute their own negative experiences to substance use[844]. Informational approaches thus seemed to affect substance use if they were congruent with own negative experiences.

Intervention aims and approaches in general

Several papers offered suggestions regarding intervention aims and approaches in general. For example, Duff (2014a) and Dilkes-Frayne (2014) highlighted the limited agency of substance users and of substances and called for greater attention to how assemblages or actor-networks shape substance use experiences; Supski et al. (2017) identified strengthening of alternative practices as a potential prevention aim; and Ally et al. (2016) suggested using typologies of situated substance use patterns to tailor interventions and to define preventive goals. The present research supports these recommendations. Following up on Alley et al., the idea of individual socio-spatial networks (in section 11.7) might inspire us to consider which network types are desirable or acceptable from a prevention perspective.

In addition, the visual theory in Figure 38 (p. 531) may be a useful tool for prevention planning and research[845]. In line with a 'relational' approach to space but also intervention guidance (e.g., Wight et al. 2016), the model could be used to map out the various elements of an intervention and consider how their interplay may produce different results. It could help to clarify under what circumstances (socio-spatial, personal, other) an intervention would bring about desired outcomes. Similarly, it could be used to play through various scenarios assuming different user groups to better estimate potential outcomes, including iatrogenic effects. As shown earlier, situational *pathways* (cf. statistical associations) support a different perspective on environmental intervention. Future research could explore the practical usefulness of the proposed model in intervention design or evaluation. Also, the present study did not specifically focus on how interventions are construed by substance users: future research could explore this question and thereby help develop the proposed theoretical model further.

A key element of the proposed theory is the connection between 'perceived' and 'interpreted' space. To reiterate, 'perceived space' refers to the meaningful *ensemble* that is produced when a person perceives a physical environment (e.g., using sensory organs and prior knowledge, accounting for physical and symbolic relations as described in Chapter 3), while 'interpreted

[844] For example, the heavier smokers in the sample attributed tiredness, shortness of breath, etc. to their smoking (see Chapter 12 for further examples).
[845] The draft conceptual model (see section 4.2.4) included specific boxes for prevention activities. These were not included in the final model, as the empirical data highlighted how interventions may affect many pathway elements.

space' refers to the overall *meanings* that emerge from this ensemble. Such interpreted space was characterised in this study via 12 dimensions. The model could be used to consider first which latent dimension ('interpreted space') should be targeted (based on the assumed mechanism) and then decide what tangible or other features ('perceived space') could be modified to achieve the desired changes[846]. This would help to make mechanisms explicit which were generally only implied in the reviewed literature. Referring to the proposed 12 dimensions would also be a way of reducing the overwhelming complexity ("myriad of cues", Marteau, 2018: 117, see section 2.4.1) inherent to a primarily physical understanding of the environment. Future research using the theoretical model could explore how specific components of 'perceived space' affect 'interpreted space' on the latent dimensions, also considering potential differences between user groups.

The proposed model complements existing (psychological) theories by outlining a more 'meaningful' route to situated substance use. Chapter 2 offered a critique of the methodological disregard for substance users' thoughts and feelings that can result from a too strong focus on (and narrow conceptualisation of) 'automatic processes'. The present research illustrates how mediating experiences, thoughts and feelings can be considered and how this can help to explain situated substance use outcomes. The mediators were not categorised here as 'automatic' or 'reflective', and a cursory inspection suggested that they could be either. The model may be understood as illustrating what 'automatic' processes can look like at the level of interpretation, thoughts and feelings. Given the sociological background of the present thesis, integration of the proposed theory with dual-process models was not attempted, but this could be pursued in future work.

Finally, the inclusion of a hypothetical ideal space as imagined by study participants was an important aspect of the present research, as it helped to identify substance users' preferences for spaces and regarding their own substance use. It is not feasible to expand these points here further, but prevention researchers may find further inspiration in section 11.3.

[846] To illustrate, ideas for how tangible aspects may affect latent dimensions of space construal include (partially from empirical data, partially hypothesised): layout (e.g., arrangement of seating, table size) may influence activities (e.g., ability to have a conversation, eating) and thereby impact on perceived closeness to people, togetherness of activity, orientation; layout and built features (e.g., large open areas vs. smaller rooms and booths) may influence perceived privacy and thereby impact on perceived needs for self-presentation; music (e.g., pace, volume) may affect perceived relaxation, type of social gathering; promotional offers for alcohol may influence perceived type of social gathering, substance use expectations; and so on.

13.5.3. Socio-spatial theory

The present study offers – via the practical application of socio-spatial thinking in a health context – empirical data with which socio-spatial theories can be discussed. So far, the theory emerging from this thesis was described with terms targeted toward prevention researchers, hence trying to minimise 'socio-spatial' jargon[847]. A few observations regarding socio-spatial theory shall be added here, with a focus on Löw's (2001, 2016) 'sociology of space' approach. It was beyond this thesis to compare Löw's approach with other theories (e.g., social practices, assemblages, actor-network theory), though sections 1.2.2 and 3.3.3 offered some reflections in this regard. Other researchers may wish to explore the specific features, advantages and disadvantages of each approach more systematically.

Many aspects of Löw's theory are supported by the present research[848], for example the role of "perception, memory and imagination" in the constitution of spaces (Löw, 2016: 135). The "duality of structure and action" (Löw, 2016: 145) characterised every element of the proposed theory, as even the factors that may be viewed as structural (e.g., tangible aspects, general substance use position, personal factors, social influences) could become irrelevant in specific situations or change as a result of study participants' actions. Although the pathways in Chapter 12 described situations at the micro-contextual level, they showed how broader social structures (e.g., societal views on substance use) translate into spatial structures (e.g., rules around appropriateness of substance use in specific contexts) (on spatial structures, see Löw, 2016: 143). The importance of routines (Löw, 2016: 136ff.) was also evident. The pathways further showed how participants effected changes to address "bodily-emotional desire" or "unease" (Löw, 2016: 157). Beyond these details, the study confirms that "synthesis" (Löw, 2016: 135) is a useful concept to guide research. The relational perspective inherent to the concept of 'synthesis' helped to connect the various elements explored in this thesis and to appreciate how 'interpreted' space emerges from the dynamic interplay of many influences and socio-spatial aspects. The practical value of a socio-spatial research lens was demonstrated with reference to explaining patterns of situated substance use and abstinence. This should give other researchers the confidence to work with Löw's approach, which is still relatively new internationally and in the substance use field.

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[847] The choice of language in section 13.2 reflects the final focus of the present study as situated in the substance use field rather than urban studies. In the language of Chapter 3, the theory would have been described differently, referring, for example, to 'situation' as a 'relational arrangement of living beings and social things'.

[848] This was noteworthy because the present study did not directly apply Löw's framework to study spaces (the study author did this in Kurtev, 2008), but used Löw's concepts rather as a starting point to explore how substance users construe spaces. Thus, it was not a given that the data would reproduce elements from Löw's approach.

In terms of where the present study departed from Löw, this does not strictly disconfirm Löw's theory but rather enhances it. Section 3.2.5 critiqued that Löw did not specifically address the role of 'meaning' and that 'relations' appeared to be primarily physical. The present study argued that 'relations' should instead refer to symbolic meaning and consequently summarised socio-spatial aspects in terms of *why* they appeared to matter to participants (as explained in section 10.3). Following on from this, the present research suggests that space can be understood as twice-construed or, to adapt Löw's terms, as twice-synthesised: firstly as 'perceived space' referring to living beings and social things, their physical and symbolic relations, including their relations to the person construing the space. 'Interpreted space' then refers to latent meanings that emerge from these physico-symbolic relational arrangements. 'Interpreted space' thus resembles Löw's concept of 'atmosphere', which she describes as the "*external effects of social goods and people in their spatial arrangement as realized in perception*" (Löw, 2016: 172, original emphasis). Löw implies that atmospheres *emerge from* the perception of material arrangements. The present model (Figure 38, p. 531) makes this clear by placing 'interpreted space' in a separate box. It also adds to Löw's theory by proposing 12 dimensions along which such 'atmospheres' can be described, including dimensions not usually associated with the term 'atmosphere'. The term 'interpreted space' (rather than 'atmosphere') is therefore used in the proposed model to avoid pre-conceived notions and to emphasise the act of interpretation by a person: 'interpreted space' is understood as representing a second layer of 'synthesis'. Socio-spatial researchers could therefore use the proposed theory as an extension of Löw's approach.

In relation to this, Löw (2001, 2016, 2018) did not offer a visualisation of her socio-spatial theory, and so the present study makes a useful contribution by making explicit how different socio-spatial concepts may relate to each other. It is hoped that this will inspire other socio-spatial scholars to use visual displays in their theorising and results presentation, thereby making concepts and assumed relationships clearer. Presentation of concepts in a visual format also facilitates critique, and the model in Figure 38 – to be understood in this context as a sketch rather than a fully-formed theory – is offered to stimulate further socio-spatial theorising, in relation to substance use as well as in general.

The thesis aimed to understand how socio-spatial aspects are construed by people rather than researchers, and to compare the elicited aspects with those proposed by Löw. Section 13.2.3 already commented briefly on how the elicited aspects corresponded to Löw's proposed aspects. This section adds a note on the *value* of using empirically versus theoretically derived aspects. Exploring how people construe spaces helped, for example, to identify key components of situations (in particular setting, activity, people, and time), not all of which were

considered by Löw. The present study showed how Kelly's (1963/1955) personal construct theory and associated repertory grid technique can be used to conceptualise and elicit construed socio-spatial aspects as 'personal constructs'[849]. This helped to identify specific dimensions along which people interpret spaces and which can be used to describe atmospheres. However, certain aspects could not be captured well with an approach focussed on construal and synthesis, such as the role of 'structural principles' (e.g., gender and class)[850] or of 'spatial structures' (as described in Chapter 3). With regard to the latter, for example, participants reported their personal rules around substance use and space, rather than societal rules (though own rules often seemed to be based on societal rules). This suggests that there is value in using *both* types of frameworks: theoretically and empirically derived. Future research could explore how the two perspectives can be combined best.

13.6. Conclusion

13.6.1. Answering the research question

To summarise, the main research question, '*how do construed socio-spatial aspects relate to situated substance use?'*, may be answered as follows:

Löw (2001, 2016) suggests that physical environments are perceived in their symbolic materiality as meaningful ensembles. The present thesis adds that these ensembles are interpreted according to 'latent dimensions for space construal', which can be thought of as personal constructs (Kelly, 1963/1955) that are shared by a group of people and which help them make sense of their everyday spaces. The so-produced 'interpreted space' acts as a mediator and triggers – but only if supported by moderating factors such as a person's general position on substance use or their construal of social norms – certain thoughts and feelings (including below consciousness) which then result in situated substance use or abstinence, as well as a range of other outcomes specific to the immediate situation (e.g., how a space is experienced) as well as extending beyond the immediate situation (e.g., reinforcing or challenging general views on substance use).

Extending Löw's (2001, 2016) 'sociology of space' approach, the present thesis suggests that space can be conceptualised as consisting of at least three layers: physical environment,

[849] Müller (2018, reviewed in section 4.1.3) also combined 'personal constructs' with a 'sociology of space' approach, but the present research design was better suited to elicit personally relevant aspects of micro-contexts.
[850] It is possible that this would have emerged using comparative research.

perceived space, and interpreted space. The *physical environment* consists of what is physically and materially present in a given situation. It is of limited relevance to a sociological perspective because, as Löw (2018: 44) highlights, we cannot perceive the environment in its neutral physical form but see it always as imbued with meaning. This suggests our *construals* of the physical environment to be of key interest, and the present thesis proposes that these can be further distinguished into 'perceived' and 'interpreted' space.

According to the theory developed in the present thesis, when people refer to the 'physical environment', they actually describe *perceived space*: tangible features, living beings, social things and other physico-materialities that are perceived with the senses. This level also includes thing-like intangible aspects (e.g., laws) which we 'know' to be part of a space (similarly to Löw's primarily symbolic social goods, as described in section 3.2.5). 'Perceived space' is closely related to physical environment, but it is not identical. As Löw suggests, we do not perceive isolated spatial elements but see them in meaningful relation to each other, as arrangements or ensembles. The present thesis identified setting, people, activities and time as essential components of perceived space, and different figurations of these components can be understood to produce different 'situations' in a socio-spatial sense.

Löw highlights that arrangements of living beings and social things create 'atmospheres'. The present thesis proposes that such atmospheres can be re-conceptualised as a third layer of space: *interpreted space*. This refers to construal at a deeper level, as a step toward the meanings a space takes on for a specific person or group at a given moment or, through repetition, over time. Drawing on Kelly's (1963/1955) personal construct theory, the empirical research at hand identified 12 dimensions along which everyday spaces were interpreted by study participants. 'Construed socio-spatial aspects' can thus refer to these latent dimensions of space construal or to manifest components such as setting, people, activities and time (which are 'construed' insofar that they are selectively perceived as constituting a situation).

According to the present thesis, the physical environment can be conceptualised as twice-construed: once at a more manifest and once at a more latent level. It can be argued that this distinction is merely heuristic, which may be why Löw seems to use the term 'synthesis' for both kinds of construal. However, the present thesis showed the theoretical and practical value of making the distinction, for example, because 'interpreted space' can then be understood as a mediating step between the tangible aspects of a space (as the independent variable) and thoughts, feelings and actions related to substance use (as the outcomes of interest).

The study showed that spaces are associated with certain situated substance use patterns *while also* being construed in certain ways on the identified dimensions for space construal

which are not necessarily related to substance use. Thus, it is within space as a relational assemblage, and as a result of socio-spatial 'operations of synthesis' (as per Löw), that substances and their use can become associated with additional meanings that emerge from the situation. The thesis thus seems to align closely with the grounded-cognition theory of desire by Papies et al. (2015, 2020) and their related concept of 'situated conceptualisation'.

The empirical analysis found that spaces representing different substance use patterns were construed differently also on the 12 identified dimensions for space construal, and illustrative data showed what such differences may look like. For example, spaces of no or rare substance use were construed as more stressful than spaces associated with alcohol or cigarette use. However, more nuanced findings emerged at the detailed level, when these broader categories were differentiated according to feeling and specific products. A key distinction worth highlighting did not concern substance use as such, but rather the stark differences *within* the category of spaces representing no or rare substance use. Substance users' own positively construed spaces of no or rare substance use emerged as a potential field for future research.

13.6.2. Original contribution

The basic premise of the present study was that spaces which vary in terms of the situated substance use pattern would also be construed differently with regard to other socio-spatial aspects. This assumption was supported by the empirical analyses, and the data illustrated potential differences.

In addition, the study presents a visual model (shown in Figure 38, p. 531) that can help to explain situated substances use outcomes, including situational abstinence. The model was developed based on empirical data and takes into account various influences (e.g., setting and other situational aspects, personal and cultural factors) to explain under what circumstances people accept or decline environmental 'invitations' to use (or not use) substances. It offers a novel perspective for the substance use field because it focusses on how spaces are interpreted (including below awareness). The model draws on Löw's (2001, 2016) socio-spatial concept of 'synthesis', and it goes beyond Löw's original theory by introducing a distinction between 'perceived' and 'interpreted' space. Hence, it is outlined as a socio-spatial theory for substance use prevention.

The most original feature of the proposed model is the inclusion of 'interpreted space', which acts as a mediator (explanatory step) between physical environment and people's thoughts, feelings, and actions. Drawing on Kelly's (1963/1955) personal construct theory and related methods, the thesis offers a suggestion for 12 latent dimensions that can be used to explore

and describe interpreted space systematically. The dimensions are empirically derived and thus complement approaches using researcher-defined aspects.

An important implication is that research on contextual aspects of substance use should not limit itself to manifest aspects (e.g., tangible features) but explicitly consider latent aspects related to meaning. The present study proposes a conceptual distinction between manifest and latent aspects of space, while also highlighting their relationship as part of a causal mechanism (whereby manifest aspects affect how a space is interpreted).

The proposed model can explain differences in outcomes with regard to situated substance use practices and experiences. It is most suited to explain aspects of substance use that are associated with meaning by substance users. As such, it can be a useful addition to other models currently informing prevention work.

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APPENDICES

Abstract

The present thesis explores alcohol and cigarette use from two perspectives: socio-spatial theory and substance use prevention. There has been growing interest in the contextual features of substance use events and how immediate environments can be changed to prevent use and related harms. Much of this literature does not conceptualise the environment in a comprehensive way, which limits potential insights for prevention. This thesis applies socio-spatial theory to develop a conceptualisation of the environment that may support new strategies in substance use prevention.

Theoretically, Löw's sociology of space was combined with Kelly's personal construct theory to study how potential target groups construe spaces, specifically what they perceive as the salient features of everyday settings and how these relate to their own alcohol drinking or cigarette smoking in those spaces. The overarching question was: how do construed socio-spatial aspects relate to situated substance use?

The empirical study used an interview-based mixed-methods design. Study participants were 24 female socially integrated users of alcohol or cigarettes aged 18-26 years, recruited from a student population in Vienna. Participants listed spaces from their everyday life (e.g., home, university, bar) and compared these using repertory grid technique to identify and rate them on salient socio-spatial features. Elicited spaces, features, ratings and interview transcripts were analysed using qualitative content analysis and statistical techniques.

In total, 296 spaces and 108 salient features were elicited. On this basis, 12 latent dimensions for space construal were identified. Spaces that represented different substance use patterns were construed differently on these latent dimensions. Additional qualitative analyses of situational pathways showed how the latent dimensions produced situational substance use or abstinence through interactions with other factors. 'Interpreted space' emerged as a key mediator between physical environment and people's actions.

The findings are integrated into a visual model to explain why people may accept or decline environmental invitations to use substances or abstain. The study can thereby inform socio-spatial theory, substance use research and prevention.

Key words: alcohol, tobacco, relational space, environmental prevention, repertory grid

Zusammenfassung

Sozialräumliche Aspekte von Substanzgebrauch und Abstinenz: „interpretierter Raum“ als Konzept für die Verhältnisprävention

Die vorliegende Arbeit untersucht den Gebrauch von Alkohol und Zigaretten aus raumsoziologischer sowie suchtpräventiver Sicht. Zuletzt rückten situationsbezogene Faktoren von Substanzgebrauch verstärkt in den Fokus wissenschaftlicher Forschung, sowie die Frage, wie Veränderungen der physischen Umwelt Substanzgebrauch und Folgeschäden vorbeugen können. Ein Großteil dieser Literatur nutzt einen begrenzten Umweltbegriff, was mögliche Erkenntnisse für die Prävention einschränkt. Ausgehend von einem sozialwissenschaftlichen Raumbegriff entwickelt diese Dissertation eine Konzeptualisierung von Umwelt, die neue Zugänge in der Suchtprävention ermöglichen kann.

Theoretisch wurde Löws Raumsoziologie mit Kellys Theorie der persönlichen Konstrukte verbunden, um zu untersuchen, wie potenzielle Zielgruppen Räume gedanklich herstellen, was sie also als die wesentlichen Merkmale von Alltagssettings wahrnehmen und wie diese Merkmale mit ihrem eigenen Gebrauch von Alkohol oder Zigaretten in diesen Räumen zusammenhängen. Die hauptsächliche Forschungsfrage war: Wie hängen wahrgenommene sozialräumliche Aspekte mit situationsbezogenem Substanzgebrauch zusammen?

Die empirische Studie verfolgte einen Mixed-Methods Ansatz auf Basis von Interviews. Studienteilnehmerinnen waren 24 sozial integrierte Konsumentinnen von Alkohol oder Zigaretten im Alter von 18 bis 26 Jahren, die an der Universität Wien studierten. Teilnehmerinnen nannten Räume ihres Alltags (z.B. Zuhause, Universität, Bar) und verglichen diese mittels Repertory-Grid-Methodik, um wesentliche sozialräumliche Aspekte herauszuarbeiten und die Räume mittels dieser zu bewerten. Erhobene Räume, Aspekte, Bewertungen sowie Interviewtranskripte wurden mittels qualitativer Inhaltsanalysen und statistischer Verfahren ausgewertet.

Insgesamt wurden 296 Räume und 108 sozialräumliche Aspekte erhoben. In der Folge konnten 12 Dimensionen der Rauminterpretation bestimmt werden. Räume, die sich hinsichtlich des Substanzgebrauchs unterschieden, wurden auf diesen Dimensionen ebenfalls unterschiedlich verortet. Eine qualitative Analyse situationsbezogener Verläufe zeigte weiters auf, wie die Dimensionen im Zusammenspiel mit anderen Faktoren Substanzgebrauch oder Abstinenz bedingen können. „Interpretierter Raum“ zeichnete sich als wesentliche vermittelnde Variable zwischen der physischen Umwelt und menschlichem Handeln ab.

Ein visuelles Modell führt die Ergebnisse zusammen und zeigt auf, wie die physische Umwelt Substanzgebrauch oder Abstinenz begünstigen kann. Die Studie kann daher einen Beitrag zu sozialwissenschaftlichen Raumtheorien sowie zur Forschung und Prävention in Bezug auf Substanzgebrauch leisten.

Schlagwörter: Alkohol, Tabak, relationaler Raum, Verhältnisprävention, Repertory Grid

Appendix B: Ad hoc review of example interventions in EMCDDA report

The following is the background table to Table 2, p. 76, and is included here for transparency. The coding exercise was conducted on an exploratory basis without involvement of a second coder, and thus the results should be regarded as indicative rather than definitive.

	Primary target[c]			Intervention type[d]	
Example intervention as per Oncioiu et al. (2018: 18–19)[a]	**Alcohol/ tobacco industry**	**(Potential) Substance users**	**Other (e.g., public services)**	**Restriction/ Coercion[e]**	**Other approach[f]**
Alcohol					
Age-related prohibition of alcohol purchase/consumption	x	x		x	
Bans and restrictions on alcohol advertising and promotion	x			x	x
Control/restriction of production, retail sale (hours, location) and distribution of alcoholic beverages	x			x	
Licensing system for retailers of alcoholic beverage	x			x	x
Drink driving legislation (maximum blood concentration) [b]		*x*		*x*	
Prohibition to sell alcoholic beverages to intoxicated/impaired patrons	x			x	
Mandatory alcohol training for bar staff (servers, waiters)	x				x
Bans to display alcoholic beverages at the point-of-sale in retail stores	x			x	x
Limitation of alcoholic beverages at major public events[b]	*x*	*x*		*x*	
Prohibition to use alcoholic beverages in school premises or grounds		x		x	
Prohibition to sell alcoholic beverages in school premises or grounds	x			x	
Prohibition to use alcoholic beverages in workplaces		x		x	
Prohibition to sell alcoholic beverages in workplaces	x			x	
Increase the taxes and prices of alcoholic beverages	x	x		x	
Lower the prices of soft drinks in recreational venues (i.e. pubs, bars, etc.)	x	x			x

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	Primary target[c]			Intervention type[d]	
Example intervention as per Oncioiu et al. (2018: 18–19)[a]	**Alcohol/ tobacco industry**	**(Potential) Substance users**	**Other (e.g., public services)**	**Restriction/ Coercion[e]**	**Other approach[f]**
Alter the design of glasses for alcoholic beverages in recreational settings (i.e. smaller volume, taller narrower glasses to avoid pouring in excess, etc.)	x				x
Use crystal-free glasses (e.g. plastic) in recreational settings[b]	*x*				*x*
Alter music played in alcohol consumption environments (e.g. limit music volume)	x				x
Tobacco					
Age-related prohibition of tobacco products purchase/consumption	x	x		x	
Bans and restrictions on tobacco advertising and promotion	x			x	x
Smoke-free indoor public and working premises	x	x		x	
Smoke-free school grounds and public playgrounds	x	x		x	
Prohibition to sell tobacco products in school proximity	x			x	
Prohibition to sell tobacco products in workplaces	x			x	
Smoke-free private vehicles carrying passengers less than 18 years old[b]		*x*		*x*	
Licensing system for retailers of tobacco products	x			x	x
Bans to display tobacco products at the point-of-sale in retail stores	x			x	x
Prohibition of cigarettes and hand-rolled tobacco with characteristic odour and flavour	x			x	x
Standardised packaging for tobacco products	x			x	x
Plain packaging for tobacco products	x			x	x
Increase the taxes on and prices of tobacco products	x	x		x	
Removal of cigarette machines from public spaces	x			x	x

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	Primary target[c]			Intervention type[d]	
Example intervention as per Oncioiu et al. (2018: 18–19)[a]	**Alcohol/ tobacco industry**	**(Potential) Substance users**	**Other (e.g., public services)**	**Restriction/ Coercion[e]**	**Other approach[f]**
Common to illicit drugs, alcohol and tobacco					
Longer opening hours of drug-free youth establishments (youth clubs, sport clubs, art clubs, etc.)			x		x
Good availability of night public transport and taxis[b]			*x*		*x*
Good lighting in public spaces[b]			*x*		*x*
CCTV (closed-circuit television) in public areas[b]			*x*	*x*	
Police presence at places and times where the risk of violent crime in public environments is high due to high drug or alcohol consumption[b]			*x*	*x*	
Cleaning up neighbourhoods to remove drug dealers	x		x	x	x

Note. In this overview, approaches could be allocated to multiple interventions types. Table 2 in Chapter 2 included only one code to avoid interventions appearing multiple times in the table.

[a] **Intervention labels** in first column are stated as in the original report (Oncioiu et al., 2018: 18–19).

[b] Font in italics indicates interventions that appeared to have harm reduction as a primary goal (e.g., to prevent alcohol-related violence rather than alcohol use per se) (categorised by AB).

[c] **Primary target:** whose actions are directly affected, who has to take action to implement the intervention.

[d] **Intervention type:** type of approach, taking into account COM-B categories (see Michie et al., 2011).

[e] 'Restriction' and 'coercion' were not distinguished because sanctions associated with (non-adherence to) restrictions were regarded as potentially coercive.

[f] "Other approach": e.g., COM-B categories 'Incentivisation', 'Environmental restructuring', 'Persuasion' (in line with Michie et al., 2011).

Appendix C: Preliminary literature review (2016)

C.1 Search terms

Example search in Web of Science Core Collection, 4.1.2016

Category		Search terms	Comment
1	Substances	drug* OR substance* OR alcohol* OR drink* OR intoxicat* OR beer OR wine OR tobacco OR smoking OR smoker* OR cigarette* OR cannabis OR marijuana OR hashish OR cocaine OR stimulant* OR amphetamine* OR pill OR ecstasy OR heroin OR opioid* OR opiate* OR hallucinogen* OR psychedelic* (971,183)	Search in title
2	Space	place* OR space* OR spacing OR setting* OR site* OR context OR heterotopia OR assemblage OR socio-spatial OR spatial OR spatiality OR geograph* OR environment* OR sociosphere* OR socioscape* OR location* OR indoor* OR outdoor* OR frontstage OR backstage OR stage OR where (1,929,033)	Search in title; NB – additional searches with 'situation' conducted later
3		#1 AND #2 (24,267)	
4	Refine by research field	substance abuse (2,790); behavioural sciences (648); social sciences other topics (149); geography (103); social work (88); social issues (51); anthropology (36); women's studies (33); sociology (68) (3,885)	
5	Refine by publication type	articles (2,676), book chapters (50), reprint (1) (2,679)	Meeting abstracts, editorials, reviews and other publication types were excluded
6	Terms associated with less relevant results	disease OR placebo OR hepatitis OR hiv OR hcv OR dealing OR violent OR violence OR gang OR prostitut* OR segregat* (4,193,686)	Search in title, abstract, keywords; terms identified by looking through the search results from #5
7		#5 NOT #6 (2,015)	
		Sorted by date (newest first) Exported first 500 results (i.e., most recent)	First 500 results went as far back as September 2011

Note. The above table shows the main search conducted in the *Web of Science* database for the preliminary review. Search terms in #1 and #2 were also applied to the *ProQuest Sociological Abstracts* database (search in title or abstract: 12,498 results). The results were refined by publication date (2010-2016; 4,033 results), sorted by relevance, and the first 300 results exported (this number was determined by scrolling down and pre-screening the search results). Another 100 results were added based on additional searches using 'situation' as a search term for 'space'. A simplified version of this strategy was applied to the University of Vienna's library search engine *u:search*.

A list of German terms similar to #1 and #2 was developed and applied to *Web of Science* (search in title, abstract, keywords, refine by language: German; 136 results) and to *WISO SOLIS* (largest German-language social science database) (search in title: 87 results).

C.2 Reference list for 128 publications included in preliminary review

The 12 studies that were also included in the recent systematic reviews covered in section 4.1.5 (see also Appendix D) are highlighted with an asterisk.

Primary studies – mixed methods

Asbridge M, Valleriani J, Kwok J, and Erickson PG (2016) Normalization and denormalization in different legal contexts. Comparing cannabis and tobacco. *Drugs: Education, Prevention and Policy*: 1–12.

* Carlini C, Andreoni S, Martins SS, Benjamin M, Sanudo A, and Sanchez ZM (2014) Environmental characteristics associated with alcohol intoxication among patrons in Brazilian nightclubs. *Drug and Alcohol Review* 33 (4): 358–66.

Erickson PG and van der Maas M (2013) Revisiting Deterrence: Legal Knowledge, Use Context and Arrest Perception for Cannabis. *Czech Sociological Review* 49 (3): 427–48.

Forsyth AJM (2012) The impact of the Scottish ban on smoking in public places upon nightclubs and their patrons. *Journal of Substance Use* 17 (3): 203–17.

Ravn S (2012) Managing Drug Use in Danish Club Settings. A Normalized Enterprise? *Young* 20 (3): 257–76.

Roberts M and Townshend T (2013) Young adults and the decline of the urban English pub: issues for planning. *Planning Theory & Practice* 14 (4): 455–69.

Stevenson LC, Bohanna I, Robertson JA, and Clough AR (2013) Aboriginal people in remote communities in Arnhem Land (Northern Territory) restrict their smoking in some environments. Implications for developing and implementing interventions to reduce exposure to environmental tobacco smoke. *Drug and Alcohol Review* 32 (6): 627–30.

Primary studies – qualitative

Aresi G and Pedersen ER (2016) 'That right level of intoxication'. A Grounded Theory study on young adults' drinking in nightlife settings. *Journal of Youth Studies* 19 (2): 204–20.

Bancroft A, Zimpfer MJ, Murray O, and Karels M (2014) Working at Pleasure in Young Women's Alcohol Consumption. A Participatory Visual Ethnography. *Sociological Research Online* 19 (3): 65–78.

Barton A and Husk K (2014) "I don't really like the pub […]": reflections on young people and pre-loading alcohol. *Drugs and Alcohol Today* 14 (2): 58–66.

Bell K (2013) Where there's smoke there's fire: Outdoor smoking bans and claims to public space. *Contemporary Drug Problems* 40 (1): 99–128.

Bøhling F (2014) Crowded contexts: On the affective dynamics of alcohol and other drug use in nightlife spaces. *Contemporary Drug Problems* 41 (3): 361–92.

Bøhling F (2015) Alcoholic assemblages. Exploring fluid subjects in the night-time economy. *Geoforum* 58: 132–42.

Dare J, Wilkinson C, Allsop S, Waters S, and McHale S (2014) Social engagement, setting and alcohol use among a sample of older Australians. *Health & Social Care in the Community* 22 (5): 524–32.

Demant J (2013) Affected in the nightclub. A case study of regular clubbers' conflictual practices in nightclubs. *International Journal of Drug Policy* 24 (3): 196–202.

Demant J and Landolt S (2014) Youth Drinking in Public Places. The Production of Drinking Spaces in and Outside Nightlife Areas. *Urban Studies* 51 (1): 170–84.

Dilkes-Frayne E (2014) Tracing the "Event" of Drug Use. "Context" and the Coproduction of a Night Out on MDMA. *Contemporary Drug Problems* 41 (3): 445–79.

Dilkes-Frayne E (2016) Drugs at the campsite. Socio-spatial relations and drug use at music festivals. *International Journal of Drug Policy* 33 (3): 27–35.

Duff C (2012) Accounting for context. Exploring the role of objects and spaces in the consumption of alcohol and other drugs. *Social & Cultural Geography* 13 (2): 145–59.

Duff C (2014) The place and time of drugs. *International Journal of Drug Policy* 25 (3): 633–39.

Emslie C, Hunt K, and Lyons A (2015) Transformation and time-out. The role of alcohol in identity construction among Scottish women in early midlife. *International Journal of Drug Policy* 26 (5): 437–45.

Farrance SA (2012) *A Taste for Cigarettes: Tobacco Smoking as Cultural Capital in the Working Class Symbolic Economy*. A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of MASTER OF ARTS in the Department of Sociology. Victoria: University of Victoria.

Farrugia A (2015) "You Can't Just Give Your Best Mate a Massive Hug Every Day": Young Men, Play and MDMA. *Contemporary Drug Problems* 42 (3): 240–56.

Foster J and Heyman B (2013) Drinking alcohol at home and in public places and the time framing of risks. *Health, Risk & Society* 15 (6-7): 511–24.

Haines-Saah RJ, Oliffe JL, White CF, and Bottorff JL (2013) "It is just not part of the culture here". Young adults' photo-narratives about smoking, quitting, and healthy lifestyles in Vancouver, Canada. *Health & Place* 22: 19–28.

Highet G, Ritchie D, Platt S, Amos A, Hargreaves K, Martin C, and White M (2011) The re-shaping of the life-world: male British Bangladeshi smokers and the English smoke-free legislation. *Ethnicity & Health* 16 (6): 519–33.

Hill KM (2014) *Understanding Drinking Behaviour: Affordances and an Ecological Approach to Cognition*. A thesis submitted in partial fulfilment of the requirement of Oxford Brookes University for the degree of Doctor of Philosophy. Oxford: Oxford Brookes University.

Järvinen M and Demant J (2011) The normalisation of cannabis use among young people. Symbolic boundary work in focus groups. *Health, Risk & Society* 13 (2): 165–82.

Jayne M, Gibson C, Waitt G, and Valentine G (2012) Drunken mobilities. Backpackers, alcohol, 'doing place'. *Tourist Studies* 12 (3): 211–31.

Johnstad PG (2017) User perceptions of mental health consequences of hallucinogen use in self-identified spiritual contexts. *Nordic Studies on Alcohol and Drugs* 32 (6): 545–62.

Katainen A, Lehto A-S, and Maunu A (2015) Adolescents' sense-making of alcohol-related risks. The role of drinking situations and social settings. *Health* 19 (5): 542–58.

Lau N, Sales P, Averill S, Murphy F, Sato S-O, and Murphy S (2015) Responsible and controlled use. Older cannabis users and harm reduction. *International Journal of Drug Policy* 26 (8): 709–18.

MacLean S and Moore D (2014) 'Hyped up'. Assemblages of alcohol, excitement and violence for outer-suburban young adults in the inner-city at night. *International Journal of Drug Policy* 25 (3): 378–85.

Mui HZ, Sales P, and Murphy S (2014) Everybody's Doing It: Initiation to Prescription Drug Misuse. *Journal of Drug Issues* 44 (3): 236–53.

Parder M-L and Vihalemm T (2015) "… if there's a party, then there's definitely alcohol". Construction of partying practices and abstinence in Estonian youth forums. *Nordic Studies on Alcohol and Drugs* 32 (6): 563–78.

Pawson M and Kelly BC (2014) Consumption and Community. The Subcultural Contexts of Disparate Marijuana Practices in Jam Band and Hip-Hop Scenes. *Deviant Behavior* 35 (5): 347–63.

Pedersen W, Sandberg S, and Copes H (2015) High Speed. Amphetamine Use in the Context of Conventional Culture. *Deviant Behavior* 36 (2): 146–65.

Pennay A (2012) Carnal pleasures and grotesque bodies: Regulating the body during a "big night out" of alcohol and party drug use. *Contemporary Drug Problems* 39 (3): 397–428.

Percy A, Wilson J, McCartan C, and McCrystal P (2011) *Teenage drinking cultures*. York: Joseph Rowntree Foundation.

Petersen MA, Nørgaard LS, and Traulsen JM (2015) Pursuing Pleasures of Productivity. University Students' Use of Prescription Stimulants for Enhancement and the Moral Uncertainty of Making Work Fun. *Culture, Medicine and Psychiatry* 39 (4): 665–79.

Poulsen M (2015) Embodied Subjectivities: Bodily Subjectivity and Changing Boundaries in Post-Human Alcohol Practices. *Contemporary Drug Problems* 42 (1): 3–19.

Ravn S and Duff C (2015) Putting the party down on paper: a novel method for mapping youth drug use in private settings. *Health & Place* 31: 124–32.

Roberts M (2015) 'A big night out'. Young people's drinking, social practice and spatial experience in the 'liminoid' zones of English night-time cities. *Urban Studies* 52 (3): 571–88.

Robinson J, Ritchie D, Amos A, Greaves L, and Cunningham-Burley S (2011) Volunteered, negotiated, enforced: family politics and the regulation of home smoking. *Sociology of Health & Illness* 33 (1): 66–80.

Rooke C, Amos A, Highet G, and Hargreaves K (2013) Smoking spaces and practices in pubs, bars and clubs. Young adults and the English smokefree legislation. *Health & Place* 19: 108–15.

Stewart MJ, Greaves L, Kushner KE, Letourneau NL, Spitzer DL, and Boscoe M (2011) Where There Is Smoke, There is Stress: Low-Income Women Identify Support Needs and Preferences for Smoking Reduction. *Health Care for Women International* 32 (5): 359–83.

Tan QH (2013a) Smell in the City. Smoking and Olfactory Politics. *Urban Studies* 50 (1): 55–71.

Tan QH (2013b) Smoking spaces as enabling spaces of wellbeing. *Health & Place* 24: 173–82.

Taylor A (2015) *The Exploration of Transformational Experiences at Festivals*. A Thesis Submitted to the School of Graduate Studies Of the University of Lethbridge In Partial Fulfillment of the Requirements for the Degree MASTER OF SCIENCE (HEALTH SCIENCES). Lethbridge: University of Lethbridge.

Thurnell-Read T (2011) Off the Leash and Out of Control. Masculinities and Embodiment in Eastern European Stag Tourism. *Sociology* 45 (6): 977–91.

Trell E-M, van Hoven B, and Huigen PPP (2014) 'In summer we go and drink at the lake': young men and the geographies of alcohol and drinking in rural Estonia. *Children's Geographies* 12 (4): 447–63.

Waitt G, Jessop L, and Gorman-Murray A (2011) 'The guys in there just expect to be laid': embodied and gendered socio-spatial practices of a 'night out' in Wollongong, Australia. *Gender, Place & Culture* 18 (2): 255–75.

Waitt G and Jong A de (2014) Embodied geographies of alcohol and the weekend in the Bega Valley, New South Wales, Australia. *Leisure Studies* 33 (2): 116–32.

Wilkinson S (2015) Young people's alcohol-related urban im/mobilities. In: Thurnell-Read T (ed) *Drinking Dilemmas*. *Space, culture and identity*. London: Routledge, 132–49.

Wolf JP and Chávez R (2015) "Just make sure you can get up and parent the next day". Understanding the contexts, risks, and rewards of alcohol consumption for parents. *Families in Society: The Journal of Contemporary Social Services* 96 (3): 219–28.

Primary studies – quantitative

Anamali M (2013) *Depends Who Offers and Where Offered: The Context of Drug Offers and First Time Cannabis Use*. Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Arts. Burnaby: Simon Fraser University.

Attwood AS, Scott-Samuel NE, Stothart G, and Munafò MR (2012) Glass Shape Influences Consumption Rate for Alcoholic Beverages. *PLoS ONE* 7 (8): e43007.

Bacon AK, Cranford AN, and Blumenthal H (2015) Effects of Ostracism and Sex on Alcohol Consumption in a Clinical Laboratory Setting. *Psychology of Addictive Behaviors* 29 (3): 664–72.

Bellis MA, Hughes K, Jones L, Morleo M, Nicholls J, McCoy E, Webster J, and Sumnall H (2015) Holidays, celebrations, and commiserations: measuring drinking during feasting and fasting to improve national and individual estimates of alcohol consumption. *BMC Medicine* 13 (1): 113.

Brown KG, Stautz K, Hollands GJ, Winpenny EM, and Marteau TM (2016) The Cognitive and Behavioural Impact of Alcohol Promoting and Alcohol Warning Advertisements. An Experimental Study. *Alcohol and Alcoholism* 51 (3): 354–62.

* Buettner CK, Khurana A, and Slesnick N (2011) Drinking at college parties. Examining the influence of student host-status and party-location. *Addictive Behaviors* 36 (12): 1365–68.

* Callinan S, Livingston M, Dietze P, and Room R (2014) Heavy drinking occasions in Australia: Do context and beverage choice differ from low-risk drinking occasions? *Drug and Alcohol Review* 33 (4): 354–57.

Carpenter MJ, Saladin ME, LaRowe SD, McClure EA, Simonian S, Upadhyaya HP, and Gray KM (2014) Craving, Cue Reactivity, and Stimulus Control Among Early-Stage Young Smokers. Effects of Smoking Intensity and Gender. *Nicotine & Tobacco Research* 16 (2): 208–15.

Chan J, Burnett T, Baillie R, Blomfield S, Cameron-Christie P, Dickson J, Fleishl W, Ghandi S, Gordon K, Heo J, Kesy A, Kao AY, Kenny C, Knight A, Wilson N, and Thomson G (2014) Smoking in outdoor areas of bars and cafés. Large differences between midday and evening prevalences. *Drugs: Education, Prevention and Policy* 21 (6): 484–88.

Dahne J, Hise L, Brenner M, Lejuez CW, and MacPherson L (2015) An experimental investigation of the functional relationship between social phobia and cigarette smoking. *Addictive Behaviors* 43 (2): 66–71.

Dunbar R (2016) *Friends on tap: the role of pubs at the heart of the community. A Report for CAMRA*. University of Oxford.

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Etter J-F and Bullen C (2011) Electronic cigarette: users profile, utilization, satisfaction and perceived efficacy. *Addiction* 106 (11): 2017–28.

Fjær EG, Pedersen W, Soest T von, and Gray P (2016) When is it OK to be drunk? Situational and cultural variations in the acceptability of visible intoxication in the UK and Norway. *International Journal of Drug Policy* 29: 27–32.

Foster J, Martin C, and Patel S (2015) The initial measurement structure of the Home Drinking Assessment Scale (HDAS). *Drugs: Education, Prevention and Policy* 22 (5): 410–15.

* Gallupe O and Bouchard M (2013) Adolescent parties and substance use. A situational approach to peer influence. *Journal of Criminal Justice* 41 (3): 162–71.

García-Rodríguez O, Pericot-Valverde I, Gutiérrez-Maldonado J, Ferrer-García M, and Secades-Villa R (2012) Validation of smoking-related virtual environments for cue exposure therapy. *Addictive Behaviors* 37 (6): 703–08.

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Hogarth L, Maynard OM, and Munafò MR (2015) Plain cigarette packs do not exert Pavlovian to instrumental transfer of control over tobacco-seeking. *Addiction* 110 (1): 174–82.

Hughes K, Quigg Z, Bellis MA, Calafat A, van Hasselt N, Kosir M, Voorham L, Goossens FX, Duch M, and Juan M (2012) Drunk and Disorganised. Relationships between Bar Characteristics and Customer Intoxication in European Drinking Environments. *International Journal of Environmental Research and Public Health* 9 (11): 4068–82.

June KM, Norton KJ, Rees VW, and O'Connor RJ (2012) Influence of measurement setting and home smoking policy on smoking topography. *Addictive Behaviors* 37 (1): 42–46.

Kingsland M, Wolfenden L, Tindall J, Rowland BC, Lecathelinais C, Gillham KE, Dodds P, Sidey MN, Rogerson JC, McElduff P, Crundall I, and Wiggers JH (2015) Tackling risky alcohol consumption in sport. A cluster randomised controlled trial of an alcohol management intervention with community football clubs. *Journal of Epidemiology and Community Health* 69 (10): 993–99.

Kleinjan M, Strick M, Lemmers L, and Engels RCME (2012) The Effectiveness of a Cue-Reminder Intervention to Reduce Adolescents' Alcohol Use in Social Contexts. *Alcohol and Alcoholism* 47 (4): 451–57.

Koordeman R, Kuntsche E, Anschutz DJ, van Baaren RB, and Engels RCME (2011) Do We Act upon What We See? Direct Effects of Alcohol Cues in Movies on Young Adults' Alcohol Drinking. *Alcohol and Alcoholism* 46 (4): 393–98.

* Kuendig H and Kuntsche E (2012) Solitary Versus Social Drinking: An Experimental Study on Effects of Social Exposures on In Situ Alcohol Consumption. *Alcoholism: Clinical and Experimental Research* 36 (4): 732–38.

* Kuendig H and Kuntsche E (2013) Beyond personality-experimental investigations of the effects of personality traits on in situ alcohol consumption in social and solitary drinking contexts. *Addictive Behaviors* 38 (3): 1635–38.

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Lipperman-Kreda S, Paschall MJ, and Saltz RF (2015) Relationships between drinking contexts and co-use of alcohol and other substances: event-level analyses. *Alcoholism: Clinical and Experimental Research* 39 (S1): 143A. (Full paper published as: Lipperman-Kreda S, Paschall MJ, Robert F S, and Morrison CN (2018) Places and social contexts associated with simultaneous use of alcohol, tobacco and marijuana among young adults. *Drug and Alcohol Review* 37 (2): 188–95.)

Lochbihler SL, Miller DA, and Etcheverry PE (2014) Extending Animal Models to Explore Social Rewards Associated With Designated Smoking Areas on College Campuses. *Journal of American College Health* 62 (3): 145–52.

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Monk RL and Heim D (2013a) Environmental Context Effects on Alcohol-Related Outcome Expectancies, Efficacy, and Norms: A Field Study. *Psychology of Addictive Behaviors* 27 (3): 814–18.

Monk RL and Heim D (2013b) Panoramic Projection: Affording a Wider View on Contextual Influences on Alcohol-Related Cognitions. *Experimental and Clinical Psychopharmacology* 21 (1): 1–7.

Monk RL and Heim D (2014) A Real-Time Examination of Context Effects on Alcohol Cognitions. *Alcoholism: Clinical and Experimental Research* 38 (9): 2454–59.

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Monk RL, Sunley J, Qureshi AW, and Heim D (2016b) Smells like inhibition. The effects of olfactory and visual alcohol cues on inhibitory control. *Psychopharmacology* 233 (8): 1331–37.

Noel NE, Daniels KA, Ogle RL, Maisto SA, Jackson LA, Jr, Ehlke SJ, and Carroll MG (2015) Women's drinking decisions in sexually risky situations. Effects of a low level of intoxication. *Addictive Behaviors* 47: 61–65.

Ordoñana JR, González-Javier F, and Gómez-Amor J (2012) Psychophysiological reactivity to environmental tobacco smoke on smokers and non-smokers. *Addictive Behaviors* 37 (7): 838–43.

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Russo ET, Hulse TE, Adamkiewicz G, Levy DE, Bethune L, Kane J, Reid M, and Shah SN (2015) Comparison of Indoor Air Quality in Smoke-Permitted and Smoke-Free Multiunit Housing: Findings From the Boston Housing Authority. *Nicotine & Tobacco Research* 17 (3): 316–22.

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Terlecki MA, Ecker AH, and Buckner JD (2014) College Drinking Problems and Social Anxiety: The Importance of Drinking Context. *Psychology of Addictive Behaviors* 28 (2): 545–52.

Terry-McElrath YM, O'Malley PM, and Johnston LD (2013) Simultaneous alcohol and marijuana use among U.S. high school seniors from 1976 to 2011. Trends, reasons, and situations. *Drug and Alcohol Dependence* 133 (1): 71–79.

Thrul J, Bühler A, and Ferguson SG (2014) Situational and mood factors associated with smoking in young adult light and heavy smokers. *Drug and Alcohol Review* 33 (4): 420–27.

* Thrul J and Kuntsche E (2015) The impact of friends on young adults' drinking over the course of the evening—an event-level analysis. *Addiction* 110 (4): 619–26.

Tobin KE, Latkin CA, and Curriero FC (2014) An examination of places where African American men who have sex with men (MSM) use drugs/drink alcohol. A focus on social and spatial characteristics. *International Journal of Drug Policy* 25 (3): 591–97.

Walaszek LA (2014) *The Influence of Drinking Location, Party Composition and Protective Factors on Young Women's Drinking Habits*. DISSERTATION Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University. Columbus, OH: The Ohio State University.

Wiedermann W, Niggli J, and Frick U (2014) The Lemming-effect: harm perception of psychotropic substances among music festival visitors. *Health, Risk & Society* 16 (4): 323–38.

Wiium N, Burgess S, and Moore L (2011) Brief report. Multilevel analysis of school smoking policy and pupil smoking behaviour in Wales. *Journal of Adolescence* 34 (2): 385–89.

* Wray JM, Godleski SA, and Tiffany ST (2011) Cue-Reactivity in the Natural Environment of Cigarette Smokers: The Impact of Photographic and In Vivo Smoking Stimuli. *Psychology of Addictive Behaviors* 25 (4): 733–37.

Wray JM, Gray KM, McClure EA, Carpenter MJ, Tiffany ST, and Saladin ME (2015) Gender Differences in Responses to Cues Presented in the Natural Environment of Cigarette Smokers. *Nicotine & Tobacco Research* 17 (4): 438–42.

Zacher M, Bayly M, Brennan E, Dono J, Miller C, Durkin S, Scollo M, and Wakefield M (2014) Personal tobacco pack display before and after the introduction of plain packaging with larger pictorial health warnings in Australia: an observational study of outdoor café strips. *Addiction* 109 (4): 653–62.

Reviews – (quasi-)systematic

Foster JH and Ferguson C (2014) Alcohol 'pre-loading': a review of the literature. *Alcohol and Alcoholism* 49 (2): 213–26.

Foster JH and Ferguson CS (2012) Home drinking in the UK: trends and causes. *Alcohol and Alcoholism* 47 (3): 355–58.

Heckman BW, Kovacs MA, Marquinez NS, Meltzer LR, Tsambarlis ME, Drobes DJ, and Brandon TH (2013) Influence of affective manipulations on cigarette craving: a meta-analysis. *Addiction* 108 (12): 2068–78.

Hollands GJ, Shemilt I, Marteau TM, Jebb SA, Lewis HB, Wei Y, Higgins JPT, and Ogilvie D (2015) Portion, package or tableware size for changing selection and consumption of food, alcohol and tobacco. *Cochrane Database of Systematic Reviews* (9): CD011045.

Hughes K, Quigg Z, Eckley L, Bellis M, Jones L, Calafat A, Kosir M, and van Hasselt N (2011) Environmental factors in drinking venues and alcohol-related harm: the evidence base for European intervention. *Addiction* 106 (Suppl 1): 37–46.

Monk RL and Heim D (2014) A systematic review of the Alcohol norms literature. A focus on context. *Drugs: Education, Prevention and Policy* 21 (4): 263–82.

Monshouwer K, Verdurmen J, Ketelaars T, and van Laar MW (2014) *Points of sale of tobacco products. Synthesis of scientific and practice-based knowledge on the impact of reducing the number of points of sale and restrictions on tobacco product displays*. Utrecht: Trimbos Institute.

Reviews – narrative

Coomber R, McElrath K, Measham F, and Moore K (2013) *Key Concepts in Drugs and Society*, SAGE Key Concepts series. London: Sage Publications.

EMCDDA (2012) *Travel and drug use in Europe: a short review*. Lisbon: European Monitoring Centre for Drugs and Drug Addiction.

McClernon FJ and Roy Choudhury R (2013) I Am Your Smartphone, and I Know You Are About to Smoke: The Application of Mobile Sensing and Computing Approaches to Smoking Research and Treatment. *Nicotine & Tobacco Research* 15 (10): 1651–54.

Wilkinson S (2015a) Alcohol, Young People and Urban Life. *Geography Compass* 9 (3): 115–26.

Wilkinson S (2015b) Young People's Drinking Geographies. In: Evans B, Horton J, and Skelton T (eds) *Play, Recreation, Health and Well Being*, Geographies of Children and Young People 9. Singapore: Springer.

Wray TB, Merrill JE, and Monti PM (2014) Using Ecological Momentary Assessment (EMA) to Assess Situation-Level Predictors of Alcohol Use and Alcohol-Related Consequences. *Alcohol Research: Current Reviews* 36 (1): 19–27.

C.3 Socio-spatial aspects covered by included studies

Labels and categories as developed by AB during data extraction in 2016 (see also section 4.2.4). Main categories are sorted by frequency, order within categories is approximately thematic. This list is provided here for completeness and to support future research; it is not intended as a definite categorisation.

People

- Number of people, crowding, being with people
- Being alone
- Family members, kin (not further specified)
- Parents
- Siblings or relatives
- Children
- Other vulnerable groups (e.g., ill/old people, pregnant women)
- Older people in a non-vulnerable context
- Intimate partner, significant other, spouse, date, boyfriend/girlfriend
- Best/Close friends
- Friends/acquaintances (known peers)
- Work colleagues
- Unknown peers, like-minded people
- Stranger(s) (not further specified)
- Users (including other smokers, drinkers, intoxicated people), including substance use/what substance used by e.g., present friends; includes seeing other people use (e.g., in movies) [Koordeman, 2011]; 'group intoxication'
- Non-users
- Male/female companions (gender as variable)
- Adults (e.g., as opposed to young people, people over 30)
- Other characteristics of people present e.g., other age groups, sexual orientation
- Venue staff (also door staff) including characteristics (number, age, sex) and behaviour (e.g., monitoring the venue, searches, tidying, table service)
- Social workers
- Security
- Police or similar
- Other institutional roles (e.g., council worker)

Activities

- Substance use (e.g., drinking, smoking) as main activity, drinking to get drunk
- Relatedness of different substance use behaviours (e.g., drinking and smoking)
- Drinking games
- Making fun of oneself and of others
- Urinating, vomiting
- "Destroying oneself" [Thurnell-Read 2011]
- Music (listening to music, sound, concert)
- Partying
- Dancing
- Flirting, sexual behaviour, dating
- Rituals, ritualised behaviour (e.g., 'skål-ritual', performing the 'stag night' [Thurnell-Read 2011])
- Conversation, socialising, talking
- Drinking coffee
- Eating, meals (including e.g., BBQs)
- Reading books, newspaper
- Sports (active or as spectator) [literature did not always distinguish clearly]
- Watching TV, DVD, playing computer games
- Leisure (in general), relaxation, doing nothing
- Treating oneself
- Work (including study, housework)
- Transitioning between activities
- "Time-out", taking a break
- Standing around
- Waiting, between activities, bored, queueing
- Other activity (not further specified)

Place and occasion

- Location, setting, place
- Relation to other or between spaces (e.g., proximity/distance to home [e.g., to avoid drink-driving], travel/mobility, city centre/suburbs, pre-loading)
- Special occasions (e.g., family events, birthday parties, new year's eve, Halloween)
- Ease/difficulty of access to the space (e.g., entrance fee)
- Day of the week, weekend

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Norms

- Ease/difficulty of access to substances (e.g., availability, cost, drink promotions, being able to help yourself [if at home] [Foster 2010])
- Refusal to serve to underage/intoxicated people vs. Underage drinking
- Laws (e.g., smoking ban)
- External rules regarding substance use (e.g., smoke free policy, parental rules)
- External rules regarding other aspects (e.g., house rules)
- Own rules regarding substance use (e.g., house rules)
- Social norms on substance use, permissive vs. restrictive attitudes towards substances
- Social norms on gender
- Social norms on (sub)culture
- Social norms on the body, how the body may behave (e.g., imperative to look inconspicuous)
- Social norms on other aspects (e.g., ethnicity, delinquency, being polite)
- Imperative to let go, upside-down to everyday

Atmospheres, safety, inclusion/exclusion

- Atmosphere (e.g., comfortable, friendly, rowdiness)
- Class, e.g., "upscale" or "shabby"/cheap furniture [though in Hughes 2011 this was referred to as 'venue style']
- Cleanliness, smell, pollution (including e.g., poor washroom facilities, litter, glass on floor)
- Availability of safety measures (e.g., safety plan, security guards, CCTV)
- Safety, fear of crime, violence, spiked drinks
- Fear of accident/injury
- Being observed by others
- Surveillance, control and intervention by others (e.g., adults, police), (No) Fear of arrest/fine
- Conflicts, processes of inclusion/exclusion, bonding, connecting, belonging, intimacy
- Ordered/planned vs. chaotic/spontaneous
- Situational stress (including images representing stress)
- Frequency of time spent at the place
- Ownership of the place, territoriality
- Anonymity
- Private/public

Materialities

- Substances (including smell, sight, sound)
- Tobacco smoke
- Substance use-related paraphernalia & objects (e.g., bars, beer glasses, bong, pipe, ashtrays, smoker wristbands for club)
- Food/water availability
- Non substance use specific objects (e.g., comfortable furniture, seating, wallpaper, dancefloor, pool tables, TV, mobile phone, clothes, sound system, plastic cups, jukebox, "tranquil artwork" [Hughes 2011], shelter, CCTV [closed circuit television])
- Live band
- Bodies, (dissolving) bodily boundaries
- Limited opportunities for things to do

'Natural' environment

- Inside/outside
- Nature/urban
- Humidity or temperature
- Wind speed
- Noise, noisy, loud
- Light, lighting (e.g., bright or low)
- Ventilation
- Sense of time, slow/fast time
- Day/night, time of day
- Season of the year

Signs and symbols

- Packaging (e.g., cigarettes)
- Pictures of the substance or related object
- Hearing about the substance or related object
- Subtle prevention campaign-related cue
- Non-substance use related pictures
- Advertisements, promotions of substances
- Advertisements, promotions of energy drinks
- Advertisements, promotions of soft drinks
- Warnings (e.g., health warnings)
- Signs (e.g., forbidding use or serving to intoxicated)

C.4 Settings covered by included studies

Labels and categories as developed by AB during data extraction in 2016 (see also section 4.2.4). Order is approximately by frequency. This list is provided here for completeness and to support future research. It is not intended as a definite categorisation.

- Pub/bar, including laboratory pub/bar
- Home/Residence (not party context), including semi-naturalistic home setting in laboratory
- Private parties & gatherings, pre-drinking locations
- Dancing settings (e.g., nightclub, disco)
- Other home/residence (e.g., friend, parents, relatives) (not party context or not specified)
- Café, restaurants
- Research laboratory
- Workplace/office, meeting room, or another work-related context
- Outdoor or public spaces (in general or not further defined)
- Street, squares, by the canal, bus stops
- Park
- Special occasions (e.g., birthday parties, new year's eve, Halloween, etc.) (setting not specified)
- Holiday, abroad, travel (partying, backpacking)
- Car
- Licensed premises (in general, not further specified)
- School, school grounds [though note that in some cases 'school' was used to refer to higher education]
- Other place (not further specified)
- Music festivals
- Beach
- Public transport (e.g., buses), taxis
- University campus, student residence, fraternity/sorority houses
- Outdoor areas at home
- Outdoor areas of bars, restaurants, cafes, clubs
- Forest/nature, old railway dam, mountains
- Sporting event, sports venue, gym (as spectator or participant)
- University lecture theatre
- Motel, hotel, hostel
- Music/concert venues
- Raves, unlicensed dance parties (e.g., warehouses etc)
- On the water (e.g., on a boat, by the lake)
- Shop, shopping mall, leisure mall or similar
- Street festivals
- Designated smoking areas
- Outdoor barbecues
- Other leisure spaces (e.g., shooting club, snooker hall)
- Transformational festivals
- Waste grounds
- Sauna
- Cottage
- Hamburger kiosk
- Theatre/cinema
- Museum
- University library
- Retirement village

Appendix D: Updated literature review (2021)

D.1 Methodology for literature review in section 4.1.5

Reviews were identified using the Web of Science database by combining search terms/options for substances, space, and reviews (see below), supplemented with backward and forward reference searching as well as handsearching (e.g., Cochrane database). The searches were last updated in January 2021. All search results were screened for relevance.

Eligible reviews for section 4.1.5 of the present thesis were *journal articles* published in *2015 or later* that used *systematic review methods* to identify and summarise primary studies on the relationship between *socio-spatial aspects and proximal alcohol or cigarette use* or related harms *at the micro-environmental level*. One seminal review from before 2015 (Hughes et al., 2011) was included as an additional reference point for the discussion of the recent reviews. For the present purposes, a review was deemed to use systematic review methods if search terms and sources were documented and if a data extraction table (per primary study or across all primary studies) was provided. Many studies were excluded based on this criterion, but it was important to limit the review to systematic reviews for several reasons (e.g., traditional reviews do not typically provide structured detail regarding the included studies). Also, reviews were only included if they considered *multiple* socio-spatial aspects. Initially, reviews were to be included only if review authors clearly distinguished between different socio-spatial aspects, but due to scarcity of reviews identified for the tobacco field, this criterion was broadened to simply require that *socio-spatial aspects be distinguishable* from the text (e.g., reported in data extraction tables). Reviews focussing on physiological changes (e.g., as measured in fMRI studies) were excluded. There were no limits with regard to populations, though reviews were not considered if they purposefully excluded European research. Reviews focussing on intervention studies were excluded from section 4.1.5 but informed section 4.1.2.

Data were extracted using a structured template (see Appendix D.3 for completed data extraction tables). A formal quality assessment was not undertaken, but each included review was informally assessed using a list of questions tailored to the present review, incorporating criteria from existing quality assessment tools for reviews (e.g., Shea et al., 2017).

D.2 Search terms

Category		Search terms	Comment
1	Substances	alcohol* OR drink* OR cigar* OR tobacco* OR nicotine OR smoking OR smoke* OR drug* OR substance* OR intoxicat* OR abstinen* OR abstention OR addict*	Only alcohol and tobacco were included as specific substances, in line with the present study's empirical focus
2	Space	momentary OR context* OR event* OR situation* OR environment* OR occasion* OR cue* OR space* OR place* OR setting* OR location* OR spatial or trigger* OR ecological OR situated	
3	Reviews	review* OR summar* OR overview OR evidence OR research OR synthesi* OR apprais* OR synopsis OR meta-analy* OR DOCUMENT TYPES: (Review)	Each search for reviews was undertaken twice: once using the search terms and once the option to limit the search to reviews; the results from the two searches were then merged
4	Repertory grids	"rep grid" OR "rep grids" OR "repertory grid" OR "repertory grids" OR Kelly OR "personal construct" OR "personal constructs" OR "personal construction"	
5	Aspects	component* OR element* OR aspect* OR facet* OR attribute* OR characteristic* OR feature* OR dimension* OR constructs OR meaning*	Only used to search for reviews on socio-spatial aspects for section 4.1.5

The above table is a simplified summary to illustrate the search strategy. Search terms from each category were combined using the Boolean operator 'AND', so that publications containing at least one term from each relevant category would appear in the search results:

- to identify reviews for sections 4.1.2 and 4.1.5, combining categories #1, #2 and #3;
- to identify reviews for section 4.1.3, combining categories #2, #3 and #5;
- to identify repertory grid studies for section 4.1.3, combining categories #2 and #4
- to identify repertory grid studies for section 4.1.6, combining categories #1, #2 and #4).

Searches were generally conducted in publication titles (i.e., "TI=" in Web of Science database), but extended to abstract (i.e., "AB=") or topic (i.e., "TS=") in some instances (e.g., when searching for repertory grid studies). All searches were conducted in the *Web of Science* database (last updated in January 2021). In addition, the search strategy to identify repertory grid studies for section 4.1.6 was applied to *Sociological Abstracts, PubMed and PsycINFO* databases; this led to the inclusion of one additional paper from PsycINFO.

D.3 Data extraction tables for reviews in section 4.1.5

Cox et al. (2019)

Review details	Included studies	Space	Substance use
Cox et al. (2019) 'A systematic review of high-risk environmental circumstances for adolescent drinking', *Journal of Substance Use* **Author objectives:** "To our knowledge, this is the first systematic review of the effect [of] environmental characteristics on adolescent alcohol use." (p. 472) **Review type as described by authors:** Systematic review with qualitative synthesis **Years searched**: appears to be earliest possible until June 2018 **Sources:** MEDLINE, CINAHL, ERIC, Global Health, PsycINFO, SOCIndex, Sociological Abstracts, Education Full-Text, reference lists of eligible articles **Search terms:** "keywords in the domains of adolescents, alcohol, and environmental contexts (comprising group composition, social and geospatial locations, and time factors)" (p. 469) **Structured quality assessment reported:** No ***Comment by AB:*** study focussing on adolescents, mixed findings between studies are described and partially discussed, 'situational factors' were	**Number of included studies (total):** 31 articles **Scope:** Alcohol **Other substances considered:** No **Studies relevant to present review:** all **Study designs:** eligible was "original research examining where, with whom, and when adolescent alcohol consumption occurred", addressing "the direct relationship between" "at least one theory-based environmental factor as an independent variable" and adolescent "alcohol use as a dependent variable" (p. 469); "All but one study used retrospective recall to gather data, and one used ecological momentary assessment." (p. 469) **Populations:** eligible were adolescents (13-19 years) (studies of college students were excluded) **Countries:** USA (16 studies), Europe (10 studies), Australia (2), Canada (1), Israel (1), Korea (1) **Quality assessment results:** none reported but authors highlight recall bias as issue for studies using retrospective recall and note that only one study used	**Spatial type/concept used by review authors:** drinking context as per Freisthler et al. (2014) **Socio-spatial aspects as specified by review authors:** Based on framework on adolescent drinking context by Freisthler et al. (2014), the review authors distinguished: "*situational factors*: availability of alcohol, adult supervision, time of day/day of week; *social factors*: number of people present at drinking event, demographic composition of people present, drinking behavior of people present; *location factors*: drinking location, activity space (local area within which an adolescent moves or travels during a period of time), density of alcohol outlets" (p. 469, original emphasis) **Socio-spatial aspects in relevant studies:** (not summarised by review authors but most reported data refers to drinking location [25 articles], number of people present [11 articles], demographics of people present [9 articles], adult supervision [7 articles], time of day/day of week [6 articles]) **Use of theories in relevant studies:** (not addressed by review authors)	**Outcomes of interest:** adolescent alcohol consumption; "quantity or frequency level was not discriminated" for study selection (p. 469) **Results:** "Adolescents most commonly consume alcohol on weekend evenings and either in their home or someone else's home. Availability of alcohol, increased group size, and the presence of others, particularly close friends, who are drinking increases risk for alcohol use" (p. 465) **Mechanisms:** gender was found to moderate relationship between context and substance use, differences according to type of drinker (e.g., non-drinker, moderate, heavy drinker) are also noted; review authors identify need for more research to understand moderating effects of individual characteristics (p. 472) **Author conclusions:** "Certain environments exert greater risk for alcohol consumption among adolescents" (p. 465); "Results of this systematic review provide evidence that adolescent alcohol use is largely an opportunistic event that occurs in the presence of peers. Adolescents tend to drink on weekend evenings, and they do so when alcohol is available. Heavier drinking is more likely to occur when

operationalised more narrowly than suggested by Freisthler et al. (review authors provide no explanation for this), focus on (purported) causal relationships rather than association, unclear what is meant by focus on 'direct' relationships, 43 studies excluded due to "Wrong context factor" (p. 470) (no examples of 'wrong' factors given), drinking location (e.g., pub, home) as sole contextual aspect for many included studies, results appear to be descriptive rather than analytical (e.g., describing frequent or typical drinking contexts), inconsistencies (e.g., review is ambiguous with regard to how many studies were represented in the 31 articles, data table identifies two records for drinking outlets but main text refers to only one record, Weiss & Moore 1994 report on age of people present in their abstract but this has not been extracted)	ecological momentary assessment to study adolescent alcohol use	**Other theoretical perspectives:** framework for drinking context by Freisthler et al. (see above) **Limitations identified by review authors:** no studies researching activity spaces, only few studies on role of alcohol outlets	close peers who are also drinking are present." (in 'Discussion', p. 472) **Implications for prevention:** review specifically developed to inform prevention efforts (p. 465); "All of these drinking context characteristics represent modifiable environmental elements." (p. 465); review authors recommend family-based strategies "to focus on securing alcohol in the home so that it is not readily available to adolescents" (p. 471); for countries where adolescents may frequent on-premise drinking establishments, "prevention programming might focus on the specific environment of the bars to reduce excessive alcohol consumption [... e.g.,] age-verification and responsible bar management" (p. 471); need for "active adult supervision" rather than the "mere presence of an adult in the home" (p. 472); suggest that (civil) laws which "hold property owners, or any person who controls the property, liable for underage alcohol consumption that occurs on the property" may be "a beneficial tool", though acknowledging mixed evidence (p. 472)

Hughes et al. (2011)

Review details	Included studies	Space	Substance use
Hughes et al. (2011) 'Environmental factors in drinking venues and alcohol-related harm: the evidence base for European intervention', *Addiction* **Author objectives:** to identify "environmental factors in drinking	**Number of included studies (total):** 53 papers covering 34 studies **Scope:** Alcohol	**Spatial type/concept used by review authors:** focus on "public drinking environments, such as pubs, bars and nightclubs (drinking venues)" (p. 38) **Socio-spatial aspects as specified by review authors:** "The review focused on	**Outcomes of interest:** "drinking behaviours (e.g. drunkenness) and harms including injury, assault, road traffic crashes, crime and service of alcohol to underage or drunk customers" (p. 38); findings on "alcohol use and service practices" (p. 40) presented

establishements [sic] that are associated with increased alcohol consumption and associated harm and to understand the extent of study in this area across Europe" (p. 37) NB: "the purpose of the review was not to assess in depth the strength of associations between environmental factors and alcohol-related outcomes, but rather to gain a better understanding of existing literature and study methods to inform new European research (AMPHORA [project])" (p. 42) **Review type as described by authors:** Systematic review **Years searched:** 1990-2009 **Sources:** "Ten health, social sciences and education databases and 10 key websites" (p. 38), including e.g., MEDLINE, PsycINFO, ERIC, Web of Science, ETOH (p. 39), reference lists (p. 38) **Search terms:** "comprehensive search strategy" (details not reported, available upon request from review authors) (p. 38) **Structured quality assessment reported:** No ***Comment by AB:*** mostly observational studies in this review, inclusion of qualitative studies, contradictory findings are discussed, categorisation of socio-spatial aspects based on prior literature in the field, difference between physical and social factors not clear (i.e., no definitions offered) > allocation	**Other substances considered:** (e.g. illegal drugs included as socio-spatial aspect) **Studies relevant to present review:** all **Study designs:** eligible were "studies that had explored associations between physical, staffing and social factors in drinking environments and increased alcohol use or alcohol-related harm" (p. 37); "qualitative studies in which researchers had observed the circumstances surrounding alcohol-related harm were included" (p. 38); included studies represented variety of designs, mostly "observational research techniques, often in combination with other research methods [...] Most were naturalistic observations, although some included experimental techniques (e.g. adjusting music volume) [...] Other study types included retrospective surveys, cross-sectional and time-series analyses, experimental studies and randomized controlled trials" (p. 39) **Populations:** (not applicable, included were various types of public drinking environments) **Countries:** 9 countries, studies mostly from outside Europe: USA (12), Australia (8), UK (5), Canada (3), France, (2), Bulgarian, Netherlands, Spain, Sweden (one each) (pp. 38-39) **Quality assessment results:** none but review authors comment that few studies had been conducted in Europe and that "many [of the included studies, especially outside Europe] had collected	environmental factors that could be identifiable through naturalistic observational research (the method to be used in the present study) and modified locally through environmental interventions. Consequently, factors such as staff length of service and level of training […], patron characteristics (e.g. age, ethnicity, individual activities, drinking group composition) […], and factors dependent on regulation such as hours of alcohol service […] were not included" (p. 38); "environmental factors identified in the studies […] were grouped into three categories [… based on Graham & Homel, 2008]: physical factors, social factors and staffing factors" (p. 39) **Socio-spatial aspects in relevant studies:** Approx. 30 different aspects listed, allocated to three categories (see above); for physical factors: e.g., poor ventilation, cleanliness, crowding; for social factors, e.g., cheap drinks, permissive environment; for staff factors: e.g. age, friendliness, gender (p. 40-41). (review authors do not comment on how frequently each factor was studied but the summary table suggests that most factors had been studied in three countries or more) **Use of theories in relevant studies:** (not discussed) **Other theoretical perspectives:** (none) **Limitations identified by review authors:** (none identified)	separately from those on "alcohol-related problems" (p. 41); 13 studies measured alcohol use and serving practices, 23 studies measured alcohol-related harm **Results:** "Throughout the studies, a wide range of physical, staffing and social factors had been associated with higher levels of alcohol use and related harm in drinking environments. Factors that appeared particularly important in contributing to alcohol-related problems included a permissive environment, cheap alcohol availability, poor cleanliness, crowding, loud music, a focus on dancing and poor staff practice. However, findings were not always consistent across studies." (p. 37) **Mechanisms:** Factors discussed included e.g., training of staff, legal requirements, interactions between various environmental factors, drug-specific effects (NB: mechanisms appear to be suggested by primary study and review researchers rather than based on empirical data; see hypothesised example mechanisms on p. 43) **Author conclusions:** "Drinking establishments, their management and the behaviours of the young people who use them vary widely across Europe. While international research shows that environmental factors in drinking settings can have an important influence on alcohol-related harm, there is currently a scarcity of knowledge on the relevance and impacts of such factors in modern European settings." (p. 37)

debatable (e.g., 'food availability' as social factor, 'shabby decor' as physical factor), no detailed data extraction table, review authors note that primary studies accounted for "confounding effects" (p. 42) but no details provided, therefore unclear to what extent found associations may be explained by other variables (e.g., patron characteristics)	data more than a decade prior to the review" (p. 37)		**Implications for prevention:** no specific recommendations (implications relate to a primary study planned by the review authors); "Developing this knowledge will support the implementation of strategies to create drinking environments in Europe that are less conducive to risky drinking and alcohol-related harm" (p. 37)

Mair et al. (2019)

Review details	Included studies	Space	Substance use
Mair et al. (2019) 'Space and Place in Alcohol Research', *Current Epidemiology Reports* **Author objectives:** "To summarize the recent literature on social and physical environments and their links to alcohol use and identify empirical research strategies that will lead to a better understanding of alcohol use in contexts" (p. 412) **Review type as described by authors:** Review of recent literature **Years searched:** 2015-June 2019 **Sources:** PubMed **Search terms:** "search terms for alcohol ('alcohol,' 'alcohol drinking') together with terms related to contextual factors ('neighborhood factors,' 'community factors,' 'contextual factors,' 'residence factors,' 'space and place,' 'geospatial,' 'spatial,' 'geography')" (p. 413)	**Number of included studies (total):** 75 studies in three groups: 'Regional and Neighborhood Factors' (55 studies); 'Geographic Context' (15 studies); 'Drinking Locations and Contexts' (6 studies) **Scope:** Alcohol **Other substances considered:** No **Studies relevant to present review:** 6 studies on 'Drinking Locations and Contexts' **Study designs:** only quantitative empirical designs eligible with alcohol use as a dependent variable and "a construct of space or place" as an independent variable (p. 413); relevant studies utilised national/household surveys (2 studies), school-based surveys (2 studies), geographic ecological momentary assessments (GEMA) (2 studies)	**Spatial type/concept used by review authors:** "micro-environments (i.e., areas smaller than neighborhoods)" (p. 414); "contexts […] as the places where individuals live and/or drinking-related activities take place as well as the social and physical characteristics of those places)" (p. 415) **Socio-spatial aspects as specified by review authors:** "characteristics or types of drinking locations" (p. 414) **Socio-spatial aspects in relevant studies:** "all 6 studies compared alcohol use in different drinking locations (e.g., home vs. bar), 2 additionally examined characteristics of people at the location (e.g., number of intoxicated patrons) [references omitted], and 1 examined location-specific factors (e.g., presence of a keg, enforcement of legal drinking age)" (p. 414-5) **Use of theories in relevant studies:** (was not addressed by review authors)	**Outcomes of interest:** "heavy drinking and subsequent experiences of harm" (p. 412); measures in the relevant studies were "survey-derived measures of alcohol use" (5 studies) or "peak blood alcohol content (BAC)" (1 study) (p. 415) **Results:** "Although these studies differed in environmental factors examined, 5 studies found significant associations between drinking locations and alcohol use" (p. 415) **Mechanisms:** (not a focus for the review authors but e.g., one study found 'perceived number of intoxicated people' to be a partial mediator between setting and use [see Marzell et al., 2015, in the review's supplementary table]) **Author conclusions:** "The dynamic, longitudinal, and multiscale processes by which social and physical structures affect social interactions and substance use have not yet been uncovered or quantified. In order to understand and quantify these processes, assessments

Structured quality assessment reported: No ***Comment by AB:*** useful overview of broader 'health and place'-style research, very few relevant studies identified, limited search strategy, focus on causal relationships rather than association, results summarised very broadly (i.e., not by socio-spatial aspect)	**Populations:** only studies with a "sample with the majority being adults aged 18 or older" eligible; 4 of the relevant studies were focussed on specific groups (university students, 3 studies; gay and bisexual men, 1 study) **Countries:** USA (4 studies), Russia, South Africa (1 study each) **Quality assessment results:** none	**Other theoretical perspectives:** Routine activities theory is proposed as a framework to connect "daily activity patterns", "physical and social environments" and "opportunities for substance use and abuse" (p. 415); "activity spaces" as the locations where individuals spend time as part of their typical routines (p. 415) **Limitations identified by review authors:** "Still underdeveloped is the concept of routine drinking activities and drinking activity spaces. This is the 'gold standard' we would like to be able to achieve in order to best understand social and physical environmental spaces that are directly linked with specific alcohol consumption patterns. This is difficult to measure, as it involves layering information specific to drinking (where, when, with who) on top of general activity spaces assessment." (p. 415)	of exposures (e.g., how individuals use space) and risks within specific locations are essential. Methods to better assess these exposures and risks include model-based survey approaches, ecological momentary assessment (EMA), and other forms of ecologically and temporally specific analyses, affiliation network analyses, simulation models, and qualitative/multimethods studies." (p. 412) **Implications for prevention:** Important to understand "social and physical characteristics of environments" (p. 412) to "develop more precise and effective preventive interventions, both individual-based [...] and environmentally based", focussed on providing support or restricting access in relation to e.g., specific times, locations, or social interactions (p. 418)

Serre et al. (2015)

Review details	Included studies	Space	Substance use
Serre et al. (2015) 'Ecological momentary assessment in the investigation of craving and substance use in daily life: A systematic review', *Drug and Alcohol Dependence* **Author objectives:** "(1) assess the link between craving and substance use; and (2) identify relevant moderators of craving among substance users" (p. 1)	**Number of included studies (total):** 91 studies – "Thirty-eight studies examined moderators of craving, 23 studies examined the link between craving and substance use, and 30 studies examined both of these questions" (p. 3) **Scope:** Alcohol, tobacco, illicit drugs: "A majority of studies involved the use of tobacco (63 studies) and alcohol (nine studies). Three studies involved both alcohol and tobacco use" (p. 3); 16	**Spatial type/concept used by review authors:** (none) **Socio-spatial aspects as specified by review authors:** "Moderators were grouped in inter- and intra-individual variables" (p. 13) **Socio-spatial aspects in relevant studies:** "The intra-individual (within-person) variable most frequently assessed for its influence on craving	**Outcomes of interest:** 'craving' (including 'urges', p. 13): the included studies assessed this via questionnaire items; substance use (in relation to craving only) **Results:** "Craving levels were found to be positively associated with negative and [i.e., as well as] positive affect, stress, substance related-cues, the presence of other individuals using the target substance or other substances,

Review type as described by authors: Systematic review **Years searched:** up to October 2013 **Sources:** PubMed, PsycInfo, hand searching reference lists **Search terms:** "The terms 'experience sampling method' or 'ESM' or 'ecological momentary assessment' or 'EMA' or 'electronic diary' or 'interactive voice response' or 'IVR' were combined with the terms 'craving' or 'urge' or 'desire'" (p. 3) **Structured quality assessment reported:** No ***Comment by AB:*** written in a context of relapse prevention, useful focus on craving as a potential mediator, 'cues' not further distinguished, contextual factors not distinguished depending on whether moderating or 'inducing' role, all 'intra-individual moderators' addressed together (no further categorisation, limited conceptualisation as 'environmental' or similar)	studies on illicit substances: "One study involved heroin use and nine studies assessed cocaine and heroin users treated with methadone. One study involved ecstasy users and three [studies involved] cannabis users. Two studies involved poly-substance user samples" (p. 3) **Other substances considered:** NA **Studies relevant to present review:** 68 studies that examined moderators of craving **Study designs:** eligible studies used ecological momentary assessment (EMA) that explored "the link between craving and substance use" or "moderators of craving" (p. 3); "The majority of studies used electronic diaries (ED), but three used interactive voice response (IVR), three combined ED with a tape-recorder, four used smart-phone web-enabled protocols, two used text messages with cell-phones, one used an actigraph and one used a wrist watch, three used an internet-based survey, and two combined the use of a watch (to indicate time of assessment) with a notebook (to write the answers)." (p. 3) **Populations:** studies with substance users ("subjects reporting any alcohol or drug use", p. 3) were eligible; of the included studies, 85 studies covered adults including 5 studies of "student samples or young adults between 18 and 22 years old"; 6 studies covered "adolescents between 13 and 19 years old" (p. 3); "Five studies evaluated only women and two others only men" (p. 3);	was state affect (20 studies)." (p. 13); use of other substances, food, coffee; substance-related cues; "seeing the substance or seeing other people using substances" (p. 14); restrictions, location, work vs. leisure activities (p. 16) **Use of theories in relevant studies:** (not addressed by review authors) **Other theoretical perspectives:** (not addressed by review authors) **Limitations identified by review authors:** (none)	substance availability, specific locations, food [or hunger, p. 13] and caffeine intake, and it was found to be inversely related with treatment, coping and self-efficacy. Craving was also associated with previous substance use [i.e., the same substance], but the direction of this association was inconsistent across studies." (p. 15); use of substances (e.g., alcohol, cocaine) also increased craving for other substances (e.g., tobacco) (p. 13-14); "While a large majority of tobacco studies reported at least one positive relationship between craving and substance use, currently or prospectively, the number of studies concerning other substances makes it difficult to draw conclusions with confidence." (p. 15); "Among the 53 studies examining these associations [between craving and substance use], results of 91 analyses were reported: 69 found positive associations (76%), 20 found non-significant associations, and two found inverse relationship between craving and substance use." (p. 14) NB: "It is also important to note that although a majority of studies involved tobacco, our results were often pooled across substances, and it remains possible that craving and its moderators could be affected by substance type" (p. 15) **Mechanisms:** "Numerous studies reported on age and gender differences, but with a wide range of effects that did not provide a consistent pattern of results" (p. 13); "level of use and addiction severity" increased craving after exposure to substance use related cues (p. 13); other individual differences

	diverse in terms of substance use (e.g., substances [see above], in treatment vs. not in treatment, attempting to quit [most studies] vs. no desire to quit, heavy/daily users [most studies] vs. studies with less frequent users, etc.) **Countries:** (not reported) **Quality assessment results:** none but review authors note that heterogeneity in methods and sample characteristics limited their ability to synthesise data and draw conclusions (p. 15); "Studies that failed to report an association between craving and substance use were characterized by statistical or methodological limitations (floor effect, length of assessment period) or had reported an association only under particular conditions or only with some craving measures." (p. 17)		were also found (NB: review authors refer to "variables that could induce, regulate, or moderate craving" (p. 13), so these findings are not limited to moderators of the relationship between context and use); review authors speculate in the discussion that relationship between craving and substance use may be moderated by "the individual's history of substance use" (p. 16) as well as the type of substance; "effects of substance availability appeared to be inconsistent across studies": may depend on e.g., interest in quitting and type of substance (p. 17) **Author conclusions:** "This review provides strong support for the link between craving and substance use [at least for tobacco, p. 15], and underscores the importance of the timing of assessments" (p. 1) **Implications for prevention:** none; review authors provide general directions in relation to treatment (e.g., focus on "craving control", need for "better understanding of the emergence and moderation of craving") (p. 17)

Stanesby et al. (2019)

Review details	Included studies	Space	Substance use
Stanesby et al. (2019) 'The contexts of heavy drinking: A systematic review of the combinations of context-related factors associated with heavy drinking occasions', *PLoS ONE*	**Number of included studies (total):** 65 studies **Scope:** Alcohol	**Spatial type/concept used by review authors:** "occasion" (p. 1); "Event-level alcohol consumption refers to an individuals' drinking pattern during a given occasion. An occasion typically refers to a day or evening, but may be	**Outcomes of interest:** "amount of alcohol consumed" (p. 1); "Heavy drinking patterns (commonly termed 'binge', 'risky single occasion', 'heavy episodic' or 'short-term risky' drinking)" (p. 2); typically measured in included

Author objectives: "This systematic review identifies and describes the specific combinations and sequences of context-related factors that are associated with heavy drinking occasions." (p. 1) (methodological objectives noted on p. 4) **Review type as described by authors:** Systematic review **Years searched:** until January 2018 **Sources:** MEDLINE, Embase and the Cumulative Index to Nursing and Allied Health Literature (CINAHL), consultation with experts **Search terms:** "detailed list of search terms that describe alcohol drinking, event-level or event-based study design, and combinations, interactions or sequences" (p. 6) **Structured quality assessment reported:** Yes ***Comment by AB:*** interesting approach to consider combinations and sequences of different types of contextual factors, search strategy limited by terms relating to 'event-level or event-based' designs, search strategy has greater emphasis on certain forms of drinking (e.g., pre-drinking, pub crawls), study rated 'poor' was not excluded from synthesis of results, socio-spatial aspects categorised (though unclear on what basis and debatable in the details), non-significant or contradictory findings not extracted (but contradictory findings reported in supplements), appear to	**Other substances considered:** cigarette use, illicit drug use and energy drink use considered as contextual factors **Studies relevant to present review:** (the sample included 11 studies limited to individual characteristics/states but as these were event-specific, they are also considered relevant) **Study designs:** "Eligible articles were event-level [e.g., EMA] and event-based studies [e.g., retrospective] that quantitatively analysed associations of sequences or combinations of context-related factors with event-level alcohol consumption [of the individual]" (p. 1); experiments were excluded (p. 21); included studies represented five designs: ecological momentary assessment (EMA) (17 studies), daily diary (15 studies), street interview (14 studies), retrospective survey of single previous drinking occasion (11 studies), timeline follow back (TLFB) (8 studies) (p. 8); "Twenty-eight studies (43%) investigated the association between a *sequence* of event-level factors and event-level drinking, and 52 studies (80%) investigated the association between a *combination* of two or more context-related factors and event-level drinking." (p. 12, emphasis added) **Populations:** general population studies were eligible (special populations not eligible) (see also 'Countries' below); populations in included studies were mostly adolescents or young adults, in particular students (36 studies) and nightlife precinct patrons (12 studies);	more specific (e.g., during a visit to a venue)" (p. 2); "immediate drinking context" (p. 3); "immediate contexts (described by specific combinations of context-related and individual-level factors)" are distinguished from "broader contexts (described by specific sequences of immediate contexts)" (p. 4) (examples given by authors suggest that 'occasion' may be equivalent to 'broader drinking context') **Socio-spatial aspects as specified by review authors:** "physical and social attributes of the setting, characteristics and state of individuals, and the interactions of these components" (p. 1); "Immediate drinking context" emerges from the combination and sequencing of three aspects: "Individual characteristics/ state", "Physical environment", "Social environment" (p. 3); **Socio-spatial aspects in relevant studies:** A broad range of socio-spatial aspects; review authors focussed on contexts as the combination of various aspects; 156 such contexts were identified in primary studies and grouped by review authors in relation to ca. 30 aspects; 8 studies considered the individual, the social environment *and* the physical environment, with 37 such 'contexts' identified as related to heavier or lighter drinking **Use of theories in relevant studies:** (not addressed by review authors) **Other theoretical perspectives:** (not addressed by review authors)	studies via "number of drinks consumed during the drinking occasion or that day or evening" (40 studies) or "estimated blood alcohol concentration" (19 studies) (p. 11); "We compiled a list of combinations and sequences associated with heavier drinking (i.e., 'risky contexts') and with lighter drinking ('protective contexts')" (p. 1) **Results:** "Daily mood, day of week, location and drinking group characteristics are important drivers of whether an individual engages in a heavy drinking occasion" (p. 1); "Elements of contexts that were commonly associated with heavier or lighter drinking occasions included a person's mood throughout the day, the size, gender and expectations of the social group, the location where drinking takes place, and whether certain events or parties are attended." (p. 19); "A total of 156 unique contexts were identified as being associated with heavier or lighter drinking. Of these, 110 contexts (71%) were associated with heavier drinking (labelled as 'risky contexts'), and 46 contexts (29%) were associated with lighter drinking (labelled as 'protective contexts')." (p. 12); "Very few sequences of factors were reported as being associated with event-level alcohol consumption." (p. 2); "There were three main sequences that are each found to be associated with heavy drinking: pre-drinking, yesterday's alcohol consumption and multi-day accumulation of stress." (p. 18); Results are shown separately for each combination of socio-spatial aspects (i.e., 'context') (as per the primary studies), outcomes are

have considered only 'lighter drinking' for 'protective contexts' but not abstinence	"Twenty-nine studies (45%) restricted their sample to drinkers" (p. 8) **Countries:** eligible studies were limited to "broadly Western countries" (p. 5); mostly from North America (42 studies) and Europe (17 studies) **Quality assessment results:** "The study quality (risk of within-studies bias) for most of the studies were rated 'good' (44/65; 68%), 20 (31%) were rated 'fair', and one (2%) was rated 'poor'." (p. 8)	**Limitations identified by review authors:** "Relatively few contexts were described in relation to the physical environment. Research investigating whether and how physical contexts are associated with an individual's drinking behaviour is needed because, in a practical sense, modification of the physical environment may be relatively feasible (e.g. luminosity, noise level and density restrictions, location-specific text message interventions)" (p. 19); "A minority of the studies included in this review described contexts via a combination of factors related to the individual, the social environment and the physical environment" (p. 19, original emphasis); few studies addressed sequences rather than combinations (p. 19)	summarised (as associated with 'heavier drinking' or 'lighter drinking') NB: "the tendency for lower values to be a variable's reference category/value may partly explain why fewer protective contexts were identified than risky contexts." (p. 21) **Mechanisms:** special attention in results presentation given to interactions with gender (i.e., differential effects for men or women); "The direction and magnitude of some associations differed by gender, age, personality and motives, such that in particular social or physical contexts, some people may feel compelled to drink more while others are compelled to drink less." (p. 1-2); e.g., "The immediate social context was found to be most strongly associated with drinking behaviour when combined with certain individual characteristics." (p. 17) NB – the review focusses on substance use results from sequences and combinations of socio-spatial aspects. **Author conclusions:** "Contexts or factors are experienced in specific sequences that shape the broader drinking context and influence drinking behaviours and consequences but are under-studied." (p. 2) **Implications for prevention:** (only addressed in very general terms, i.e., that the findings of such research can help make interventions more effective and targeted)

Stevely et al. (2020b)

Review details	Included studies	Space	Substance use
Stevely et al. (2020b) 'Contextual characteristics of adults' drinking occasions and their association with levels of alcohol consumption and acute alcohol-related harm: a mapping review', *Addiction* **Author objectives:** "This mapping review aimed to identify and describe the theoretical approaches to conceptualizing drinking occasions, study designs, predictors and outcome measures used in existing research with a view to identifying dominant approaches, research gaps and areas for further synthesis" (p. 218) **Review type as described by authors:** Mapping review **Years searched:** earliest available (1975) to January 2019 **Sources:** Ovid MEDLINE, PsycInfo and the Web of Science Social Sciences Citation Index (SSCI) **Search terms:** "key terms relating to three concepts: alcohol consumption (e.g. alcohol-related or alcoholic beverage*), event-level research (e.g. ecological momentary assessment) and characteristics of drinking occasions (e.g. venue*, weekend). These were combined" (p. 219) NB: Studies addressing topics covered by other recent (2014 or later) reviews were excluded (p. 220)	**Number of included studies (total):** 278 papers (some of which reported on multiple studies) **Scope:** Alcohol **Other substances considered:** Reviews on alcohol and energy drink use mentioned (p. 220); 'Illicit drugs' (use and availability) included as contextual characteristics **Studies relevant to present review:** all **Study designs:** only studies using "quantitative event-level methods" to estimate "associations […] between the context of adults' drinking occasions and consumption and/or acute alcohol-related harm" (pp. 218-9) were eligible; most common designs in included studies were daily diary (70 papers), single-occasion recall (66 papers), experiments (43 papers), ecological momentary assessment (39 papers) **Populations:** only studies of adult populations eligible (not special populations); half of included studies focussed on student participants (133 studies) **Countries:** USA (170 studies), Australia (21 papers), Canada (17 papers), Switzerland (17 papers), England (14 papers), the Netherlands (10 papers), New Zealand (5 papers) were most common	**Spatial type/concept used by review authors:** "drinking occasions" (p. 218) (initially not further specified, later conceptualisation suggested via reference to practice theories, p. 226) **Socio-spatial aspects as specified by review authors:** "contextual characteristics (e.g. venue, timing or company)" (p. 218); "Eligible studies must quantitatively measure one or more contextual characteristics of individual drinking occasions" (p. 219); "Contextual characteristics were organized into six categories [...]—meaning, timing, venue, company, situation (e.g. crowding) or drink type" (p. 220) **Socio-spatial aspects in relevant studies:** review authors identified 33 contextual characteristics measured by at least five papers (p. 223); "Meaning characteristics were the most commonly studied (n = 155; 55.8%), followed by timing (n = 132; 47.5%), company (n = 80; 28.8%), venue (n = 75; 27.0%), situation (n = 63; 22.7%) and drink type (n = 18; 6.5%)" (p. 224); certain characteristics tended to be measured together (e.g., drink type, venue, timing) (p. 225); of the 33 identified characteristics, 'day of the week' was most common (81 papers); "much of the literature focuses on psychological constructs (e.g. mood or stress), time of day and day of the week, with less attention paid to reasons for drinking, drinking motives, the drinking of others and the evolution of drinking occasions	**Outcomes of interest:** "event-level consumption or acute alcohol-related harm" (p. 218); "Alcohol consumption was most commonly measured using the number of drinks or another measure of consumption volume" (171 papers) (p. 225) **Results:** "The results reported in each paper were not extracted, as the aim of this review was to map the topics and methods covered by existing literature" (p. 220); "The most common outcome type considered was consumption (n = 224; 80.6%) and only a few papers studied specific acute harm outcomes such as unprotected sex (n = 24; 8.6%), drink driving (n = 14; 5.0%) or sexual violence (n = 9; 3.2%)." (p. 218); review authors specified a list of harms based on literature and a scoping search (p. 220) **Mechanisms:** "Participant characteristics were frequently included in analyses as controls" (e.g., sex, age, usual drinking, 230 papers) (p. 222-3); "most papers used material elements [...] as predictors for their outcome of interest. However, they did not explore the meanings the respondent associated with these materials [...] which could mediate or moderate the observed associations with outcome measures" (p. 226) **Author conclusions:** "Studies from 1975 to 2019 using event-level methods to estimate associations between

Structured quality assessment reported: No ***Comment by AB:*** large number of studies, comprehensive search strategy but limited by search terms on 'event-level research', socio-spatial aspects categorised (though debatable in the details), theoretical frameworks addressed but socio-spatial theory not mentioned by review authors	**Quality assessment results:** none reported, but review authors note: "The available literature is also limited with regard to diversity of population studied. Almost half the papers identified focused on students in the United States, which limits the generalizability of their findings" (p. 225)	over their duration" (p. 226); "Most papers reported drinking occasions across a range of settings (n = 198; 71.2%), but 45 (16.2%) focused on a single type of setting only—such as licensed premises (n = 9; 3.2%), nightclubs (n = 7; 2.5%) or bars (n = 21; 7.6%). The remaining 35 (12.6%) papers used experimental settings." (p. 222) **Use of theories in relevant studies:** "Papers typically lacked a stated theoretical approach (n = 203; 73.0%)" (p. 218); "Those that did [have an explicit theoretical framework] typically used psychological theories, such as the theory of planned behaviour, and focused on specific contexts such as motivations (informed by motivational models)" (p. 221); as a result, "the literature to date offers a much-reduced view of occasions, with only a small number of occasion characteristics (or elements) included within each study and no clear rationale offered for decisions on which characteristics are or are not included" (p. 226) **Other theoretical perspectives:** review authors suggest 'theories of practice' as a possible theoretical framework to conceptualise 'drinking occasions' in future research (following Shove et al.: materials, competencies, meanings; and "Southerton's five understandings of time") (p. 226) (AB: socio-spatial theory not mentioned) **Limitations identified by review authors:** "only 53 (19.1%) papers studied three or more occasion characteristics and most used methods that assume occasion characteristics do	contextual characteristics of drinking occasions, consumption levels and acute harms were largely focused on students and consumption outcomes, and most have considered a limited range of contextual characteristics" (p. 218); "the literature as a whole lacks a clear conception of drinking occasions—and therefore how to measure and analyse them" (p. 225) **Implications for prevention:** (no intervention recommendations; recommendations focus on socio-spatial aspects to be addressed in future research, e.g., competencies, p. 226)

		not change during an occasion (n = 189; 68.0%).” (p. 218); review authors link this to “the lack of theory-based conceptualization of drinking occasions” (p. 224)	

Stevely et al. (2020a)

Review details	Included studies	Space	Substance use
Stevely et al. (2020a) ‘Drinking contexts and their association with acute alcohol-related harm: A systematic review of event-level studies on adults’ drinking occasions’, *Drug and Alcohol Review* **Author objectives:** “to summarise the available evidence on direct and moderation effects of contextual characteristics of adults’ drinking occasions on acute harm outcomes” (p. 310) **Review type as described by authors:** Systematic review with narrative synthesis **Years searched:** earliest available (1975) to January 2019 **Sources:** Ovid MEDLINE, Ovid PsycInfo and the Web of Science Social Sciences Citation Index (SSCI) **Search terms:** “terms for three key concepts: alcohol consumption (e.g. alcohol* drink*), event-level research (e.g. occasion-based) and contextual characteristics of drinking occasions (e.g. weekend)” (p. 310)	**Number of included studies (total):** 95 papers reporting on 77 studies **Scope:** Alcohol **Other substances considered:** reviews relating to alcohol use with illicit drugs or with energy drinks are mentioned (p. 310); illicit drug use is included as a contextual characteristic **Studies relevant to present review:** all **Study designs:** “Eligible papers used quantitative designs and event-level data collection methods. They linked one or more drinking contexts to acute alcohol-related harm” (p. 309); most common designs were single occasion recall, prospective daily diary/24 h recall, ecological momentary assessment, retrospective diary (p. 311) **Populations:** only studies of adult populations eligible (not special populations); most included papers focussed on young adults (65 papers), in particular students (p. 312) **Countries:** Most common were USA (62 papers), Australia (9 papers), Canada (6	**Spatial type/concept used by review authors:** “drinking occasion” – “Studies collected information about drinking occasions but the definition of these occasions varied across studies. Twenty-eight (30%) papers are based on contextual information collected about drinking during an entire day. Seven (7%) papers consider drinking in the 6 h before an injury and seven (7%) measure drinking at one specific drinking location. Many papers (n = 44; 46%) do not explicitly define an occasion, allowing participants to make this judgement themselves” (p. 312) **Socio-spatial aspects as specified by review authors:** “Eligible studies measure one or more contextual characteristics of drinking occasions” (p. 310); “Our understanding of contextual characteristics is grounded in theories of practice and we use the term ‘context’ as an accessible equivalent to ‘elements of practice’ [reference to Shove et al.]. Contextual characteristics include materials (e.g. drink type or a pub), competencies (e.g. managing levels of intoxication) and meanings (e.g. drinking to celebrate).” (p. 310); “We have developed the following contextual	**Outcomes of interest:** “acute alcohol-related harms” (p. 310); review authors specified a list of harms based on literature and a scoping search (p. 310-311); harms in included studies were aggregate measures, unprotected sex, accidental injuries and acute hospitalisation, assault and aggression, drink driving, sexual violence, acute alcohol use disorder symptoms, crime (p. 312); “Aggregate measures of multiple acute harms are the most commonly studied outcome (n = 30; 32%).” (p. 314) **Results:** “We found substantial evidence for direct effects of drinking context on harms. All of the contextual characteristics types studied (e.g. people, place, timing, psychological states, drink type) were consistently associated with harms. Certain contexts were frequently studied and associated with harms, in particular, weekend drinking, drinking in licensed premises and concurrent illicit drug use.” (p. 309) Results are summarised in detail by type of acute harm and by contextual characteristics category.

NB: builds on a mapping review (Stevely et al., 2020b, extracted above) to summarise the subset of identified studies which measured acute harm (cf. consumption only); "This is the most comprehensive review to date" (p. 318) **Structured quality assessment reported:** Yes (but no individual results) ***Comment by AB:*** focus on harms rather than consumption as such, findings were highlighted as significant by review authors if a single study within a category found a significant association (i.e., did not have to be a majority of studies within a category, evident from table on p. 314), effect sizes not reported in review, unclear on what basis the review authors developed the categories for contextual characteristics, non-significant findings not extracted, limited information on populations	papers), Switzerland (5); few "in non-Western countries" (p. 312, details on p. 313) **Quality assessment results:** "Study quality is good overall although measures often lack validation" (p. 309); "The main limiting factor is the use of self-report measures of occasion characteristics that lack validation" (p. 312-313); "Around a third of included papers do not control for alcohol consumption in analyses [...]. However, they can evidence the importance of understanding which contextual characteristics are associated with harm." (p. 314)	characteristic categories for ease of interpretation: people, place, timing, psychological states, drink type and other." (p. 311) **Socio-spatial aspects in relevant studies:** a broad range of socio-spatial aspects, Table S3 lists 61 characteristics within the broader categories **Use of theories in relevant studies:** (not discussed in this review, see Stevely et al., 2020b above) **Other theoretical perspectives:** review authors draw on practice theory in their broad conceptualisation of 'context' (see above) **Limitations identified by review authors:** "The lack of comprehensive characteristics included in studies also limits the quality of study results, as associations between contextual characteristics and acute harm may be related to unstudied features of drinking occasions." (p. 317)	**Mechanisms:** "Few studies tested for mediation or moderation effects." (p. 317); "this literature has not consistently separated direct associations from potential effects mediated by consumption or moderation effects of drinking context" (p. 318) **Author conclusions:** "A large range of contextual characteristics of drinking occasions are directly associated with acute alcohol-related harm, over and above levels of consumption." (p. 309); "This is the first comprehensive review summarising evidence to date on the association between contextual characteristics of adults' drinking occasions and any outcome" (p. 318) **Implications for prevention:** "The findings of our review indicate target drinking contexts for prevention efforts that are consistently associated with increased alcohol-related acute harm, particularly drinking in licensed premises, at the weekend and concurrently with illicit drug use" (p. 318); "Our review can inform future interventions aimed at modifying drinking environments such as targeting illicit drug use or increasing the availability of food [or staff number]." (p. 318)

Veilleux and Skinner (2015)

Review details	Included studies	Space	Substance use
Veilleux and Skinner (2015) 'Smoking, food, and alcohol cues on subsequent behavior: A qualitative systematic review', *Clinical Psychology Review*	**Number of included studies (total):** 68 articles **Scope:** smoking, food and alcohol	**Spatial type/concept used by review authors:** cues	**Outcomes of interest:** "behavioral outcomes" (measured by the researchers), "target syntonic (same behavior as cue) and dystonic outcomes

Author objectives: to answer specified questions: "(1) Is there value in distinguishing between the effects of cue exposure on behavior from the responses to cues (e.g., self-reported craving) predicting behavior?; (2) What are the effect [sic] of cues on behavior beyond lapse, such as broadly considering both target-syntonic (e.g., do cigarette cues predict smoking-related behaviors) and target-dystonic behaviors (e.g., do cigarette cues predict other outcomes besides smoking)?; (3) What are the lessons to be learned from examining cue exposure studies across smoking, food and alcohol domains?" (p. 13) **Review type as described by authors:** Systematic review **Years searched:** (not reported, included studies range from 1985 until 2013) **Sources:** Web of Science, PsycInfo, reference lists **Search terms:** "'cue-reactivity,' 'cue exposure' or 'cue-specific' along with 'craving,' 'urge' or 'desire,' separately for smoking ('smoking,' 'nicotine,' 'tobacco,' or 'cigarette'), alcohol ('alcohol,' 'ethanol,' or 'drinking') and food ('food' or 'eating')" (p. 16) **Structured quality assessment reported:** No ***Comment by AB:*** interesting theoretical discussions on the role of craving, interesting to distinguish 'cue-reactivity' (understood as measuring mediators)	**Other substances considered:** none (exclusion of illicit substances is justified on pp. 16 and 24) **Studies relevant to present review:** 54 studies (19 on alcohol cues, 35 on smoking cues) **Study designs:** eligible were studies that analysed "the relationship between cue exposure and [behavioural] outcome" (p. 16); studies focussing on interventions (p. 16) as well as on "retrospective behavior, hypothetical behavior or perceptions of behavior" (p. 23) were not eligible; included studies used "both within- and between- subject designs involving manipulation of an independent variable, and others that were more correlational (e.g., non-experimental)" (p. 24) **Populations:** no eligibility criteria reported; "In alcohol cue-reactivity research, participants are typically either college students or alcohol dependent individuals in treatment" (p. 17); "The smoking studies used the widest variety of participants across age, gender and smoking frequency. However, the alcohol studies were skewed toward male participants, and tended to have a bimodal distribution of either light/social drinkers or alcohol dependent people undergoing treatment" (p. 21) (NB: data extraction table shows that most smoking studies included adult daily smokers) **Countries:** (not reported)	**Socio-spatial aspects as specified by review authors:** main distinction is between substance use related cues ("target cues") and "neutral" cues (p. 16); review authors do not distinguish cues further **Socio-spatial aspects in relevant studies:** not addressed by review authors but data extraction tables state cues used in smoking studies (e.g., cigarettes lit or unlit, related objects [e.g., lighters, ashtrays], people including confederates smoking, smoking related pictures, mental imagery, film) and alcohol studies (e.g., alcoholic beverage, alcohol related pictures, smell, film, mental imagery); a comparison conducted for the present thesis found that the included studies in the two domains used somewhat different cues, with a greater range of cues used in smoking; in both cases, 'in vivo' cigarettes or alcoholic beverages and pictures were the most common cues **Use of theories in relevant studies:** (not addressed) **Other theoretical perspectives:** (review authors use dual-process framework to highlight role of non-conscious craving as well as automatic route from cue to behaviour [i.e., not mediated by conscious craving]) **Limitations identified by review authors:** (none in relation to socio-spatial aspects)	[…] (i.e., behavior in a different domain than the cues presented)" (pp. 13, 16) **Results:** smoking and alcohol-related cues increased likelihood of smoking and drinking, respectively: "Evidence generally indicates an effect of cue exposure on both target-syntonic and target-dystonic behavior, and that self-report cue-reactivity [i.e., craving, p. 20] predicts immediate target-syntonic outcomes." (p. 13); "some indication that *in vivo* cues, as opposed to [mental] imagery or picture cues, are more effective than other cue types in terms of influencing subsequent outcomes" (p. 18, original emphasis); "higher alcohol consumption and greater smoking behavior [was also found] for participants who viewed film or television clips depicting smoking and alcohol use" (p. 18); "none of the few studies that tested for cross-mode outcomes (e.g. the effect of food or alcohol cues on smoking topography, or the effect of smoking cues on alcohol consumption) found a significant cue exposure effect" (p. 19); one study found that alcohol cue-induced craving reduced subsequent cigarette use (p. 21) **Mechanisms:** effects differed based on e.g., age, gender, level of dependence; review authors highlight the role of "deprivation [.. i.e.,] time since the participant last ate, drank alcohol, or smoked" (p. 21-22); "at least for smoking cues, deprivation [> 1 hr since last cigarette] likely influences behavioral outcomes" (p. 22); "availability or opportunity to use" may also moderate relationship between cue and behaviour (p. 22): two relevant studies "found an

from ‘cue exposure’ (understood here as measuring behaviour), review authors consider also automatic/nonconscious link between cues and behaviour (i.e., not mediated by conscious craving), interesting to consider potential for ‘target-dystonic’ effects, number of identified studies seems rather low, cues are little categorised by review authors, cues are rather distinguished from a methodological point of view (e.g., ‘in vivo’ versus imagery) (but cues reported in data extraction table), interesting to highlight “availability or opportunity to use” as a potential moderator (rather than a cue in itself)	**Quality assessment results:** none reported but review authors note: e.g., “compared to the plethora of studies examining self-reported craving as an outcome variable, the corpus of work examining behavior as an outcome are [sic] still very limited” (p. 21); sampling issues (e.g., focus on certain population groups, p. 21); lack of consideration for internal motivation to quit (p. 22-23); the (“likely […] incorrect”) assumption that “cue-reactivity is a relatively stable individual difference [...] across contexts and over time” (p. 23); use of conscious craving (i.e., measured via self-report) as an assumed mediator between context and behaviour (thereby neglecting non-conscious pathways) (p. 23); “neither cue-specific craving nor peak-provoked craving have received much empirical attention in the alcohol and food domains” (p. 23)		increase in behavior when the target was available compared to when it was not” (p. 22); “internal quit motivation” is also highlighted: “The role of quit motivation is the least explored motivational element in the cue-reactivity literature, which is ironic as an underlying motivation to restrict or restrain use is a central element in temptation scenarios and generally highlighted in the self-regulation literature.” (p. 22) **Author conclusions:** “the number of studies (a) reporting behavioral outcomes, and (b) reporting analyses connecting cue-reactivity to behavioral outcomes are surprisingly scant [...] future work would benefit from explicit comparisons of cue exposure versus cue-reactivity and taking some of the methodological strengths of each target domain and apply them to the other areas (e.g., including motivation as a study component in smoking and alcohol cue exposure studies, examining outcomes beyond consumption in food studies). [...] we recommend research addressing mechanisms of how and why cues influence behavior, as well as identifying situations when they do not” (p. 24) **Implications for prevention:** (none, review authors discuss avenues for future research in the cue-reactivity field)

D.4 Data extraction tables for repertory grid studies in section 4.1.3 (space)

Some publications reported also other data and analyses; the data extraction focussed on those that were most relevant to section 4.1.3.

Aitken (1990)

Study	Data collection	Construct categories: type of analysis & results
Aitken (1990) 'Local Evaluations of Neighborhood Change', *Annals of the Association of American Geographers* **Research question/ purpose:** "to identify and evaluate the human dimensions of change within the context of an inner-city neighborhood of San Diego, California" (p. 247) **Country:** USA	**Elements:** elicited freely – "any physical elements in their neighborhood that had disappeared or arrived during the course of their [the study participants'] residence" (p. 259); on average 9 "elements of change" were elicited, mostly "houses, apartments, offices, and stores" (p. 259) **Supplied constructs:** (none) **Qualifying phrase:** "in which way two are similar and therefore different from the third" (p. 259) (no specific qualifying phrase appears to have been used) **Sample size:** 38 in the repertory grid part of the research (p. 259)	**Analysis:** Principal components analysis (p. 259), a two-factorial solution was chosen to visualise the relationships between elements and constructs (p. 260) **Categories:** the author describes the elements using the original constructs (pp. 260-261) (i.e., no construct categories proposed) **Overall focus:** differences between elements representing different types of neighbourhood change

Harrison and Sarre (1975)

Study	Data collection	Construct categories: type of analysis & results
Harrison and Sarre (1975) 'Personal Construct Theory in the Measurement of Environmental Images', *Environment and Behavior* **Research question/ purpose:** "interest was focussed on the general image of their urban environment held by a group of female city	**Elements:** elicited and supplied – up to 15 personal places elicited per study participant, using the question: "name 15-20 places important to you in your everyday life in Bath?" (p. 12); plus standard list of 25 important places in the city based on authors' own knowledge of the city (p. 7) and five pilot interviews (p. 12) **Supplied constructs:** up to 9 personal constructs elicited per study participant (p. 12); plus a standard list of nine constructs developed based on literature, researcher interest and pilot interviews (p. 12) (e.g., "move/static", "like/dislike", p. 10)	**Analysis:** construct classification (p. 14; no details provided; appears to have been akin to a qualitative content analysis, but unclear whether categories were developed from the data or specified ex ante); principal component analysis; factor analysis of various 'supergrids' (pp. 17-18) **Categories:** 334 constructs were classified into four main classes as follows (p. 11, p. 14): "A - Affective" ("emotions aroused in people by places", p. 14); "E - Evaluative" ("person's opinions of the place", p. 14); "R - Relational" ("how the person comes into contact with the place and what role each has in the interaction", p. 14); "D -

residents" (p. 3); "to measure the general image of the city [Bath, England] of a group of urban residents using the repertory grid test" (p. 5) **Country:** UK NB: Authors also report on a repertory grid study with shopkeepers, but this was not relevant to the present thesis and is not extracted here.	NB: "To maintain spontaneity these lists of supplied elements and constructs were only shown to the respondents after the elicitation of personal places and constructs" (p. 12) **Qualifying phrase:** "to state some way in which two of the elements are alike and different from the third" (p. 5) (no specific qualifying phrase appears to have been used) **Sample:** 20 in relevant study (p. 6)	Descriptive" ("quasi-objective statements about various aspects of places", p. 14); descriptive constructs (D) were further distinguished into six "subclasses" (p. 11, p. 14): "D1 - Form"; "D2 - Function"; "D3 - Position in space"; "D4 - Position in time"; "D5 - Origin"; "D6 - Class" ("position in society", p. 15); A, E, R = "subjective" constructs; D = "objective" constructs (p. 14); "the descriptive and relational constructs are far more numerous than the affective and evaluative" (p. 16) First three PCA components were labelled by authors ("according to the combination of constructs which load heavily on them", p. 15) and these labels were compared across participants; "with the components aesthetic/functional and identify/not appearing repeatedly as the two largest" (p. 15); the remaining component labels were more varied and were therefore not further aggregated (p. 15-16) Factor analysis of a 'construct supergrid' (limited to 25 standards elements) found three components: "ugly/functional/used versus beautiful/aesthetic/typical Bath"; "use/like/feel at home versus feel strange/dislike move past"; "uninvolved versus involved" (p. 18), authors note that "Component 3 was interpretable with some difficulty" (p. 18), consensus on a fourth component could not be reached (p. 18) Factor analysis of an 'element supergrid' (limited to 9 standard constructs) found three significant components: "liked and beautiful [... versus] disliked and ugly"; "places with which the subjects were involved and which they used [... versus] places where they felt out of place"; "places which had been known for a long time and which were of wide significance [... versus] those which had been recently discovered and which were of local significance" (p. 20) NB: Noteworthy that labels used for PCA and factor components are not equivalent to categories used in construct classification; authors do not compare or integrate the different results **Overall focus:** illustrating different approaches to analysing grid data

Home et al. (2010)

Study	Data collection	Construct categories: type of analysis & results
Home et al. (2010) 'Cultural and Biological Determinants in the Evaluation of Urban Green Spaces', *Environment and Behavior* **Research question/ purpose:** "identify the determinants that cause landscapes to be either favored or rejected [... and] to answer the research question of whether the determinants that cause a landscape to be either selected or rejected are cultural and refer implicitly to behavior that is learned [reference omitted], or biological, and refer to behavior that is innate [reference omitted]." (p. 496) **Country:** Switzerland	**Elements:** supplied categories – 10 urban green spaces; "Nine photographs of urban green spaces, selected in consultation with an urban ecologist as being representative of the various green spaces within Zurich, were used as stimulus materials" (p. 503-504); plus ideal space: "Respondents were asked to imagine their ideal urban green space and to imagine and remember what their ideal would look like when photographed and presented in a similar way to the stimulus photographs" (p. 504) **Supplied constructs:** (none) **Qualifying phrase:** "Respondents were presented with a random group of three elements, from the set of 10, and asked to nominate which 2 elements were somehow similar to each other and different from the third. The justification for differentiation of the elements was noted as a pole of a construct. The respondent was then asked to identify the contrast to the elicited pole, thus completing the construct" (p. 504) (no specific qualifying phrase appears to have been used) **Sample:** 17	**Analysis**: qualitative content analysis; principal component analysis and multidimensional scaling; constructs were classified as 'biological' or 'cultural' with reference to prior literature (p. 505); 118 elicited constructs: "83 were deemed to be determinants belonging to components used by the respondents to describe either the favored or rejected landscape" (p. 507) **Categories:** elicited constructs were classified as 'biological' or 'cultural' based on theoretical considerations; no categories developed from the data; "Although constructs were repeated among respondents and grouped into components in the principal components analysis, there was no evident consistency in the grouping of components between respondents; for example, nature loaded with unstructured growth for one respondent, whereas it loaded with recreation, interest, and size for another" (p. 514) **Overall focus:** characteristics of favoured and rejected urban green spaces and whether these characteristics relate more strongly to 'biological' or to 'cultural' aspects

Honikman (1976)

Study	Data collection	Construct categories: type of analysis & results
Honikman (1976) 'Construct theory as an approach to architectural and environmental design', *The Measurement of Intrapersonal Space by Grid Technique (book)*	**Elements:** supplied – 17 "colour photographs of living-rooms" selected by the author (p. 173) (subset of 10 was used for rating, p. 174) **Supplied constructs:** (none) **Qualifying phrase:** (no details provided, no specific qualifying phrase appears to have been used) (the construct elicitation proceeded in two stages – after a triad elicitation, the second stage	**Analysis:** principal components analysis **Categories:** two-dimensional solution for graphic displays, three dimensions in tables; "at least 60 per cent was accounted for by the first two principal components [for each individual respondent]" (p. 174-175); categories not further described

Research question/ purpose: "to relate the physical environment to the construed environment" (p. 174); "to identify "superordinate constructs" (p. 172) (i.e., the "important ideas", p. 174) with which respondents "anticipated and reconstrued events such as living-room, home, house, etc." (p. 172) as well as the "sub-structure of subordinate constructs in such a way that the roles and importance of physical characteristics, items and features could be understood" (p. 173) **Country:** USA	used the 'laddering' technique to create more specific (i.e., 'subordinate') constructs based on the initially elicited constructs [p. 174], resulting in "ten initial constructs" and "ten laddered constructs", p. 177) **Sample size:** (unclear, appears to have been at least 29)	**Overall focus:** to develop a series of constructs that link broader meanings to physical characteristics and thereby understand what meaning physical aspects hold

Müller (2018)

Study	Data collection	Construct categories: type of analysis & results
Müller (2018) 'Die gesellschaftliche Konstruktion der Stadt. Eine Theorie zur Soziologie der Städte' *(book)* **Research question/ purpose:** "sowohl die Konstruktionsprinzipien und Sinnzuschreibungen, mit denen städtische Wirklichkeit hergestellt wird, zu erfassen, als auch zu klären, wie diese Stadt zu dieser und jene zu jener wird" [to identify constructs and meaning relating to the construal of	**Elements:** supplied & supplied categories- 26 heterogeneous elements referring to real and hypothetical regions, cities, neighbourhoods and related concepts (e.g., 'Bremen today', 'Bremen yesterday', 'Bremen morgen real', 'Typical Bremen', 'Image Bremen', 'My part of town', 'City that sets a good example', 'Ideal city', 'City of science', 'Concept globalisation', 'Life in the countryside') (p. 107) (limited detail on how the elements were chosen in practice); elements unfamiliar or 'uncomfortable' for participants were excluded at the beginning of interviews (p. 115) **Supplied constructs:** (none) **Qualifying phrase:** Two elements were selected, participants were asked 'are [Element 1] and [Element 2] rather similar or rather different?', this was followed with a question such as 'how are	**Analysis:** qualitative content analysis; categories with fewer than 20 constructs were removed (p. 145); principal component analysis (PCA) **Categories:** 3,483 constructs were reduced to 43 categories through qualitative content analysis (p. 149, all categories shown on p. 150); nine categories representing the top 20% in terms of how frequently they were mentioned are highlighted by the author (p. 169); these nine categories were labelled as: varied vs. neglected cultural offer; positive vs. negative visual appearance and city image; short vs. long journey times; extroverted vs. introverted; characterised by green areas vs. built areas; open to change vs. insistence on established models; good vs. poor school and educational system; low vs. high unemployment; social mix vs. segregation and monocultures (p. 151-153, 169, translation by AB)

cities and explain how each city develops its own character] (p. v) NB: translations from the German original for this table were undertaken by AB. **Country:** Germany	[Element 1] and [Element 2] different?' (p. 115-116) (no specific qualifying phrase appears to have been used) **Sample size:** 352	Statistical relations between the 43 construct categories were analysed using PCA, identifying six topic areas: culture, society and economic capability; local decision-making, financial and educational policies, and family-friendliness; social and economic circumstances and societal participation; ecological quality, personal relationships, psychological tension and affordability; local amenities and mobility; townscape and identity (p. 192-196, p. 225) **Overall focus:** in what categories do people think about cities and how are cities distinguished using these categories

Wan and Shen (2015)

Study	Data collection	Construct categories: type of analysis & results
Wan and Shen (2015) 'Salient attributes of urban green spaces in high density cities: The case of Hong Kong', *Habitat International* **Research question/ purpose:** "to elicit users' perceptions of key attributes of urban green spaces (UGS) in Hong Kong […] and assess their associations with perceptions of the usefulness, quality, and the frequency of visits in a sample of users of these spaces" (p. 92) **Country:** Hong Kong / China	**Elements:** supplied categories – participants used their own examples of urban green spaces based on 9 "descriptors" developed through a pilot study (p. 94); "E1: A Good Quality Urban Green Space; E2: An Average Quality Urban Green Space; E3: A Bad Quality Urban Green Space; E4: An Urban Green Space I Visit Most Often; E5: An Urban Green Space I Visit Sometimes; E6: An Urban Green Space I Visit Least Often; E7: A Large Urban Green Space; E8: A Small Urban Green Space; E9: An Ideal Urban Green Space" (p. 94); "The respondents were asked to recall eight different UGS that they had visited in the past six months and then assign one of the eight descriptors (E1 through E8) to each of the UGS they had identified. The respondents were told not to assign E9 ('An Ideal Urban Green Space') to any of the UGS they had visited. They were instructed to imagine an ideal urban green space that could be in this category" (p. 94) **Supplied constructs:** (none) **Qualifying phrase:** "In what way are any two of these similar, but different from the third?" (p. 94) (no specific qualifying phrase appears to have been used) **Sample size:** 21 in the repertory grid part of the study	**Analysis:** "Data reduction" (a qualitative content analysis approach) to eliminate ambiguous or vague constructs and group the remaining ones based on similarity (p. 94); "Factor analysis, a principal components analysis with Varimax rotation was used to group the constructs from RGT into a smaller number of interpretable underlying factors" (p. 95) **Categories:** 131 constructs were reduced to 26 categories using the qualitative "data reduction" approach (p. 95; shown on p. 96); factor analysis helped to group the 26 constructs into four factors (p. 96); the four factors are described as: "Features" (e.g., "design, facilities, and the management of UGS"); "Naturalness" (e.g., "scenic view, green features, air quality, and sufficient space"); "Accessibility" (e.g., "hours of operation (access), location, and fees to use the UGS"); "Variety of Facilities" (e.g., "range of facilities under various weather conditions and ancillary facilities") (p. 96) NB: "The four factors identified from the RGT interviews accounted for 53%, 59%, and 16% of the variation in usefulness, perceived quality, and frequency of visits, respectively" (p. 96) **Overall focus:** to develop a taxonomy of subjective categories of urban green space and understand how these predict the perceived usefulness, quality & frequency of use

Wysor (1983)

Study	Data collection	Construct categories: type of analysis & results
Wysor (1983) 'Comparing College Students' Environmental Perceptions and Attitudes: A Methodological Investigation', *Environment and Behavior* **Research question/ purpose:** "to examine perceptions of subjects' everyday environment, in an attempt to determine the salience of environmental issues to these individuals" (p. 616) **Country:** USA	**Elements:** elicited/supplied – 15 Bellingham, Washington places; "local place names that were familiar to all the participating students" (p. 622); the list was created based during a dedicated research stage prior to the repertory grid interviews, and the sample for the repertory grid study consisted of those students "who had created similar lists of places" in the first stage (p. 623) **Supplied constructs:** (none) **Qualifying phrase:** "which place differed from the other two and for what reason" (p. 625); "During the process subjects were discouraged from employing constructs with extremely limited ranged of conveniences (applicability)" (p. 625) (no specific qualifying phrase appears to have been used) **Sample:** 26 in the repertory grid part of the study (p. 263)	**Analysis:** constructs were classified using the categories suggested by Harrison and Sarre (1975) (see above in the present table) and inspected to identify "'environment-connoting' content'" (p. 622) **Categories:** (none, the author used an existing categorisation scheme by Harrison and Sarre (1975), see above in the present table) **Overall focus:** to explore differences between participant groups (students of environmental studies vs. business students)

D.5 Data extraction tables for repertory grid studies in section 4.1.6 (substance use)

Gains and Thomson (1990)

Study	Methods	Findings
Gains and Thomson (1990) 'Contextual evaluation of canned lagers using repertory grid method', *International Journal of Food Science & Technology* **Scope:** Alcohol (beer) **Research question or purpose:** "empirical	**Sample:** 20 consumers; "The consumers, 15 males and five females aged between 20 and 33 were all regular drinkers of canned lagers from the University of Reading and an industrial research centre on site." (p. 700) **Elements:** 17 canned lagers (representing different brands [e.g., Carling, Carlsberg] and types, i.e., standard, premium, pils, super-strength; p. 700), chosen by researchers **Qualifying phrase:** "*In what situations* would you consume two of these products, but not the third?" (p. 700, emphasis added)	**Nr of elicited elements/constructs:** "Between five and 19 contexts were elicited across all the consumers." (p. 701) **Construct categories:** "three principal axes were found to describe the perceptual dimensions common to most people" (p. 699); Axis 1: "Treat/indulgence; Special occasion; To get drunk" vs. "With meals; Outdoor activities; For refreshment/thirst quenching; Axis 2: "For refreshment/thirst quenching; Party/away from home" (opposite pole not stated); Axis 3: "Away from home" vs. "At home; Friends round" (pp. 702-3; Axis 2 is not clearly labelled/described); three dimensions accounted for "more than 88% of the variation" (p. 701)

investigation of contextual influences [on food acceptability]" (p. 699); "part of a much larger investigation of the factors influencing the acceptability of lagers" (p. 700) **Socio-spatial concept/theory:** 'drinking contexts' with reference to Scriven et al. (1989) **Funding:** Agricultural Food Research Council (UK) and the Brewers' Society **Comment by AB:** market research context (funded by industry); Axis 2 unclear; follow-up study to Scriven et al. (1989)	**Elicited constructs:** contexts in which canned lagers would be consumed **Supplied constructs:** appropriateness (i.e., of supplied products for elicited contexts) **Rating:** "Each of the assessors was subsequently asked to rate each product for its appropriateness for each of their own lists of contexts, on a 100-mm visual analogue scale with anchor points labelled 'never' and 'always'" (p. 700) NB: different focus during construct elicitation (on contexts) versus rating (on appropriateness) **Type of analysis:** "product by context matrix" (p. 700); generalized Procrustes analysis (to identify principal components); principal co-ordinate analysis (to explore participant differences)	**Differences between elements:** "The standard lagers are considered appropriate for all but a few specific contexts, although there are, of course, differences between the different brands. The super-strength and premium canned lagers are considered more appropriate as treats and on special occasions. In addition, the super-strength lagers are considered more appropriate for getting drunk and for drinking at home, whilst the premium products are considered more appropriate for drinking away from home [and with meals, p. 702]." (p. 705); "Super-strength and premium canned lagers were considered more self-indulgent, whilst ordinary lagers were considered more appropriate for refreshment" (p. 699) **Differences between participants:** (were examined but findings not relevant to the present thesis) **Implications for prevention:** (none, focus is rather on marketing and advertising, but no specific recommendations made)

Lynch (1995)

Study	Methods	Findings
Lynch (1995) 'Adolescent smoking—an alternative perspective using personal construct theory', *Health Education Research* **Scope:** Tobacco **Research question or purpose:** "to elicit the personal constructs that young people have about smoking and then to see what variations exist between students who smoke and	**Sample:** "19 (nine male and 10 female) 16-17 year old volunteers from the lower sixth of a local comprehensive [school]" in the UK; 7 smokers and 12 non-smokers **Elements:** 12 pictures of smoking situations, supplied by researcher: "common set of photo-elements for all subjects" (p. 98); "illustrated people smoking in different circumstances and in various situations […] selected from health education resource materials to show the widest range of smoking situations that could be found." (p. 99) **Qualifying phrase:** "All students were asked to look at each picture with the question: 'why do you think the people in these pictures are smoking?'" (p. 99; unclear if this was a qualifying phrase or a priming question, see below); "students were asked to identify two	**Nr of elicited elements/constructs:** "all produced between five and seven bipolar personal constructs" (p. 99) **Construct categories:** nine categories: worried (e.g., depressed, coping); individual (e.g., for self, boredom); image (e.g., to impress); rebel (e.g., defiant); enjoyment; calming; habit (e.g., addicted); experiment (e.g., curiosity); exciting (p. 101, examples in parentheses illustrate further constructs labels included within the categories) **Differences between elements:** (none reported) **Differences between participants:** overall number of constructs and topics of constructs were very similar between the 7 smokers and 12 non-smokers, but certain constructs were mentioned more

those that do not" (p. 98); "pilot study" (p. 95) **Socio-spatial concept/theory:** (none) **Funding:** Oxford Regional Health Authority, additional funding provided by Dr Ian Clark **Comment by AB:** very small sample sizes considering the focus on participant differences in the analysis and generalisations made in discussion, conclusions only partially supported by data, embedded in a critique of school-based health education (e.g., as assuming that all smokers are the same), use of supplied images may increase likelihood that constructs represent public rather than personal constructs (i.e., which may explain similarities between groups?)	of the three pictures that had something in common with each other" (p. 99) **Elicited constructs:** (perceived reasons for smoking; however, examples of elicited constructs shown in the article suggest that constructs were not limited to reasons for smoking, it is possible that there was no specific qualifying phrase) **Supplied constructs:** (none) **Rating:** "five-point scale with the emergent pole being 1 and the implicit pole being 5. All of the 12 pictures were eventually rated on every subsequently identified construct" (p. 99) **Type of analysis:** hierarchical cluster analysis (to identify similarly construed elements and constructs); frequency counts; merging of grids separately for the two groups (smokers and non-smokers) using 'Mode grid' option in Sociogrid software	often by one group than the other e.g., "this group of non-smokers think that smoking is much more enjoyable than this group of smokers do" (p. 101); sociogrid analysis: "far from being a discrete sub-group, these smokers do not think about smoking in a uniform way, whereas non-smokers do show a significant degree of commonalty with each other, in terms of how they think about smoking." (p. 98) **Implications for prevention:** "The findings suggest that the failure of recent anti-smoking programmes, aimed at young people, may have been inevitable. [...] Individuality, rather than social and image constructs, appear to be of far greater significance to young smokers than the literature would suggest. There is a need to broaden traditional approaches to smoking prevention and take account of intrinsic psychological causes of smoking rather than just the social symptoms" (p. 95); author suggests that community-based rather than school-based programmes may be more effective, especially for those most likely to smoke (p. 103-104)

Schmidt and Sapsford (1995)

Study	Methods	Findings
Schmidt and Sapsford (1995) 'Women's view of pubs: a study of methods', *Journal of Managerial Psychology* **Scope:** Alcoholic and non-alcoholic beverages and food	**Sample:** 5 middle-class women aged 35-44 in the Greater Manchester area **Elements:** "six public houses – the most frequently visited one, others which were visited on a regular basis, and some which were disliked" (p. 19)	**Nr of elicited elements/constructs:** 15-20 constructs per participant **Construct categories:** five categories are reported based on the content analysis: "environment" ("most important/salient category"), "customers", "staff", "entertainment", "product" ("scored very low") (pp. 19-20); these categories were reproduced in the quantitative analyses (p. 20)

Research question or purpose: to explore women's perceptions of public houses; "pilot study […] to a full-blown study on women and public houses" (p. 19); to test four different methodological approaches: "role repertory grids, 'critical-incident' questionnaires, individual comparatively unstructured interviews, and group 'focus' interviews" (p. 18) **Socio-spatial concept/theory:** (none) **Funding:** (not reported) **Comment by AB:** very small sample size, comparison of different methods, substance use was not the main focus of this research, not clear what 'importance' in construct ratings referred to and whether the rating accorded to standard repertory grid technique	**Qualifying phrase:** "Constructs were elicited by asking for a characteristic on which two of the houses were similar and the other different" (p. 19) (no specific qualifying phrase appears to have been used) **Elicited constructs:** perceived characteristics of various pubs **Supplied constructs:** (none reported) **Rating:** "A 'positive pole' was identified for each construct – the end of the bipolar dimension more likely to make the informant want to revisit a pub – and the importance of this factor was rated on a five-point scale, 5 being the preferred pole of the construct" (p. 19) **Type of analysis:** content analysis, considering the importance/ saliency of constructs as rated on a 5-point scale; cluster and principal component analysis (individually per participant)	**Differences between elements:** "the elements in the grid are strongly polarized, suggesting a great deal of contrast between pubs and the extent to which they meet individual women's requirements" (p. 19) **Differences between participants:** individual participants differed with regard to which categories of constructs appeared to be most important (e.g., physical environment versus other customers) (pp. 19-20) **Implications for prevention:** (none – focus was on differences between the four methods and on "how pubs should be managed to make them accessible and acceptable to women customers", p. 18; e.g., "It would also appear that the breweries are largely justified in paying a great deal of attention to the physical environment, p. 19; "a repertory grid approach could help [publicans … to attract and retain female customers] by establishing a female customer typology", p. 25)

Scriven et al. (1989)

Study	Methods	Findings
Scriven et al. (1989) 'A contextual evaluation of alcoholic beverages using the repertory grid method', *International Journal of Food Science & Technology*	**Sample:** 20 participants; "fifteen males and five females, aged between twenty and thirty-three, used in this study were all regular drinkers of canned lager (lager beer). All the subjects worked on campus at the University of Reading and included research workers, technicians, lecturers and students" (p. 174)	**Nr of elicited elements/constructs:** "The number of constructs elicited ranged from eleven to forty-two." (p. 175) **Construct categories:** "five principal components were found to describe the perceptual dimensions common to most people. The poles of these dimensions are summarily interpreted as: [1] thirst-quenching *vs.* not; [2] formal meal *vs.* social drinking environment;

Scope: Alcohol **Research question or purpose: "**to investigate the extension of the repertory grid method to study context [… as] the initial step in a much larger investigation of canned lagers" (p. 174); pilot study to test usefulness of repertory grid technique **Socio-spatial concept/theory:** "context; operationally defined as being a time, manner, place or circumstance in which a food product is consumed" (p. 174) (appears to be their own operationalisation); conceptualisation of socio-spatial aspects as 'perceptual dimensions' **Funding:** Agricultural and Food Research Council (U.K.), Cadbury Schweppes plc and the University of Reading **Comment by AB:** market research context (funded by industry); precursor-study to Gains and Thomson (1990)	**Elements:** 22 alcoholic beverages supplied by researcher; "chosen to span the range of products available on the U.K. market" (p. 174); "beverage names printed on separate cards (p. 174); e.g., "draught lager", "cider", "vodka", "red wine" (p. 175) **Qualifying phrase:** "*In what contexts would you consume (or be more likely to consume)* Products A and B but not Product C, or vice-versa" (p. 174, emphasis added) **Elicited constructs:** contexts in which alcoholic beverages would be consumed **Supplied constructs:** appropriateness (i.e., of supplied products for elicited contexts) **Rating:** "After all the contexts had been elicited, the subject was asked to score each alcoholic beverage for appropriateness in each of his/her contexts. Responses were recorded on a 100-mm visual analogue scale anchored by the words never and always at opposite extremes." (p. 174) NB: different focus during construct elicitation (on contexts) versus rating (on appropriateness) **Type of analysis:** "product by context data matrix" (p. 174); generalized Procrustes analysis (to identify principal components); principal co-ordinate analysis (to explore participant differences)	[3] before meals *vs.* after meals; [4] in a pub [or similar public places, p. 178] *vs.* outside a pub [e.g., home or outdoor activities, p. 178]; [5] consumed neat *vs.* mixed" (p. 173, original emphasis, numbering of components added by AB); five components accounted for 74.4% of the variation (p. 175); second and third component were also associated with "special occasions" (p. 177) **Differences between elements:** three main groups: spirits and fortified wines (e.g., "inappropriate" "after sport or in hot weather", p. 177); wines and champagne (e.g., "formal meal/special occasions", p. 177); draught, canned beers and lagers (e.g., "thirst-quenching", "after sport or in hot weather", "associated with less formal social occasions", p. 177); different types of spirits and fortified wines (as well as champagne and sparkling wine, cf. regular wine) can be further distinguished depending on whether they are appropriate for drinking before meals (or on special occasions) or after meals (p. 177); beers can be further distinguished depending on whether they are associated with pubs or similar public places (draught beer) versus at home or outdoors (canned beer) (p. 179); "gin, whisky, vodka and white wine" were associated with use as mixed drinks (p. 181) **Differences between participants:** found differences in construal between students and other participants (p. 179-181) **Implications for prevention:** none, recommendations refer to "product development or the marketing of existing products" (p. 174); e.g., "These results have important implications for advertising. For example, in order to be consistent with consumer perceptions, canned lager should perhaps be advertised by showing a group of friends drinking after playing sport on a sunny day" (p. 177); ""The position of white wine [... as appropriate for drinking mixed] suggests that it could be more strongly marketed in the U.K. as a 'cooler' (long drink), as is already the case in the U.S.A. and Australia" (p. 179); "advertising strategies, consistent with existing consumer perceptions, could be readily identified. Information on product attributes has also been recovered and could be used for product development" (p. 181)

Shek (2012)

Study	Methods	Findings
Shek (2012) 'Personal Construction of Cough Medicine among Young Substance Abusers in Hong Kong', *The Scientific World Journal* **Scope:** cough medicine, but other substances were considered for comparison **Research question or purpose:** "to examine young substance abusers' personal constructions of cough medicine in relation to different types of drugs and nondrugs via the repertory grid test based on personal construct psychology" (p. 2), follow-up to an earlier focus group study (p. 9) **Socio-spatial concept/theory:** (none) **Funding:** (not reported) **Comment by AB:** unclear sample, some but not all participants had personal experience with the substances (i.e., supplied elements); no explanation for why heroin was chosen as key reference substance; prevention recommendations only partially based on data	**Sample:** 11 "single males aged between 15 and 24 years" (p. 3), Hong Kong (very limited information about sample, examples in the text suggest participants were current abusers of cough medicines [weekly or daily use in past 3 months] and some but not all had used illegal substances) **Elements:** 15 elements supplied by researchers: 1. heroin, 2. cough medicine, 3. organic solvent, 4. marijuana, 5. tranquilizers, 6. "ice", 7. ecstasy, 8. cocaine, 9. depressants, 10. ketamine, 11. cigarette, 12. beer, 13. liquor, 14. essence of chicken, 15. chewing gum (p. 3) (no information how elements were presented, possibly just as words) **Qualifying phrase:** "[…] *in which most important way* two elements were alike but differed from the third one" (p. 3, emphasis added) **Elicited constructs:** most important construed characteristics of substances; most constructs referred to drug effects (including harms and benefits), p. 4; "10 constructs were elicited via the triadic method" (p. 3) **Supplied constructs:** "two supplied constructs (addictive versus nonaddictive and lethal versus nonlethal)" (p. 3) (i.e., 12 constructs total in each grid) **Rating:** "6-point scale, with 4 to 6 represented the construct pole and 1 to 3 represented the contrast pole" (p. 3) **Type of analysis:** content analysis, distances between elements (using INGRID software) to examine which elements were perceived as similar or dissimilar)	**Nr of elicited elements/constructs:** (standardised number of 10 constructs across participants) **Construct categories:** four categories of constructs are described: "psychological consequences" ("cognitive", "affective", "behavioral", including benefits), "addictive nature", "harmful effects", "other aspects" (e.g., accessibility, affordability) (p. 4) **Differences between elements:** The author focussed on how cough medicine was construed by itself and in comparison with illegal drugs (in particular heroin) as well as "gateway drugs" (beer, liquor, cigarettes, p. 4); example findings: "cough medicine was most similar to ketamine and marijuana and least similar to organic solvent" (p. 4); cough medicine was construed as less harmful and addictive than heroin but similar to heroin in other respects (p. 11); compared with how heroin was construed in relation to cigarettes, beer and liquor, cough medicine was construed as more similar to cigarettes, beer and liquor (p. 4) **Differences between participants:** "a higher level of construed similarity between cough medicine and the gateway drugs [cigarettes, beer, liquor] was related to a lower level of construed harm of cough medicine [... i.e.,] for those who construed that there was high dissimilarity between cough medicine and the gateway drugs, they tended to perceive that cough medicine had greater harm" (p. 6) **Implications for prevention:** This is a focus of this article, with several recommendations offered on pp. 11-12; in particular, the author highlights that cough medicine was seen as similar to "soft drugs" (p. 4, 11) and prevention efforts should seek to change this construal (e.g., "raise the public awareness of harmful effects", p. 11); "promotion of psychosocial competence", e.g., to help users develop better coping strategies and understand reasons for use (p. 12); "it is also important to consider how the construed benefits of cough medicine abuse can be minimized, whereas the construed harms can be translated into motivation to quit the drug" (p. 9)

Appendix E: Eligibility criteria for study participants

This appendix documents the revision of criteria throughout the fieldwork and illustrates how keeping the originally envisioned criteria would have affected the final sample size.

E.1 Overview of changes

The table overleaf lists the criteria according to which recruited individuals were selected for interview at three different points in time: prior to recruitment; at the end of recruitment wave 1; and at the end of recruitment wave 3 (the final criteria). The criteria were developed based on the indicators mentioned in section 5.3 and operationalised as questions on the sign-up form and screening questionnaire for interested individuals. The development of the form and questionnaire is further documented in Appendix G.1.

The criteria envisioned prior to recruitment as listed in the table already reflect the changes made to obtain institutional ethics approval; hence, the originally planned criteria (i.e., including cannabis users) are not shown. Also not shown are the various points between waves 1 and 3 at which changes were made; these changes are, however, reflected in the final criteria.

In the table, inclusion criteria are listed in the top row, while exclusion criteria are listed in the bottom row[851]. The inclusion criteria are separated further by a dashed line: those listed above the dashed line were covered in the sign-up form, while those listed below the dashed line were covered in the screening questionnaire. The points listed as exclusion criteria were only covered in the screening questionnaire. Missing responses lead to exclusion if it was not possible confirm eligibility.

The table also highlights what changes were made to the criteria during the fieldwork. Two types of changes are distinguished: i) criteria that were used initially but removed later on are highlighted in dark grey; and ii) criteria that were amended are highlighted in light grey, with the changes emphasised in bold font in subsequent columns.

[851] To avoid repetition in the table (e.g., listing “female” as an inclusion criterion and “male” as an exclusion criterion), each criterion variable is referred to only once, *either* as an inclusion *or* an exclusion criterion, with the implication that the other values lead to exclusion or inclusion, respectively. Whether a criterion was labelled as inclusive or exclusive in the table was determined by simplicity. For example, if most values of a variable led to exclusion and the remaining one value led to inclusion, then this value was listed as the inclusion criterion.

Comparison of initial, revised and final criteria for study participants

	Criteria envisioned at the start of recruitment	Revised criteria at the end of recruitment wave 1	Final criteria at the end of recruitment wave 3
Inclusion criteria	• Interested in a face-to-face interview • Sufficient German skills to participate in interview • Enrolled at the University of Vienna at least 12 months prior to interview • Studies at the Faculty of Business, Economics and Statistics [**later amended**] • 18-24 years old [**later amended**] • Female	• Interested in a face-to-face interview • Sufficient German skills to participate in interview • Enrolled at the University of Vienna at least 12 months prior to interview • Studies at the Faculties of Business, Economics and Statistics; **Mathematics; or Law** • 18-**26** years old • Female	• Interested in a face-to-face interview • Sufficient German skills to participate in interview • Enrolled at the University of Vienna at least 12 months prior to interview • Studies at the Faculties of Business, Economics and Statistics; Mathematics; or Law • 18-26 years old • Female
	• Never been married or entered a civil partnership • Lives in Vienna [**later amended**] • Living at current address for at least 12 months [**later amended**] • Both parents have completed at least secondary school [**later amended/removed**] • Monthly or weekly alcohol use in past three months (but not (almost) daily or less than monthly) [**later amended**] • Monthly or weekly cigarette use in past three months (but not (almost) daily or less than monthly) [**later amended**] • No more than 4 standard drinks per drinking day on average [**later amended/removed**] • No more than 5 cigarettes per smoking day on average [**later amended/removed**]	• Never been married or entered a civil partnership • Lives in Vienna, **Burgenland or Lower Austria** • Living at current address for at least **six** months; **three months if previously lived in the same region** • **At least one** parent has completed at least secondary school • **Any** alcohol use in past three months • No more than 4 standard drinks per drinking day on average **(no more than 2 standard drinks for daily users)** • No more than **10** cigarettes per smoking day on average (no more than 5 cigarettes for daily smokers)	• Never been married or entered a civil partnership • Lives in **Austria (any region)** • Living at current address for at least six months; three months if previously lived in the same region • Any alcohol **or cigarette** use in past three months
Exclusion criteria	• Pregnant or trying to conceive • Has one or more children • Living arrangements change frequently [**later removed**] • Did not grow up in Austria (ages 6-18 years) [**later removed**] • Works full-time • Does not have enough money to meet needs at least some of the time [**later amended**]	• Pregnant or trying to conceive • Has one or more children • Living arrangements change frequently • Works full-time • Does not have enough money to meet needs at least **most of the time** • **Poor or very poor** physical or mental health • Strong desire or urge to use alcohol or cigarettes on a **daily** basis in past three months	• Pregnant or trying to conceive • Has one or more children • Works full-time • **Never** has enough money to meet needs • Poor or very poor physical or mental health • Health, financial, legal or social problems due to alcohol or cigarette use on a **weekly or (almost) daily** basis in past three months

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Exclusion criteria	• Fair, poor or very poor physical or mental health [**later amended**] • Strong desire or urge to use alcohol or cigarettes on a monthly, weekly or (almost) daily basis in past three months [**later amended/removed**] • Health, financial, legal or social problems due to alcohol or cigarette use at least once or twice in past three months [**later amended**] • Failed to do what was normally expected due to alcohol or cigarette use at least once or twice in past three months [**later amended**] • Friends, relatives or other people expressed concern about alcohol or cigarette use in past three months [**later removed**] • Tried and failed to control, cut down or stop using alcohol or cigarettes in past three months [**later removed**] • Used alcohol with medication to "get high" in past 12 months [**later removed**] • Inhaled laughing gas or similar substances to "get high" in past 12 months [**later removed**] • Used Ritalin, Modafinil or other prescription medicines without a prescription or otherwise than prescribed for cognitive enhancement past 12 months [**later removed**] • Used prescription tranquillisers or barbiturates without a prescription or otherwise than prescribed to "get high" or to relax in past 12 months [**later removed**] • Used new psychoactive substances in past 12 months [**later removed**] • Ever used cannabis or other illegal substances (non-medical use only) [**later removed**] • Used cannabis or other illegal substances in past 12 months (non-medical use only) • Ever injected a substance (non-medical use only) • Ever been in treatment for substance use • Was based on the street or in a homeless shelter for at least two nights in past 12 months	• Health, financial, legal or social problems due to alcohol or cigarette use **on a monthly, weekly or (almost) daily basis** in past three months • Failed to do what was normally expected due to alcohol or cigarette use **on a monthly, weekly or (almost) daily basis** in past three months • Tried and failed to control, cut down or stop using alcohol or cigarettes in past three months • Used cannabis or other illegal substances in past 12 months (non-medical use only) • Ever injected a substance (non-medical use only) • Ever been in treatment for substance use • Was based on the street or in a homeless shelter for at least two nights in past 12 months	• Failed to do what was normally expected due to alcohol or cigarette use on a **weekly or (almost) daily** basis in past three months • Used cannabis or other illegal substances in past 12 months (non-medical use only) • Ever injected a substance (non-medical use only) • Ever been in treatment for substance use • Was based on the street or in a homeless shelter for at least two nights in past 12 months

E.2 Implications of keeping or amending the original criteria

Number of recruited individuals meeting different criteria for interview

	Criteria at start of recruitment	Revised criteria, wave 1	Final criteria, wave 3	Actually invited to interview
Wave 1	**0**	**3**	**6**	**3**
Out of successfully recruited individuals in wave 1 (n=23)	0%	13%	26%	13%
Out of potential participants in wave 1 (n=37, estimated)	0%	8%	16%	8%
Out of "promising" screening questionnaires in wave 1 (n=19)	0%	16%	32%	16%
All waves	**0**	**13**	**29**	**25**
Out of successfully recruited individuals across waves (n=71)	0%	18%	41%	35%
Out of potential participants across waves (n=198, estimated)	0%	7%	15%	13%
Out of "promising" screening questionnaires across waves (n=59)	0%	22%	49%	42%

To understand how keeping the original criteria would have affected the study, the table above shows how many people met (or would have met) the original and the revised criteria at two points in time, namely after recruitment wave 1 and after recruitment wave 3. Throughout this section, "successfully recruited" persons are those who completed both the sign-up form and the screening questionnaire (i.e., the 71 cases labelled as "Data matched and complete" in Figure 5, p. 221). For comparison, the numbers of individuals actually invited to interview are also shown.

The table shows that keeping the originally envisioned criteria would have meant that *none* of the successfully recruited individuals (wave 1: n=23; across waves: n=71) would have been eligible for interview. Revising the criteria at the end of wave 1 meant that three individuals (13%) out of those successfully recruited in wave 1 became eligible for interview. Had those revised criteria been maintained until the end of the fieldwork, then only 13 (18%) out of all successfully recruited individuals would have been eligible for interview.

Conversely, had the final criteria been used from the very beginning, then six individuals could have already been invited for interview after wave 1 (26% of successfully recruited) and 29 individuals could have been invited for interview overall (41% of successfully recruited). In

practice, the final criteria were only used at the end of wave 3, and therefore the actual number of people who were invited to interview (n=25, see section 5.6) was lower[852].

To contextualise this further, the numbers are also presented as percentages of the estimated numbers of potential participants at the end of recruitment wave 1 (n=37) and across all recruitment waves (n=198), and of "promising" screening questionnaires at the end of recruitment wave 1 (n=19) and across all recruitment waves (n=59).

Potential participants were those people who could have been invited to interview *if there had been no exclusion criteria at all*. The only remaining criterion would have then been willingness to take part (i.e., pure convenience sampling). This number was approximated by considering how many people were approached in person (wave 1: n=45; across waves: n=283) and discounting those who declined the invitation (e.g., due to lack of time or lack of interest) (wave 1: n=13; across waves: n=104). Finally, those individuals successfully recruited through other strategies were added (wave 1: n=5; across waves: n=19)[853].

"Promising" screening questionnaires refer to those cases in which a person already met the criteria covered in the initial sign-up form, so that their eligibility depended only on whether they also met the criteria covered in the screening questionnaire (which was completed separately after the sign-up form). Hence, "promising" screening questionnaires referred to those people who could have been invited to interview if there had been no criteria *on the screening questionnaire* (i.e., only applying the criteria on the sign-up form).

These figures show that using the criteria as revised at the end of wave 1 still led to the exclusion of over 90% of individuals from wave 1 who were (or might have been) interested to participate in case of eligibility. Even after finalising the criteria in wave 3, it is estimated that over 80% of interested or potentially interested individuals would have still been considered ineligible for interview.

Similarly, using the criteria as revised at the end of wave 1 meant that over 80% of individuals who met the criteria covered in the sign-up form had to be excluded in wave 1 because they did not meet the criteria covered in the screening questionnaire. By continuing the revision of

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[852] The remaining four individuals had been recruited earlier in the fieldwork. By the end of wave 3, they were no longer interested/available (n=1) or their personal circumstances had changed to render them ineligible (e.g., they had become over 26 years old) (n=3).

[853] The two numbers are estimates of the actual numbers of potential participants, as the data required to calculate the precise numbers are not available. The estimates may be too high as they assume that all persons who were approached in person and did not decline the study invitation would have been interviewed in case of eligibility. Conversely, the estimates may be too low because they do not account for those individuals who found out about the study through means other than in-person recruitment and wanted to participate but could not sign up due to not meeting the basic sign-up criteria.

the criteria after wave 1, this rate was improved considerably. Across waves, had the final criteria been used from the very beginning, only about half of individuals who met the criteria covered in the sign-up form would have had to be excluded due to not meeting the criteria covered in the screening questionnaire.

E.3 Review of criteria covered in screening questionnaire

To decide on amendments, criteria were also reviewed on an individual basis. The two tables shown on the next pages show, for each criterion covered in the screening questionnaire, how many of the successfully recruited individuals (n=71) and of the "promising" screening questionnaires (i.e., those individuals who already met the criteria covered in the sign-up form; n=59) it would have excluded. The first table does so using the criteria envisioned at the start of recruitment (assuming they had remained unchanged), while the second table does so using the final set of criteria (assuming they had been used from the very beginning). To avoid misinterpretation of these tables, criteria are always formulated as exclusion criteria. In some cases, multiple criteria are listed in one cell. These criteria were not presented to participants separately but as lists of items, with participants merely having to indicate whether any of the items in the list applied to them. This was done to better protect users of illegal substances as well as to increase response rates regarding sensitive items (see also Chapter 8).

The first table shows that the criterion that interview participants use cigarettes on a monthly or weekly basis would have by itself excluded over 80% of successfully recruited individuals, as most recruited individuals were non-smokers (n=34; 48%) or daily smokers (n=19; 27%). Furthermore, the original criteria stated that interview participants should not have used any legal substances besides alcohol or nicotine in the past 12 months, and no illegal substances in their lifetime. This would have excluded two thirds of successfully recruited individuals. Simply combining these two criteria would have already led to the exclusion of 70 individuals (96% of successfully recruited; not shown in the table). Considering only the promising screening questionnaires, the rank order remains unchanged and the percentages differ only marginally. The table also shows which criteria were removed, amended or kept in their original form in the final criteria (for details on changes, see Appendix E.1).

Number of individuals not meeting <u>original</u> interview criteria covered in screening questionnaire, out of all successfully recruited individuals (n=71) and "promising" screening questionnaires (n=59), and amendments made

Interview criteria as envisioned at the start of recruitment (screening questionnaire only)	n (%) of all	n (%) of 'promising' screeners	R	A	O
			in final criteria		
• Not monthly or weekly cigarette use in past three months (i.e., (almost) daily or less than monthly)	59 (83%)	47 (80%)	X		
• Used alcohol with medication to "get high" in past 12 months • Inhaled laughing gas or similar substances to "get high" in past 12 months • Used Ritalin, Modafinil or other prescription medicines without a prescription or otherwise than prescribed for cognitive enhancement past 12 months • Used prescription tranquillisers or barbiturates without a prescription or otherwise than prescribed to "get high" or to relax in past 12 months • Used new psychoactive substances in past 12 months • Ever used cannabis or other illegal substances (non-medical use only)	47 (66%)	38 (64%)	X		
• Both parents had not completed at least secondary school	36 (51%)	30 (51%)	X		
• Strong desire or urge to use alcohol or cigarettes on a monthly, weekly or (almost) daily basis in past three months	29 (41%)	24 (41%)	X		
• Had lived at current address for less than 12 months	25 (35%)	21 (36%)		X	
• Used cannabis or other illegal substances in past 12 months (non-medical use) • Ever injected a substance (non-medical use only) • Ever been in treatment for substance use • Was based on the street or in a homeless shelter for at least two nights in past 12 months	25 (35%)	21 (36%)			X
• Not monthly or weekly alcohol use in past three months (i.e., (almost) daily or less than monthly)	23 (32%)	19 (32%)		X	
• Did not have enough money to meet needs at least some of the time	21 (30%)	16 (27%)		X	
• Fair, poor or very poor physical or mental health	19 (27%)	16 (27%)		X	
• More than 5 cigarettes per smoking day on average	19 (27%)	16 (27%)	X		
• Did not grow up in Austria (ages 6-18 years)	14 (20%)	12 (20%)	X		
• Health, financial, legal or social problems due to alcohol or cigarette use at least once or twice in past three months	13 (18%)	12 (20%)		X	
• Failed to do what was normally expected due to alcohol or cigarette use at least once or twice in past three months	12 (17%)	10 (17%)		X	
• Did not live in Vienna	10 (14%)	9 (15%)		X	
• More than 4 standard drinks per drinking day on average	8 (11%)	7 (12%)	X		
• Tried and failed to control, cut down or stop using alcohol or cigarettes in past three months	7 (10%)	7 (12%)	X		
• Friends, relatives or other people expressed concern about alcohol or cigarette use in past three months	5 (7%)	5 (8%)	X		
• Ever married or entered a civil partnership	< 5	< 5			X
• Living arrangements changed frequently	< 5	< 5	X		
• Worked full-time	< 5	< 5			X
• Pregnant or trying to conceive • Had one or more children	< 5	< 5			X
Total number of individuals not meeting at least one of the original criteria covered in the screening questionnaire	71 (100%)	59 (100%)			

Note. R = Removed in final criteria. A = Amended in final criteria. O = Original criterion remained unchanged in final set of criteria.

Number of individuals not meeting <u>final</u> interview criteria covered in screening questionnaire, out of all successfully recruited individuals (n=71) and 'promising' screening questionnaires (n=59)

Interview criteria as finalised at the end of recruitment wave 3 (screening questionnaire only)	n (%) of all	n (%) of 'promising' screeners
• Used cannabis or other illegal substances in past 12 months (non-medical use only) • Ever injected a substance (non-medical use only) • Ever been in treatment for substance use • Was based on the street or in a homeless shelter for at least two nights in past 12 months	25 (35%)	21 (36%)
• Had not lived at current address for at least six months; three months if previously lived in the same region	8 (11%)	8 (14%)
• No alcohol or cigarette use in past three months	5 (7%)	< 5
• Failed to do what was normally expected due to alcohol or cigarette use on a weekly or (almost) daily basis in past three months	< 5	< 5
• Never had enough money to meet needs	< 5	< 5
• Poor or very poor physical or mental health	< 5	< 5
• Ever married or entered a civil partnership	< 5	< 5
• Worked full-time	< 5	< 5
• Pregnant or trying to conceive • Had one or more children	< 5	< 5
• Health, financial, legal or social problems due to alcohol or cigarette use on a weekly or (almost) daily basis in past three months	0 (0%)	0 (0%)
• Did not live in Austria (any region)	0 (0%)	0 (0%)
Total number of individuals not meeting at least one of the final criteria covered in the screening questionnaire	35 (49%)	30 (51%)

The second table (above) shows that after the finalisation of criteria at the end of recruitment wave 3, the main exclusion criterion referred to use of illegal substances in the past 12 months, substance use through injection, use of treatment services, and homelessness; with over a third of all successfully recruited individuals stating that at least one of these statements applied to them. Furthermore, more than one in ten successfully recruited individuals had not lived at their current address or in their current region for the specified minimum amount of time. Five individuals (7%) had not used alcohol or cigarettes in the previous three months. Of those successfully recruited, 33 individuals did not meet at least one of these three criteria (46%; not shown in the table). Considering only the promising screening questionnaires, the rank order remains unchanged and the percentages differ only marginally.

E.4 Review of criteria covered in sign-up form

Number of individuals not meeting final criteria covered in sign-up form, across waves

	A	B	C
Interview criteria as revised at the end of recruitment wave 1 (sign-up form only)	Did not complete sign-up during recruitment in person (n=217)	Sign-up completed (any recruitment path) (n=85)	All (n=302)
Not interested in a face-to-face interview	104 (48%)[a]	14 (16%)[b]	118 (39%)
Enrolled at the University of Vienna less than 12 months prior to interview	35 (16%)	2 (2%)	37 (12%)
Insufficient German skills to participate in interview	33 (15%)	0 (0%)	33 (11%)
Did not study at the Faculties of Business, Economics and Statistics; Mathematics; or Law	23 (11%)	6 (7%)	29 (10%)
Not 18-26 years old	10 (5%)	7 (8%)	17 (6%)
Not enrolled at the University of Vienna	12 (6%)	0 (0%)	12 (4%)
Not female	0 (0%)	0 (0%)	0 (0%)
Total number of individuals not meeting at least one of the final criteria covered in sign-up form	217 (100%)	28 (33%)	231 (76%)

[a] Including "no interest", "lack of time for sign-up", "lack of time for interview", "wish to review information online before sign-up" and "lack of confidence to take part in interview".
[b] These individuals completed the sign-up form but did not complete the screening questionnaire, which was interpreted as lack of interest for the purposes of this table.

The table above shows, for each final criterion covered in the sign-up form, how many individuals it excluded in practice. To understand the data, it is important to know that the criteria covered in the sign-up form also served as basic criteria for signing up (explained in Appendix E.5). Participants were informed of the basic criteria at the beginning of the sign-up form and asked to proceed only if they met them. Ineligible individuals who proceeded anyway were redirected to an exit screen so that they were not able to complete the sign-up form. Furthermore, recruitment was targeted at individuals meeting the basic criteria (i.e., females aged 18-24 years studying at the target faculties), so that individuals who would not meet the basic eligibility criteria were systematically excluded. Consequently, for example, male students were not invited to sign up to the study, they were discouraged from completing the sign-up form, and even if they attempted to complete the sign-up form, they were unable to do so because the form redirected them to an exit screen after the first set of questions[854]. Therefore, to estimate how many people were excluded according to the criteria covered by the sign-up form, it was necessary to consider not only the completed or incomplete forms, but also those interested individuals who had been excluded prior to offering the sign-up form.

[854] If men were approached (for example in a group setting), they were also informed of the study and asked to forward the invitation to female peers who might be interested in study participation.

Consequently, Column A shows how many of those who were approached by recruiters in person did not complete the sign-up form, and what was the main reason given. For the purposes of this table, the row labelled “Not interested in a face-to-face interview” includes not only those 28 individuals who explicitly stated “no interest” as a reason for not signing up, but also those individuals who stated reasons such as “lack of time” which may also signal lack of interest. Column B refers to those who completed the sign-up form in person or through other recruitment paths. Although individuals who did not meet the basic sign-up criteria were generally discouraged from signing up, at certain points in the fieldwork, individuals were able to complete the sign-up form even if they did not meet specified criteria relating to age, enrolment duration or faculty affiliation (to inform the revision of criteria). Had the final criteria been used from the beginning, these individuals would have been included in column A (except for those not recruited in person). The total figure shown accounts for the fact that some individuals did not meet multiple criteria. Missing from the table and column C are those interested individuals who found out about the study through means other than in-person recruitment but did not meet the sign-up criteria. Hence, it is not possible to say, for example, how many male students were or would have been interested in study participation.

Number of individuals not meeting selected original criteria covered in sign-up form, out of all successfully recruited individuals (n=23) and “promising” sign-up forms (n=5) at the end of recruitment wave 1

Interview criteria (sign-up form only)	n (%) of all	n (%) of “promising” sign-ups
Age		
Not 18-24 years old (original criterion)	7 (30%)	2 (40%)
Not 18-26 years old *(revised criterion)*	1 (4%)	1 (20%)
Faculty affiliation		
Not at the Faculty of Business, Economics and Statistics *(original criterion)*	6 (26%)	2 (40%)
Not at the Faculties of Business, Economics and Statistics; Mathematics; or Law *(revised criterion)*	4 (17%)	2 (40%)

To better understand how revising the criteria affected eligibility rates, this second table (above) presents relevant data from the end of wave 1 on age and faculty affiliation. “Promising” sign-up forms refer to those cases in which a person already met the criteria covered in the screening questionnaire, so that their eligibility as participants depended only on whether they also met the criteria covered in the sign-up form. These data show that seven (30%) of 23 individuals successfully recruited in wave 1 did not meet the original criterion regarding age. However, of these, six (86%) were aged 25 or 26 years at the time of signing up. Across all recruitment waves, 15 (21%) of the 71 successfully recruited individuals were aged 25 or 26 years at the time of signing up (data not shown). Consequently, it was possible to improve eligibility rates considerably by increasing the upper age limit by two years. Although

these data do not suggest that adding further faculties was essential, this was necessary for other reasons, as explained in section 5.2.5.

E.5 Basic criteria for sign-up

Section 5.3 described eligibility criteria for study participants; these were used to select interviewees from among those who had signed up to the study. A subset of these criteria served as basic criteria for sign-up; these determined who was invited to the study and who could complete the sign-up procedure. Specifying basic criteria for sign-up was important to avoid signing on many individuals who would certainly not be eligible for study participation. The eligibility criteria for study participants could not be used for this purpose because they were complex, included sensitive items and were not finalised prior to recruitment. The basic criteria for signing up to the study did not change as much over the course of the fieldwork as the criteria for study participants, but some changes were nevertheless necessary.

As communicated to potential study participants

The following sign-up criteria were stated on the first page of the sign-up form (i.e., interested individuals were asked to proceed only if they met the following criteria):

- Having studied at the University of Vienna for at least 12 months
- Female
- 18-24 years old (later changed to 18-30 years old)
- Interested in a face-to-face interview

These criteria were also stated on the printed invitation cards and posters as well as on the project website.

Within the first week of recruitment, the upper age limit was found to be too low, as many students were over 24 years old. Individuals who assisted with recruitment, including lecturers and student representatives, also strongly suggested to amend the age criterion. Electronic materials were consequently amended to state “18-30 years” as the preferred age range. Otherwise, the sign-up criteria as communicated to potential study participants did not change.

Potential participants were explicitly informed that non-substance users could also sign up. This was done to avoid marginalisation of non-substance users and to better protect participating substance users. In addition, excluding certain individuals from participation may reduce perceived privacy (Hibell, 2003: 65). Using broad eligibility criteria for sign-up was therefore methodologically preferable to ensure a high level of perceived privacy.

Potential participants were also informed that it was not necessary to drink or smoke “a lot” in order to take part. This addressed a common misperception regarding the scope of the study, as it was commonly assumed that substance use research focuses on heavy users.

As implemented by recruiters

Recruiters generally communicated the sign-up criteria as stated above. Nevertheless, the criteria used by recruiters differed somewhat from those communicated to potential participants, mostly because criteria for study participants had not yet been finalised at the time of recruitment.

Recruiters targeted females who looked to be 18 to 24 years old but in some cases, the approached individuals were aged over 24 years. In recruitment waves 1 and 2, recruiters would allow individuals aged up to 30 years to sign up, as the age criterion for study participants had not yet been finalised. In recruitment wave 3, individuals aged over 26 years were excluded more systematically during recruitment (e.g., by asking their age prior to offering the sign-up form).

The criterion stating a 12-month minimum enrolment at the University of Vienna was relaxed in recruitment waves 1 and 3. In recruitment wave 1, recruitment took place in January/ February 2017 and included students who had enrolled as late as March 2016 (i.e., 11 months prior to sign-up). This was justified because interviews were scheduled to take place in March 2017, hence fulfilling the criterion. In recruitment wave 3, the criterion was relaxed at the final recruitment session in an effort to recruit as many individuals as possible before the end of the fieldwork. The last recruitment session took place at the end of May 2018 and included students who had enrolled as late as October 2017. With final interviews scheduled for June 2018, recruiting these individuals opened up the possibility of increasing the number of study participants by amending the interview criterion from a 12-month to a 9-month minimum enrolment at the university. Finally, a sufficient number of individuals were eligible for interview using the 12-month criterion and therefore this change to the interview criteria was not required and these individuals did not take part in interviews.

In addition to the criteria communicated to potential participants, from wave 2 onwards, recruiters also used faculty affiliation as a criterion, limiting sign-up to students enrolled at the three target faculties in line with the revised interview criteria (e.g., by asking students about their faculty or study subject prior to offering the sign-up form). Furthermore, recruiters did not sign up individuals whose German language skills were not sufficient to engage in the recruitment conversation.

As implemented on the sign-up form

Individuals interested in study participation had to complete a sign-up form. If participants did not meet the basic criteria, they could not complete the sign-up form but were redirected to an exit screen thanking them for their interest and informing them that they were not eligible to participate. The following responses to questions on the sign-up form led to participants being redirected to an exit screen:

- No interest in a face-to-face interview
- Male gender, or gender not specified
- 31 years or older, 16 years or under, or age not specified
- Enrolment in current term, or enrolment date not specified
- Enrolment in previous term (not used in recruitment wave 1 and at the last recruitment session in wave 3)
- Faculty other than the three target faculties, or faculty not specified *(not used in recruitment wave 1)*
- Not enrolled at the University of Vienna

Individuals who indicated that they wished to be contacted only face-to-face (i.e., not by phone or email) were not redirected to an exit screen but received a message with instructions on how to sign up to the study in person or alternatively return to the sign-up form and agree to be contacted by phone or email.

Appendix F: Recruitment materials

F.1 Invitation card

A card such as the one shown below was distributed at fieldwork sites, handed out for referral, and given to those individuals who were approached in person but could not be recruited on the spot (see also section 5.4.2 on recruitment procedures).

Front:

Back:

Note. The participant ID code and PIN number differed on each card and were hand-written on the back as shown in the above example (procedures further described in section 8.3.3).

F.2 Thank-you card

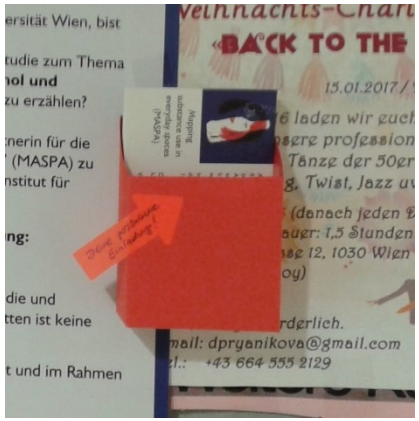
A card such as the one shown below was given to those individuals who signed up to the study in person (see also section 5.5.4 on reminders).

Front:

Back:

Note. The participant ID code and PIN number differed on each card and were hand-written on the back as shown in the above example (procedures further described in section 8.3.3).

F.3 Posters



Left: poster used for recruitment (printed size was A4).

Centre: invitation cards were attached to posters using a box; a note invited viewers to take a card.

Right: example of poster in context ('OMP' fieldwork site, wave 1); in later waves, multiple posters were hung up next to each other to increase their visibility.

F.4 Job advertisement for research assistant

Research Assistant auf Werkvertragsbasis, sofortiger Beginn, Wien

Gesucht wird ein **Research Assistant** (m/w) (Werkvertragsbasis) zur Unterstützung bei der Durchführung eines Dissertationsprojektes aus dem Fachgebiet Soziologie (www.maspa-studie.at).

Aufgabengebiet:

- Anwerben von Studienteilnehmerinnen (persönliches Ansprechen von Studentinnen an der Universität Wien)

Zusätzliche Aufgaben je nach Interesse und Verfügbarkeit:

- ev. Transkription von Interviewaufzeichnungen
- ev. Analyse von Interviews (inhaltsanalytische Verfahren)
- ev. Auswertung von Literatur

Die verschiedenen Aufgaben werden jeweils separat vorbereitet und verrechnet. Die erste Aufgabe besteht darin, in den kommenden Wochen 30 Studienteilnehmerinnen anzuwerben. Dafür sind Studentinnen an der Universität Wien persönlich anzusprechen und zur Teilnahme am Dissertationsprojekt einzuladen.

Tätigkeitsort: Studienteilnehmerinnen sollen in ausgewählten Instituten der Universität Wien angeworben werden (im 1. und 9. Bezirk). Für die restlichen Aufgaben ist kein Arbeitsort vorgegeben (können z.B. von zuhause aus erledigt werden).

Zeitraum: Einschulung in das laufende Dissertationsprojekt im September bzw. Anfang Oktober 2017, gefolgt vom Anwerben der Studienteilnehmerinnen im Oktober bzw. November 2017. Geschätzter Zeitaufwand: insgesamt ca. 30 Stunden (inkl. Einschulung und Nachbereitungstreffen sowie Anfertigen der Dokumentation). Freie Zeiteinteilung. Unterstützung bei den weiteren Aufgaben (Transkription etc.) je nach Interesse und Verfügbarkeit im Laufe des Jahres 2018.

Dein Profil:

- Du studierst Soziologie oder ein anderes sozialwissenschaftliches Fach (Master oder letztes Jahr Bachelor) oder hast ein solches Studium abgeschlossen.
- Du bist zuverlässig, kontaktfreudig, und du gehst die Dinge gerne systematisch an.
- Das Einhalten der Regeln der guten wissenschaftlichen Praxis ist für dich eine Selbstverständlichkeit.
- Du verfügst über ein mobiles Endgerät (Tablet, Smartphone mit großem Display oder handlicher Laptop), das du für das Anwerben von Studienteilnehmerinnen nutzen kannst.
- Du bist bereit, an einer kurzen Einschulung und einem Nachbereitungstreffen teilzunehmen.
- Interesse an methodologischen und forschungsethischen Themen ist von Vorteil.

Das erwartet Dich:

- Möglichkeit, an einem interessanten Forschungsprojekt mitzuarbeiten und praktische Erfahrungen im Bereich Datenerhebung und Datenanalyse zu sammeln.
- **Bezahlung auf Werkvertragsbasis**: **300 EUR** für das ordnungsgemäße Anwerben von 30 Studienteilnehmerinnen und Abgabe der entsprechenden Dokumentation; Bezahlung für weitere Tätigkeiten nach Vereinbarung.

Sonstige Informationen: Dein Beitrag zum Projekt wird im Rahmen der Danksagung in der Dissertationsschrift gewürdigt.

Bei Interesse bitte Lebenslauf sowie kurzes Motivationsschreiben (max. 1 A4 Seite) inklusive Info, wann Du anfangen kannst und ob du an allen Aufgaben oder nur am Anwerben von Studienteilnehmerinnen interessiert bist, bis zum **17. September 2017** an [Kontaktdaten].

Ich freue mich auf Deine aussagekräftige Bewerbung. Vielen Dank!

F.5 Effectiveness of recruitment strategies

This appendix describes recruitment results and associated challenges for each strategy described in section 5.4.2 as well as the reminders described in section 5.5.4. It was possible to link sign-ups to specific recruitment strategies by including a question on the sign-up form about how participants had found out about the study and by allocating ID codes (entered by participants during sign-up) to specific strategies in advance.

Recruitment in person

Key figures on recruitment in person

		Study author (% of Total)	Research assistant	Total
A	Number of recruitment sessions	9 (28%)	23	32
B	Number of sessions (OMP only)	7 (35%)	13	20
C	Number of sessions (Juridicum only)	2 (17%)	10	12
D	Hours spent actively recruiting	12 (31%)	27	39
E	Number of people approached	63 (22%)	220	283
F	Number of people signed-up in person	28 (42%)	38	66
G	Number of people signed-up in person (OMP only)	22 (49%)	23	45
H	Number of people signed-up in person (Juridicum only)	6 (29%)	15	21
I	Sign-up rate (sign-ups [row F] divided by people approached [row E])	44%	17%	23%
J	Number of people immediately completing the screening questionnaire in front of the recruiter	19 (76%)	6	25
K	Immediate completion rate (screening questionnaires completed immediately [row J] divided by sign-ups [row F])	68%	16%	38%
L	Average time spent recruiting to sign up one person (minutes per sign-up)	26 min	43 min	36 min
M	Study participants resulting from recruitment in person	7 (39%)	11	18

The table above summarises in-person recruitment in numbers. Between January 2017 and May 2018, two recruiters (a research assistant and the study author) undertook a total of 32 recruitment sessions, consisting of 20 sessions at the OMP fieldwork site (representing two faculties) and 12 sessions at the Juridicum (representing one faculty). Recruitment sessions were clustered in three waves, as explained in section 5.2.4. In wave 1, the study author was solely responsible for recruitment; in wave 2, it was the research assistant; and in wave 3, both recruiters were active. In total, 39 hours were spent at the fieldwork sites actively recruiting study participants, with recruitment sessions lasting about 70 minutes on average to avoid recruiter fatigue. The two recruiters personally approached 283 persons, of whom 66 (23%)

signed up to the study on the spot. Of these, 25 (38%) also completed the screening questionnaire immediately in front of the recruiter.

Of those who did not sign up to the study, 113 persons (52%) might have been interested but did not meet basic eligibility criteria for sign-up (see Appendix E.5); 43 students (20%) did not have time to sign up (e.g., about to have an exam); 28 students (13%) were not interested; 19 students (9%) did not have time to participate in an interview; 11 students (5%) wanted to visit the project website before sign-up; and three students (1%) did not feel confident taking part in an interview (despite assurances from the recruiter regarding the nature of the interview).

Although a research assistant supported the recruitment process, the study author undertook a substantial part of recruitment. As shown in the table, the study author recruited 28 (42%) out of the 66 persons who signed up the study, and 19 (76%) out of the 25 persons who also completed the screening questionnaire in front of the recruiter. Of the 18 participants recruited in person, seven (39%) were recruited by the study author.

Differences in performance between recruiters were due to a number of factors. First, the basic eligibility criteria for sign-up changed during the recruitment period (see Appendix E.5). For example, in wave 1, when the study author was the only recruiter, students of any faculty could sign up to the study. However, in waves 2 and 3, when the research assistant conducted most of the recruitment, only students from the three target faculties were eligible to sign up, and 23 students from other faculties (10% of those approached by the research assistant) were deemed ineligible. Second, the possibilities available to recruiters in terms of framing differed. Whilst the research assistant had to present the project as a research study and herself as a member of a research team, the study author was able to appeal to potential study participants on a more personal level by appearing as a fellow student needing help with a dissertation. Several students agreed to help because they were also going to require other people's help for their studies in the near future. Hence, students likely perceived study participation to be more rewarding when recruited by the author[855]. Finally, data suggest that recruiters' decision-making during recruitment differed (e.g., approaching different types of individual)[856]. This latter point emphasises the advantages of using two different recruiters to reduce selection bias.

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[855] The reasons given by those who did not sign up to the study also suggest that the framing was important. Only 4 (6%) out of 63 persons approached by the study author said they were not interested to take part, but this was the case for 24 (11%) out of 220 persons approached by the research assistant.

[856] For example, the author approached only seven individuals who had been enrolled at the university for less than 12 months (8% of 63 individuals approached by me), but the research assistant approached 30 such individuals (14% of 220 approached). Furthermore, the author reported only four individuals with insufficient German language skills (6% of 63 approached), but the research assistant reported 29 such individuals (13% of 220 approached). It

One concern was that the same person might be approached twice. However, this happened only to three people (1% of all approached; second sign-up attempt excluded from the table). Clustering the recruitment in waves and separating recruiters temporally may have consequently reduced the risk of multiple sign-up attempts targeting the same person.

Posters and invitation cards

Key figures on distribution of invitation cards (including for referral)

	Number of cards …	OMP	Juridicum	Both sites
A	Distributed on tables, in sitting areas, by cash machines, etc.	162	56	218
B	Distributed in other locations within the university buildings (e.g., bookshop, bathrooms, lockers)	0	22	22
C	Displayed by posters	75	15	90
D	Given to people who did not sign up during recruitment in person	139	19	158
E	Given to student representatives for referral	35	0	35
F	Given to personal contacts for referral (includes cards offered to students during a seminar and cards passed on to a student representative)	35	0	35
G	Given to study participants for referral	16	9	25
H	Distributed by study author	222	105	327
I	Distributed by research assistant	240	16	256
J	Distributed in Wave 1 only	179	0	179
K	Distributed in Wave 2 only	248	0	248
L	Distributed in Wave 3 only	35	121	156
M	**Total number of cards distributed**	**462**	**121**	**583**
N	Number of complete sign-ups	1	0	1
O	Study participants resulting from distribution of invitation cards	0	0	0

Posters were hung up at fieldwork sites at the beginning of each wave and replaced if they had been removed. However, it was not possible to ensure a continuous display of posters during recruitment due to the frequent changes made to the notice boards (see below). No study participant signed up to the study on the basis of posters alone.

is unclear whether the research assistant approached more foreigners or whether recruiters differed in their assessment of language skills.

The table above provides details on the use of invitation cards. In total, 583 invitation cards were distributed (*not* including 67 thank-you cards given to already-recruited individuals). The research assistant was responsible for distribution of invitation cards at fieldwork sites (row A) and for handing them to people who did not sign up during recruitment in person (row D), while the study author was responsible for all recruitment strategies. The three main routes for dissemination were: leaving cards on tables, in sitting areas and similar locations around the fieldwork sites (n=218; 37%); giving them to people who did not sign up during recruitment in person (n=158; 27%); and attaching cards to the posters (n=90; 15%). Overall, 330 cards (57%) were distributed by leaving them at the fieldwork sites (rows A to C), and 253 cards (43%) were handed to people (rows D to G; although some of these were consequently left at the fieldwork sites). Use of cards for referral is further described in the next section.

Comparing the two fieldwork sites, fewer cards were distributed at the Juridicum (n=121; 21%) than at the OMP (n=462; 79%). This was in part because the Juridicum housed only one faculty and was added as a fieldwork site to the research project later than the OMP. There were also fewer locations at the Juridicum to distribute cards than at the OMP. In addition, recruitment waves 1 and 2 at the OMP suggested that the distribution of invitation cards was not an efficient strategy, and therefore recruitment wave 3 at the Juridicum focussed on in-person recruitment rather than the distribution of cards, and most referral was also organised without invitation cards. Nevertheless, cards were distributed also at the Juridicum, including in unusual places to increase the likelihood of cards being noticed[857].

In summary, distributing 583 invitation cards led to only one complete sign-up, resulting from a card left on a table. Sign-up data suggest that further individuals may have attempted sign-up based on these cards but that they were unable to do so because they did not meet basic eligibility criteria (see also footnote 857, p. 686). While further sign-ups might have been obtained by distributing more cards, this was not possible due to the necessity to avoid spamming the faculties.

Displaying posters and invitation cards was challenging in both fieldwork sites. As the study was an individual student project, it was not possible to use the locked notice boards reserved for official university announcements. Instead, the posters had to be displayed on notice boards available to the general public. It was found that posters were frequently removed or covered up by other posters. Notice boards were also used by commercial advertisers who

[857] This strategy worked somewhat, as one invitation card left in a bathroom resulted in a completed screening questionnaire. However, this screening questionnaire could not be considered further as there was no matching complete sign-up form.

could afford more aggressive advertising strategies (e.g., plastering the entire noticeboard with multiple very large posters in bright colours). For the invitation cards, it was felt that distributing too many cards or distributing them too often or in inappropriate locations may be perceived as spam by students or university staff. Preference was therefore given to areas designated for leaflets, and permission was sought where necessary (e.g., student representatives, bookshop). In the other locations, cards were distributed sparingly so as not to cause a nuisance. Like the posters, invitation cards were frequently removed or disappeared visually among a plethora of other leaflets.

Referral

Three groups of student representatives were approached for referral, representing mathematics and two fields of economics, and all three groups agreed to support the study. One group posted an invitation to the study on their Facebook page, which may have contributed to sign-ups via Facebook. Only few cards (35 cards in total) were distributed this way, as student representatives were unable to actively recruit participants and suggested that invitation cards left in their offices would not be picked up. The acquaintance of one additional student representative was made through a personal contact (see below). This person agreed to recruit study participants and subsequently reported approaching at least five students. Although this led to no sign-ups, it resulted in useful feedback which informed the revision of eligibility criteria (i.e., increasing the age limit). Student representatives for law were not approached explicitly for referral.

Asking personal contacts to support recruitment led to one complete sign-up (*and subsequently one interview*) through referral by a friend. In addition, two lecturers working at the OMP agreed to pass invitation cards on to their students and took a total of 25 cards. One of the lecturers asked for the project to be briefly presented during the seminar prior to her offering the invitation cards, which also allowed trialling this recruitment approach (i.e., recruiting in lectures). Although no sign-ups resulted from this latter path, one of the students attending the seminar was a student representative who subsequently agreed to support the project as described above.

As regards study participants, 13 of the 24 participants were asked to assist with recruitment. Of these, 11 agreed and took a total of 25 invitation cards. However, most appeared to take the cards out of politeness, and those who appeared willing to help provided reasons why they would not succeed (e.g., stating that their friends were unlikely to have time for an interview). Correspondingly, the sign-up data suggest that asking participants to assist with recruitment led to no additional sign-ups. The other two participants declined, with one of them explaining

that she did not wish to bother her friends with a study invitation. The other 11 participants (mostly law students) were not asked for referrals because these interviews took place in the last two weeks of the fieldwork, when a sufficient number of participants had already been identified.

One additional sign-up resulted from referral by "a friend or study colleague" (response on the sign-up form), but as this person generated their own ID code rather than using a prepared ID code (as explained in section 8.3.3), the source of the referral remained unclear.

Social media

Key figures on online recruitment via Facebook

		Economics	Mathematics	Law	**Total**
A	Number of Facebook "pages"	4	1	0	**5**
B	Number of Facebook "groups"	7	1	1	**9**
C	Total number of subscribers (page followers or group members) at the time of posting[a]	13,472	2,801	5,186	**21,459**
D	Estimated number of unique subscribers (page followers or group members) at the time of posting[b]	6,501	2,381	5,186	**14,068**
E	Number of posts containing study invitations	20	3	1	**24**
F	Number of complete sign-ups from target faculties	5	1	7	**13**
G	Sign-up rate (sign-ups [row F] divided by subscribers [row D])	0,08%	0,04%	0,13%	**0,09%**
H	Average number of posts required to sign up one person (posts [row E] divided by sign-ups [row F])	4	3	0,14	**1,85**
I	Study participants resulting from online recruitment via Facebook	0	1	4	**5**

[a] Each group or page was counted once even if study invitations were posted more often.
[b] Only the most subscribed group or page per study area was considered to account for the possibility of multiple page or group subscriptions by the same individual.

The above table summarises online recruitment. Study invitations were posted on Facebook 24 times over the recruitment period. Posts targeted five pages of official student representatives and nine discussion groups for students of specific subjects[858]. Most of these

[858] Facebook "pages": "AktionsGemeinschaft WiWi" (economics); "STV I-BW Veranstaltungen" (economics); "Roter Boersenkrach" (economics); "STV Statistik UniWien" (economics); "Roter Vektor Mathe" (mathematics). Facebook "groups": "BWZ Elite, der echte Ort um I-BW zu studieren ! - Uni Wien" (economics); "Erstsemester BWL/IBWL Uni Wien" (later renamed "I-BW am OMP Erstsemester '18/'19") (economics); "Volkswirtschaftslehre Universität Wien" (economics); "VWL Uni Wien 2017" (economics); "VWL Uni Wien Erstsemestrige 14/15" (economics); "Master VWL Uni Wien" (economics); "Uni Wien Statistik 16/17" (later renamed "Uni Wien Statistik Start WS 15/16") (economics);

referred to economics, as economics covered four fields of study, represented on Facebook with multiple pages and groups. For mathematics, posts targeted one page and one group. For law, posts targeted one group (with over 5,000 members) but no page, as student representatives did not allow visitor posts. Numbers of subscribers ranged from 136 to 5,186 per page or group at the time of posting, and it was estimated that in total the targeted sites had over 14,000 unique subscribers. In most cases, the study invitation was posted once in wave 1 (Jan/Feb 2017) and a second time in wave 3 (May 2018). As the legal faculty was targeted only in wave 3, the invitation was posted only once.

Challenges of using Facebook included having to use it sparingly so as not to cause a nuisance. Checks carried out after the recruitment phase suggested that four (17%) of the 24 posts had been removed by administrators, although two of these remained accessible through searches. Posts on pages (as opposed to groups) appeared only in a sidebar and were therefore unlikely to be noticed. Finally, the sites differed in how much they were used, and it is unclear how many of the estimated 14,000 subscribers actually saw the study invitations and how many were eligible for sign-up.

Despite these challenges, online recruitment on those sites led to 13 sign-ups from the target faculties (5 economics, 1 mathematics and 7 law students). Sign-ups occurred mostly after posts on sites with over 1,000 subscribers, but the sign-up rate was not constant. On one occasion, posting to pages and groups totalling some 8,000 subscribers resulted in only one sign-up. The sign-up rate also differed by faculty. At the economics and mathematics faculties, the sign-up rate (number of complete sign-ups per estimated number of unique subscribers) was 0,08% and 0,04%, respectively, whereas at the law faculty, the sign-up rate was 0,13%. Thus, while 23 posts to Facebook pages and groups associated with the economics and mathematics faculties led to 6 sign-ups from these faculties, one single post to a large group associated with the law faculty accounted for 7 sign-ups and therefore for half of the sign-ups obtained via social media.

In addition, one student from another faculty and one student who did not state their faculty signed up via Facebook but it was not clear whether this was in response to the targeted study invitations or through referral from the study author's own network.

One argument against online recruitment as the main recruitment strategy was the greater risk of self-selection bias. Data from the screening questionnaire confirmed that individuals who

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"Mathematik Uni Wien (BSC,MSC +Lehramt)" (mathematics); "Studenten @ Juridicum" (law). Further potentially relevant Facebook sites were identified but not used for recruitment, for example because visitor posts were disabled or because members did not appear to represent the target population.

signed up via Facebook were, for example, more likely to report fair or poor mental health or substance use related problems than those recruited through other means. Consequently, they were also less likely to meet the eligibility criteria for study participants. This confirmed the choice of strategies such as cold canvassing to reduce self-selection bias in the present study, especially given the focus on non-vulnerable populations.

Contacting individuals initially deemed ineligible

In total, 25 students who had signed up to the study but were initially deemed ineligible as study participants were asked at a later date if they were still interested in study participation. Nine students (36%) confirmed their continued interest and updated their information, and of these, one person was eligible as a study participant. One additional student did not update her information but contacted the study author to explain that she was no longer available for interview due to other commitments.

Other recruitment paths

Besides the planned recruitment paths, one additional person signed up after finding out about the study through the job advertisement posted online to identify a research assistant.

Physical and electronic reminders

Timing of screening questionnaire completion, in relation to completed sign-up forms

	Recruited in person	Recruited through other means	Total (% of complete sign-ups)
Immediately after completing the sign-up form	25	18	43 (51%)
Later, without an electronic reminder	10	1	11 (13%)
After first electronic reminder	16	NA	16 (19%)
After second electronic reminder	1	NA	1 (1%)
Screening questionnaire was never completed	14	0	14 (16%)
Total	66	19	85 (100%)

The table above gives an overview on the use of reminders. Of the 66 individuals who signed up to the study in person, 25 (38%) also completed the screening questionnaire immediately in front of the recruiter. Of the remaining 41 individuals, ten (24%) completed the screening questionnaire by themselves at a later point (usually within three days). This suggests that physical reminders, particularly the thank-you cards, were effective. The remaining 31 individuals received electronic reminders. Of these, 16 (52%) individuals completed the screening questionnaire after the first reminder, one individual did so after a second reminder,

but 14 individuals did not complete the screening questionnaire even after two reminders. It is possible that these individuals had signed up out of politeness or similar reasons, in which case the separate screening questionnaire offered an opportunity to withdraw from the study prior to receiving an invitation to interview. Of the 19 individuals who signed up the study through other means, all completed also the screening questionnaire without any additional prompts. Overall, 54 (64%) out of 85 individuals who signed up to the study completed the form without a separate electronic reminder.

Appendix G: Sign-up form and screening questionnaire

G.1 Development of the instruments

Adaptation of existing instruments

Existing instruments including question items, scales or questionnaires and related sources were consulted to inform the development of the sign-up form and screening questionnaire (e.g., Kokkevi and Hartgers, 1995; Gsellhofer et al., 1997; Scheurich et al., 2000; WHO ASSIST Working Group, 2002; United Nations Office on Drugs and Crime, 2003; Schütz et al., 2005; Humeniuk et al., 2008; Lensvelt-Mulders, 2008; Yurek et al., 2008; Uhl et al., 2009; Bühringer and Sassen, 2010; Hoffmeyer-Zlotnik et al., 2010; Barreto et al., 2014; Aguilar-Raab et al., 2015; Feistritzer et al., 2015; Khazaal et al., 2015; Klimont and Baldaszti, 2015; Ramelow et al., 2015; Wippermann et al., 2015; GESIS - Leibniz-Institute for the Social Sciences, 2016; Lamnek and Krell, 2016; Piontek et al., 2016; Seyer et al., 2016; Strizek et al., 2016; Strizek and Uhl, 2016; Barratt et al., 2017; Statistik Austria, 2019)[859]. These were identified through Internet searches, by checking online repositories (e.g., Evaluation Instruments Bank of the EMCDDA; the "ZIS" database of questions of the GESIS - Leibniz-Institute for the Social Sciences; or the "EHES" collection for addiction research by Glöckner-Rist and Rist, 2010) and publications providing overviews of instruments (e.g., Uhl et al., 2009; Darke, 2010; McCrady et al., 2010; Schaub and Maier, 2012), by taking part in other studies (e.g., Global Drug Survey) and noting what questions were asked, as well as by asking colleagues. The latter route was especially important for identifying Austrian materials, as these were not included in international or German repositories. Consequently, a great number of instruments were retrieved.

To narrow down the instruments *specifically on substance use*, a list of criteria was prepared. These criteria stated that, to be considered for the present study, an instrument should ideally:

- Be published with tested psychometric properties
- Not require major adaptations for use in the present study
- Collect the data required for the present study
- Be a screening tool rather than a diagnostic tool
- Be appropriate for multiple substances

[859] Sources relating specifically to cannabis were also consulted (e.g., Annaheim, 2012; Zeisser et al., 2012; Asbridge et al., 2014; Aguilar-Raab et al., 2015; Legleye et al., 2015) and questions regarding cannabis were developed; however, these were not included in the final instruments due to the conditions placed upon the research by the institutional ethics committee.

- Not require any training prior to use
- Be appropriate for self-administration
- Require little time for completion (e.g., no more than 5-10 minutes or 20 items)
- Be free of charge
- Not be proprietary (e.g., no permission for use required)
- Be available in German

A table was created with these criteria as well as other fields (e.g., intended setting or population) in the top row, while each subsequent row represented one instrument. Over 30 instruments[860] were reviewed. As the aim was to identify suitable instruments (not to provide a thorough review of each instrument), if a criterion was not met, the instrument was disregarded and its review discontinued. This exercise found that the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) by the World Health Organization (WHO) (WHO ASSIST Working Group, 2002; Schütz et al., 2005; Humeniuk et al., 2008) met the needs of the present study best. The other instruments were disregarded because they did not meet important criteria (e.g., they required training or were tailored to use with dependent users) or because they did not perform as well as the WHO ASSIST in the review. The European Addiction Severity Index (EuropASI) (Kokkevi and Hartgers, 1995; Gsellhofer et al., 1997; Scheurich et al., 2000) included some aspects of interest and so was also considered subsequently.

The other retrieved documents included entire questionnaires used in surveys and covered different topics (i.e., not limited to substance use). Therefore, using the earlier criteria and reviewing them in their entirety was not appropriate. Instead, relevant question items were identified and extracted from each document into a table, entering similar items in the same row. Consequently, columns showed different ways in which a question could be formulated, while different rows addressed different aspects (variables). Relevant questions from the two instruments identified earlier (WHO ASSIST V3.0 and EuropASI) were added to the table. The

[860] The following instruments were included in the table: ASI Addiction Severity Index; AUDIT Alcohol Use Disorders Identification Test; CAGE; CAST Cannabis Abuse Screening Test; CDDR Customary Drinking and Drug Use Record; CIDI-SAM Composite International Diagnostic Instrument – Substance Abuse Module by WHO; CDP Comprehensive Drinker Profile; CRAFFT; CUDIT Cannabis Disorder Identification Test; DAST Drug Abuse Screening Test; DUDIT Drug Use Disorders Identification Test; EuropASI; FAST Fast Alcohol Screening Test; Form-90; Leeds Dependence Questionnaire; MAP Maudsley Addiction Profile; MAST Michigan Alcohol Screening Test; OTI Opiate Treatment Index; Problematic Use of Marijuana (PUM); PRISM Psychiatric Research Interview for Substance and Mental Disorders; QF Quantity-frequency; RAPI Rutgers Alcohol Problem Index; RAPS4; SADD Short Alcohol Dependence Data; SADQ Severity of Alcohol Dependence Questionnaire; SCID Structured Clinical Interview for the DSM; SDS Severity of Dependence Scale; SDSS Substance Dependence Severity Scale; SODQ Severity of Opiate Dependence Questionnaire; TBFM Timeline Follow-Back Method; TWEAK; WHO ASSIST. References for these are available from the literature cited earlier (e.g., Darke, 2010; McCrady et al., 2010).

table below illustrates this process by showing two questionnaires in relation to two variables (translated from German to English for the purposes of this illustration).

Comparing question items used in different instruments (edited extract)

	Instruments		
Variable	**Epidemiologischer Suchtsurvey 2015 (Piontek et al., 2016)**	**ATHIS Statistik Austria (Klimont and Baldaszti, 2015)**	**(continued with other instruments)**
Alcohol – heavy episodic drinking in last 12 months	In the last 12 months, on how many days did you drink 5 or more glasses of alcohol, regardless of whether it was beer, wine/sparkling wine, spirits or alcoholic mixed drinks? On approximately … days On no day	In the last 12 months, how often did you drink 6 or more alcoholic beverages on one occasion? For example, at a party, at a meal, in the evening with friends or alone at home, … In terms of quantity, one beverage means, e.g., ½ l beer or Most, ¼ l wine or sparkling wine, 3 small glasses of schnapps or hard liquor, 6 small glasses of low-percentage liquor or 2 bottles of alcopops. Every day or almost every day 5 to 6 days a week 3 to 4 days a week 1 to 2 days a week 2 to 3 days a month Once a month Less than once a month Not at all in the last 12 months Never so far in my whole life	…
Smoking – quit attempt in last 12 months	In the last 12 months, did you make a serious attempt to give up smoking? Yes No	In the last year, did you seriously attempt to stop smoking? Yes No	…
(continued with other variables)	…	…	…

Note. Translated to English for this table; for the original wording in German, please see cited references.

The table was reviewed to select variables and items to include in the sign-up form and screening questionnaire for the present study. First, the variables were reviewed by comparing rows across the first column only. As the sign-up form and screening questionnaire were primarily intended to help identify eligible study participants (as opposed to being primary sources of data), variables relating to the specified eligibility criteria were prioritised. This led to the exclusion of many variables which were not essential for assessing eligibility (e.g., heavy episodic drinking, lifetime use of new psychoactive substances, religious beliefs). Next, possible question wordings concerning the selected variables were reviewed by comparing columns across single rows. Priority was given to those question wordings which corresponded best to the scope of the present study and which adhered to recommendations on question design (e.g., easy to understand, specific; e.g., Schnell et al., 2005: 334–340; Midanik and

Drescher-Burke, 2010: 101–107). If no single question met the study's needs completely, the ones that came closest were highlighted.

The questions were then adapted to the needs of the present study. Where a single item had been found to meet the study's needs, changes were often minor (e.g., using the informal "Du" instead of the formal "Sie" to address participants), but could also be more significant. For example, the WHO ASSIST asks about each substance separately, but the present study required asking about multiple substances concurrently[861]. Where no single item had been found to meet the study's needs, the items that came closest informed the development of a new item.

Final checks and revisions ensured that items adapted from other instruments were tailored to the present study (e.g., using an informal tone to suit the student population, applicable also in the case of little or no substance use). In addition, to decrease the burden on participants in terms of required time and cognitive effort, any open-ended answer options were converted to closed answer options. Although opting for closed answer options reduced the scale of measurement (e.g., from interval to ordinal), this approach was appropriate for the needs of the present study.

Appendix G.4 documents the adaptation process further by providing details of source instruments, original wordings and changes for all questions in the sign-up form and screening questionnaire that were adapted from other instruments.

Development of custom questionnaire items

Where no suitable question was identified in the existing instruments, questions were newly developed. This concerned those areas of the sign-up form and screening questionnaire which were specific to the present study, for example certain information about study participants (e.g., details of enrolment at the university, prior accommodation), items relating to procedural aspects of questionnaire completion (e.g., asking if they had an invitation card, ID code and PIN number) or to some of the exclusion criteria.

Taking into account guidance on question wording (e.g., Schnell et al., 2005: 334–340; Midanik and Drescher-Burke, 2010: 101–107), there were no particular challenges in formulating items

[861] To determine eligibility for the present study, it was only necessary to know if participants had had negative experiences in relation to their substance use, but not in relation to which substance exactly. In addition, asking about multiple substances concurrently reduced the time required for questionnaire completion.

to collect the study-specific information about study participants or to address the procedural aspects of questionnaire completion. Pretesting led only to minimal revisions.

Developing the items on some of the exclusion criteria was more complex, as these referred to intimate, stigmatised or illegal aspects of participants' lives. A special approach was therefore taken to anonymise responses at the point of data collection. This is described in section 8.3.1, but briefly, the exclusion criteria were provided as lists of statements and participants were asked only to indicate if any of these statements applied to them (without being informed that these were potential exclusion criteria). The statements were developed based on items from existing instruments (see Appendix G.4). Initially, two lists of statements were proposed to distinguish essential from desired exclusion criteria. As pretesting indicated that the list of essential criteria was too diverse (covering statements on pregnancy as well as on substance use), the final version contained three lists.

Construction and technical implementation of the instruments

To construct the instruments, the questions were ordered and structured in sections with introductory texts. Guidance (e.g., Johnston, 2003b; Lensvelt-Mulders, 2008; Midanik and Drescher-Burke, 2010), such as to ask less sensitive and easy-to-answer questions before more sensitive or difficult ones, was helpful in this regard. Another suggestion was to provide introductions that would help normalise stigmatised behaviours, thereby reducing effects of social desirability (Midanik and Drescher-Burke, 2010: 102). An example of applying this guidance to the present study was to precede the questions on substance use related problems (adapted from WHO ASSIST) with a short text featuring the following sentence: "For some people, substance use is associated with negative consequences, while for others it isn't"[862]. When writing the introductions and instructions, the previously reviewed instruments were again consulted to identify possible wordings.

Although initially it was intended to offer the sign-up forms and screening questionnaires on paper to those who were recruited in person, pretests suggested that it was acceptable for participants to complete the form and questionnaire electronically on a device handed to them. Offering the instruments electronically had major advantages (e.g., no need to transport physical questionnaires, no need for data entry, avoiding problems arising from mixed-mode data collection), and so the electronic version was offered as the default option. Participants could still complete a hard copy version if preferred, but this option was never used in practice.

[862] German original: "Für manche Menschen ist Substanzgebrauch mit negativen Folgen verbunden, für andere Menschen nicht."

Consequently, the draft instruments were converted into online questionnaires. Two different providers were used to best protect study participants. The sign-up form was set up with the German provider “SoSci Survey” (Leiner, 2016) at www.soscisurvey.de, while the screening questionnaire was set up with the British provider “Online Surveys” (Jisc, 2016) at www.onlinesurveys.ac.uk. These two providers catered specifically to academic research, met data protection requirements and had been successfully used in previous research projects. “SoSci Survey” was chosen for the sign-up form because it allowed more complex programming and branching (i.e., skipping or displaying certain questions or questionnaire pages depending on participants’ answers to earlier questions). This was important for the sign-up form so that, for example, people who did not meet basic eligibility criteria could be redirected to an exit screen. Tests were carried out to ensure that the branching worked, that data were captured correctly, and that the questionnaires worked in different Internet browsers as well as on mobile devices. Versions suitable for printing and completion offline were developed based on the online questionnaires, with changes to accommodate the different mode (e.g., additional instructions to participants where automatic branching occurred in the online version) (Leeuw and Hox, 2008a).

Pretesting

The draft sign-up form and screening questionnaire were finalised through pretesting. Although not the main data collection instruments, it was essential that they were well understood and positively perceived by study participants. Poorly designed instruments would have likely increased the number of incomplete or erroneous responses which in turn would have decreased the number of potential study participants. One aim of the pretesting was therefore to ensure that the perceived cost of signing up and completing the screening questionnaire was minimal. This meant more than ensuring an acceptable completion time. As Leeuw and Hox (2008b: 252) note, questionnaire completion can also be perceived as costly if it is experienced as annoying, upsetting or otherwise related to negative feelings.

Campanelli (2008: 198) suggests that pretesting should comprise at least three waves, starting with informal methods such as self-completion and asking friends and relatives for help, followed by more formal approaches such as expert review, and finishing with field tests such as respondent debriefing. The present study followed this recommendation by combining informal methods (waves 1 and 2) with expert review (wave 2) and cognitive pretesting and participant debriefing (waves 2 and 3) (for an overview of testing methods, see Campanelli, 2008). To summarise the three waves:

- *Wave 1:* The main aims of this wave utilising informal methods were to identify any obvious problems and to test the completion time. The draft sign-up form and screening questionnaire were completed by the study author and her husband, and potential areas for improvement were discussed. This led to minor changes.

- *Wave 2:* This wave aimed to uncover concealed problems by using informal methods in a more structured way and by consulting other social scientists as experts. A weblink to the draft instruments was sent to fellow doctoral students, friends and family with a structured request for feedback. Four fellow doctoral students provided feedback by email or in person. In addition, one post-doctoral peer with expertise in cognitive enhancement provided general feedback as well as specific feedback on the items concerning substances used for cognitive enhancement. One friend took part in a face-to-face interview using think-aloud and probes. After this wave, the instruments were revised more substantially.

- *Wave 3:* This wave aimed to test the instruments with people who closely resembled the target population (as recommended by e.g., Schnell et al., 2005: 348; Campanelli, 2008) and to obtain additional information to inform recruitment and interview procedures. Two students resembling the target population were recruited from the OMP fieldwork sites to take part in face-to-face interviews using think-aloud and probes. The interviews took place on two different days to allow for revision of the instruments after the first interview, meaning that the second student tested the near-final version. After this interview, all major issues that would have substantially affected response rates or the quality of responses had been addressed, and further pretesting was therefore not carried out.

In total, feedback was received from nine persons, of which seven were female and two were under 25 years old. Five provided feedback in person. Additional persons, including the academic supervisor, provided input on how to address the pretesting feedback.

Those who were invited in wave 2 to provide structured feedback received a list of questions to consider. The questions covered the following aspects: time needed to complete; usability and visual appearance; technical, typographical and other errors; clarity of questionnaire logic and structure; clarity of questions and instructions; potential sources of negative feelings; the two-part approach including use of ID and PIN; and the project website. They were also able to give comments relating to other aspects. Responses generally followed the suggested structure.

The face-to-face interview at wave 2 lasted 1,5 hours, while the interviews at wave 3 lasted 30 minutes. As pretesting did not require participants to verbally disclose any sensitive information about themselves, interviews with the two students were held in a university cafeteria. Participant consent to the pretest interviews was obtained orally, and no financial compensation was offered. The interviews followed a written interview guide, developed specifically for this purpose.

Pretest interviews consisted of three parts. First, an introduction was provided. Pretest participants were informed about the study and the purpose of the pretest (i.e., to obtain feedback on the recruitment materials). They were invited to consider themselves as members of the research team for the duration of the pretest interview. Assurance was given that any notes or observations would focus on how to improve the recruitment materials. Second, the recruitment materials were tested. Pretest participants were first asked to comment on the invitation card and poster. Then, they were presented with the project website on a mobile device (tablet) and invited to sign up to the study. To test both sign-up options, one received an invitation card, while the other two proceeded without. Pretest participants were invited to make comments or ask questions at any time, and they made use of this possibility (e.g., speaking out if a question was unclear). In addition, prepared questions were asked after certain items and at the end of each questionnaire page, combining retrospective think-aloud techniques with specific probes[863]. Spontaneous questions were asked, for example, if participants looked surprised, laughed or hesitated. Third, pretest participants were invited to give general feedback on the materials (e.g., duration, appearance). In addition, the two students were asked to comment on issues such as what would be an acceptable length of time for the interview and what compensation, if any, would be appropriate.

The questions and instructions to pretest participants were developed based on literature regarding (cognitive) pretesting and piloting (e.g., Kurz et al., 1999; Johnston, 2003b; Beatty, 2004; Snijkers, 2004; Schnell et al., 2005: 347–351; Campanelli, 2008; Leeuw and Hox, 2008b; Midanik and Drescher-Burke, 2010; Mohorko and Hlebec, 2015).

The general feedback was very positive concerning aspects such as the design, logic or ease of use of the materials. The two-part approach separating sign-up and screening questionnaire was seen as cumbersome but also as demonstrating professionality and a commitment to

[863] Probes sought to understand, for example, if questions were understood as intended (e.g., “what did you think of when rating your health?” [when asked to self-rate their physical and mental health]) and what might be possible dropout points (e.g., “where would you click first?” [when they saw the website]; “do you think people would enter their contact details here?” [when asked for contact details]; “would you continue to the next part now?” [at the end of the sign-up form]).

ensuring anonymity. The detailed feedback suggested changes, including major ones such as removing entire question items. Each feedback point was addressed separately, and any contentious feedback points were discussed with the academic supervisor as well as peers who had not been involved in the pretest. Examples of changes that were made in response to the feedback include:

- improving instructions perceived as confusing (e.g., in relation to the user-generated ID code);
- removing question items that repeatedly caused irritation (e.g., an item asking study participants to assign themselves to a social stratum);
- adding answer options to account better for different circumstances (e.g., some participants typically drank less than a whole drink or smoked less than a whole cigarette);
- replacing terms perceived as unsettling with more neutral ones (e.g., “unpleasant experiences” instead of “problems”, “questionnaire about alcohol and cigarettes” instead of “screening questionnaire”); and
- improving design aspects to encourage completion (e.g., displaying the weblink to the screening questionnaire at the end of the sign-up form with a “continue here” message in a large font size).

The pretest stage also allowed tests concerning technical and procedural aspects. For example, using the pretest data, it was possible to test data linkage across the two datasets. Furthermore, wave 3 of the pretest offered an opportunity to test the strategies for in-person recruitment.

After the pretests, only minor changes were made to the instruments (e.g., updating information on when interviews would take place). The final instruments are shown in Appendices G.2 and G.3.

G.2 Sign-up form

Page 1 – Brief participant information, data protection, consent to complete sign-up form

Vielen Dank, dass du dich zur Teilnahme an der Studie "*Ma*pping substance use in everyday *spa*ces" (MASPA) anmelden möchtest! Die Anmeldung geht ganz leicht und dauert nur ca. 3 Minuten.

In der Studie geht es darum, in welchen Situationen Substanzen wie Alkohol und Zigaretten konsumiert werden. Die Studie soll wissenschaftliche Grundlagen für die Planung zukünftiger Maßnahmen zur Gesundheitsförderung und Prävention schaffen. Die Studie wird im Rahmen eines Dissertationsprojekts an der Universität Wien durchgeführt.

Bitte melde dich nur an, wenn du:

- seit mind. 12 Monaten an der Universität Wien studierst
- weiblich bist
- 18-30 Jahre alt bist
- Interesse an einem persönlichen Interview hast

Der Gebrauch von Alkohol oder Zigaretten ist keine Voraussetzung für eine Anmeldung. Auch muss man nicht „besonders viel" rauchen oder trinken, da es nicht um „problematischen", sondern um ganz alltäglichen bzw. gelegentlichen Konsum geht.

Bei der Anmeldung werden persönliche Angaben wie Alter, Geschlecht und Kontaktdaten erfasst, um Interviewpartnerinnen auswählen und kontaktieren zu können. **Alle Angaben werden streng vertraulich behandelt und nur anonymisiert ausgewertet.** Details zu Datenschutz und eine Anleitung, wie du dich bei Bedarf offline bzw. ohne die Angabe von Kontaktdaten anmelden kannst, findest du auf der Seite Projektinformationen.

Bei Bedarf findest du eine PDF-Vorschau des Formulars hier. Bei Fragen kannst du mich gerne jederzeit kontaktieren: [E-Mail-Adresse]

Vielen Dank im Voraus für deine Teilnahme!

Deine Teilnahme erfolgt freiwillig. Wenn du auf den Button „Weiter" klickst, bestätigst du, dass du mit der Anmeldung fortfahren möchtest.

Page 2 – Basic data about potential participants

Wenn du ein Einladungskärtchen bekommen hast, dann lege dieses bitte bereit, bevor du mit der Anmeldung beginnst (eine Anmeldung ist aber auch ohne Einladungskärtchen möglich).

Bei Antwortoptionen mit einem Kreis kannst du nur eine Antwort wählen, bei Antwortoptionen mit einem Kästchen kannst du mehrere Antworten auswählen. Du kannst die Buttons "Zurück" oder "Weiter" verwenden, um durch das Formular zu navigieren. Bitte benutze nicht den "Zurück"-Button deines Browsers, da dadurch Daten verloren gehen könnten.

1. Möchtest du dich zur Teilnahme an der MASPA-Studie anmelden?

Teilnahme an der MASPA-Studie bedeutet ein qualitatives face-to-face Interview zum Thema "Alltagsräume und der Gebrauch von Alkohol und Zigaretten". Das Interview wird zwischen Februar und Juni 2018 stattfinden und ca. 1 bis 1,5 Stunden dauern. Genaue Uhrzeit und Ort werden mit dir abgestimmt. Für weitere Infos, siehe bitte die Projektwebseite (www.maspa-studie.at).

❍ Ja
❍ Nein

2. Wie alt bist du?
[PULL-DOWN MENU: from „16 Jahre oder jünger" through to „31 Jahre oder älter" plus additional option „Keine Angabe"]

3. Dein Geschlecht?
❍ weiblich
❍ männlich

❍ Keine Angabe

4. Seit welchem Semester studierst du an der Universität Wien?
WS = Wintersemester; SS = Sommersemester
[PULL-DOWN MENU: listing last 16 terms through to „WS 2010/11 oder früher“ plus additional options „Ich studiere derzeit nicht an der Universität Wien“ and „Keine Angabe“]

5. Wenn du an der Universität Wien studierst, in welchem Studienprogramm befindest du dich derzeit?
☐ Bachelorstudium
☐ Masterstudium
☐ Diplomstudium
☐ Doktorats-/PhD-Studium
☐ Anderes, und zwar: [FREE TEXT ENTRY FIELD]
☐ Keine Angabe

6. Zu welcher Fakultät bzw. zu welchem Zentrum gehört dein Studium?
Falls du mehrere Studien belegst, kannst du mehr als eine Antwort wählen.
☐ Katholisch-Theologische Fakultät
☐ Evangelisch-Theologische Fakultät
☐ Rechtswissenschaftliche Fakultät
☐ Fakultät für Wirtschaftswissenschaften
☐ Fakultät für Informatik
☐ Historisch-Kulturwissenschaftliche Fakultät
☐ Philologisch-Kulturwissenschaftliche Fakultät
☐ Fakultät für Philosophie und Bildungswissenschaft
☐ Fakultät für Psychologie
☐ Fakultät für Sozialwissenschaften
☐ Fakultät für Mathematik
☐ Fakultät für Physik
☐ Fakultät für Chemie
☐ Fakultät für Geowissenschaften, Geographie und Astronomie
☐ Fakultät für Lebenswissenschaften
☐ Zentrum für Translationswissenschaft
☐ Zentrum für Sportwissenschaft und Universitätssport
☐ Zentrum für Molekulare Biologie
☐ Zentrum für LehrerInnenbildung
☐ Keine Angabe

7. Wie möchtest du am liebsten von mir kontaktiert werden (z.B. damit wir einen Interviewtermin vereinbaren können)?
☐ Telefonisch (Anruf)
☐ Nachricht über WhatsApp oder SMS
☐ E-Mail
☐ Nur persönlich (face-to-face)

8. Hast du ein Einladungskärtchen für die MASPA-Studie zur Hand, auf dem ein ID-Code steht?
Den ID-Code findest du auf der Rückseite unterhalb des Uni-Logos. Wenn du dein Einladungskärtchen nicht bei dir hast oder kein Einladungskärtchen bekommen hast, gib bitte “Nein” an.
❍ Ja
❍ Nein

9. Wie hast du von der MASPA-Studie erfahren?
☐ Von Forscherin angesprochen (z.B. an der Uni, auf einer Veranstaltung)
☐ Freunde, StudienkollegInnen
☐ Poster, Flyer, Einladungskärtchen

☐ E-Mail
☐ Soziale Medien (z.B. Facebook, Twitter)
☐ Internetforum
☐ Andere Webseite
☐ Zeitschrifteninserat
☐ Sonstiges, und zwar: [FREE TEXT ENTRY FIELD]
☐ Weiß nicht mehr

Page 3 – Participant contact details

10. Unter welcher Telefonnummer oder E-Mail-Adresse kann ich dich am besten erreichen?

Deine Kontaktdaten werden streng vertraulich behandelt und nur im Rahmen dieses Forschungsprojektes verwendet, um mit dir einen Interviewtermin vereinbaren zu können.

Tipps zur Wahrung deiner Privatsphäre:

- *Gib eine Telefonnummer oder E-Mail-Adresse an, zu der nur du Zugang hast.*
- *Wenn du eine E-Mail-Adresse angibst, so ist es ideal, wenn dein Name, Geburtsdatum oder deine Matrikelnummer daraus nicht ersichtlich sind. Zum Beispiel ist eine E-Mail-Adresse wie sonne001@email.at besser als martha.mustermann@email.at oder a1234567@unet.univie.ac.at.*
- *Wenn du keine „anonyme" E-Mail-Adresse hast, kannst du auch nur deine Handynummer angeben.*

Tel.Nr. [FREE TEXT ENTRY FIELD]
E-Mail [FREE TEXT ENTRY FIELD]

Achtung! Eine Online-Anmeldung ist nur möglich, wenn du hier eine Tel.Nr. oder E-Mail-Adresse angibst. Ansonsten musst du für eine Anmeldung persönlich an der Universität Wien vorbeikommen. Alle Infos dazu findest du bei Bedarf hier.

Page 4a – Supplied ID code (if response to question 8 on Page 2 was "Ja")

Deine Anmeldung zur MASPA-Studie ist fast abgeschlossen. Um deine Privatsphäre zu schützen, bekommst du für die Dauer der Studie ein Pseudonym (eine Art Ersatz-Name) zugewiesen.

Dein Pseudonym ist der ID-Code auf deinem Einladungskärtchen. Es handelt sich hierbei um einen persönlichen ID-Code nur für dich – bitte teile ihn mit niemandem.

Bitte behalte das Einladungskärtchen bei dir bis du auch den Fragebogen zu Alkohol und Zigaretten ausgefüllt hast.

11. Bitte gib hier den ID-Code an, so wie er auf deinem Einladungskärtchen steht. Der ID-Code besteht aus drei Buchstaben (z.B. AAF).
*Die vierstellige PIN-Nummer bitte **nicht** angeben.*

[FREE TEXT ENTRY FIELD]

Page 4b – User-generated ID code (if response to question 8 on Page 2 was "Nein")

Deine Anmeldung zur MASPA-Studie ist fast abgeschlossen. Um deine Privatsphäre zu schützen, bekommst du für die Dauer der Studie ein Pseudonym (eine Art Ersatz-Name) zugewiesen. Das heißt, du musst nie deinen Namen angeben.

Auf dieser Seite stelle ich dir drei Fragen, mit denen ein einzigartiger ID-Code für dich erstellt werden kann. Dieser wird für die Dauer der Studie dein Pseudonym sein. Die Fragen sind so gewählt, dass man dich anhand dieser Informationen **nicht** identifizieren kann.

11. Wie viele ältere Brüder hast du?

Beispiel: Wenn du zwei ältere Brüder hast, wähle "2" als Antwort.
[PULL-DOWN MENU: from 0 to 10]

12. Mit welchem Buchstaben beginnt der Vorname deiner Mutter?
Beispiel: Wenn deine Mutter Petra heißt, wähle "P" als Antwort.
[PULL-DOWN MENU: from A to Z including umlauts]

13. An welchem Tag wurdest du geboren?
Beispiel: Wenn dein Geburtstag am 15. April ist, wähle "15" als Antwort.
[PULL-DOWN MENU: from 1 to 31]

14. Gib hier alle drei Antworten nacheinander ohne Abstände ein. Das ist dein ID-Code bzw. Pseudonym für die Dauer der Studie.
Beispiel: Im obigen Beispiel wäre das resultierende Pseudonym 2P15.

[FREE TEXT ENTRY FIELD]

Page 5 – Thank-you and prompt to complete screening questionnaire

Vielen herzlichen Dank – du hast dich erfolgreich für die MASPA-Studie angemeldet!

Bitte fülle auch sofort den Fragebogen zu Alkohol und Zigaretten aus. Damit kann ich die Interviewpartnerinnen bestmöglich auswählen. Das wird nur ein paar Minuten dauern.

➔ **Hier geht's weiter** ➔

Bei Fragen oder Kommentaren kannst du mich gerne unter [E-Mail-Adresse] kontaktieren. Unter www.maspa-studie.at findest du bei Bedarf weitere Projektinformationen.

G.3 Screening questionnaire

Page 1 – Brief participant information, data protection, consent to complete screening questionnaire

MASPA Fragebogen

Vielen Dank, dass du dich für die Studie "*Ma*pping substance use in everyday *spa*ces" (MASPA) angemeldet hast!

Bevor es zum Interview geht, möchte ich noch etwas mehr über dich erfahren. Die folgenden Seiten enthalten einen kurzen Fragebogen zu deiner Person und zu deinen Erfahrungen mit Substanzen wie Alkohol und Zigaretten. Der Fragebogen enthält keine Fragen zu deinen „Alltagsräumen", da dieses Thema nur im persönlichen Interview behandelt wird. **Das Ausfüllen des Fragebogens dauert nur ca. 5-8 Minuten.**

Alle Angaben werden **streng vertraulich** behandelt und nur anonymisiert ausgewertet. Details zu Datenschutz und eine Anleitung, wie du diesen Fragebogen bei Bedarf offline ausfüllen kannst, findest du auf der Seite Projektinformationen.

Bei Bedarf findest du eine PDF-Vorschau des Fragebogens hier. Bei Fragen kannst du mich gerne jederzeit kontaktieren: [E-Mail-Adresse]

Vielen Dank im Voraus für deine Mithilfe!

Deine Teilnahme erfolgt freiwillig. Wenn du auf den Button „Weiter" klickst, bestätigst du, dass du mit dem Fragebogen fortfahren möchtest.

Page 2 – Sign-up reminder

Bei Antwortoptionen mit einem Kreis kannst du nur eine Antwort wählen, bei Antwortoptionen mit einem Kästchen kannst du mehrere Antworten auswählen. Du kannst die Buttons "Zurück" oder "Weiter" verwenden, um durch das Formular zu navigieren. Bitte benutze nicht den "Zurück"-Button deines Browsers, da dadurch Daten verloren gehen könnten.

1. Hast du dich bereits für die MASPA-Studie angemeldet (d.h. das Anmeldeformular ausgefüllt)?

❍ Ja, persönlich (im Beisein der Forscherin)
❍ Ja, online (Forscherin war nicht anwesend)
❍ Nein, noch nicht
❍ Weiß nicht

Page 2a – Sign-up reminder (in case of „Nein, noch nicht" or „Weiß nicht" on Page 2)

Wenn du dich noch nicht angemeldet hast oder dir nicht sicher bist, dann melde dich bitte zuerst zur MASPA-Studie an bevor du hier weitermachst.

Die Anmeldung dauert nur ca. 3 Minuten: Anmeldeformular in neuem Browserfenster öffnen

Wenn du dich angemeldet hast, kannst du auf "Weiter" klicken.

Page 3 – Invitation card

2. Hast du ein Einladungskärtchen zur MASPA-Studie zur Hand, auf dem eine PIN-Nummer steht?
Die PIN-Nummer findest du auf der Rückseite des Kärtchens unterhalb des Uni-Logos.
Wenn du kein Einladungskärtchen bekommen hast, gib "Nein" an.
❍ Ja
❍ Nein

Page 4a – User-generated PIN number (in case participants answered „Nein" on Page 3)

Im Anmeldeformular habe ich dir drei Fragen gestellt, mit denen ein ID-Code bzw. Pseudonym für dich erstellt wurde.

Wenn du dir deinen ID-Code gemerkt oder notiert hast, gib ihn hier an.

Wenn du dir nicht sicher bist, beantworte einfach die drei Fragen unten **noch einmal genau so**, wie du sie bei der Anmeldung beantwortet hast.

3. Dein ID-Code bzw. Pseudonym (bei der Anmeldung erstellt)
Der Code besteht aus Zahlen und Buchstaben (z.B. 2P15).
[FREE TEXT ENTRY FIELD]

Falls du dir nicht sicher bist, beantworte die drei Fragen einfach noch einmal:

4. Wie viele ältere Brüder hast du?
Beispiel: Wenn du zwei ältere Brüder hast, wähle "2" als Antwort.
[PULL-DOWN MENU: from 0 to 10]

5. Mit welchem Buchstaben beginnt der Vorname deiner Mutter?
Beispiel: Wenn deine Mutter Petra heißt, wähle "P" als Antwort.
[PULL-DOWN MENU: from A to Z including umlauts]

6. An welchem Tag wurdest du geboren?
Beispiel: Wenn dein Geburtstag am 15. April ist, wähle "15" als Antwort.
[PULL-DOWN MENU: from 1 to 31]

Page 4b – Supplied PIN number (in case participants answered „Ja" on Page 3)

7. Bitte gib hier die **PIN-Nummer** an, so wie sie auf deinem Einladungskärtchen steht. Die PIN-Nummer besteht aus vier Ziffern (z.B. 0215).
*Den dreistelligen ID-Code bitte **nicht** angeben.*
[FREE TEXT ENTRY FIELD]
Wenn du die PIN-Nummer eingetragen hast, streiche ID-Code und PIN-Nummer bitte durch, sodass sie nicht mehr lesbar sind. Danach kannst du das Einladungskärtchen

wegschmeißen.

Page 5 – Socio-demographic characteristics

Über dich

Die Fragen auf den nächsten zwei Seiten beziehen sich auf **Hintergrundinformationen über dich und deinen Alltag**. Danach kommen die Fragen zu Alkohol und Zigaretten.

8. Was ist dein derzeitiger Familienstand?
❍ Ledig
❍ Verheiratet (oder eingetragene Partnerschaft)
❍ Verwitwet (oder hinterbliebene(r) eingetragene(r) Partner(in))
❍ Geschieden (oder aufgelöste eingetragene Partnerschaft)
❍ Keine Angabe

8.a. Falls du nicht verheiratet bist, hast du einen **fixen Partner/eine fixe Partnerin**?
❍ Ja, ich habe einen fixen Partner/eine fixe Partnerin
❍ Nein, ich habe derzeit keinen fixen Partner/keine fixe Partnerin
❍ Keine Angabe

9. Mit wem lebst du in einem Haushalt zusammen?
☐ Allein
☐ Partner / Partnerin
☐ Freunde
☐ Mitbewohner/in
☐ Eltern
☐ Geschwister
☐ Eigene Kinder
☐ Andere Familienmitglieder
☐ Andere
☐ Ändert sich oft
☐ Keine Angabe

10. In welchem Bundesland wohnst du derzeit?
❍ Burgenland
❍ Kärnten
❍ Niederösterreich
❍ Oberösterreich
❍ Salzburg
❍ Steiermark
❍ Tirol
❍ Vorarlberg
❍ Wien
❍ Ich wohne nicht in Österreich
❍ Keine Angabe

11. Wie lange wohnst du schon an deiner derzeitigen Adresse?
❍ weniger als 3 Monate
❍ 3 bis 6 Monate
❍ 6 Monate bis 1 Jahr
❍ 1 bis 3 Jahre
❍ 3 bis 5 Jahre
❍ 5 bis 10 Jahre
❍ 10 bis 20 Jahre
❍ 20 Jahre oder mehr
❍ Keine Angabe

12. Wo hast du davor gewohnt?
❍ Im selben Bundesland
❍ In einem anderen Bundesland
❍ Außerhalb von Österreich
❍ Ich wohne schon immer an dieser Adresse
❍ Keine Angabe

13. Wo hast du im Alter von 6 bis 18 Jahren vorwiegend gelebt?
❍ Burgenland
❍ Kärnten
❍ Niederösterreich
❍ Oberösterreich
❍ Salzburg
❍ Steiermark
❍ Tirol
❍ Vorarlberg
❍ Wien
❍ Außerhalb von Österreich
❍ Keine Angabe

14. Was ist bislang dein höchster Bildungsabschluss?
Hinweis: Falls du im Ausland die Schule besucht hast, wähle bitte jenen Abschluss, der dem tatsächlichen am ehesten entspricht.
❍ Hauptschule, Unterstufe AHS, NMS, Sonderschule
❍ Lehre, BMS
❍ AHS (z.B. Gymnasium)
❍ Letzte zwei Jahre der BHS (BHS-Abschluss) (z.B. HAK, HTL, HBLA)
❍ Fachlehrgang oder Kolleg mit Hochschulcharakter
❍ universitärer Abschluss: Bachelor/Bakkalaureat
❍ universitärer Abschluss: Master, Magister, Diplom Ingenieur
❍ universitärer Abschluss: Doktorat, PhD
❍ andere Art des Abschlusses
❍ keine Angabe

15. Was ist der höchste Schulabschluss deines **Vaters**?

Hinweis: Falls dein Vater im Ausland die Schule besucht hat, wähle bitte jenen Abschluss, der dem tatsächlichen am ehesten entspricht.

❍ Kein Schulabschluss
❍ Hauptschule, Unterstufe AHS, Sonderschule
❍ Lehre, BMS
❍ AHS (z.B. Gymnasium), BHS (z.B. HAK, HTL, HBLA)
❍ Fachhochschule oder Universität
❍ andere Art des Abschlusses
❍ weiß es nicht
❍ keine Angabe

16. Was ist der höchste Schulabschluss deiner **Mutter**?

Hinweis: Falls deine Mutter im Ausland die Schule besucht hat, wähle bitte jenen Abschluss, der dem tatsächlichen am ehesten entspricht.

❍ Kein Schulabschluss
❍ Hauptschule, Unterstufe AHS, Sonderschule
❍ Lehre, BMS
❍ AHS (z.B. Gymnasium), BHS (z.B. HAK, HTL, HBLA)
❍ Fachhochschule oder Universität
❍ andere Art des Abschlusses
❍ weiß es nicht
❍ keine Angabe

17. Bist du derzeit neben dem Studium erwerbstätig?

❍ Ja, Vollzeit
❍ Ja, Teilzeit (regelmäßig)
❍ Ja, Teilzeit (unregelmäßig, Gelegenheitsarbeit)
❍ Nein, ich bin derzeit nicht erwerbstätig (ich studiere Vollzeit)
❍ Keine Angabe

18. Hast du genug Geld, um deine Bedürfnisse erfüllen zu können?

❍ Völlig
❍ Überwiegend
❍ Halbwegs
❍ Eher nicht
❍ Überhaupt nicht
❍ Keine Angabe

Page 6 – Physical and mental health, alcohol and cigarette use

Vielen Dank für deine soziodemografischen Angaben! Jetzt kommen zwei Seiten zu deinem **Gesundheitszustand** und deinen **Erfahrungen mit Alkohol und Zigaretten**.

Diese Informationen sind sehr wichtig für mich, weil sie mir helfen, Interviewpartnerinnen auszuwählen. Deshalb wäre ich dir sehr dankbar, wenn du **so ehrlich wie möglich** antwortest. Alle deine Angaben werden **streng vertraulich** behandelt. Deine persönlichen Angaben wie Alter usw. sind separat im Anmeldeformular erfasst worden – das heißt, deine Privatsphäre ist bestmöglich geschützt.

Gesundheit im Allgemeinen

Zuerst möchte ich dich bitten, deinen **allgemeinen Gesundheitszustand** einzuschätzen.

19. Wie würdest du deinen **körperlichen** Gesundheitszustand bewerten?
Wähle bitte die Option, die am ehesten zutrifft.
❍ sehr gut
❍ gut
❍ mittelmäßig
❍ schlecht
❍ sehr schlecht
❍ Keine Angabe

20. Wie würdest du deinen **psychischen** Gesundheitszustand bewerten?
Wähle bitte die Option, die am ehesten zutrifft.
❍ sehr gut
❍ gut
❍ mittelmäßig
❍ schlecht
❍ sehr schlecht
❍ Keine Angabe

Alkohol

Die nächsten Fragen beschäftigen sich mit **alkoholischen Getränken**, wie zum Beispiel Bier, Wein, Spirituosen oder Alkopops (süße, vorgemischte Getränke).

21. Wie lange ist es her, dass du **zuletzt** alkoholische Getränke getrunken hast (wenn überhaupt)?
Zum Beispiel: Bier, Wein, G'spritzter oder Sekt, Cider, Spirituosen (z.B. Schnaps, Tequila, Wodka, Gin, Cognac, Whisky, Rum, Jägermeister, Likör), alkoholhaltige Mixgetränke (z.B. Alkopops, Longdrinks, Cocktails, Bowle).
❍ Nicht länger als 30 Tage
❍ Zwischen 1 und 12 Monate
❍ Länger her als 1 Jahr
❍ Habe noch nie Alkohol getrunken
❍ Keine Angabe

22. Wie alt warst du, als du **zum ersten Mal** mindestens ein Glas Alkohol getrunken hast?
Wenn du dich nicht genau erinnerst, gib bitte eine Schätzung an.
[PULL-DOWN MENU: from „war etwa 9 Jahre alt oder jünger" to „war etwa 31 Jahre oder älter" plus additional options „Habe noch nie mindestens ein Glas Alkohol getrunken" and „Keine Angabe"]

23. Wenn du an die **letzten drei Monate** zurückdenkst, wie oft hast du alkoholische Getränke (Bier, Wein, Spirituosen, usw.) konsumiert?

Wähle bitte die Option, die am ehesten zutrifft.
❍ Nie (nicht konsumiert in den letzten 3 Monaten)
❍ Ein- bis zweimal (1 oder 2 Mal in den letzten 3 Monaten)
❍ Monatlich (1-3 Mal in einem Monat)
❍ Wöchentlich (1-4 Mal pro Woche)
❍ Täglich oder fast täglich (5-7 Tage pro Woche)
❍ Keine Angabe

24. An so einem Tag, an dem du etwas trinkst, wie viele alkoholische Getränke konsumierst du dann im Durchschnitt?
Ein Getränk entspricht hier einem kleinen Glas Wein oder Sekt (0,125 l), einem kleinen Bier (0,3 l), einem großen Schnaps (0,04 l), oder einem Mischgetränk mit ca. 4 cl Spirituosenanteil.
❍ Ich trinke gar nicht
❍ weniger als ein Getränk
❍ 1-2 Getränke
❍ 3-4 Getränke
❍ 5-6 Getränke
❍ 7-9 Getränke
❍ 10 Getränke oder mehr
❍ Keine Angabe

Zigaretten

Die nächsten Fragen beschäftigen sich mit dem **Rauchen von Zigaretten**.

25. Wann hast du **zuletzt** an einer Zigarette gezogen (aus der Schachtel und/oder selbstgedreht) (wenn überhaupt)?
❍ In den letzten 30 Tagen
❍ Vor 1 bis 12 Monaten
❍ Vor mehr als 1 Jahr
❍ Habe noch nie geraucht
❍ Keine Angabe

26. Wie alt warst du, als du **das erste Mal** mindestens eine ganze Zigarette geraucht hast (auch wenn du heute nicht mehr rauchst)?
Wenn du dich nicht genau erinnerst, gib bitte eine Schätzung an.
[PULL-DOWN MENU: from „war etwa 9 Jahre alt oder jünger“ to „war etwa 31 Jahre oder älter“ plus additional options „Habe noch nie mindestens eine ganze Zigarette geraucht“ and „Keine Angabe“]

27. Wenn du an die **letzten drei Monate** zurückdenkst, wie oft hast du Zigaretten geraucht?
Wähle bitte die Option, die am ehesten zutrifft.
❍ Nie (nicht konsumiert in den letzten 3 Monaten)
❍ Ein- bis zweimal (1 oder 2 Mal in den letzten 3 Monaten)
❍ Monatlich (1-3 Mal in einem Monat)
❍ Wöchentlich (1-4 Mal pro Woche)
❍ Täglich oder fast täglich (5-7 Tage pro Woche)

❍ Keine Angabe

28. An so einem Tag, an dem du rauchst, wie viele Zigaretten rauchst du dann im Durchschnitt?
❍ Ich rauche gar nicht
❍ weniger als eine Zigarette
❍ 1-5 Zigaretten
❍ 6-10 Zigaretten
❍ 11-20 Zigaretten
❍ mehr als 20 Zigaretten
❍ Keine Angabe

Page 7 – Negative experiences related to alcohol or cigarette use (adapted from WHO ASSIST)

In dieser Studie geht es um ganz alltäglichen bzw. gelegentlichen Gebrauch von Substanzen wie Alkohol und Zigaretten.

Für manche Menschen ist Substanzgebrauch mit negativen Folgen verbunden, für andere Menschen nicht. Die folgenden Fragen beziehen sich auf **mögliche unangenehme Erlebnisse** in Zusammenhang mit deinem Substanzgebrauch.

29. Wenn du an die **letzten drei Monate** zurückdenkst, wie oft hast du einen starken Wunsch oder ein starkes Verlangen verspürt, Alkohol oder Zigaretten zu konsumieren?
❍ Nie
❍ Ein- bis zweimal
❍ Monatlich
❍ Wöchentlich
❍ Täglich oder fast täglich
❍ Keine Angabe

30. Wenn du an die **letzten drei Monate** zurückdenkst, wie oft hat der Konsum von Alkohol oder Zigaretten zu Problemen geführt, d.h. zu gesundheitlichen oder finanziellen Problemen, zu Konflikten mit dem Gesetz, oder zu Schwierigkeiten im sozialen Umfeld?
❍ Nie
❍ Ein- bis zweimal
❍ Monatlich
❍ Wöchentlich
❍ Täglich oder fast täglich
❍ Keine Angabe

31. Wenn du an die **letzten drei Monate** zurückdenkst, wie oft hast du es wegen des Konsums von Alkohol oder Zigaretten nicht geschafft, Dinge zu erledigen, die man für gewöhnlich von dir erwartet?
❍ Nie
❍ Ein- bis zweimal
❍ Monatlich
❍ Wöchentlich
❍ Täglich oder fast täglich

❍ Keine Angabe

32. Haben sich Freunde, Verwandte oder andere Personen **jemals** besorgt gezeigt, weil du Alkohol oder Zigaretten konsumierst?
❍ Nein, nie
❍ Ja, aber nicht in den letzten drei Monaten
❍ Ja, in den letzten drei Monaten
❍ Keine Angabe

33. Hast du **jemals** versucht, den Konsum von Alkohol oder Zigaretten zu kontrollieren, zu reduzieren oder ganz aufzugeben und es **nicht** geschafft?
❍ Nein, nie
❍ Ja, aber nicht in den letzten drei Monaten
❍ Ja, in den letzten drei Monaten
❍ Keine Angabe

Page 8 – Applicability of exclusion criteria

Fast fertig! Hier findest du nur noch drei Listen an Aussagen.

Bitte lies sie dir aufmerksam durch und **gib jeweils an, ob mindestens eine Aussage auf dich zutrifft**.

Hinweis: Um den Fragebogen kurz zu halten, werden verschiedene Themen gleichzeitig abgefragt.

Liste 1

- Ich habe **in meinem Leben** schon mal Cannabis (Marihuana, Pot, Gras, Haschisch) konsumiert.
- Ich habe **in den letzten 12 Monaten** Alkohol gemeinsam mit Medikamenten genommen, um „high" zu werden.
- Ich habe in den letzten 12 Monaten Lachgas, Poppers (Amylnitrit u.ä.), Klebstoff, Benzin, Lösungsmittel, Lack, Feuerzeuggas oder Ähnliches inhaliert, um „high" zu werden.
- Ich habe in den letzten 12 Monaten **ohne ärztliche Verschreibung** (oder anders als verschrieben) Ritalin, Modafinil oder andere verschreibungspflichtige Medikamente genommen, um meine Leistungsfähigkeit zu steigern (nicht gemeint sind Tee, Kaffee, koffeinhaltige Energy Drinks, Koffeintabletten, usw. oder Substanzen wie Kokain, Amphetamine, Ecstasy, Speed).
- Ich habe in den letzten 12 Monaten **ohne ärztliche Verschreibung** (oder anders als verschrieben) verschreibungspflichtige Beruhigungs- oder Schlafmittel (z.B. Valium, Xanax, Rohypnol, Diazepam, usw.) genommen, um „high" zu werden oder um besser zu entspannen.
- Ich habe in den letzten 12 Monaten neue psychoaktive Substanzen konsumiert (auch bekannt als „Legal Highs", „Research Chemicals", „Badesalze", „Kräutermischungen" oder „NPS") (z.B. Mephedron, Spice, Lava Red, Kronic, Euphoria etc.).
- Ich habe **in meinem Leben** schon mind. eine der folgenden Substanzen konsumiert: Kokain (Koks, Crack, usw.), Amphetamine (Speed, MDMA, Ecstasy, usw.), Methamphetamine (Crystal Meth), Halluzinogene (LSD, Acid, Pilze, PCP, DMT, Ketamin,

usw.), GHB/GBL (Liquid Ecstasy, Hydroxybutansäure), Opiate (Heroin, Morphium, Methadon, Codein, usw.) (gemeint ist **nur nicht-medizinischer Gebrauch**).

34. Trifft irgendeine der Aussagen aus **Liste 1** (oben) auf dich zu?
❍ Nein, keine Aussage aus Liste 1 trifft auf mich zu
❍ Ja, mind. eine Aussage aus Liste 1 trifft auf mich zu
❍ keine Angabe

Hier ist die zweite Liste:

Liste 2

- Ich habe **in den letzten 12 Monaten** Cannabis (Marihuana, Pot, Gras, Haschisch) konsumiert.
- Ich habe **in den letzten 12 Monaten** mind. eine der folgenden Substanzen konsumiert: Kokain (Koks, Crack, usw.), Amphetamine (Speed, MDMA, Ecstasy, usw.), Methamphetamine (Crystal Meth), Halluzinogene (LSD, Acid, Pilze, PCP, DMT, Ketamin, usw.), GHB/GBL (Liquid Ecstasy, Hydroxybutansäure), Opiate (Heroin, Morphium, Methadon, Codein, usw.) (gemeint ist **nur nicht-medizinischer Gebrauch**).
- Ich habe mir **in meinem Leben** schon mal eine Droge (z.B. Heroin, Kokain, Amphetamine, anabole Steroide) mit einer Spritze injiziert (gemeint ist **nur nicht-medizinischer Gebrauch**).
- Ich bin **derzeit oder war früher** wegen meines Gebrauchs von Alkohol oder anderen Substanzen in Behandlung (z.B. ambulante/stationäre Entgiftung, Substitution, ambulante/stationäre Suchteinrichtung, Tagesbetreuung, psychiatrische Klinik, usw.).
- Ich war **in den letzten 12 Monaten** obdachlos und musste mind. zwei Nächte auf der Straße oder in einer Notschlafstelle (z.B. Obdachlosenheim) verbringen.

35. Trifft irgendeine der Aussagen aus **Liste 2** (oben) auf dich zu?
❍ Nein, keine Aussage aus Liste 2 trifft auf mich zu
❍ Ja, mind. eine Aussage aus Liste 2 trifft auf mich zu
❍ keine Angabe

Und hier die dritte Liste:

Liste 3

- Ich habe ein oder mehrere Kinder.
- Ich bin derzeit schwanger.
- Ich versuche derzeit aktiv, schwanger zu werden.

36. Trifft irgendeine der Aussagen aus **Liste 3** (oben) auf dich zu?
❍ Nein, keine Aussage aus Liste 3 trifft auf mich zu
❍ Ja, mind. eine Aussage aus Liste 3 trifft auf mich zu
❍ keine Angabe

37. Hier kannst du bei Bedarf noch Bemerkungen zum Fragebogen oder zur Studie machen:
[FREE TEXT ENTRY FIELD]

Bitte klicke auf den Button "Abschließen", um den Fragebogen abzuschließen.

Page 9 – Thank-you and next steps

Danke!

Vielen herzlichen Dank, dass du dir Zeit für die Anmeldung und den Fragebogen genommen hast! Damit hast du mir sehr bei der Auswahl der Interviewpartnerinnen geholfen.

Der Fragebogen enthielt keine Fragen zu deinen „Alltagsräumen“, da dieses Thema nur im persönlichen Interview behandelt wird.

Die Interviews werden zwischen Februar und Juni 2018 stattfinden. Wenn du als Interviewpartnerin ausgewählt wirst, werde ich dich in diesem Zeitraum unter der angegebenen E-Mail-Adresse oder Telefonnummer kontaktieren, um einen Termin für das Interview zu vereinbaren.

Aufgrund begrenzter Ressourcen werden nur ausgewählte Interviewpartnerinnen persönlich kontaktiert. Außerdem können eventuell nicht alle Personen, die an einer Teilnahme interessiert sind, zum Interview eingeladen werden. Danke für dein Verständnis! In jedem Fall möchte ich mich für deine Anmeldung zur MASPA-Studie bedanken.

Bei Interesse an den Studienergebnissen, bei Fragen oder Kommentaren kannst du mich gerne unter [E-Mail-Adresse] kontaktieren. Unter www.maspa-studie.at findest du bei Bedarf weitere Projektinformationen.

G.4 Annotated list of questions adapted from other sources

G.4.1 List of source questionnaires in alphabetical order

Abbreviation as used in this appendix	**Full citation**
ALLBUS 2014	GESIS - Leibniz-Institute for the Social Sciences. (2016). Allgemeine Bevölkerungsumfrage der Sozialwissenschaften: ALLBUS 2014 Fragebogendokumentation. Material zu den Datensätzen der Studiennummern ZA5240 und ZA5241. Köln: GESIS Datenarchiv. Retrieved from https://dbk.gesis.org/dbksearch/file.asp?file=ZA5240_fb.pdf
Austrian general population survey (GPS) 2016	Strizek, J., & Uhl, A. (2016). Bevölkerungserhebung zu Substanzgebrauch 2016: Band 1: Forschungsbericht. Wien: Gesundheit Österreich GmbH. Questionnaire was kindly provided by the study authors upon request.
ATHIS Statistik Austria 2014	Klimont, J., & Baldaszti, E. (2015). Österreichische Gesundheitsbefragung 2014: Hauptergebnisse des Austrian Health Interview Survey (ATHIS) und methodische Dokumentation. Wien: Statistik Austria. Questionnaire was appended to the report.
Drogenmonitoring Oberösterreich 2015	Seyer, S., Paulik, R., Gschwandtner, F., & Lehner, R. (2016). Drogenmonitoring Oberösterreich 2015: Ergebnisbericht mit dem Forschungsschwerpunkt Methamphetamine „Crystal Meth". Linz: Institut Suchtprävention - Pro Mente OÖ.
Epidemiologischer Suchtsurvey 2015	Piontek, D., Kraus, L., Matos, E. G. d., & Atzendorf, J. (2016). Der Epidemiologische Suchtsurvey 2015. SUCHT, 62(5), 259–269. Questionnaire available from: https://www.esa-survey.de/fileadmin/user_upload/Epidemiologischer_Suchtsurvey_2015.pdf
ESPAD 2015 (Austrian version)	Strizek, J., Anzenberger, J., Kadlik, A., Schmutterer, I., & Uhl, A. (2016). ESPAD Österreich. European School Survey Project on Alcohol and other Drugs: Band 1: Forschungsbericht. Wien: Gesundheit Österreich GmbH. Questionnaire was kindly provided by the study authors upon request.
EuropASI (German version)	Gsellhofer, B., Fahrner, E.-M., Weiler, D., Vogt, M., Hron, U., & Platt, J. (1997). European Addiction Severity Index (EuropASI): Deutsche Version. Nach dem amerikanischen Original von T. McLellan, 5. Ed., 1992, und der europäischen Version EuropASI von A. Kokkevi, Ch. Hartgers, P. Blanken, E.-M. Fahrner, G. Pozzi, E. Tempesta & A. Uchtenhagen, 1993. Retrieved from http://www.emcdda.europa.eu/html.cfm/index3647EN.html
Global Drugs Survey 2016 (German version)	Barratt, M. J., Ferris, J. A., Zahnow, R., Palamar, J. J., Maier, L. J., & Winstock, A. R. (2017). Moving on From Representativeness: Testing the Utility of the Global Drug Survey. Substance Abuse: Research and Treatment, 11, 1178221817716391. https://doi.org/10.1177/1178221817716391 Questionnaire available upon request from the authors.
Mikrozensus 2016 (Statistik Austria)	Statistik Austria. (2019). Mikrozensus ab 2004. Retrieved from https://www.statistik.at/web_de/frageboegen/private_haushalte/mikrozensus/index.html The questionnaire version used was dated 3rd quarter of 2016. At the time of writing, this was no longer available to view online. However, the current questionnaire version (1st quarter of 2019) was very similar to the one used. It was available from: http://www.statistik.at/wcm/idc/idcplg?IdcService=GET_PDF_FILE&dDocName=119814
Suchtmittelmonitoring Wien 2015	Feistritzer, G., Schaup, T., Gredinger, G., & Friesenbichler, S. (2015). Suchtmittel-Monitoring 2015: Bevölkerungsbefragung Wien. Presseunterlage. Wien: Institut für empirische Sozialforschung GmbH; SDW - Sucht- und Drogenkoordination Wien gGmbH. Retrieved from https://sdw.wien/wp-content/uploads/Suchtmittelmonitoring_2015_Presseunterlage.pdf
WHO ASSIST V3.0 (German version)	Schütz, C. G., Daamen, M., & van Niekerk, C. (2005). Deutsche Übersetzung des WHO ASSIST Screening-Fragebogens. SUCHT, 51(5), 265–271. Questionnaire available from: https://www.who.int/substance_abuse/activities/who_assist_v3_german.pdf

All web pages were last accessed 16.1.2019.

G.4.2 Additional sources (academic literature)

Lensvelt-Mulders, 2008	Lensvelt-Mulders, G. (2008). Surveying sensitive topics. In E. D. d. Leeuw, J. J. Hox, & D. A. Dillman (Eds.), EAM book series. International Handbook of Survey Methodology (pp. 461–478). New York, London: Lawrence Erlbaum Associates, Tayler & Francis.
Yurek et al., 2008	Yurek, L. A., Vasey, J., & Sullivan Havens, D. (2008). The use of self-generated identification codes in longitudinal research. Evaluation Review, 32(5), 435–452.

G.4.3 Annotated list of questions

The below table shows relevant questions from the sign-up form and screening questionnaire of the present study in the *left* column and details regarding the source question in the *right* column. For simplicity, where multiple source questions were used, only one source is given for illustrative purposes. In terms of formatting, emphases of individual words or phrases have been preserved in the table, but additional layout and formatting options used in the questionnaires (e.g., questions in bold) are not mirrored below. The questions are shown in German (in line with the data collection language in this study, any English language source items were translated); the right column therefore summarises main changes. Source questionnaires in German generally used the formal ("Sie") form: this was always changed to the informal ("du") form to tailor the questionnaire to the student population in this study. In addition, an answer option to indicate refusal ("Keine Angabe") was offered even if this was not done in the source questionnaires.

Question in the present study	**Source (see Appendices G.4.1/G.4.2 for full citation)**
7a. Unter welcher Telefonnummer oder E-Mail-Adresse kann ich dich am besten erreichen? Deine Kontaktdaten werden streng vertraulich behandelt und nur im Rahmen dieses Forschungsprojektes verwendet, um mit dir einen Interviewtermin vereinbaren zu können. Tipps zur Wahrung deiner Privatsphäre: • Gib eine Telefonnummer oder E-Mail-Adresse an, zu der nur du Zugang hast. • Wenn du eine E-Mail-Adresse angibst, so ist es ideal, wenn dein Name, Geburtsdatum oder deine Matrikelnummer daraus nicht ersichtlich sind. Zum Beispiel ist eine E-Mail-Adresse wie sonne001@email.at besser als martha.mustermann@email.at oder a1234567@unet.univie.ac.at. • Wenn du keine "anonyme" E-Mail-Adresse hast, kannst du auch nur deine Handynummer angeben. Tel.Nr.: …… E-Mail: ……	**Source:** ALLBUS 2014 **Item:** INTER_07 Und unter welcher E-Mail-Adresse können wir Sie am besten erreichen? E-Mail-Adresse: _____ Falls mehrere E-Mail-Adressen vorhanden sind, dann die Adresse notieren, unter der die Befragungsperson am besten erreichbar ist! **Main changes:** added option to give telephone number; added privacy statement and instructions

Question in the present study	Source (see Appendices G.4.1/G.4.2 for full citation)
Wie viele ältere Brüder hast du? Beispiel: Wenn du zwei ältere Brüder hast, wähle “2” als Antwort. [Pull-down menu with answer options from 0 to 10]	**Source:** Yurek et al., 2008: 437 **Item:** [What is the . . .] Number of older brothers (living and deceased)? **Main changes:** rephrased as a personal question, removed reference to “living and deceased” (not necessary due to short time-frame between completion of sign-up form and of screening questionnaire), added an example
Mit welchem Buchstaben beginnt der Vorname deiner Mutter? Beispiel: Wenn deine Mutter Petra heißt, wähle “P” als Antwort. [Pull-down menu with answer options from A to Z including umlauts]	**Source:** Yurek et al., 2008: 437 **Item:** [What is the . . .] First letter of mother’s first name? **Main changes:** rephrased as a personal question, added an example
An welchem Tag wurdest du geboren? Beispiel: Wenn dein Geburtstag am 15. April ist, wähle “15” als Antwort. [Pull-down menu with answer options from 1 to 31]	**Source:** Yurek et al., 2008: 437 **Item:** [What is the . . .] Number representing the month you were born? **Main changes:** used day of the month instead of the month itself, rephrased and simplified as a personal question in German, added an example
Was ist dein derzeitiger Familienstand? □ Ledig □ Verheiratet (oder eingetragene Partnerschaft) □ Verwitwet (oder hinterbliebene(r) eingetragene(r) Partner(in)) □ Geschieden (oder aufgelöste eingetragene Partnerschaft) □ Keine Angabe	**Source:** Mikrozensus 2016 (Statistik Austria) **Item:** B4 Was ist Ihr Familienstand? Ledig Verheiratet (oder eingetragene Partnerschaft) Verwitwet (oder hinterbliebene(r) eingetragene(r) Partner(in)) Geschieden (oder aufgelöste eingetragene Partnerschaft) **Main changes:** reference to current situation added (“derzeitiger”) (in line with e.g., Austrian GPS 2016)
Falls du nicht verheiratet bist, hast du einen **fixen Partner/eine fixe Partnerin**? □ Ja, ich habe einen fixen Partner/eine fixe Partnerin □ Nein, ich habe derzeit keinen fixen Partner/keine fixe Partnerin □ Keine Angabe	**Source:** Austrian GPS 2016 **Item:** SD_4. Haben Sie einen fixen Partner/eine fixe Partnerin? (Interviewer: überreiche Antwortkarte 45) 1) Ja, ich habe einen fixen Partner/eine fixe Partnerin und wir leben zusammen in einem Haushalt 2) Ja, ich habe einen fixen Partner/eine fixe Partnerin, aber wir leben nicht zusammen in einem Haushalt 3) Nein, ich habe derzeit keinen fixen Partner/keine fixe Partnerin 99) keine Antwort **Main changes:** added qualifier at beginning of the question to link to previous question; references to living together removed and answer options merged (the next question asked separately about living arrangements)
9. Mit wem lebst du in einem Haushalt zusammen? □ Allein □ Partner / Partnerin □ Freunde □ Mitbewohner/in □ Eltern □ Geschwister □ Eigene Kinder □ Andere Familienmitglieder □ Andere □ Ändert sich oft □ Keine Angabe	**Source:** Global Drugs Survey 2016 (German version) **Item:** Mit wem leben Sie zusammen? Partner / Partnerin Freunde Allein Eltern Mitbewohner/in Geschwister Andere Familienmitglieder Andere **Main changes:** clarification added (“in einem Haushalt”); order of answer options changed; two answer options (“Eigene Kinder”, “Ändert sich oft”) added

Question in the present study	Source (see Appendices G.4.1/G.4.2 for full citation)
10. In welchem Bundesland wohnst du derzeit? □ Burgenland □ Kärnten □ Niederösterreich □ Oberösterreich □ Salzburg □ Steiermark □ Tirol □ Vorarlberg □ Wien □ Ich wohne nicht in Österreich □ Keine Angabe	**Source:** Austrian GPS 2016 **Item:** SD_8a In welchem Bundesland haben Sie ihren Lebensmittelpunkt? 1) Burgenland 2) Kärnten 3) Niederösterreich 4) Oberösterreich 5) Salzburg 6) Steiermark 7) Tirol 8) Vorarlberg 9) Wien 99) Keine Antwort **Main changes:** question wording changed (from "Lebensmittelpunkt" to "wohnst du derzeit") to better align it with the study eligibility criteria; answer option added ("Ich wohne nicht in Österreich")
11. Wie lange wohnst du schon an deiner derzeitigen Adresse? □ weniger als 3 Monate □ 3 bis 6 Monate □ 6 Monate bis 1 Jahr □ 1 bis 3 Jahre □ 3 bis 5 Jahre □ 5 bis 10 Jahre □ 10 bis 20 Jahre □ 20 Jahre oder mehr □ Keine Angabe	**Source:** EuropASI (German version) **Item:** Wie lange leben Sie schon unter Ihrer derzeitigen Adresse? Jahre Monate **Main changes:** question wording changed ("wohnst") for consistency with previous question; answer options provided as categories
12. Wo hast du davor gewohnt? □ Im selben Bundesland □ In einem anderen Bundesland □ Außerhalb von Österreich □ Ich wohne schon immer an dieser Adresse □ Keine Angabe	**Source:** Mikrozensus 2016 (Statistik Austria). **Item:** Haben Sie damals (....) (Datum des Sonntags der Referenzwoche vor einem Jahr) im gleichen Bundesland gewohnt? Wenn nein, in welchem Bundesland bzw. Staat (falls Ausland)? Ja Nein, in einem anderen Bundesland Nein, in einem anderen Staat **Main changes: q**uestion wording and answer options simplified, additional answer option added („Ich wohne schon immer an dieser Adresse")
13. Wo hast du im Alter von 6 bis 18 Jahren vorwiegend gelebt? □ Burgenland □ Kärnten □ Niederösterreich □ Oberösterreich □ Salzburg □ Steiermark □ Tirol □ Vorarlberg □ Wien □ Außerhalb von Österreich □ Keine Angabe	**Source:** ALLBUS 2014 **Item:** F122A V382 Liste 122 vorlegen! Wo haben Sie während Ihrer Jugendzeit vorwiegend gelebt? Im Gebiet des heutigen Deutschlands, und zwar: A Baden-Württemberg [… German states as answer options …] R Thüringen Frühere deutsche Ostgebiete (z.B. Schlesien, Ostpreußen) Sonstiges Land, und zwar: _____ Bitte auf der nächsten Seite eintragen! KA **Main changes:** question wording changed for greater clarity ("während Ihrer Jugendzeit" to "im Alter von 6 bis 18 Jahren"); answer options adapted to Austrian context; last option more general (specific details as in original item were not required)
14. Was ist bislang dein höchster Bildungsabschluss? Hinweis: Falls du im Ausland die Schule besucht hast, wähle bitte jenen Abschluss, der dem tatsächlichen am ehesten entspricht. □ Hauptschule, Unterstufe AHS, NMS, Sonderschule □ Lehre, BMS □ AHS (z.B. Gymnasium) □ Letzte zwei Jahre der BHS (BHS-Abschluss) (z.B. HAK, HTL, HBLA)	**Source:** Austrian GPS 2016 **Item:** SD_10. Was ist ihr höchster Bildungsabschluss? (Interviewer: überreiche Antwortkarte 48; ISCED Level nicht vorlesen, dient nur der internen Information) 1) Weniger als Volksschule, Kindergarten, Vorschule (ISCED 0) 2) Volksschule, Sonderschule (ISCED 1) 3) Hauptschule, Unterstufe AHS, NMS, Sonderschule (ISCED 2, ISCED 3C kurz (unter 2 Jahren) 4) Lehre, BMS (ISCED 3 A/B/C lang) 5) AHS (ISCED 3 A/B/C lang) 6) Letzte zwei Jahre der BHS (BHS-Abschluss) (ISCED 4A/B)

Question in the present study	Source (see Appendices G.4.1/G.4.2 for full citation)
□ Fachlehrgang oder Kolleg mit Hochschulcharakter □ universitärer Abschluss: Bachelor/Bakkalaureat □ universitärer Abschluss: Master, Magister, Diplom Ingenieur □ universitärer Abschluss: Doktorat, PhD □ andere Art des Abschlusses □ keine Angabe	7) Fachlehrgang oder Kolleg mit Hochschulcharakter (ISCED 5B) 8) universitärer Abschluss: Bachelor (ISCED 5A) 9) universitärer Abschluss: Master, Magister, Diplom Ingenieur (ISCED 5A) 10) universitärer Abschluss: Doktorat, PhD (ISCED 6) 11) nicht klassifizierbar (andere Art des Abschlusses) 99) keine Antwort **Main changes:** added clarification ("bislang") tailored to student population; first two answer options removed as inappropriate for university students; examples and clarifications for AHS, BHS and Bachlor added (in line with Mikrozensus 2016, Statistik Austria).
15. Was ist der höchste Schulabschluss deines **Vaters**? Hinweis: Falls dein Vater im Ausland die Schule besucht hat, wähle bitte jenen Abschluss, der dem tatsächlichen am ehesten entspricht. □ Kein Schulabschluss □ Hauptschule, Unterstufe AHS, Sonderschule □ Lehre, BMS □ AHS (z.B. Gymnasium), BHS (z.B. HAK, HTL, HBLA) □ Fachhochschule oder Universität □ andere Art des Abschlusses □ weiß es nicht □ keine Angabe	**Source:** ESPAD 2015 (Austrian version) **Item:** C47 Was ist der höchste Schulabschluss deines Vaters? 1 Hauptschulabschluss oder kein Schulabschluss 2 eine höhere Schule (AHS, BHS, BMS) besucht, aber nicht abgeschlossen 3 Abschluss an einer höheren Schule (AHS, BHS, BMS) 4 Fachhochschule oder Universität besucht 5 Fachhochschule oder Universität abgeschlossen 6 weiß es nicht 7 keine Kategorie ist zutreffend **Main changes:** emphasis and instructions added; answer options amended to focus only on completed education and to ensure consistency with previous question
16. Was ist der höchste Schulabschluss deiner **Mutter**? Hinweis: Falls deine Mutter im Ausland die Schule besucht hat, wähle bitte jenen Abschluss, der dem tatsächlichen am ehesten entspricht. □ Kein Schulabschluss □ Hauptschule, Unterstufe AHS, Sonderschule □ Lehre, BMS □ AHS (z.B. Gymnasium), BHS (z.B. HAK, HTL, HBLA) □ Fachhochschule oder Universität □ andere Art des Abschlusses □ weiß es nicht □ keine Angabe	**Source:** ESPAD 2015 (Austrian version) **Item:** C48 Was ist der höchste Schulabschluss deiner Mutter? 1 Hauptschulabschluss oder kein Schulabschluss 2 eine höhere Schule (AHS, BHS, BMS) besucht, aber nicht abgeschlossen 3 Abschluss an einer höheren Schule (AHS, BHS, BMS) 4 Fachhochschule oder Universität besucht 5 Fachhochschule oder Universität abgeschlossen 6 weiß es nicht 7 keine Kategorie ist zutreffend **Main changes:** emphasis and instructions added; answer options amended to focus only on completed education and to ensure consistency with previous question
17. Bist du derzeit neben dem Studium erwerbstätig? □ Ja, Vollzeit □ Ja, Teilzeit (regelmäßig) □ Ja, Teilzeit (unregelmäßig, Gelegenheitsarbeit) □ Nein, ich bin derzeit nicht erwerbstätig (ich studiere Vollzeit) □ Keine Angabe	**Example source:** EuropASI (German version) **Item:** 8. Überwiegende Erwerbstätigkeit in den letzten drei Jahren 1 - ganztags 2 - Teilzeit (regelmäßig) 3 - Teilzeit (unregelmäßig, Gelegenheitsarbeit) 4 - Schüler, Student, Auszubildender 5 - Bundeswehr, Zivildienst 6 - Rentner, Behinderter 7 - arbeitslos 8 - in geschlossener Einrichtung (Krankenhaus, Gefängnis, Therapie o.ä.) 9 - Hausfrau **Main changes:** time-frame and answer options adapted for better alignment with eligibility criteria in present study (combining with similar questions from other source questionnaires)

Question in the present study	Source (see Appendices G.4.1/G.4.2 for full citation)
18. Hast du genug Geld, um deine Bedürfnisse erfüllen zu können? □ Völlig □ Überwiegend □ Halbwegs □ Eher nicht □ Überhaupt nicht □ Keine Angabe	**Source:** ATHIS Statistik Austria 2014 **Item:** LQ12 Haben Sie genug Geld, um Ihre Bedürfnisse erfüllen zu können? Überhaupt nicht Eher nicht Halbwegs Überwiegend Völlig **Main changes:** order of answer options changed for consistency with other questions
19. Wie würdest du deinen **körperlichen** Gesundheitszustand bewerten? Wähle bitte die Option, die am ehesten zutrifft. □ sehr gut □ gut □ mittelmäßig □ schlecht □ sehr schlecht □ Keine Angabe	**Example source:** Austrian GPS 2016 **Item: WB_1** Wie würden Sie Ihren körperlichen Gesundheitszustand bewerten? (Interviewer: überreiche Antwortkarte 1) 1) sehr gut 2) eher gut 3) durchschnittlich 4) eher schlecht 5) sehr schlecht 99) keine Antwort **Main changes:** answer options adapted using a similar question in the Austrian Health Interview Survey (ATHIS)
20. Wie würdest du deinen **psychischen** Gesundheitszustand bewerten? Wähle bitte die Option, die am ehesten zutrifft. □ sehr gut □ gut □ mittelmäßig □ schlecht □ sehr schlecht □ Keine Angabe	**Example source:** Austrian GPS 2016 **Item: WB_2** Wie würden Sie Ihren psychischen Gesundheitszustand bewerten? (Interviewer: überreiche Antwortkarte 1) 1) sehr gut 2) eher gut 3) durchschnittlich 4) eher schlecht 5) sehr schlecht 99) keine Antwort **Main changes:** answer options adapted using a similar question in the Austrian Health Interview Survey (ATHIS)
21. Wie lange ist es her, dass du **zuletzt** alkoholische Getränke getrunken hast (wenn überhaupt)? Zum Beispiel: Bier, Wein, G'spritzter oder Sekt, Cider, Spirituosen (z.B. Schnaps, Tequila, Wodka, Gin, Cognac, Whisky, Rum, Jägermeister, Likör), alkoholhaltige Mixgetränke (z.B. Alkopops, Longdrinks, Cocktails, Bowle). □ Nicht länger als 30 Tage □ Zwischen 1 und 12 Monate □ Länger her als 1 Jahr □ Habe noch nie Alkohol getrunken □ Keine Angabe	**Source:** Epidemiologischer Suchtsurvey 2015 **Item:** 63. Wie lange ist es her, dass Sie zuletzt alkoholische Getränke, also Bier, Wein/Sekt, Spirituosen (z.B. Schnaps, Cognac, Whisky, Likör) oder alkoholhaltige Mixgetränke (z.B. Alkopops, Cocktails) getrunken haben? Nicht länger als 30 Tage Zwischen 1 und 12 Monate Länger her als 1 Jahr Habe noch nie Alkohol getrunken **Main changes:** examples of alcoholic beverages moved to instructions, further examples added (e.g. based on other surveys); added a qualifier ("wenn überhaupt") to better accommodate non-users
22. Wie alt warst du, als du **zum ersten Mal** mindestens ein Glas Alkohol getrunken hast? Wenn du dich nicht genau erinnerst, gib bitte eine Schätzung an. □ Habe noch nie mindestens ein Glas Alkohol getrunken □ war etwa 9 Jahre alt oder jünger □ war etwa 10 Jahre alt [… further answer options from 11 to 29 years …] □ war etwa 30 Jahre alt □ war etwa 31 Jahre oder älter □ Keine Angabe	**Source:** Epidemiologischer Suchtsurvey 2015 **Item:** 60. Wie alt waren Sie, als Sie zum ersten Mal mindestens 1 Glas Alkohol getrunken haben? Wenn Sie sich nicht genau erinnern, geben Sie bitte eine Schätzung an. War etwa .... Jahre alt Habe noch nie mindestens 1 Glas Alkohol getrunken **Main changes:** emphasis added; order of answer options changed to better accommodate non-users

Question in the present study	Source (see Appendices G.4.1/G.4.2 for full citation)
23. Wenn du an die **letzten drei Monate** zurückdenkst, wie oft hast du alkoholische Getränke (Bier, Wein, Spirituosen, usw.) konsumiert? Wähle bitte die Option, die am ehesten zutrifft. □ Nie (nicht konsumiert in den letzten 3 Monaten) □ Ein- bis zweimal (1 oder 2 Mal in den letzten 3 Monaten) □ Monatlich (1-3 Mal in einem Monat) □ Wöchentlich (1-4 Mal pro Woche) □ Täglich oder fast täglich (5-7 Tage pro Woche) □ Keine Angabe	**Source:** WHO ASSIST V3.0 (German version) **Item:** Frage F2 Wenn Sie an die **letzten drei Monate** zurückdenken, wie oft haben Sie (1. Substanz, 2. Substanz, usw.) konsumiert? Antwortkarte (ASSIST-Fragen 2-5) nie — nicht konsumiert in den letzten 3 Monaten ein bis zweimal — 1 oder 2 mal in den letzten 3 Monaten monatlich — 1-3 mal in einem Monat wöchentlich — 1-4 mal pro Woche täglich oder fast täglich — 5-7 Tage pro Woche **Main changes:** instructions added; examples of substances phrased to be consisted with previous questions
24. An so einem Tag, an dem du etwas trinkst, wie viele alkoholische Getränke konsumierst du dann im Durchschnitt? Ein Getränk entspricht hier einem kleinen Glas Wein oder Sekt (0,125 l), einem kleinen Bier (0,3 l), einem großen Schnaps (0,04 l), oder einem Mischgetränk mit ca. 4 cl Spirituosenanteil. □ Ich trinke gar nicht □ weniger als ein Getränk □ 1-2 Getränke □ 3-4 Getränke □ 5-6 Getränke □ 7-9 Getränke □ 10 Getränke oder mehr □ Keine Angabe	**Source:** Global Drugs Survey 2016 (German version) **Item:** Wenn Sie sich Ihren Alkoholkonsum während den letzten 12 Monaten vergegenwärtigen... Wie viele alkoholische Getränke konsumieren Sie üblicherweise an einem Tag, an dem Sie trinken? 1-2 3-4 5-6 7-9 10 oder mehr **Main changes:** reference to 12-month time-frame removed for consistency with previous questions; question wording changed for consistency with the equivalent cigarette question (see below); additional answer options to accommodate non-users and very light users; added definition of standard drink for increased clarity. Definition of standard drink developed based on definitions provided in ESPAD 2015 survey (Austrian version), Austrian general population survey, and Drogenmonitoring Oberösterreich 2015.
25. Wann hast du **zuletzt** an einer Zigarette gezogen (aus der Schachtel und/oder selbstgedreht) (wenn überhaupt)? □ In den letzten 30 Tagen □ Vor 1 bis 12 Monaten □ Vor mehr als 1 Jahr □ Habe noch nie geraucht □ Keine Angabe	**Source:** Epidemiologischer Suchtsurvey 2015 **Item:** 38. Wann haben Sie zuletzt geraucht? Kreuzen Sie bitte **nur ein** Kästchen an! In den letzten 30 Tagen Vor 1 bis 12 Monaten Vor mehr als 1 Jahr **Main changes:** explicit reference to cigarettes for increased clarity (phrase ("aus der Schachtel und/oder selbstgedreht") taken from the Austrian Health Interview Survey (ATHIS); added qualifier ("wenn überhaupt") and additional answer option ("Habe noch nie geraucht") to accommodate non-users (original questionnaire used additional filters/routing); emphasis added
26. Wie alt warst du, als du **das erste Mal** mindestens eine ganze Zigarette geraucht hast (auch wenn du heute nicht mehr rauchst)? Wenn du dich nicht genau erinnerst, gib bitte eine Schätzung an. □ Habe noch nie eine ganze Zigarette geraucht □ war etwa 9 Jahre alt oder jünger □ war etwa 10 Jahre alt [… further answer options from 11 to 29 years …] □ war etwa 30 Jahre alt □ war etwa 31 Jahre oder älter □ Keine Angabe	**Source:** Epidemiologischer Suchtsurvey 2015 **Item:** 35. Wie alt waren Sie, als Sie das erste Mal geraucht haben (auch wenn Sie heute nicht mehr rauchen)? Wenn Sie sich nicht genau erinnern, geben Sie bitte eine Schätzung an. War etwa .... Jahre alt **Main changes:** added further information ("mindestens eine ganze Zigarette") for increased clarity and consistency with equivalent alcohol question in the questionnaire; emphasis added

Question in the present study	Source (see Appendices G.4.1/G.4.2 for full citation)
27. Wenn du an die **letzten drei Monate** zurückdenkst, wie oft hast du Zigaretten geraucht? Wähle bitte die Option, die am ehesten zutrifft. □ Nie (nicht konsumiert in den letzten 3 Monaten) □ Ein- bis zweimal (1 oder 2 Mal in den letzten 3 Monaten) □ Monatlich (1-3 Mal in einem Monat) □ Wöchentlich (1-4 Mal pro Woche) □ Täglich oder fast täglich (5-7 Tage pro Woche) □ Keine Angabe	**Source:** WHO ASSIST V3.0 (German version) **Item:** Frage F2 Wenn Sie an die **letzten drei Monate** zurückdenken, wie oft haben Sie (1. Substanz, 2. Substanz, usw.) konsumiert? Antwortkarte (ASSIST-Fragen 2-5) nie nicht konsumiert in den letzten 3 Monaten ein bis zweimal 1 oder 2 mal in den letzten 3 Monaten monatlich 1-3 mal in einem Monat wöchentlich 1-4 mal pro Woche täglich oder fast täglich 5-7 Tage pro Woche **Main changes:** instructions added; examples of substances phrased to be consisted with previous questions; question wording adapted to specific substance (“geraucht”)
28. An so einem Tag, an dem du rauchst, wie viele Zigaretten rauchst du dann im Durchschnitt? □ Ich rauche gar nicht □ weniger als eine Zigarette □ 1-5 Zigaretten □ 6-10 Zigaretten □ 11-20 Zigaretten □ mehr als 20 Zigaretten □ Keine Angabe	**Source:** Epidemiologischer Suchtsurvey 2015 **Item:** 39. An so einem Tag, an dem Sie rauchen, wie viele Zigaretten rauchen Sie dann im Durchschnitt? Etwa .... Zigaretten **Main changes:** answer options provided (categories based on those used in ESPAD 2015 survey, Austrian version); additonal answer option added (“Ich rauche gar nicht”) to accommodate non-smokers
29. Wenn du an die **letzten drei Monate** zurückdenkst, wie oft hast du einen starken Wunsch oder ein starkes Verlangen verspürt, Alkohol oder Zigaretten zu konsumieren? □ Nie □ Ein- bis zweimal □ Monatlich □ Wöchentlich □ Täglich oder fast täglich □ Keine Angabe	**Source:** WHO ASSIST V3.0 (German version) **Item:** Frage F3 Wenn Sie an die **letzten drei Monate** zurückdenken, wie oft haben Sie einen starken Wunsch oder ein starkes Verlangen verspürt, (1. Substanz, 2. Substanz, usw.) zu konsumieren? Antwortkarte (ASSIST-Fragen 2-5) nie ein bis zweimal monatlich wöchentlich täglich oder fast täglich **Main changes:** asked for several substances together (not separately for each individual substance)
30. Wenn du an die **letzten drei Monate** zurückdenkst, wie oft hat der Konsum von Alkohol oder Zigaretten zu Problemen geführt, d.h. zu gesundheitlichen oder finanziellen Problemen, zu Konflikten mit dem Gesetz, oder zu Schwierigkeiten im sozialen Umfeld? □ Nie □ Ein- bis zweimal □ Monatlich □ Wöchentlich □ Täglich oder fast täglich □ Keine Angabe	**Source:** WHO ASSIST V3.0 (German version) **Item:** Frage F4 Wenn Sie an die **letzten drei Monate** zurückdenken, wie oft hat der Konsum von (1. Substanz, 2. Substanz, usw.) zu Problemen geführt, d.h. zu gesundheitlichen oder finanziellen Problemen, zu Konflikten mit dem Gesetz, oder zu Schwierigkeiten im sozialen Umfeld? Antwortkarte (ASSIST-Fragen 2-5) as above **Main changes:** asked for several substances together (not separately for each individual substance)
31. Wenn du an die **letzten drei Monate** zurückdenkst, wie oft hast du es wegen des Konsums von Alkohol oder Zigaretten nicht geschafft, Dinge zu erledigen, die man für gewöhnlich von dir erwartet? □ Nie □ Ein- bis zweimal □ Monatlich □ Wöchentlich □ Täglich oder fast täglich □ Keine Angabe	**Source:** WHO ASSIST V3.0 (German version) **Item:** Frage F5 Wenn Sie an die **letzten drei Monate** zurückdenken, wie oft haben Sie es wegen des Konsums von (1. Substanz, 2. Substanz, usw.) nicht geschafft, Dinge zu erledigen, die man für gewöhnlich von Ihnen erwartet ? Antwortkarte (ASSIST-Fragen 2-5) as above **Main changes:** asked for several substances together (not separately for each individual substance)

Question in the present study	Source (see Appendices G.4.1/G.4.2 for full citation)
32. Haben sich Freunde, Verwandte oder andere Personen **jemals** besorgt gezeigt, weil du Alkohol oder Zigaretten konsumierst? □ Nein, nie □ Ja, aber nicht in den letzten drei Monaten □ Ja, in den letzten drei Monaten □ Keine Angabe	**Source:** WHO ASSIST V3.0 (German version) **Item:** Frage F6 Haben sich Freunde, Verwandte oder andere Personen **jemals** besorgt gezeigt, weil Sie (1. Substanz, 2. Substanz, etc.) konsumieren ? Antwortkarte (ASSIST-Fragen 6-8) Nein, nie. Ja, aber nicht in den letzten drei Monaten. Ja, in den letzten drei Monaten. **Main changes:** asked for several substances together (not separately for each individual substance)
33. Hast du **jemals** versucht, den Konsum von Alkohol oder Zigaretten zu kontrollieren, zu reduzieren oder ganz aufzugeben und es **nicht** geschafft? □ Nein, nie □ Ja, aber nicht in den letzten drei Monaten □ Ja, in den letzten drei Monaten □ Keine Angabe	**Source:** WHO ASSIST V3.0 (German version) **Item:** Frage F7 Haben Sie **jemals** versucht, den Konsum von (1. Substanz, 2. Substanz, usw.) zu kontrollieren, zu reduzieren oder ganz aufzugeben und es **nicht** geschafft ? Antwortkarte (ASSIST-Fragen 6-8) Nein, nie. Ja, aber nicht in den letzten drei Monaten. Ja, in den letzten drei Monaten. **Main changes:** asked for several substances together (not separately for each individual substance)
Liste 1 • Ich habe **in meinem Leben** schon mal Cannabis (Marihuana, Pot, Gras, Haschisch) konsumiert. • Ich habe **in den letzten 12 Monaten** Alkohol gemeinsam mit Medikamenten genommen, um „high" zu werden. • Ich habe in den letzten 12 Monaten Lachgas, Poppers (Amylnitrit u.ä.), Klebstoff, Benzin, Lösungsmittel, Lack, Feuerzeuggas oder Ähnliches inhaliert, um „high" zu werden. • Ich habe in den letzten 12 Monaten **ohne ärztliche Verschreibung** (oder anders als verschrieben) Ritalin, Modafinil oder andere verschreibungspflichtige Medikamente genommen, um meine Leistungsfähigkeit zu steigern (nicht gemeint sind Tee, Kaffee, koffeinhaltige Energy Drinks, Koffeintabletten, usw. oder Substanzen wie Kokain, Amphetamine, Ecstasy, Speed). • Ich habe in den letzten 12 Monaten **ohne ärztliche Verschreibung** (oder anders als verschrieben) verschreibungspflichtige Beruhigungs- oder Schlafmittel (z.B. Valium, Xanax, Rohypnol, Diazepam, usw.) genommen, um „high" zu werden oder um besser zu entspannen. • Ich habe in den letzten 12 Monaten neue psychoaktive Substanzen konsumiert (auch bekannt als „Legal Highs", „Research Chemicals", „Badesalze", „Kräutermischungen" oder „NPS") (z.B. Mephedron, Spice, Lava Red, Kronic, Euphoria etc.). • Ich habe **in meinem Leben** schon mind. eine der folgenden Substanzen konsumiert: Kokain (Koks, Crack, usw.), Amphetamine (Speed, MDMA, Ecstasy, usw.), Methamphetamine (Crystal Meth), Halluzinogene (LSD, Acid, Pilze, PCP,	**Example source:** ESPAD 2015 (Austrian version) **Item:** C33 Wann (wenn überhaupt) hast du Folgendes <u>zum ersten Mal</u> getan? Mach bitte <u>ein</u> Kreuz in <u>jeder</u> Zeile! nie mit 9 Jahren oder jünger [… answer options …] mit 16 Jahren oder älter a) verschreibungspflichtige Beruhigungs-- oder Schlafmittel probiert (ohne ärztliche Verschreibung) b) illegale Amphetamine/Aufputschmittel oder Methamphetamine probiert c) Kokain oder Crack probiert d) Ecstasy probiert e) Schnüffelstoffe (z.B. Klebstoff, Lack, Feuerzeuggas) probiert um "high" zu werden f) Alkohol gemeinsam mit Medikamenten probiert um „high" zu werden . **Main changes:** changed from a question to a statement; changed timeframe in line with eligibility criteria; emphasis added; added further examples and exanded list of substances based on other questionnaires, e.g. Global Drugs Survey 2016; Suchtmittelmonitoring Wien 2015; Epidemiologischer Suchtsurvey (refers to "Legal Highs, Research Chemicals, Badesalze, Kräutermischungen, NPS o. ä." as one category)

Question in the present study	Source (see Appendices G.4.1/G.4.2 for full citation)
DMT, Ketamin, usw.), GHB/GBL (Liquid Ecstasy, Hydroxybutansäure), Opiate (Heroin, Morphium, Methadon, Codein, usw.) (gemeint ist **nur nicht-medizinischer Gebrauch**). 34. Trifft irgendeine der Aussagen aus **Liste 1** (oben) auf dich zu? □ Nein, keine Aussage aus Liste 1 trifft auf mich zu □ Ja, mind. eine Aussage aus Liste 1 trifft auf mich zu □ keine Angabe	
Liste 2 • Ich habe **in den letzten 12 Monaten** Cannabis (Marihuana, Pot, Gras, Haschisch) konsumiert. • Ich habe **in den letzten 12 Monaten** mind. eine der folgenden Substanzen konsumiert: Kokain (Koks, Crack, usw.), Amphetamine (Speed, MDMA, Ecstasy, usw.), Methamphetamine (Crystal Meth), Halluzinogene (LSD, Acid, Pilze, PCP, DMT, Ketamin, usw.), GHB/GBL (Liquid Ecstasy, Hydroxybutansäure), Opiate (Heroin, Morphium, Methadon, Codein, usw.) (gemeint ist **nur nicht-medizinischer Gebrauch**). • Ich habe mir **in meinem Leben** schon mal eine Droge (z.B. Heroin, Kokain, Amphetamine, anabole Steroide) mit einer Spritze injiziert (gemeint ist **nur nicht-medizinischer Gebrauch**). • Ich bin **derzeit oder war früher** wegen meines Gebrauchs von Alkohol oder anderen Substanzen in Behandlung (z.B. ambulante/stationäre Entgiftung, Substitution, ambulante/stationäre Suchteinrichtung, Tagesbetreuung, psychiatrische Klinik, usw.). • Ich war **in den letzten 12 Monaten** obdachlos und musste mind. zwei Nächte auf der Straße oder in einer Notschlafstelle (z.B. Obdachlosenheim) verbringen. 35. Trifft irgendeine der Aussagen aus **Liste 2** (oben) auf dich zu? □ Nein, keine Aussage aus Liste 2 trifft auf mich zu □ Ja, mind. eine Aussage aus Liste 2 trifft auf mich zu □ keine Angabe	As for the “Liste 1” item above. Questions and answer options from different questionnaires were rephrased as statements to be included in a list of exclusion criteria in the screening questionnaire. **Example sources/items:** WHO-ASSIST v3.0 “Haben Sie sich jemals irgendeine Substanz mit einer Spritze verabreicht (nur nicht-medizinischer Gebrauch) ?” ESPAD 2015: “Drogen durch Injektion mit einer Nadel (Heroin, Kokain, Amphetamine)” Global Drugs Survey 2016: “Zu guter Letzt möchten wir gerne wissen, ob Sie sich jemals eine Droge injiziert haben (IV, IM, mit Ausnahme von Steroiden) oder jemand anderes Ihnen bereits einmal eine Droge injiziert hat? “ [for list of treatment options] EuropASI: 16. Wie oft haben Sie folgende Behandlungen erhalten? Alkohol Drogen 1 - ambulante Entgiftung 2 - stationäre Entgiftung 3 - Substitution 4 - ambulante Suchteinrichtung 5 - stationäre Suchteinrichtung 6 - Tagesbetreuung 7 - Psychiatrische Klinik 8 - andere Klinik/andere Station 9 - andere Behandlung

Appendix H: Interview materials

H.1 Development of interview materials

Initial development, piloting and revision

The procedures described in Chapter 6 were developed in several stages between 2010 and 2016. As noted in Chapter 1, the present study originally started in 2010 at Liverpool John Moores University in the United Kingdom. A first draft of the materials and procedures was prepared in English based on relevant theoretical and methodological literature as well as prior empirical studies exploring socio-spatial aspects of substance use or everyday life more generally (e.g., Albrow, 1997; Löw, 2001; Jankowicz, 2004; Mason et al., 2004; Measham, 2004; Emmel, 2008; Moore and Miles, 2009; Reinprecht et al., 2009; Jackson, 2009). The draft materials were then developed further through pilot interviews[864] (in Liverpool in 2010 and 2011, then translated into German and piloted in Vienna in 2015) and finalised in 2016 through literature reviews aimed at identifying conceptual and methodological gaps (as outlined in Chapter 4) as well as in discussion with the academic supervisor and fellow students, researchers with repertory grids expertise (Prof. Devi Jankowicz, Helen Cullina) and substance use researchers, for example at conferences (Brotherhood, 2015a, 2015b). The following paragraphs focus on the insights obtained through the *pilot interviews*.

In total, seven pilot interviews took place between 2010 and 2015 with a diverse group of individuals[865]. Some participants were informed that this was a pilot interview, while others were not aware of the interview's pilot character. All participants were invited to give feedback on how they experienced the interview and how the procedures could be improved. Two participants were also followed-up by email to offer the results for discussion. After the interviews, relevant insights were noted (e.g., what worked well and what did not work as expected) and the procedures and materials were revised. Preliminary analyses using the pilot study data were also carried out, which also informed the final data analysis plan.

[864] The pilot study for the main interview procedures was conducted separately from the pilot study to test the sign-up form and screening questionnaire.

[865] Pilot study participants were: aged 18-40 years; four women and three men; university students, university staff and people working outside academia; people with and without children; and based in Liverpool or Vienna. They also differed in terms of substances used and substance use frequency. They did not all resemble the final target population, as this was finalised *based on* the pilot studies. However, none of the study participants were socially marginalised or had experiences with non-medical injecting drug use or drug treatment services. Four participants took part as acquaintances of the study author, while three participants were formally recruited and received a voucher worth £ 20 (approx. € 23 at the time) as a token of appreciation.

The pilot interviews helped identify areas for improvement and allowed trialling different design options to identify the most suitable ones. The following examples illustrate how pilot interviews informed each part of the repertory grid interview as applied in the present study:

- *Element elicitation & 'typical situation':* The first pilot interviews were characterised by inconsistent constructs and ratings, which highlighted the need for participants to have a clear mental image for each space on their map. In later pilot interviews, an attempt was made to create such images in a structured conversation with the interviewer but this was not found to be practically feasible due to time restrictions. Therefore, an alternative prompt ('typical situation') was developed for the actual interviews to enable participants to create those images in their mind with less interviewer support.

- *Supplied constructs & classification of mapped spaces:* The pilot interviews highlighted the need to classify spaces (e.g., according to substance use patterns) to allow informed decisions about which spaces to focus on during the interview. In the first pilot interviews, participants were asked to add relevant information *to their map* (e.g., to indicate with words or symbols where they used what, or which spaces were important to them) but this was found to distract them during the interview and – due to its unstructured nature – to limit possibilities for later analysis. Thus, it emerged that additional information about each mapped space should be collected through a separate grid with supplied constructs. It was also found that information should be collected separately for each product (e.g., distinguishing beer, wine, spirits, and so on) because spaces related to different products could be construed very differently.

- *Timing of triad formation:* In the initial interviews, a new triad was selected ad hoc between rounds of construct elicitation. This experience highlighted that deciding on all triads in advance of the construct elicitation was preferable. Further pilot interviews were used as an opportunity to try out different strategies for deciding which spaces to include and combine.

- *Qualifying phrase:* The pilot interviews highlighted the importance of a single, well-formulated qualifying phrase and offered an opportunity to try out different qualifying phrases and see how the responses differed and which one worked best in the context of the present study. For example, it was found that using a *substance use-specific qualifier resulted in notably more constructs relating to laws and norms*, which did not match the research focus on socio-spatial aspects unrelated to the threat of sanction. This supported the use of a qualifying phrase for the actual interviews that was not focussed on substance use; this also presented a methodological innovation vis-à-vis the existing literature.

- *Information about participants:* The pilot interviews highlighted what background information about participants helped to appropriately understand their mapping and construing. Pilot study participants suggested that it might be best to collect this information in advance of the interview to save time.

The pilot interviews also allowed practical insights regarding the timings of the various interview parts and the number of triads and constructs that could be realistically covered. Overall, the pilot interviews confirmed that the methodology was acceptable for participants and did not cause substantial discomfort[866].

Besides informing the design of interview procedures and materials, the pilot studies also allowed the study author to practise the repertory grid technique. Furthermore, they provided preliminary data which were used, inter alia, to refine the research questions and target group definition. For example, it was found (in line with previous literature) that having children greatly affects a person's substance use patterns and related socio-spatial construing, and therefore this became an exclusion criterion during the selection of study participants. Similarly, a pilot interview with a heavy smoker suggested that the main socio-spatial aspect differentiating spaces of situational substance use from spaces of situational abstinence was whether smoking was permitted or not, which initially led to a focus on occasional smokers (which was, however, revised during the fieldwork, as described in section 5.3.1).

Revision during the data collection stage

Section 6.3 noted that post-interview reflection and documentation was used in the present study to continuously refine interview materials and procedures during the fieldwork. After each interview, potential weaknesses were identified and rephrased as recommended changes; these were then used to update and refine interview materials and procedures prior to the next interview as far as possible.

Besides this continuous review of materials, the interview materials and procedures were thoroughly reviewed during the second interview wave. One of the first interviews in wave 2 did not 'go well' and raised doubts if a more conventional technique for qualitative interviewing might not have allowed better insights than the chosen method. At the same time, it became clear that the initially planned follow-up interviews could not be implemented due to resource limitations. Through discussion with the academic supervisor and fellow doctoral students, it

[866] The only discomfort reported was that the interview was too long and tiring. The interview procedures were subsequently revised to make them less tiring for study participants (e.g., by moving more questions into the screening questionnaire).

was concluded that both issues could be addressed by incorporating more follow-up and open-ended questions in the repertory grid interviews (thereby generating more narration to complement the repertory grid data).

The experience of a 'problematic' interview in wave 2 also prompted a review of methodological issues in the interviews conducted until that point, with a view to addressing issues before the end of the fieldwork. Interviewer mistakes[867] and similar methodological observations noted during the post-interview reflection and documentation were summarised. In addition, the transcription phase was brought forward several months. The first step of this phase required the study author to listen to the audio recordings to prepare a clickable table of contents (C-TOC), as explained in section 7.5. This was used as an opportunity to also identify potential problems and interviewer mistakes (akin to a mid-term evaluation of interviewer performance). Thus, a list of methodological issues was prepared based on the post-interview documentation for the first eight interviews and the audio-recordings from the first five interviews. For each methodological issue, it was noted why and how much it mattered (i.e., how it could negatively affect interview outcomes) and how it could be avoided or addressed in future interviews. This information was printed on a handout which the interviewer consulted prior to interviews. In addition, this information was used to revise the interview materials during wave 2. For example, relevant reminders were added to the interview guide. Further changes were then made through the continuous post-interview review as outlined above.

The following list highlights some of the changes that occurred between the first and the final interview as a result of the continuous refinement of materials as well as the review undertaken during wave 2, to illustrate what changes were made:

- *Typical situation* (issue: participants did not refer to spaces in a consistent way) – emphasise the 'typical situation' more strongly, refer to it repeatedly during the interview, ask participants to take a minute and think through each space during the element elicitation (cf. mentioning the typical situation only at the start of the interview, only asking participants *if* they had a clear mental image for each space)

[867] Although the term 'interviewer mistakes' is used, the review highlighted that some interviewer 'mistakes' could not be avoided in practice or could even be beneficial. To give an example, the review highlighted that the interviewer did not always make use of opportunities to ask a follow-up question. An undesirable effect of this was that certain aspects were not clarified and remained unclear. Although this observation translated into reminders being added to the interview guide to ask more follow-up questions, it was also acknowledged that follow-up questions could not always be asked due to time restrictions and that many follow-up questions could disrupt the interview flow and irritate or unsettle study participants.

- *Classification of spaces & triad formation* (issue: too much time spent on this step) – set a timer to 8 minutes during the triad formation break (cf. no timer set at beginning of the fieldwork); better procedures and criteria to help reduce number of spaces (if needed) and form triads more efficiently

- *Qualitative orientation* (issue: more narrative data needed for research questions) – let study participants talk freely, ask them to provide examples and detailed descriptions of situations, ask more follow-up questions, allow for longer interview duration, include a list of specific open-ended questions to ask in last interview part (cf. cutting participants off and avoiding follow-up questions to keep interviews short)

- *Better instructions to study participants, more explanations* (issue: participants could not contribute fully if they did not understand the aims and challenges of each interview part) – e.g., explain how the map will be used during the interview; clarify that elicited spaces can include places and situations; explain interviewer's role during construct elicitation; comment on potential challenges of the interview methodology; etc.

Thus, changes served to improve data validity whilst increasing the efficiency of interviews. An important part of this was to make the interview procedures more transparent, thereby improving participants' understanding of what was being asked of them and engaging them as co-producers in the interview process.

From a quantitative perspective, it may be surprising that changes were undertaken during the fieldwork. In the present study, this was deemed acceptable and agreed with the academic supervisor. Changes were such that earlier and later interviews were still comparable overall, and some aspects were purposefully not changed to maintain comparability across interviews (e.g., all participants received the same answer cards).

H.2 Interview guide

The interview guide was used flexibly by the interviewer, developed further based on prior interview experiences and adapted to the needs of individual study participants.

PIN .....

INTRODUCTION	
• *If IP is not coming – check if standing outside door!* • **"Bis wann hast du Zeit?"**	Turn off my phone
Voucher: "Danke für deine Bereitschaft, mitzumachen" • Give voucher & ask to sign voucher receipt form! (using pseudonym)	**NOTE START TIME** Offer IP a drink

Participant information:
• "Aufnahme und Transkription ok?" (show them the device)
  ○ Justification: besser aufs Gespräch konzentrieren
• "Mündliche Informationen zur Studie":
  ○ Rekrutiert von mir / Kollegin Xenia Baumgartner
  ○ Vorstellung (Person und Projekt): Name, Institution, Projekt zu Alltagsräumen und Gebrauch von Substanzen wie Alkohol und Zigaretten
  ○ "Ziel der Studie" – wie Raumwahrnehmungen und Substanzgebrauch zusammenhängen
• "Gesamtdauer ca. 1,5 Stunden", Vorgehen: "Drei Teile"
  ▪ "Fragen Substanzgebrauch"
  ▪ "Alltagsräume zeichnen" - Karte, Zeichnung oder Liste
  ▪ "Raumwahrnehmungen"
• "Vertraulich – Karte, Zitate anonymisiert"
• "Ich muss dir noch etwas Wichtiges sagen – das Interview bezieht sich nur auf die Vergangenheit, vor allem die letzten sechs Monate, also etwa seit **Dezember oder Jänner**. Wir werden nicht darüber reden, was du in der Zukunft, also zum Beispiel nächste Woche, vorhast."
	Start recorder if consent given

Informed consent: • "Zettel mit weiteren Informationen" • "Hast du Fragen?" • Obtain consent (using pseudonym)	End interview if consent to interview not given **NOTE TIME**
Additional personal information / Self-report of substance use: • "Extra Fragen" – "Antworten besser verstehen"; "vertraulich" • "Fragen zur Person" • "Fragen zum Konsum" (bei SU Fragebogen soll IP **ankreuzen** welche zutreffen) • Clarify any outstanding issues from sign-up form or screening questionnaire	**NOTE TIME** Prepare drawing materials
MAPPING	

Drawing the map:
• Explain the purpose of the map:
  ○ „Später werden wir verschiedene Räume und Situationen aus deinem Alltag miteinander vergleichen. Dafür möchte ich dich jetzt bitten, verschiedene **Räume und Situationen aus deinem Alltag** zu Papier bringen, festzuhalten, entweder als Liste aufschreiben oder aufzeichnen." **Unabhängig von SU**
• How to go about it:
  ○ „Denke daher zuerst bitte mal an eine typische Woche, was du so machst, wo du hingehst, tagsüber oder abends, zum Beispiel für Arbeit, Uni, Freizeit, mit wem du dich triffst."
  ○ "Alltagsräume" – Orte, aber auch Situationen des Alltags
  ○ "Orte, Situationen, die dir wichtig sind" – auch letzte 6 Monate
• "eventuell laut mitdenken"
• "Räume, die für deinen Konsum wichtig sind" ("alle Substanzen berücksichtigen, die du angekreuzt hast")
  ○ "Typische"
  ○ "Am häufigsten"
  ○ **"Extreme Situation"**
  ○ **"Letztes Mal"**
• "Fehlt etwas?" – aim for at least 6 elements
• "Ein klares Bild vor Augen"? ("typische Situation") – „Wichtig, dass du dir eine typische Situation aussuchst, die diesen Raum repräsentiert. Für das restliche Interview, denke bitte immer an diese eine typische Situation, wenn ich dich zu diesem Raum befrage."
• "Änderungen"?
• Check if need to ask about any specific places (e.g. if a bar is named) or symbols/visual
	Observe map creation and make notes (e.g., questions to ask)
	
	Check if map makes sense to me as well
	
	Ask if any of the following spaces should be added:
	– home
	– work
	– education
	– leisure places (e.g. sports, outdoors)
	– friends' places
	– bars/restaurants?
	– holiday?
	
	NOTE TIME

SUPPLIED CONSTRUCTS	

Closed-ended questions about the map (supplied constructs):
• Transfer elicited spaces & substances (last 6 months) to supplied constructs grid
• Nur in Bezug auf die "typische Situation"
• explain why follow-up: „nicht wertend gemeint sondern um Verständnis zu sichern".
• "Hilft mir, die richtigen Fragen zu stellen"
  ○ Wie wichtig ist dir dieser Raum bzw. typische Situation: von sehr wichtig bis gar nicht wichtig? (für dich, emotional)
  ○ Wenn du an diesen Raum bzw. typische Situation denkst, was hast du da für Gefühle: eher positive oder negative, oder ambivalente Gefühle, also weder-noch oder sowohl-als-auch?
  ○ Wie oft hältst du dich in diesem Raum auf bzw. besuchst du diesen Raum bzw. wie oft findet diese typische Situation statt? (Kategorien vorlesen)
  ○ Wenn du an die typische Situation in diesem Raum denkst, wie oft konsumierst du ... (z.B. Wein) in dieser typischen Situation: also in dieser typischen Situation niemals, selten, manchmal, oft oder immer?
  ○ Ok, und insgesamt, also unabhängig davon welche Substanz es genau ist, wie oft konsumierst du *irgendeine* Substanz in dieser typischen Situation?
	Read out questions and answer options
	
	Note - for indoor smoking bans where IP has to go outside to smoke - note both numbers (e.g., 1/5) but ask which one fits more with IP's construal
	
	If many spaces or substances, avoid asking follow-up questions *during* supplied constructs – circle ratings where a follow-up might be useful & address later

• Und wenn du dir nun einen **"idealen" Raum** bzw. eine "ideale" Situation vorstellst – also wo du dich wirklich wohlfühlst, wie würdest du diesen Raum anhand dieser Kategorien charakterisieren? ○ **FU if SU in ideal space doesn't correspond** to what was indicated earlier as favourite substance, or if SU is low even though seemed important to the IP otherwise.	**NOTE TIME**
TRIAD FORMATION / CLASSIFICATION OF SPACES (BREAK FOR PARTICIPANT)	

Complete classification grid:
• "kannst einstweilen Pause machen, aufs Klo gehen, etc."
• classify spaces, if > 12 spaces:
  ○ Start by thinking "which ones do I definitely need to keep", then consider excluding:
The ones that were added to the map last
The ones that have the lowest ratings for importance
If similar spaces are already on the map (in terms of SU)
Spaces of SU that don't seem so relevant and where SU is "a must" (e.g. socially expected)
Spaces of NSU that don't seem so relevant and where SU is "not possible" (e.g. banned)
  ○ Keep the university
  ○ Try to keep all that are very or rather important
  ○ If in doubt, better to keep a space than to leave it out
  ○ Make sure to include spaces of no, infrequent and frequent substance use
	SET TIMER TO 8 MIN
	
	NOTE TIME
	Offer IP a snack/drink
	Stop and restart the recording in case of long interview

Triad formulation: • Decide on triads (enter triad numbers in top rows of supplied constructs grid!)	
CONSTRUCT ELICITATION	

• Transfer ca. 12 spaces to blank repertory grid. Rep grid interview proper starts:
  ○ **Explain how it works**
  ○ "Dein subjektives Verständnis, so wie du es siehst"
  ○ "Es gibt keine falschen oder richtigen Antworten"
• Qualifier: "Welche zwei dieser Räume sind sich ähnlicher **in Bezug auf etwas, das du an ihnen magst oder nicht magst?**" – „bitte an die **typische Situation** denken"
  ○ "magst oder nicht magst" – "hilft, etwas spezifischere Antworten zu erhalten als wenn ich nur allgemein fragen würde"
• Possible follow-ups:
  ○ wie hast du die Antwortoption ausgewählt?
  ○ woran hast du bei der Beantwortung dieser Frage gedacht?
• Clarify that we are not supposed to complete the whole grid *(aim for 6 constructs)*
• Explain that I need to "translate" IP's words into a summary that can be entered into the grid, ask her to correct me if I did not summarise it well
• If "difference method" doesn't work, use also "opposite method"
	Remember to look at the participant, not just the grid!
	
	- avoid saying "ok"
	- say "mhm" to encourage further narration
	
	Move on to next part if IP can't elicit new constructs or is struggling with the task (consider asking open questions from next page)

IDEAL SPACE AND CONSTRUCT RANKINGS		
• "Wenn du dir nun wieder deinen **"idealen" Raum** bzw. deine "ideale" Situation vorstellst – also wo du dich wirklich wohlfühlst, wie würdest du diesen Raum anhand dieser Kategorien charakterisieren?" • "Ok, und jetzt zum Abschluss möchte ich dich noch bitten, die Begriffspaare, die wir hier gerade in der Tabelle festgehalten haben, noch in eine Reihenfolge zu bringen, und zwar zuerst in Bezug darauf, was dir **bei deinem idealen Raum wichtig** ist. Also, wenn du dir denkst, "Was ist mir bei meinem idealen Raum wichtig?", welcher dieser Aspekte ist am wichtigsten?" "... und welcher am zweitwichtigsten?" usw. • "Und wenn du jetzt an Alkohol bzw. Zigaretten denkst: Welche Aspekte sind für deinen **Substanzgebrauch** wichtig?" o "… und wenn du das wieder in eine Reihenfolge bringen müsstet… Also, wenn du dir denkst, "Was ist dafür ausschlaggebend, dass ich Alkohol oder Zigaretten konsumiere?", welcher dieser Aspekte ist am wichtigsten?" "... und welcher am zweitwichtigsten?" usw. Open questions: • "was hast du da jetzt überlegt?" • Alternatively: ask IP to reflect on these questions freely first and assign ranks later		**NOTE TIME**
	OPTIONAL: Plan B if construct elicitation is not working - Exploring one of the mapped spaces in detail	
	If possible, choose a space where I'm surprised that there isn't more use "Bis jetzt haben wir besprochen, wie du deine Alltagsräume unterschiedlich wahrnimmst und wo du was konsumierst. Jetzt würde ich mir gerne noch einen deiner Räume genauer anschauen. Nehmen wir zum Beispiel diesen Raum hier. Als du hier das letzte Mal an eine typische Situation gedacht hast, hast du angegeben, dass du hier selten/manchmal/oft Alkohol trinkst/Zigaretten rauchst. Könntest du mir bitte beschreiben, wie die typische Situation ausschaut, wenn du hier **<u>nichts</u>** trinkst/nicht rauchst? Ich werde zuhören und mir Notizen machen und ich werde dich nicht unterbrechen bis du fertig bist."	If necessary, ask participant to clarify or expand on something they said Summarise what the participant said & check if accurate
	"Und jetzt, wie sieht diese typische Situation aus, wenn du doch etwas rauchst/trinkst? Ich werde wieder zuhören bis du fertig bist."	
	"Und jetzt, wenn du diese zwei Szenarien miteinander vergleichst, was, glaubst du, sind da die Unterschiede, so im Allgemeinen und speziell in Bezug darauf, ob du etwas rauchst/trinkst?"	
SUMMARY		
Check if anything missing: • "Zusammenfassen" o **summarise what I found interesting**, or what I learnt, or how it's helping me answer my research question o "Also, wenn ich das jetzt für mich zusammenfasse, dann ist der Unterschied zwischen einer Situation, wenn du (z.B. Bier/Wein trinkst/ rauchst), im Vergleich dazu, wenn du (z.B. Bier/Wein trinkst/ nicht trinkst/nicht rauchst) folgender: …. Habe ich das richtig verstanden, oder fehlt da etwas?" o "stimmt so?"		**NOTE TIME**
• **Ask any outstanding question/clarification that I might need -** If necessary, ask participant to clarify or expand on something they said o **Check if I've got a clear understanding of all spaces** o Check if there is **a space where it could be surprising that there is <u>no</u> use** (e.g. where there would be no sanctions; a space that appears similar to spaces of use) and ask for clarification o Check if there is **a space where it could be surprising that there <u>is</u> use** (e.g. where the threat of official sanctions seems high; a space that appears similar to spaces of no use) and ask for clarification • "**Fehlt etwas**?" (e.g. a construct): o "Hätte ein anderer Vergleich einen anderen wichtigen Aspekt hervorgebracht?" o "Welche anderen Aspekte sind für deinen Konsum wichtig?"		

	OPTIONAL: Prevention perspective	

	If time permits and if participant seems interested/relaxed/willing to talk on
	• **A space of positive feelings with low substance use**
	  ○ "Für mich besonders interessant: Räume, wo du gesagt hast, dass du eher positive Gefühle hast, wenn du an sie denkst, und wo der Gebrauch von verschiedenen Substanzen keine so große Rolle spielt. Das hier zum Beispiel ist so ein Raum. "
	  ○ "**Habe ich richtig verstanden, dass du hier nichts/nicht so oft konsumierst, weil …?**"
	  ○ "Wenn wir uns jetzt diese Räume hier drüben anschauen, da konsumierst du öfter. Was müsste sich deiner Meinung nach ändern, damit du in diesen Räumen weniger oft konsumierst?"
	  ○ "Glaubst du, sie könnten sich tatsächlich dahingehend ändern, bzw. was müsste dafür passieren?"	

CONCLUSION		
• "**Danke**, dass du dir die Zeit genommen hast" • "**Anonymität** – etwas weglassen?" "Karte ok?"		Check if the map contains sensitive data
Reflection/feedback: • "Gab es etwas am Interview, das du interessant gefunden hast, und wenn ja, was? Etwas für dich dazu gelernt?" • "Interview/Methode ok?" - "Hast du irgendwelche **Verbesserungsvorschläge**, was das Interview betrifft?" „gibt es etwas, was ich beim nächsten Interview **anders oder besser machen** könnte" • "Gab es etwas, wo du das Gefühl hattest, nicht offen darüber reden zu können, oder etwas, das dir unangenehm war?" • „War es für dir eher einfach oder eher schwierig, an typische Situationen zu denken und diese miteinander zu vergleichen?" • "Hast du noch **weitere Kommentare oder Fragen** bezüglich der Interviews oder meiner Studie?", "Gibt es etwas, was du noch gerne ansprechen würdest?" • „Wenn dir noch etwas einfällt (Frage oder Kommentar), kannst du mich gerne jederzeit nach dem Interview kontaktieren"		
Next steps: • **Ok to contact them again in case of any questions?** Ja Nein		
• **„Interesse an persönlichen Ergebnissen**?" Ja Nein • "End-Ergebnisse/Bericht per E-Mail/Whatsapp zuschicken?" Ja Nein • E-Mail (if don't have it): …… *(cross out later!)*		

• Helfen, weitere Interviewpartnerinen zu finden?
  ○ if yes, **give three ID/PIN cards**
  ○ If no, ask why (explain that need this info for the report)		

Thanks! • Re-confirm if and **when** I will contact them again (e.g. in case of any questions) • "**Vielen Dank** nochmal für deine Teilnahme, du hast mir wirklich sehr geholfen! "Danke, dass du dir die Zeit genommen hast" • END		**NOTE TIME** Turn off recorder

My reflections regarding the interview:

H.3 Participant information sheet

Mapping substance use in everyday spaces (MASPA)

universität wien

Wien, im Juni 2018

Informationen zum Dissertationsprojekt
„*Ma*pping substance use in everyday *spac*es (MASPA)"

Liebe Studienteilnehmerin!

Vielen Dank, dass du dich bereit erklärt hast, bei diesem Interview mitzumachen und mich bei meiner Dissertation zu unterstützen. Hier findest du noch einmal die wichtigsten Informationen zum Interview zusammengefasst:

- In meiner Studie geht es darum, in welchen Situationen Substanzen wie Alkohol und Tabak-/Nikotinprodukte konsumiert werden. Die Studie soll wissenschaftliche Grundlagen für die Planung zukünftiger Maßnahmen zur Gesundheitsförderung und Prävention schaffen.
- **Alle Angaben werden streng vertraulich behandelt.** Bitte sei bei deinen Antworten so ehrlich wie möglich. Wenn du eine Frage nicht beantworten möchtest, dann sag es mir bitte. Bitte beachte, dass ich die Vertraulichkeit der Daten nicht garantieren kann, wenn ich gesetzlich zu einer Offenlegung verpflichtet bin, und/oder wenn der dringende Verdacht besteht, dass du dir selbst oder einer anderen Person Schaden zufügen wirst (z.B. Suizidabsicht).
- Deine persönlichen Angaben erfasse ich, um deine Antworten besser interpretieren zu können und die Studienteilnehmerinnen als Gruppe beschreiben zu können. Auf individueller Ebene werden Informationen im Bericht, in Präsentationen und anderen Publikationen nur so begrenzt bekannt gegeben, dass deine Anonymität gewährleistet ist.
- Das Interview wird mit deiner Zustimmung aufgenommen, damit ich nicht mitschreiben muss. Die Aufnahme wird nicht veröffentlicht.
- Sollte ich wörtliche Zitate aus dem Interview oder deine Zeichnung für Publikationen oder Präsentationen verwenden, so werden diese selbstverständlich anonymisiert. Wenn du möchtest, kannst du in den Endbericht vor der Publikation Einsicht nehmen. Kreuze dazu auf der nächsten Seite das entsprechende Kästchen an.
- Deine Teilnahme erfolgt freiwillig. Du kannst dich jederzeit ohne Angabe von Gründen aus der Studie zurückziehen und die Löschung bzw. Vernichtung deiner Daten verlangen. Bitte beachte aber, dass eine nachträgliche Entfernung aus der Dissertation bzw. bereits getätigten Analysen nicht oder nur bedingt möglich sein wird.
- Das heutige Interview wird ca. 1,5 Stunden dauern. Bitte mach nur mit, wenn du genug Zeit hast.
- Bei Interesse kannst du eine vorläufige Analyse des heutigen Interviews per E-Mail erhalten. Details dazu können wir am Ende des heutigen Treffens klären.
- Wenn du ein Beratungsangebot in Anspruch nehmen möchtest, so findest du unter http://www.maspa-studie.at/info#beratung weitere Informationen.

Wenn du noch zusätzliche Fragen hast, kannst du sie gerne jederzeit während des Interviews stellen oder dich nach dem Interview an mich oder meinen Betreuer wenden.

Note. The version given to participants included contact details for the study author and the academic supervisor.

H.4 Consent form (for completion by study participant)

Einverständniserklärung zur Teilnahme am Dissertationsprojekt
„*Ma*pping substance use in everyday *spa*ces (MASPA)"

Wenn du mit der Teilnahme einverstanden bist, dann kreuze bitte die entsprechenden Kästchen an und gib unten dein Pseudonym und das heutige Datum an.

Ich erkläre mich dazu bereit, im Rahmen des genannten Forschungsprojekts an einem Interview/ an mehreren Interviews teilzunehmen.	☐ Ja	☐ Nein
Ich wurde über das Ziel und den Verlauf des Forschungsprojekts informiert. Ich hatte die Gelegenheit, Fragen zu stellen. Etwaige Fragen wurden vollständig beantwortet.	☐ Ja	☐ Nein
Ich wurde darüber aufgeklärt, dass ich das Interview jederzeit abbrechen, weitere Interviews ablehnen und meine Einwilligung in eine Aufzeichnung und Niederschrift des/der Interviews zurückziehen kann, ohne dass mir dadurch irgendwelche Nachteile entstehen.	☐ Ja	☐ Nein
Ich bin damit einverstanden, dass das Interview mit einem Aufnahmegerät aufgezeichnet und sodann von den Mitarbeiterinnen und Mitarbeitern des Studienprojekts in Schriftform gebracht wird.	☐ Ja	☐ Nein
Ich bin damit einverstanden, dass meine Daten im Rahmen des Dissertationsprojekts gespeichert, ausgewertet und in anonymisierter Form in Berichten, Präsentationen und sonstigen wissenschaftlichen Publikationen verwertet werden.	☐ Ja	☐ Nein
Ich bin mit der Wiederverwendung meiner Daten zu nicht-kommerziellen, wissenschaftlichen Zwecken in thematisch verwandten Forschungsbereichen einverstanden.	☐ Ja	☐ Nein
Ich möchte über die Ergebnisse der Studie informiert werden.	☐ Ja	☐ Nein
Ich möchte in den Bericht Einsicht nehmen *bevor* er publiziert wird.	☐ Ja	☐ Nein

Wien, am _____ **Pseudonym:** _____

H.5 Additional in-person questionnaires

General characteristics (for completion by interviewer)

ID: .....

Key details about this person based on sign-up form and screening questionnaire *(complete beforehand)*	
Anything to clarify from sign-up form or screening questionnaire? *(complete beforehand)*	

MÜNDLICH: **In der Dissertation muss ich beschreiben, was für Leute an der Studie teilgenommen haben. Manche Informationen könnten auch wichtig sein, damit ich die Ergebnisse besser interpretieren kann. Daher möchte ich dir jetzt noch ein paar Fragen zu deiner Person stellen, bevor wir mit dem eigentlichen Interview beginnen.**

Du musst aber nicht alle Fragen beantworten, also wenn dir eine Frage unangenehm ist, sag es mir und wir lassen sie aus.

1. **Zuerst, in welchem Bezirk wohnst du? /** *Falls IP nicht in Wien wohnt:* **Welche dieser Kategorien beschreibt am besten deine Wohnumgebung?** *(vorlesen)*

   ○ .....
   ○ Keine Angabe

   ○ auf dem Land oder in einem kleinen Dorf
   ○ Kleinstadt (weniger als 50.000 EW)
   ○ mittelgroße Stadt (50.000 bis 250.000 EW)
   ○ Großstadt (mehr als 250.000 EW)

2. **Was studierst du, also welches Fach?**

   ○ BWL
   ○ I-BWL
   ○ VWL
   ○ Statistik
   ○ Mathematik
   ○ Jus
   ○ Sonstiges: .....
   ○ Keine Angabe

3. *Falls arbeitet:* **Du hast bei der Anmeldung angegeben, dass du Teilzeit/gelegentlich arbeitest. Was ist das für eine berufliche Tätigkeit, wenn ich fragen darf?**

   .....
   ○ Nicht zutreffend (arbeitet nicht)
   ○ Keine Angabe

4. **In welchem Land bist du geboren?** *(heutige Staatsgrenze)*

   ○ Österreich
   ○ anderes Land, und zwar: .....

   Falls IP nicht das konkrete Land angeben möchte: **Ist dieses Land heute in der Europäischen Union?**
   ○ EU
   ○ Außerhalb EU
   ○ Keine Angabe

5. **In welchem Land wurde deine <u>Mutter</u> geboren?** *(heutige Staatsgrenze)*

   ○ Österreich
   ○ anderes Land, und zwar: .....

   Falls IP nicht das konkrete Land angeben will: **Ist dieses Land heute in der Europäischen Union?**
   ○ EU
   ○ Außerhalb EU
   ○ Keine Angabe

6. **Und dein <u>Vater</u>: wo wurde er geboren?** *(heutige Staatsgrenze)*

   ○ Österreich
   ○ anderes Land, und zwar: .....

   Falls IP nicht das konkrete Land angeben möchte: **Ist dieses Land heute in der Europäischen Union?**
   ○ EU
   ○ Außerhalb EU
   ○ Keine Angabe

Substance use specific (for completion by interviewer)

Summary regarding this person based on screening questionnaire *(complete beforehand)*: **PIN: .....**

Alcohol use	
Cigarette use	
Anything to clarify from screening questionnaire?	

Jetzt noch ein paar Fragen zu deinem Substanzkonsum. Die Fragen sind ähnlich wie die, die du schon bei der Anmeldung ausgefüllt hast. Ich stelle die Fragen hier noch einmal ein bisschen anders, weil ich sie für das Interview nachher noch brauche.

7. **Welche der folgenden Substanzen hast du konsumiert …?** *Hand over the questionnaire!*

8. **Wenn du an die verschiedenen Substanzen denkst, die du hier gerade angekreuzt hast: Was konsumierst du insgesamt <u>am öftesten</u>? Und warum – also, was ist der Grund dafür, dass diese und nicht eine andere?** .....

9. **Was konsumierst du insgesamt <u>am liebsten</u>? Und warum – also wieder, was ist der Grund dafür, dass es das ist und nicht etwas Anderes?** .....

10. **Wenn du an die letzten 6 Monate denkst, war dein Gebrauch von Alkohol / Zigaretten / Medikamenten relativ stabil oder hat er sich irgendwie verändert? Zum Beispiel könnte es sein, dass du jetzt mehr oder weniger trinkst oder rauchst als vor 6 Monaten, oder vielleicht gab es eine Phase in den letzten 6 Monaten, wo etwas anders war?**

Alkohol	Zigaretten	Medikamente
○ Stabil	○ Stabil	○ Stabil
○ Hat sich verändert	○ Hat sich verändert	○ Hat sich verändert
○ K.A.	○ K.A.	○ K.A.
○ T.n.z.	○ T.n.z. (Nichtraucher)	○ T.n.z.

Falls „hat sich verändert“: **In welcher Hinsicht hat es sich verändert?**

.....

.....

11. **Hast du in den letzten drei Monaten versucht, weniger <u>Alkohol</u> zu trinken oder ganz damit aufzuhören? Das ist nicht wertend gemeint, sondern es ist nur für die Analyse wichtig zu wissen, ob jemand aufhören will oder nicht.**

○ Ja
○ Nein
○ T.n.z.
○ K.A.

12. **Hast du in den letzten drei Monaten versucht, weniger <u>Zigaretten</u> zu rauchen oder ganz damit aufzuhören? 12b. Und <u>Medikamente</u>?**

○ Ja	○ Ja
○ Nein	○ Nein
○ Nicht zutreffend (raucht nicht)	○ T.n.z.
○ K.A.	○ K.A.

13. **Wie empfindest du deinen Gebrauch von Alkohol / Zigaretten / Medikamenten allgemein – siehst <u>du</u> das persönlich irgendwie als Problem an oder eher nicht? Mich interessiert deine Meinung und ich frage nur, damit ich die Studienteilnehmerinnen besser verstehen und beschreiben kann.**

Alkohol	Zigaretten	Medikamente
○ Ja, eher problematisch	○ Ja, eher problematisch	○ Ja, eher problematisch
○ Nein, eher unproblematisch	○ Nein, eher unproblematisch	○ Nein, eher unproblematisch
○ K.A.	○ K.A.	○ K.A.
○ T.n.z.	○ T.n.z. (Nichtraucher)	○ T.n.z.

Falls „Ja, eher problematisch“: **In welcher Hinsicht ist es eher problematisch?**

.....

.....

Detailed list of substances (for completion by study participant)

Wann hast du die folgenden Substanzen zuletzt konsumiert (wenn überhaupt)?

	Heute	**In den letzten 6 Monaten** (aber nicht heute)	**Vor mehr als 6 Monaten**	**Niemals konsumiert**
Alkoholische Getränke				
Bier				
Wein (pur oder gespritzt)				
Cider				
Sekt				
Spirituosen (z.B. Schnaps, Tequila, Wodka, Gin, Cognac, Whisky, Rum, Jägermeister, Likör)				
Alkoholhaltige Mixgetränke (z.B. Alkopops, Longdrinks, Cocktails, Bowle)				
Tabak- und Nikotinprodukte				
Zigaretten (aus der Schachtel und/oder selbstgedreht)				
Zigarren, Zigarrilos, Pfeife				
Wasserpfeife mit Tabak (Shisha)				
Elektronische Zigaretten (E-Zigaretten) mit Nikotin				
Sonstige				
Alkohol gemeinsam mit Medikamenten				
Lachgas, Poppers (Amylnitrit u.ä.), Klebstoff, Benzin, Lösungsmittel, Lack, Feuerzeuggas oder Ähnliches				
Ritalin, Modafinil oder andere verschreibungspflichtige Medikamente zur Steigerung der Leistungsfähigkeit (**ohne** ärztliche Verschreibung oder anders als verschrieben)				
Verschreibungspflichtige Beruhigungs- oder Schlafmittel (z.B. Valium, Xanax, Rohypnol, Diazepam, usw.) (**ohne** ärztliche Verschreibung oder anders als verschrieben)				
Neue psychoaktive Substanzen („Legal Highs“, „Research Chemicals“, „Badesalze“, „Kräutermischungen“ oder „NPS“) (z.B. Mephedron, Spice, Lava Red, Kronic, Euphoria etc.)				

H.6 Supplied constructs grid (for completion by interviewer)

Triad asked?															Triad did not work
Triad asked?															Triad did not work
Triad asked?															Triad did not work
Triad asked?															Triad did not work
Triad asked?															Triad did not work
Triad asked?															Triad did not work
Triad asked?															Triad did not work
1															**5**
Gar nicht wichtig															Sehr wichtig
Negative Gefühle															Positive Gefühle
1-2 Mal im Jahr/seltener															Täglich oder fast täglich
niemals															immer
niemals															immer
niemals															immer
niemals															immer
niemals															immer
niemals															immer
niemals															immer
niemals															immer
niemals															immer
niemals															immer
Substanzen gesamt NIEMALS															**Substanzen gesamt IMMER**

Note. Elicited everyday spaces and substances used in the last six months were entered into the respective fields, and the grid was completed using a question-and-answer format, as described in 6.2.3. The information was then used to complete the classification grid (see Appendix H.8). The triad numbers were entered in the top rows. If, during the construct elicitation, a particular triad did not elicit any new construct or did not make sense to a participant, this was indicated in the top right corner.

H.7 Answer cards

Sehr wichtig	[5]
Eher wichtig	[4]
Weder wichtig noch unwichtig	[3]
Eher unwichtig	[2]
Gar nicht wichtig	[1]

Wenn ich an diesen Raum denke, habe ich …

Positive Gefühle	[5]
Eher positive Gefühle	[4]
Ambivalente Gefühle / kein Gefühl überwiegt	[3]
Eher negative Gefühle	[2]
Negative Gefühle	[1]

Täglich oder fast täglich (5-7 Tage pro Woche)	[5]
Wöchentlich (1-4 Mal pro Woche)	[4]
Monatlich (1-3 Mal im Monat)	[3]
Alle paar Monate (3-8 Mal im Jahr)	[2]
Jährlich (1-2 Mal im Jahr oder seltener)	[1]

Niemals	–	Selten	–	Manchmal	–	Oft	–	Immer
[1]		[2]		[3]		[4]		[5]

Note. The four answer cards were printed on firm paper and cut out along the dotted lines.

H.8 Classification grid (for completion by interviewer)

(fold here and place over supplied constructs grid)

Similar settings 1																	
Similar settings 2																	
Similar settings 3																	
Alcohol																	
Cigarettes																	
Meds/NPS																	
No substance use																	
Infrequent substance use																	
Frequent poly																	

Note. The above grid was completed by reviewing the information entered on the supplied constructs grid (further explained in section 6.2.4).

H.9 Blank repertory grid (for completion by interviewer)

1													5

Appendix I: Analysis of elicited constructs

I.1 Development of category systems

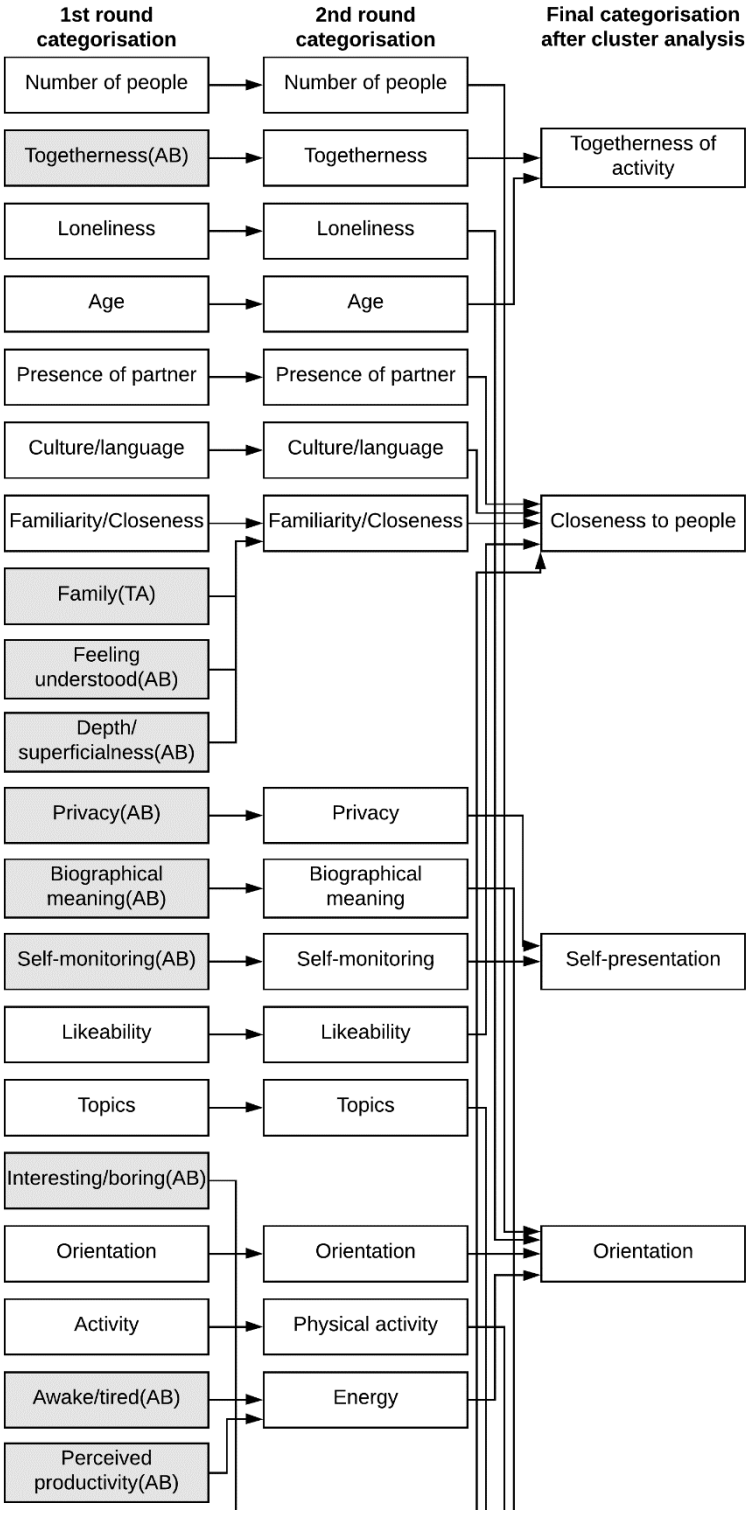
The following figure gives an overview of how categories (to summarise the elicited constructs) changed throughout the process of content analysis and cluster analysis. This appendix thus supplements section 7.2 and Chapter 10.

The first two rounds of categorisation consisted of broader and more detailed categories; the figure only shows the detailed categories. Category labels were translated from German and simplified for the purposes of this overview. Categories that were carried over from one round to the next are shown horizontally side by side. The arrows in the figure illustrate how constructs moved between rounds. To keep the figure legible, if constructs from one category moved to many categories, then arrows show only those paths representing the majority of constructs.

The first column shows the categories resulting from the first round of categorisation by two independent researchers. White boxes show 24 shared categories, whereas grey boxes show 15 non-shared categories. Of these, 12 were used only by the study author (marked with ‘AB’) and three were used only by the research assistant (marked with ‘TA’).

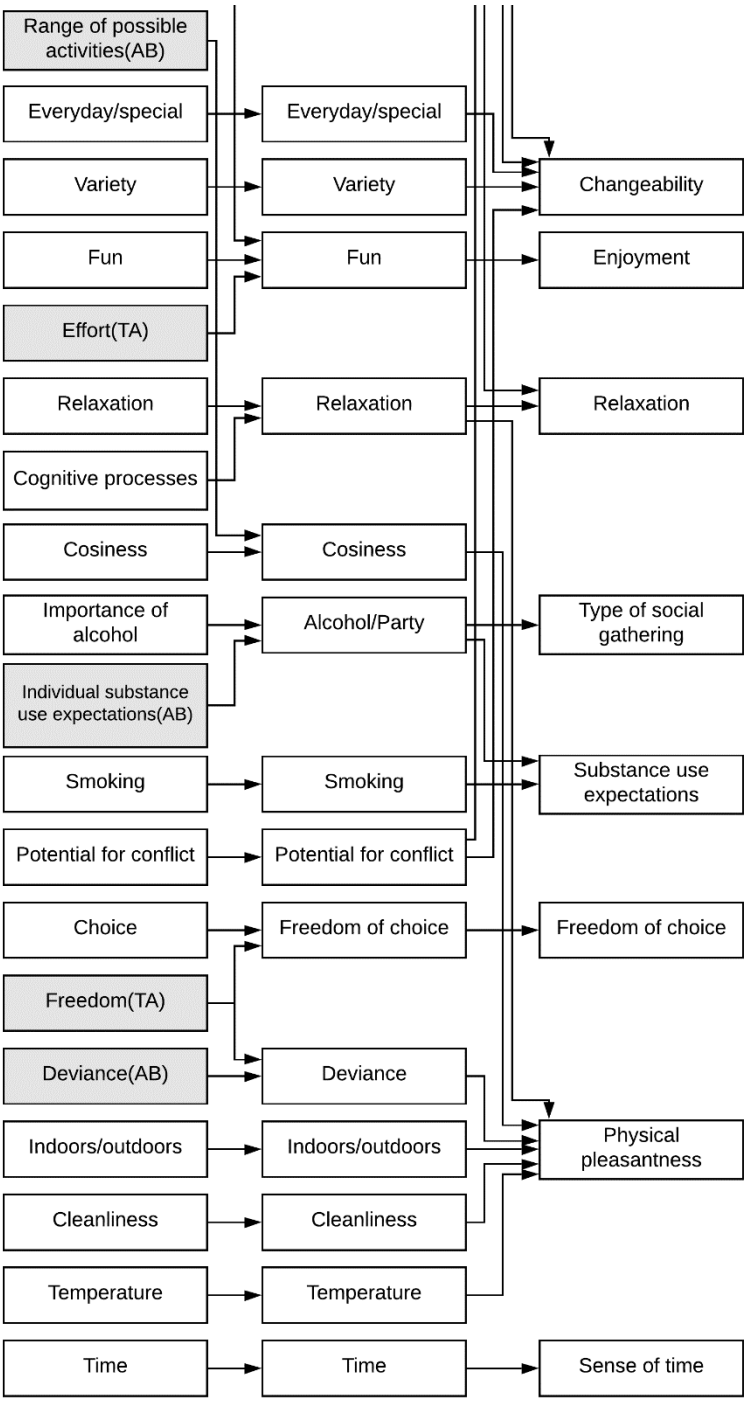
The second column shows the revised, jointly agreed category system comprising 29 categories, developed during a personal meeting between the study author and the research assistant. Seven of the study author's additional categories (grey boxes in the first column) were carried over, as these were considered to add important distinctions. Despite shared categories, constructs relating to “relaxation” and “cognitive processes” were identified as difficult to allocate, and the respective categories were merged. However, debriefing following the second round of categorisation suggested that this merge did not improve possibilities for categorisation, which prompted further changes during the final categorisation.

The third column shows the final category system which was developed following a numeric cluster analysis and discussion with the academic supervisor. The figure shows that some constructs were allocated in a new way. For example, the above-mentioned challenges concerning ‘relaxation’ were resolved by moving constructs describing relaxation/stress in response to physical surroundings to ‘physical pleasantness’. Similarly, a construct which was originally categorised as ‘freedom’ or ‘deviance’ was finally moved to ‘physical pleasantness’ (this is further commented upon in the results section).



(continued on next page)

(continued from previous page)



I.2 Table showing 108 original German language constructs allocated to 12 dimensions

The following table shows the 108 original constructs (as recorded on the repertory grid sheets during the interviews) allocated to the 12 final categories (resulting from content and cluster analyses, as described in section 7.2). Each construct is identified through the study participant number and the construct number. **English language summaries of all constructs and translations of exemplary constructs are provided in Chapter 10.**

For the subsequent quantitative analyses, some constructs were reversed by switching the poles to ensure that all poles within a category (and therefore the quantitative ratings) held a similar meaning. For example, in the first category (closeness), the left construct pole referred to feeling close while the right construct pole referred to feeling distant. The exception was construct 24.2 (left pole referred to feeling distant). For the quantitative analyses, this construct was used in a reversed form. The following table shows the original non-reversed constructs. However, an (R) at the end indicates that a construct was later reversed.

Decisions to reverse constructs for the quantitative analyses were made based on semantic content (i.e., comparing words and phrases used by study participants) but also by considering the numeric ratings. Specifically, the ratings on the “ideal space” (a hypothetical space of total well-being) were inspected to identify which pole was preferred. For example, if a study participant indicated that they wished to feel close to people in their ideal space, then “feeling close” was understood as the preferred pole. Poles were only considered to be aligned across constructs if they corresponded both on semantic meaning *and* preference. This was generally the case, except for the categories “orientation” and “changeability”. Here, study participants expressed different preferences for constructs which had similar semantic content. The table accounts for this by indicating which pole was preferred, based on the ratings awarded to the ideal space. In the subsequent quantitative analyses, subcategories were used to account for those differences.

The table also shows if a category contains multiple constructs from the same person (preceded with an asterisk). In total, there were 14 such instances. During subsequent quantitative analyses, the two constructs were either merged (8 instances) or the better fitting construct selected (if the other construct was ambiguous; 6 instances). In the latter case, the construct not used in subsequent quantitative analyses is shown in parentheses.

Closeness to people (feeling close or feeling distant)	**Orientation (outward/interaction or inward/self)**
20 constructs from 16 interview participants (IP):	17 constructs from 15 IP:
*1.4 Menschen, die mir sehr wichtig sind und die ich kenne VS. unbekannte Menschen, weniger wichtige Menschen *(1.5 Menschen, die aus meinem Land sind oder meine Muttersprache sprechen VS. "Ausländer" (sprechen andere Sprachen)) 2.1 "alltägliches Leben", kochen, wohnen, einrichten, wie man sich organisiert, harmonisch, "funktioniert gut" VS. zu intensiv, kann mir ein Zusammenleben nicht vorstellen, stur, angespannt im täglichen Leben 5.1 Personen, die ich gut kenne und mag VS. kenne Personen nicht so gut *6.1 "zuhause" fühlen, wohlfühlen, sich verstanden fühlen, über alles reden können VS. sich nicht verstanden fühlen, keine Kommunikation möglich bzw. erwünscht *6.3 unter uns sein, nur die Freunde VS. fremde Leute, nervige/anstrengende Leute *7.1 gute Freundinnen, mag gerne, unterhalten, Plaudern, gemütliches Zusammensitzen VS. versteht sich nicht so gut, hat nicht so viel gemeinsam, nicht viel verbindet *(7.2 Familie, man kann es sich nicht aussuchen VS. bloße Bekannte, sind wählbar) 8.4 persönlich, ganze Person VS. kennen nur einen Teil meiner Persönlichkeit 9.1 wichtige Leute, wohlfühlen, vertrauen, enge Freunde VS. Leute, die man nicht ausstehen kann 10.1 heimisches Gefühl, Vertrautheit, wichtige/enge Personen VS. Personen, die ich nicht so oft sehe, mit denen ich nicht so eng befreundet bin *11.2 Vertraut sein miteinander, intim, privat, untrennbar mit mir verbunden VS. unverbindlich (gefühlsmäßig), sich davon distanzieren können, es abkapseln können *(11.3 mein Freund ist dabei VS. mein Freund ist nicht dabei) 12.3 Leute, die ich mag VS. Leute, die ich nicht mag 13.1 Freundeskreis, der mir sehr nahesteht, Teil des Lebens, notwendig, kann alles erzählen, sieht oft, Vertrauen VS. gut befreundet aber steht nicht so nahe, man sieht sich nicht so oft, selten, muss nicht alles wissen, keine Verpflichtung 14.2 viele Leute, nicht so eng, eher oberflächliche Gespräche VS. nur eine weitere Person, enger befreundet, tiefgründige Gespräche, sich öffnen können (R) 16.1 freundschaftliches Beisammensein, frei gewählt VS. oberflächlich, erzwungen, kann es mir nicht aussuchen 19.2 besser kenne, leichter miteinander, eher wie Familie, will ich oft sehen VS. sieht nicht so oft, nicht im Alltag (weniger gut kennen) 22.1 tiefgründige Gespräche/Inhalte VS. oberflächliche Gespräche/Inhalte 24.1 fühle mich wohl, nur Leute, die ich mag VS. "nicht meine Leute", "Leute die nicht imponieren"	***'outward/interaction' is the preferred pole:*** 1.1 es ist lustiger, da zu sein (z.B. reden, etwas spielen) VS. einsam ("lonely") (z.B. Serien/Filme schauen, lernen) 3.3 mit niemandem reden VS. viel Kommunikation (R) 5.3 nicht alleine, habe jemanden zum Unterhalten VS. habe niemanden zum Reden 6.6 Rückzugsort, alleine sein, "sich fassen", "runterkommen" VS. Erlebtes verarbeiten, drüber reden, aufgeheitert werden, abgelenkt werden (R) 9.4 Energie, produktiv (Natur, draußen, Sport machen) VS. faul sein, nichts tun, unproduktiv, prokrastinieren 14.4 wohlfühlen, Vertrautheit, reden können aber nicht müssen, Zusammensein macht Spaß VS. allein - niemanden zum Unterhalten haben, "fad", Dinge erledigen, warten bis wieder andere Leute kommen 16.5 sozial, socialising, Inputs von außen, gesellschaftliches Ich VS. Selbstreflektion, Ich-Bezug, keine Erwartungen an mich *21.2 wach, aktiv teilnehmen, habe mehr Energie VS. müde, energielos, undynamisch *21.3 tue etwas Produktives, bekomme Energie, erfrischend VS. tue nicht viel, unproduktiv 22.3 in Gesellschaft, viele Leute (Anzahl) [1=3+, 2=2, 3=1, 5=alleine] VS. allein [1=3+, 2=2, 3=1, 5=alleine] 24.5 Kontakt - viele Leute, am neuesten Stand bleiben, neue Leute kennen lernen, Kommunikation, Rauskommen VS. Abkapseln, Stille ***'inward/self' is the preferred pole:*** 11.1 Nebeneinander nichts tun können VS. Plaudern, Aktivitäten (Stille kommt selten vor) (anstrengend) 15.1 intim, Privatsphäre mit niemandem teilen müssen, privat VS. gesellig, offen, kein Rückzugsort 17.4 rausgehen, andere Leute treffen, Austausch mit Anderen, extrovertiert VS. Zeit für mich/uns, Rückzugsort, introvertiert (R) 19.3 kann tun und machen was ich will, muss mich nicht auf andere Personen einstellen VS. muss mich mit einer anderen Person/Sache beschäftigen, soziale Interaktion steht im Vordergrund *20.2 jemand mit dem ich reden kann, mich gut unterhalten kann VS. allein (R) *20.3 denke nach was passiert ist, was in Zukunft, Selbstreflektion VS. nicht relevant für uns selbst, tratschen, weniger reflexiv, Fokus auf Gegenwart, abschalten

Togetherness of activity (together or separate)	**Changeability (varied or the same)**
5 constructs from 4 IP:	12 constructs from 9 IP:
1.2 ältere Personen VS. jüngere Leute (R) *(4.5 Gleichaltrige, junge Leute (Freunde) VS. unterschiedliche Altersgruppe (Familie)) *4.6 gemütlich, weniger Diskussionen, alle haben die gleiche Meinung darüber, was man macht, alle zusammen, man macht etwas als Gruppe VS. getrennte Aktivitäten, Personen verlassen den Raum schneller 5.2 weniger Leute, kleine Gruppe, gemeinsames Gespräch VS. viele Leute, große Gruppe, Unterhaltung: nicht mehr alle gemeinsam 8.1 zusammensitzen und miteinander reden VS. aufgeteilt, nicht alle zusammen, alle machen nicht das gleiche	***'varied' is the preferred pole:*** 2.2 körperliche Bewegung (und frische Luft) VS. kochen, spielen, reden, essen, nicht viel körperliche Bewegung *3.1 langweilig, monoton, keine Emotion, immer dasselbe, "Routine", "nichts Besonderes" VS. abwechslungsreich, immer etwas Anderes, emotional besetzt (R) *3.5 "bunte Farben", spezielles Ereignis VS. alltäglich *(4.2 Bewegung (und tratschen), man tut etwas, geht voran VS. liegen/sitzen (und tratschen)) *4.3 neue Orte kennenlernen, viel sehen, viel Neues sehen VS. selber Platz, gleicher Fleck, ein Ort, den man eh schon mag 9.3 aufgewachsen, viel Geschichte, Erinnerungen VS. neu, in mein Leben dazu gekommen, noch nicht mit Erinnerungen besetzt (R) 20.1 unterwegs, abwechslungsreich, neu VS. nur die 4 Wände, kenne es schon *23.1 viele neue Eindrücke, Offenheit, Gefühl von Weite VS. nichts Neues, visuell nicht stimulierend, "eingesperrt", begrenzt *23.2 dieselbe Person, zu zweit, weniger Leute, weniger abwechslungsreich VS. gesellig, abwechslungsreich, verschiedene Personen, Anzahl mehr (R) ***'the same' is the preferred pole:*** 6.5 gewohnt, persönlich, Leute zum Reden, gut unterhalten können, über engste Sachen reden können VS. Abenteuer, Neues, neue Kontakte, man vertraut sich nicht alles an, auf sich selber gestellt 21.1 spannungsfrei, entspannt, vorhersehbar, konfliktfrei VS. unberechenbar, könnte explodieren, Konfliktpotenzial 22.2 besonders, "Anlass", Verabredung VS. alltäglich, spontan, ergibt sich aus der Routine heraus (R)

Enjoyment (delighted or reluctant)	**Relaxation (resting mind or active mind)**
6 constructs from 5 IP:	12 constructs from 11 IP:
*7.3 Themen, wo mitreden kann bzw. die interessieren VS. nix zu tun, gelangweilt, Rauchen, Alkohol, Playstation spielen, Themen: Mädls *7.4 Spaß, gerne VS. Zweck, Verpflichtung(en) 11.4 Freizeitvergnügen, mache ich gerne VS. notwendiges Übel, genervt 16.3 Vorfreude, fix eingeplant VS. "ich muss dann noch…", ungern, lieber etwas Anderes 17.1 freiwillig, selbstbestimmt, Spaß/Freude VS. Verpflichtung, Ernst, "trocken" 23.3 macht mir Spaß, mache ich gerne VS. macht mir weniger Spaß, interessiert mich weniger	3.6 kognitiver Prozess, muss denken, etwas Intellektuelles VS. reiner/leerer Kopf (R) 6.4 kein Druck, Stress, es sich selber einteilen VS. (Leistungs)Druck, nix passt, mit anderen verglichen werden, nicht gut genug sein *(8.2 Verbindungspunkt/Themen: Beruf und Ausbildung VS. andere Themen: Freunde, "Belangloses" (R)) *8.3 Entspannung, Spaß, lustig VS. anstrengend, Arbeit, "nicht lustig" 9.5 Entspannung, Auszeit VS. Anspannung, Aufregung, etwas steht bevor oder ist zu tun, Stress 12.4 Stresssituationen, muss noch was erledigen oder machen, denke darüber nach VS. stresst mich nicht, nichts tun und nichts denken müssen (R) 14.3 reflektiertes Nachdenken, entspannend, abschalten VS. stressig, zielorientiertes Denken, anstrengender 15.3 stressig, Druck, zB noch etwas machen müssen, zB etwas falsch machen VS. stressfrei, relaxed, Energie, keine Hintergedanken (R) 16.2 "Leben", Unruhe, Action, aktiv, Musik, was lernen VS. Rückzugsort, ruhig, entspannen (R) 17.3 Kopfsache, aufraffen hinzugehen, im Kopf "in Bewegung", Reden, lernen, auch Mühsames/Unangenehmes VS. faul, nix tun, entspannen, alles liegen lassen, abschalten (R) 18.3 gedanklich abschalten, alles ist erledigt, muss nichts mehr leisten VS. gedanklich aktiv bleiben, Energie aufheben für später 22.4 (gerne weil) einfacher, leicht VS. (ungerne weil) anstrengend, sich konzentrieren, sich etwas merken müssen, aktiv sein müssen

Type of social gathering (cosy get-together or party/excess)	**Substance use expectations (expected or opposed)**
5 constructs from 4 IP:	3 constructs from 3 IP:
*5.4 Party, Gemeinschaft, Spaß, es muss lustig sein, Kontakte pflegen, Neuigkeiten erfahren, "Probleme" gehören nicht dazu VS. es muss nicht lustig sein, man kann auch über etwas Ernstes reden (R) *5.5 Fortgehen, Trinken, Rausch, Fortgehmusik, laut, unterwegs, muss schreien beim Unterhalten VS. zusammensitzen, gemütlich, man bleibt da, Spiele spielen (z.B. Brettspiele, keine Trinkspiele), Trinken nebenbei (v.a. wegen des Geschmacks), Musik im Hintergrund, Unterhaltung (R) 6.2 Spielen, Tratschen, Alkohol steht nicht im Vordergrund, gemütlich, "Jogginghose" VS. Fortgehen, Alkohol/Betrunkensein steht im Vordergrund, Essen (R) 10.2 gemütliches Beisammen sitzen, reden, besser zum Kommunizieren, vertrauter Kreis VS. Tanzen, Ausgelassenheit, eher fremde Leute kennenlernen, Feiern 14.1 Ziel: Betrunken werden, kann ausarten, Treffen um zu trinken VS. gemütliches Trinken (wenn überhaupt), Trinken steht nicht im Vordergrund (R)	12.1 frei in Bezug auf Rauchen VS. gezwungen rauszugehen zum Rauchen, wegen Person 13.2 Leute gegen Rauchen, kann nicht rauchen VS. hier kann ich rauchen, es stört niemanden (R) 21.4 Erwartung, dass Alkohol (und Shisha) konsumiert wird, "gehört dazu" VS. Alkohol passt zu diesem Ort nicht dazu

Freedom of choice (self- or other-determined)	**Self-presentation (be myself or restrain myself)**
7 constructs from 7 IP:	6 constructs from 5 IP:
3.4 viele unbekannte Menschen, "keine Wahl" VS. gemütlich fühlen, allein sein wenn ich will (R) 9.2 frei, selbständig, unabhängig VS. eingesperrt, alte Muster, von Anderen beeinflusst, Strukturen, Veränderungen nicht möglich, eingefahren 11.5 mache etwas für mich VS. mache etwas für die Anderen 12.2 freie Entscheidung ob treffen oder nicht, selber entscheide ob mache oder nicht VS. gezwungen, "muss nicht sein" 16.4 alles was ich gerne hab, "good vibes only", selbstbestimmt VS. Pflicht, kann mir die Atmosphäre nicht aussuchen, muss aus dem, was da ist, das Beste machen 22.5 freiwillig, freie Wahl VS. Inhalte sind vorgegeben 24.6 Freizeitaktivität, Unternehmung, "etwas gemacht", "möchte" VS. Programm, Vornehmen, etwas zu erledigen, "muss"	1.6 viele Unbekannte, sich bewusst sein bzw. daran denken, was ich mache oder wie ich mich anziehe VS. heimelige Atmosphäre, wenige Menschen, fühle mich sicher/entspannt (R) 4.4 Gemütlichkeit und Wohlfühlen, "Zuhause"-Gefühl, keine Fremden, geschlossener Kreis, man fühlt sich freier VS. keine Privatsphäre, viele Leute, die man nicht kennt, Einschränkungen 13.4 bin gerne da, freier, gelassen, entspannt VS. man muss sich kontrollieren, darf nicht alles, aufpassen 18.2 nicht anstrengend, nicht überlegen müssen VS. Gespräch am Leben erhalten, darauf achten, wie ich mich benehme (zB höflich, lustig), anstrengend, Energie *24.2 keine Verantwortung, nicht aufpassen müssen (zB Lautstärke, Musik, Alkoholpegel) VS. alles beobachten müssen, Spannungsverhältnis, angespannt, verantwortlich *24.3 kein Rededruck, kann über alles reden - aufgrund enger Bindung VS. überlegen, WAS reden müssen/können, auf Wortwahl achten

Physical pleasantness (physically pleasant or unpleasant)	**Sense of time (open-end or time-limited)**
10 constructs from 10 IP:	5 constructs from 5 IP:
1.3 "zivil", Musikanten spielen, Touristen VS. "frei", flegelhaftes Benehmen (Cannabis Geruch in der Nacht) 4.1 angenehmes Klima, angenehme Temperatur, nicht so heiß VS. sehr heiß, viel zu heiß 8.5 Ruhe, angenehm, loslassen, "einfach sitzen" VS. Unruhe, hektisch, "Kommen und Gehen" 11.6 ruhig, entspannt, Kräfte behalten VS. anstrengend, ermüdend, auslaugend, weil laut (Lautstärke), unruhig, wurlig 12.5 Sauberkeit, Hygiene VS. unhygienisch, mir graust, will mich dort nicht aufhalten oder muss zuerst putzen 13.3 draußen - frische Luft (in Bezug auf Rauch und Rauchen) VS. drinnen - stickig (in Bezug auf Rauch und Rauchen) 15.4 ungemütlich, steril, karg, kühl, "Arztzimmer" VS. gemütlich eingerichtet, "Schlafzimmer", freundlich (R) 17.2 locker, heiter, entspannt, z.B. Abend ausklingen lassen (Stimmung) VS. hektisch, unruhig 19.1 gemütlich, viele Aktivitäten möglich (zB kochen, Filme), auch Jogginghose ist ok VS. 1 Aktivität (zB sitzen, unterhalten, trinken), formell, einseitig 24.4 frische Luft, draußen, Tiere, Natur, Sonne, Bewegung, Sport VS. im Raum drinnen, dunkel, klein, beschränkt, stickig, Stadt	2.3 viel Zeit miteinander, unstrukturierte Zeit VS. zeitlich beschränkt, Verabredung, strukturiert, geplant 3.2 kurze Zeit, zeitlich begrenzt VS. längerer Zeitraum (R) 15.2 "echtes" Treffen, Plan, bestimmtes Ziel, längerer Zeitraum VS. kurz, Kommen und Gehen, Durchzugsraum, spontan 18.1 Zeit bleibt stehen, man muss nirgends weiter, hat nichts vor, Urlaubsfeeling, open end (abends) VS. kürzer, geplant, terminisiert, muss nachher noch etwas tun (tagsüber) 19.4 längerer Zeitraum, offen, "open end" VS. (kurzer) Zeitraum "pointiert", definiert

I.3 Indicators relating to the importance of constructs

The following table shows different indicators to help judge the importance of constructs to the study participants as a group and as individuals.

The first indicator is *frequency*. The first column here shows how many constructs were allocated to the category, expressed as an absolute number and as a proportion of all 108 constructs. The second column provides the same information with reference to all 24 study participants. The absolute numbers differ between the two columns if a category contained several constructs from the same individual.

The second indicator is *elicitation order*. The first column shows how often a construct from this category was elicited first, expressed as an absolute number and as a proportion of the study participants who reported constructs in this category. The second column shows how often a construct from this category was elicited second, and the third column shows how often a construct was elicited first or second. The third column accounts for multiple constructs from the same person and is therefore not always the sum of the other two columns.

The final indicator is *importance for the grid topic* (approximated in the present study as importance for a hypothetical ideal space, further described in section 6.2.7). The first column shows how often a construct from this category was considered to be most important for the study participant's ideal space, expressed as an absolute number and as a proportion of the study participants who reported constructs in this category and who provided such rankings[868]. The second column shows how often a construct from this category was considered to be second most important, and the third column shows how often a construct was considered to be first or second most important. The third column is the sum of the other two columns as there were no instances in which two constructs from the same person were ranked as most and second most important within the same category.

In addition to these figures, ranks are provided per column, with the first rank indicating the most important category within a column. In the case of tied ranks (i.e., equivalent values), the rank mean was calculated in line with standard practice.

[868] This ranking task was added after the start of the data collection and therefore data were not available for the first three study participants.

	Frequency		Elicitation order			Importance for ideal space		
Dimension	Nr constructs (% of 108) Rank	Nr IP (% of 24) Rank	Nr IP elicited first (% of IP in this category) Rank	Nr IP elicited second	Nr IP elicited first or second	Nr IP rated most important for ideal space	Nr IP rated 2nd most important for ideal space	Nr IP rated most or 2nd most important for ideal space
Closeness to people	20 (19%) *1.*	16 (67%) *1.*	10 (63% of 16) *1.*	4 (25% of 16) *8.*	13 (81% of 16) *1.*	4 (29% of 14) *6.*	6 (43% of 14) *3.*	10 (71% of 14) *3.*
Orientation	17 (16%) *2.*	15 (63%) *2.*	3 (20% of 15) *7,5. (=)*	2 (13% of 15) *10.*	5 (33% of 15) *8.*	3 (23% of 13) *7.*	2 (15% of 13) *7.*	5 (38% of 13) *8.*
Togetherness of activity	5 (5%) *10. (=)*	4 (17%) *10,5. (=)*	1 (25% of 4) *4,5. (=)*	2 (50% of 4) *1,5. (=)*	3 (75% of 4) *3,5. (=)*	0	0	0
Changeability	12 (11%) *3,5. (=)*	9 (38%) *5.*	4 (44% of 9) *2.*	4 (44% of 9) *3.*	7 (78% of 9) *2.*	0	4 (57% of 7) *1.*	4 (57% of 7) *4.*
Enjoyment	6 (6%) *7,5. (=)*	5 (21%) *8. (=)*	1 (20% of 5) *7,5. (=)*	0	1 (20% of 5) *11.*	3 (60% of 5) *1.*	2 (40% of 5) *4.*	5 (100% of 5) *1.*
Relaxation	12 (11%) *3,5. (=)*	11 (46%) *3.*	0	2 (18% of 11) *9.*	2 (18% of 11) *12.*	3 (30% of 10) *5.*	1 (10% of 10) *8.*	4 (40% of 10) *7.*
Type of social gathering	5 (5%) *10. (=)*	4 (17%) *10,5. (=)*	1 (25% of 4) *4,5. (=)*	2 (50% of 4) *1,5. (=)*	3 (75% of 4) *3,5. (=)*	0	1 (25% of 4) *6.*	1 (25% of 4) *10.*
Substance use expectations	3 (3%) *12.*	3 (13%) *12.*	1 (33% of 3) *3.*	1 (33% of 3) *6.*	2 (67% of 3) *5.*	0	0	0
Freedom of choice	7 (6%) *6.*	7 (29%) *6.*	0	2 (29% of 7) *7.*	2 (29% of 7) *10.*	3 (50% of 6) *2,5. (=)*	0	3 (50% of 6) *5,5. (=)*
Self-presentation	6 (6%) *7,5. (=)*	5 (21%) *8. (=)*	0	2 (40% of 5) *4,5. (=)*	2 (40% of 5) *7.*	2 (50% of 4) *2,5. (=)*	0	2 (50% of 4) *5,5. (=)*
Physical pleasantness	10 (9%) *5.*	10 (42%) *4.*	2 (20% of 10) *7,5. (=)*	1 (10% of 10) *11.*	3 (30% of 10) *9.*	3 (33% of 9) *4.*	4 (44% of 9) *2.*	7 (78% of 9) *2.*
Sense of time	5 (5%) *10. (=)*	5 (21%) *8. (=)*	1 (20% of 5) *7,5. (=)*	2 (40% of 5) *4,5. (=)*	3 (60% of 5) *6.*	0	1 (33% of 3) *5.*	1 (33% of 3) *9.*

IP … Interview participant
(=) … Tied ranks within the column

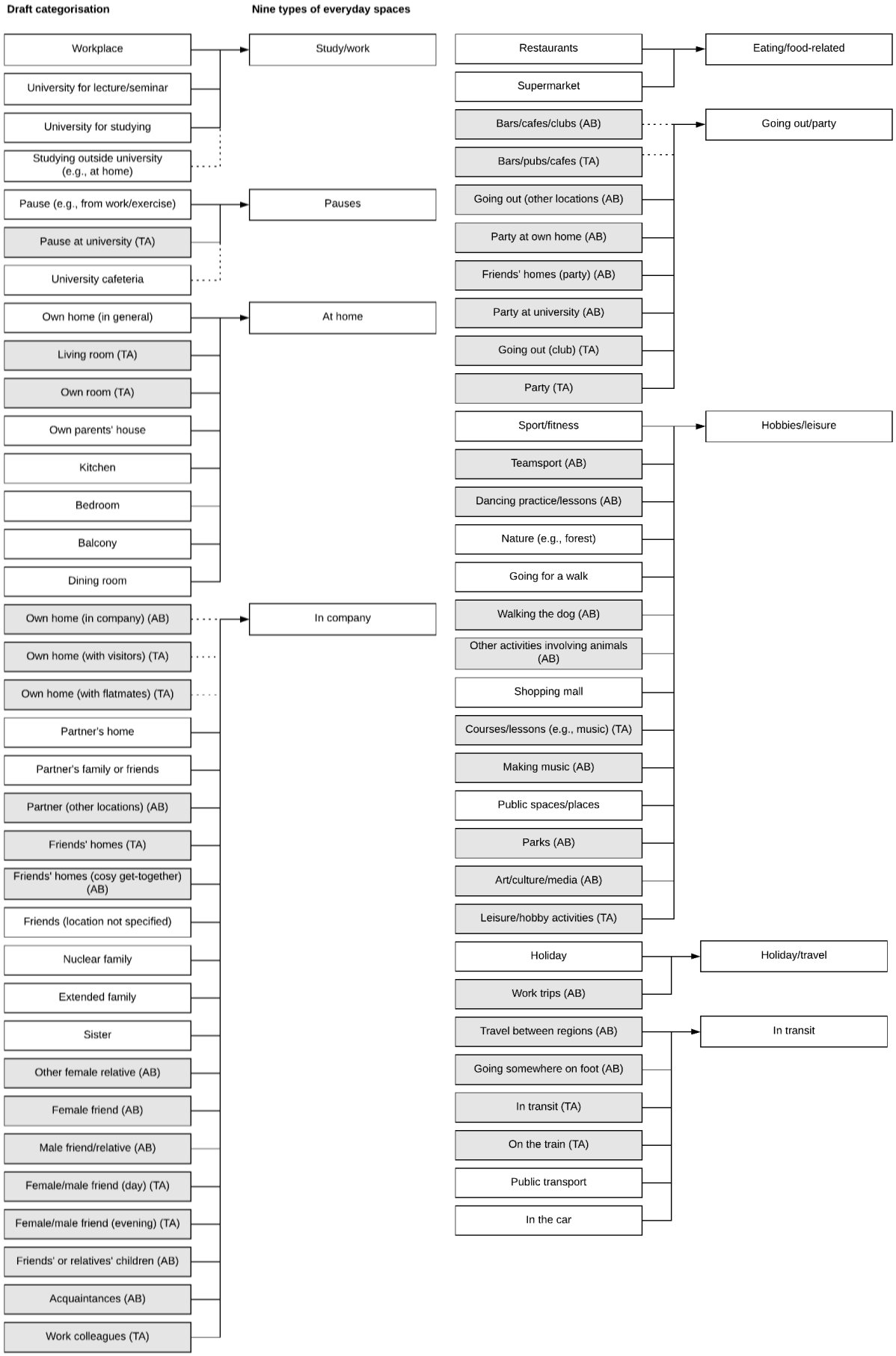
Appendix J: Analysis of elicited spaces

J.1 Development of general typology of everyday situations

The following figure gives an overview of the draft categories used to summarise the elicited spaces (see Chapter 9). Category labels were translated from German for this overview.

The draft categorisation consisted of broad and detailed categories. The first column shows the detailed categories resulting from the draft categorisation by two independent researchers. White boxes show 28 shared categories, whereas grey boxes show 39 non-shared categories. Of these, 23 were used only by the study author (marked with “AB”) and 16 were used only by the research assistant (marked with “TA”). The second column shows nine general types of everyday situations, developed from the broad categories.

The arrows in the figure illustrate the main paths along which elicited spaces were allocated to the general typology of everyday situations. Exemplary dashed lines have been included to highlight that spaces could be allocated to more than one type.


Draft categorisation
Nine types of everyday spaces
Workplace
University for lecture/seminar
University for studying
Studying outside university (e.g., at home)
Study/work
Pause (e.g., from work/exercise)
Pause at university (TA)
University cafeteria
Pauses
Own home (in general)
Living room (TA)
Own room (TA)
Own parents' house
Kitchen
Bedroom
Balcony
Dining room
At home
Own home (in company) (AB)
Own home (with visitors) (TA)
Own home (with flatmates) (TA)
Partner's home
Partner's family or friends
Partner (other locations) (AB)
Friends' homes (TA)
Friends' homes (cosy get-together) (AB)
Friends (location not specified)
Nuclear family
Extended family
Sister
Other female relative (AB)
Female friend (AB)
Male friend/relative (AB)
Female/male friend (day) (TA)
Female/male friend (evening) (TA)
Friends' or relatives' children (AB)
Acquaintances (AB)
Work colleagues (TA)
In company
Restaurants
Supermarket
Eating/food-related
Bars/cafes/clubs (AB)
Bars/pubs/cafes (TA)
Going out (other locations (AB)
Party at own home (AB)
Friends' homes (party) (AB)
Party at university (AB)
Going out (club) (TA)
Party (TA)
Going out/party
Sport/fitness
Teamsport (AB)
Dancing practice/lessons (AB)
Nature (e.g., forest)
Going for a walk
Walking the dog (AB)
Other activities involving animals (AB)
Shopping mall
Courses/lessons (e.g., music) (TA)
Making music (AB)
Public spaces/places
Parks (AB)
Art/culture/media (AB)
Leisure/hobby activities (TA)
Hobbies/leisure
Holiday
Work trips (AB)
Holiday/travel
Travel between regions (AB)
Going somewhere on foot (AB)
In transit (TA)
On the train (TA)
Public transport
In the car
In transit

J.2 Supplied constructs data on elicited spaces, by setting

J.2.1 Arithmetic means ($\bar{x}$) of supplied constructs on elicited spaces, by setting

	n	Importance	Valence	Visitation/occurrence	Frequency of … use											
					Beer	Wine	Cider	Sparkling wine	Spirits	Mixed drinks	Cigarettes	Cigar/cigarillo	Waterpipe	E-cigarettes	Alcohol with medicines	Ritalin
Own home	50	4,2	4,3	4,4	1,5	1,8	1,0	1,3	1,3	1,3	1,6	1,0	1,1	1,0	1,1	1,1
Parents' home	18	4,2	4,2	3,0	1,3	1,8	1,0	1,3	1,1	1,1	1,2	1,0	1,0	1,0	1,0	1,0
Partner's home	14	4,2	4,6	4,1	2,1	2,4	1,2	1,4	1,4	1,4	1,6	1,0	1,6	1,0	1,0	1,0
Home of friends/ acquaintances	15	3,4	4,3	3,5	2,1	2,8	1,1	1,8	1,6	1,3	2,1	1,0	1,1	1,0	1,0	1,0
Home of relatives/ acquaintances	7	3,9	4,3	2,9	1,7	1,4	1,0	1,4	1,1	1,0	2,1	1,0	1,0	1,0	1,0	1,0
University	39	3,7	3,5	4,1	1,1	1,2	1,0	1,0	1,0	1,0	1,7	1,0	1,0	1,0	1,0	1,0
Workplace	16	3,5	3,6	4,1	1,1	1,2	1,0	1,1	1,0	1,0	1,7	1,0	1,0	1,0	1,0	1,0
Café/Bar/ Restaurant	46	3,7	4,3	3,2	2,4	2,3	1,3	1,3	1,8	1,8	2,3	1,0	1,2	1,0	1,1	1,0
Nightclub	4	2,5	3,5	2,0	2,8	3,5	1,0	1,3	2,8	2,5	2,3	1,0	1,8	1,0	1,5	1,0
Sports facilities	16	3,9	4,3	4,0	1,2	1,1	1,0	1,1	1,0	1,0	1,3	1,0	1,0	1,0	1,0	1,0
Other leisure facilities	9	3,4	4,1	3,3	1,9	1,6	1,0	1,0	1,2	1,0	1,6	1,0	1,0	1,0	1,0	1,0
Nature	20	4,4	4,6	3,3	1,1	1,6	1,0	1,2	1,2	1,1	2,0	1,0	1,1	1,0	1,0	1,0
Urban spaces	24	3,7	4,8	3,5	1,8	1,5	1,1	1,1	1,3	1,4	2,6	1,0	1,1	1,0	1,0	1,0
Shopping	4	2,8	3,8	3,5	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Public transport	8	2,8	3,1	4,0	1,3	1,1	1,0	1,0	1,3	1,4	1,5	1,0	1,0	1,0	1,1	1,0
Car	4	3,5	3,5	4,0	1,0	1,0	1,0	1,0	1,0	1,0	2,0	1,0	1,0	1,0	1,0	1,0
Holiday/Work trip	20	4,0	4,7	1,3	2,0	1,8	1,3	1,2	1,5	1,3	1,3	1,1	1,2	1,0	1,0	1,0
All elicited spaces	296	3,8	4,2	3,6	1,6	1,7	1,1	1,2	1,3	1,3	1,8	1,0	1,1	1,0	1,0	1,0

Importance: 1 = not at all important, 5 = very important; Valence: 1 = negative, 5 = positive
Frequency of visitation/occurrence: 1 = annually or less frequently, 5 = daily or almost daily
Frequency of substance use: 1 = never (in the typical situation), 5 = always (in the typical situation)

Note. As the table aims to give an overview of all elicited spaces, these data have *not* been additionally weighted to account for differences between study participants. For example, the "Cigarettes" column includes elicited spaces from non-smokers, occasional smokers and daily smokers, and all spaces are given equal weight. Vertical shading and horizontal double lines are provided to facilitate reading of the table.

J.2.2 Standard deviations (SD) of supplied constructs on elicited spaces, by setting

	n	Importance	Valence	Visitation/occurrence	Frequency of … use											
					Beer	Wine	Cider	Sparkling wine	Spirits	Mixed drinks	Cigarettes	Cigar/cigarillo	Waterpipe	E-cigarettes	Alcohol with medicines	Ritalin
Own home	50	1,0	0,9	0,8	0,8	1,0	0,2	0,6	0,7	0,7	1,3	0,0	0,6	0,2	0,3	0,4
Parents' home	18	1,4	0,9	1,0	0,6	1,0	0,0	0,7	0,2	0,3	0,7	0,0	0,0	0,0	0,0	0,0
Partner's home	14	0,9	0,5	0,6	1,1	1,1	0,6	0,5	0,6	0,8	1,4	0,0	1,0	0,0	0,0	0,0
Home of friends/ acquaintances	15	1,0	1,1	0,6	1,3	1,4	0,2	1,1	1,1	0,9	1,6	0,0	0,2	0,0	0,0	0,0
Home of relatives/ acquaintances	7	0,6	0,7	1,2	0,7	0,7	0,0	1,0	0,3	0,0	1,8	0,0	0,0	0,0	0,0	0,0
University	39	1,1	0,9	0,7	0,3	0,7	0,0	0,0	0,2	0,2	1,4	0,0	0,0	0,0	0,0	0,0
Workplace	16	1,3	1,1	0,6	0,2	0,5	0,0	0,3	0,0	0,0	1,4	0,0	0,0	0,0	0,0	0,0
Café/Bar/ Restaurant	46	1,1	0,8	1,0	1,6	1,5	0,9	0,7	1,2	1,1	1,6	0,0	0,6	0,0	0,3	0,0
Nightclub	4	1,1	0,9	0,0	1,1	1,1	0,0	0,4	1,3	1,5	0,8	0,0	1,3	0,0	0,9	0,0
Sports facilities	16	1,1	0,8	0,6	0,5	0,2	0,0	0,2	0,0	0,0	1,0	0,0	0,0	0,0	0,0	0,0
Other leisure facilities	9	0,7	0,9	0,5	1,3	1,0	0,0	0,0	0,6	0,0	1,3	0,0	0,0	0,0	0,0	0,0
Nature	20	0,8	0,7	1,3	0,3	1,2	0,0	0,4	0,5	0,4	1,6	0,0	0,4	0,0	0,0	0,0
Urban spaces	24	0,9	0,4	0,7	1,4	1,0	0,3	0,3	0,9	1,2	1,9	0,0	0,4	0,0	0,2	0,0
Shopping	4	0,8	0,8	0,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Public transport	8	1,3	0,6	0,9	0,7	0,3	0,0	0,0	0,7	1,0	1,3	0,0	0,0	0,0	0,3	0,0
Car	4	1,1	0,5	0,7	0,0	0,0	0,0	0,0	0,0	0,0	1,7	0,0	0,0	0,0	0,0	0,0
Holiday/Work trip	20	0,8	0,6	0,6	1,5	1,4	1,0	0,5	0,9	0,8	0,9	0,2	0,9	0,0	0,0	0,0
All elicited spaces	296	1,1	0,9	1,1	1,1	1,1	0,4	0,6	0,8	0,8	1,5	0,1	0,5	0,1	0,2	0,2

Note. Larger standard deviations indicate greater heterogeneity in how settings were construed by study participants. All supplied constructs were provided as 5-point scales ranging from 1 to 5. For the corresponding arithmetic means, see the previous page. Vertical shading and horizontal double lines are provided to facilitate reading of the table.

J.3 Elicited spaces by setting and by situated substance use pattern

J.3.1 Correspondence of classification by setting and by situated substance use pattern

		Situated substance use pattern											
		NSU pos	NSU neg	Alc	Beer/wine	Spirits/mixers	Cig pos	Cig neg	Alc&cig	Cig&beer/wine	Cig&spirits/mixers	Waterpipe(&alc/cig)	Medication(&alc/cig)
Setting	Own home	**20**	9	10	**8**	1	5	0	3	1	2	0	**3**
	Parents' home	**10**	3	4	3	0	0	0	1	1	0	0	0
	Partner's home	**5**	0	**5**	4	1	1	0	1	1	0	**2**	0
	Home of friends/ acquaintances	3	1	**6**	2	3	2	0	3	**2**	0	0	0
	Home relatives/ acquaintances	**2**	1	**2**	1	0	**2**	0	0	0	0	0	0
	University	12	**18**	2	2	0	2	**5**	0	0	0	0	0
	Workplace	**8**	5	0	0	0	1	1	1	1	0	0	0
	Café/Bar/ Restaurant	6	3	**19**	5	**9**	5	2	**8**	**2**	**6**	1	2
	Nightclub	0	0	**2**	**2**	0	0	0	1	0	1	0	1
	Sports facilities	**11**	3	1	1	0	1	0	0	0	0	0	0
	Other leisure facilities	**6**	0	2	1	1	0	0	1	1	0	0	0
	Nature	**10**	1	4	3	1	4	0	0	0	0	1	0
	Urban spaces	**11**	0	3	2	1	**6**	0	2	1	1	1	1
	Shopping	**2**	**2**	0	0	0	0	0	0	0	0	0	0
	Public transport	1	**5**	0	0	0	0	1	0	0	0	0	1
	Car	**2**	1	0	0	0	0	1	0	0	0	0	0
	Holiday/Work trip	7	0	**11**	4	4	0	0	1	1	0	1	0
	Setting not defined	**1**	0	**1**	**1**	0	0	0	0	0	0	0	**1**
	Total[a]	110	51	64	35	18	28	10	21	11	9	5	7

Note. Numbers in cells show how 296 elicited spaces were allocated to settings and to situated substance use patterns. Populated cells are highlighted through shadowing, with top ranking cells (by column and by row) additionally emphasised. The presumed independent variable (setting) is shown as the row variable for layout purposes. See next page for tables for percentual figures.

[a] "Total" in last row refers to number of spaces allocated to a situated substance use pattern. These numbers do not equal the sums per column (not stated) because some spaces were allocated to more than one setting.

J.3.2 Setting by situated substance use pattern

		Situated substance use pattern											
		NSU pos	NSU neg	Alc	Beer/wine	Spirits/mixers	Cig pos	Cig neg	Alc&cig	Cig&beer/wine	Cig&spirits/mixers	Waterpipe(&alc/cig)	Medication(&alc/cig)
Setting	Own home	**18%**	**18%**	**16%**	**23%**	6%	**18%**	0%	14%	9%	**22%**	0%	**43%**
	Parents' home	9%	6%	6%	9%	0%	0%	0%	5%	9%	0%	0%	0%
	Partner's home	5%	0%	8%	11%	6%	4%	0%	5%	9%	0%	**40%**	0%
	Home of friends/ acquaintances	3%	2%	9%	6%	**17%**	7%	0%	14%	**18%**	0%	0%	0%
	Home relatives/ acquaintances	2%	2%	3%	3%	0%	7%	0%	0%	0%	0%	0%	0%
	University	11%	**35%**	3%	6%	0%	7%	**50%**	0%	0%	0%	0%	0%
	Workplace	7%	10%	0%	0%	0%	4%	10%	5%	9%	0%	0%	0%
	Café/Bar/ Restaurant	5%	6%	**30%**	14%	**50%**	**18%**	**20%**	**38%**	**18%**	**67%**	**20%**	**29%**
	Nightclub	0%	0%	3%	6%	0%	0%	0%	5%	0%	11%	0%	14%
	Sports facilities	10%	6%	2%	3%	0%	4%	0%	0%	0%	0%	0%	0%
	Other leisure facilities	5%	0%	3%	3%	6%	0%	0%	5%	9%	0%	0%	0%
	Nature	9%	2%	6%	9%	6%	14%	0%	0%	0%	0%	**20%**	0%
	Urban spaces	10%	0%	5%	6%	6%	**21%**	0%	10%	9%	11%	**20%**	14%
	Shopping	2%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Public transport	1%	10%	0%	0%	0%	0%	10%	0%	0%	0%	0%	14%
	Car	2%	2%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%
	Holiday/Work trip	6%	0%	**17%**	11%	**22%**	0%	0%	5%	9%	0%	**20%**	0%
	Setting not defined	1%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%	14%
	Total[a]	110	51	64	35	18	28	10	21	11	9	5	7

Note. Populated cells are highlighted through shadowing, with cells showing 15% or more additionally emphasised.
[a] "Total" in last row refers to (absolute) number of spaces allocated to a situated substance use pattern (basis for percentages shown in the table). Sums per column exceed 100% because some spaces were allocated to more than one setting. For the absolute numbers, please see the previous table.

The data shown above differ slightly from those shown in Chapter 11, as the above table includes all 296 elicited spaces (cf. subset of 273 spaces included in quantitative analyses for Chapter 11).

J.3.3 Situated substance use pattern by setting

		Situated substance use pattern												
		NSU pos	NSU neg	Alc	Beer/wine	Spirits/mixers	Cig pos	Cig neg	Alc&cig	Cig&beer/wine	Cig&spirits/mixers	Waterpipe(&alc/cig)	Medication(&alc/cig)	**Total[a]**
Setting	Own home	**40%**	18%	20%	16%	2%	10%	0%	6%	2%	4%	0%	6%	50
	Parents' home	**56%**	17%	22%	17%	0%	0%	0%	6%	6%	0%	0%	0%	18
	Partner's home	**36%**	0%	**36%**	**29%**	7%	7%	0%	7%	7%	0%	14%	0%	14
	Home of friends/ acquaintances	20%	7%	**40%**	13%	20%	13%	0%	20%	13%	0%	0%	0%	15
	Home relatives/ acquaintances	**29%**	14%	**29%**	14%	0%	**29%**	0%	0%	0%	0%	0%	0%	7
	University	**31%**	**46%**	5%	5%	0%	5%	13%	0%	0%	0%	0%	0%	39
	Workplace	**50%**	**31%**	0%	0%	0%	6%	6%	6%	6%	0%	0%	0%	16
	Café/Bar/ Restaurant	13%	7%	**41%**	11%	20%	11%	4%	17%	4%	13%	2%	4%	46
	Nightclub	0%	0%	**50%**	**50%**	0%	0%	0%	**25%**	0%	**25%**	0%	**25%**	4
	Sports facilities	**69%**	19%	6%	6%	0%	6%	0%	0%	0%	0%	0%	0%	16
	Other leisure facilities	**67%**	0%	22%	11%	11%	0%	0%	11%	11%	0%	0%	0%	9
	Nature	**50%**	5%	20%	15%	5%	20%	0%	0%	0%	0%	5%	0%	20
	Urban spaces	**46%**	0%	13%	8%	4%	**25%**	0%	8%	4%	4%	4%	4%	24
	Shopping	**50%**	**50%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4
	Public transport	13%	**63%**	0%	0%	0%	0%	13%	0%	0%	0%	0%	13%	8
	Car	**50%**	**25%**	0%	0%	0%	0%	**25%**	0%	0%	0%	0%	0%	4
	Holiday/Work trip	**35%**	0%	**55%**	20%	20%	0%	0%	5%	5%	0%	5%	0%	20
	Setting not defined	**33%**	0%	**33%**	**33%**	0%	0%	0%	0%	0%	0%	0%	**33%**	3

Note. Populated cells are highlighted through shadowing, with cells showing 25% or more additionally emphasised. Although it is standard practice to display the basis for percentages in the last row, this table shows it in the last column to main consistency with the previous two tables. The presumed independent variable (setting) is thus shown as the row variable for layout purposes.

[a] "Total" in last column refers to (absolute) number of spaces allocated to a setting (basis for percentages shown in the table). Sums per row exceed 100% because spaces could be allocated to more than one situated substance use pattern. For the absolute numbers, please see the first table in this section.

J.4 Elicited spaces by type of everyday situation and situated substance use pattern

J.4.1 Classification by type of everyday situation and by situated substance use pattern

		Situated substance use pattern											
		NSU pos	NSU neg	Alc	Beer/wine	Spirits/mixers	Cig pos	Cig neg	Alc&cig	Cig&beer/wine	Cig&spirits/mixers	Waterpipe(&alc/cig)	Medication(&alc/cig)
Type of everyday situation	At home	**28**	12	8	5	2	4	0	3	2	1	0	**3**
	Study/Work	21	**27**	0	0	0	2	**5**	0	0	0	0	0
	Pauses	**5**	0	0	0	0	4	2	1	1	0	0	0
	In company	18	4	**22**	**17**	2	**9**	0	**10**	**7**	2	**3**	2
	Going out/Party	2	1	**25**	8	**11**	1	0	**10**	2	**8**	2	2
	Hobbies/Leisure	**43**	4	8	5	2	8	0	2	2	0	0	0
	Eating/Food	3	4	**8**	3	4	2	1	1	0	1	0	0
	In transit	3	**5**	0	0	0	2	2	0	0	0	0	1
	Holiday/Travel	8	0	**10**	5	4	0	0	1	1	0	1	0
	Total	110	51	64	35	18	28	10	21	11	9	5	7

Note. Numbers in cells show how 296 elicited spaces were allocated to types of everyday situation and to situated substance use patterns. Populated cells are highlighted through shadowing, with top ranking cells (by column and by row) additionally emphasised. "Total" in last row refers to number of spaces allocated to a situated substance use pattern. These numbers do not equal the sums per column (not stated) because some spaces were allocated to more than one type of everyday situation. See next tables for percentual figures.

J.4.2 Everyday situation by situated substance use

		Situated substance use pattern											
		NSU pos	NSU neg	Alc	Beer/wine	Spirits/mixers	Cig pos	Cig neg	Alc&cig	Cig&beer/wine	Cig&spirits/mixers	Waterpipe(&alc/cig)	Medication(&alc/cig)
Type of everyday situation	At home	**25%**	24%	13%	14%	11%	14%	0%	14%	18%	11%	0%	**43%**
	Study/Work	19%	**53%**	0%	0%	0%	7%	**50%**	0%	0%	0%	0%	0%
	Pauses	5%	0%	0%	0%	0%	14%	20%	5%	9%	0%	0%	0%
	In company	16%	8%	**34%**	**49%**	11%	**32%**	0%	**48%**	**64%**	22%	**60%**	**29%**
	Going out/Party	2%	2%	**39%**	23%	**61%**	4%	0%	**48%**	18%	**89%**	**40%**	**29%**
	Hobbies/Leisure	**39%**	8%	13%	14%	11%	**29%**	0%	10%	18%	0%	0%	0%
	Eating/Food	3%	**8%**	13%	9%	22%	7%	10%	5%	0%	11%	0%	0%
	In transit	3%	**10%**	0%	0%	0%	7%	20%	0%	0%	0%	0%	14%
	Holiday/Travel	7%	0%	16%	14%	22%	0%	0%	5%	9%	0%	20%	0%
	Total	110	51	64	35	18	28	10	21	11	9	5	7

Note. Populated cells are highlighted through shadowing, with cells showing 25% or more additionally emphasised. "Total" in last row refers to (absolute) number of spaces allocated to a situated substance use pattern (basis for percentages shown in the table). Sums per column exceed 100% because some spaces were allocated to more than one type of everyday situation. For the absolute numbers, see the previous table. The data shown above differ slightly from those shown in Chapter 11: the above table is based primarily on the labels, whereas the descriptions in Chapter 11 considered additional information from the interview transcripts.

J.4.3 Situated substance use by everyday situation

		Situated substance use pattern												
		NSU pos	NSU neg	Alc	Beer/wine	Spirits/mixers	Cig pos	Cig neg	Alc&cig	Cig&beer/wine	Cig&spirits/mixers	Waterpipe(&alc/cig)	Medication(&alc/cig)	**Total[a]**
Type of everyday situation	At home	**48%**	21%	14%	9%	3%	7%	0%	5%	3%	2%	0%	5%	58
	Study/Work	**38%**	**49%**	0%	0%	0%	4%	9%	0%	0%	0%	0%	0%	55
	Pauses	**42%**	0%	0%	0%	0%	**33%**	17%	8%	8%	0%	0%	0%	12
	In company	**26%**	6%	**32%**	**25%**	3%	13%	0%	15%	10%	3%	4%	3%	68
	Going out/Party	5%	2%	**58%**	19%	**26%**	2%	0%	23%	5%	19%	5%	5%	43
	Hobbies/Leisure	**66%**	6%	12%	8%	3%	12%	0%	3%	3%	0%	0%	0%	65
	Eating/Food	16%	21%	**42%**	16%	21%	11%	5%	5%	0%	5%	0%	0%	19
	In transit	23%	**38%**	0%	0%	0%	15%	15%	0%	0%	0%	0%	8%	13
	Holiday/Travel	**40%**	0%	**50%**	**25%**	20%	0%	0%	5%	5%	0%	5%	0%	20

Note. Populated cells are highlighted through shadowing, with cells showing 25% or more additionally emphasised. Although it is standard practice to display the basis for percentages in the last row, it is shown in the last column in this table to main consistency with the previous tables. The presumed independent variable (type of everyday situation) is thus shown as the row variable for layout purposes.

[a] "Total" in last column refers to (absolute) number of spaces allocated to a type of everyday situation (basis for percentages shown in the table). Sums per row exceed 100% because spaces could be allocated to more than one situated substance use pattern. For the absolute numbers, please see the first table in this section.

J.5 Chi-square, Cramer's V, Goodman and Kruskal's lambda

J.5.1 Key statistical indicators regarding the relationship between setting and situated substance use pattern, different options for combining data

Situated substance use patterns (rows in the original bivariate table)	Number of settings (columns in the original bivariate table)	Inclusion criterion	n	χ_2	df	significance at $p < 0,05$	% of cells with expected frequencies <5	Cramer's V	λ_r (situated substance use as dependent variable)	λ_c (setting as dependent variable)	Notes
NSU vs. Alc/cig (2)	17	all settings	312	65,59	16	*	35%	0,46	0,39	0,08	a
	11	expected cell frequencies (ecf) ≥5	276	54,16	10	*	0%	0,44	0,35	0,08	
	3	key settings	134	29,98	2	*	0%	0,47	0,42	0,21	a, f
Alc vs. Cig vs. Alc&cig (3)	16	all settings	132	43,17	30	n.s.	83%	0,40	0,20	0,00	g
	8	ecf ≥1	110	28,14	14	*	67%	0,36	0,16	0,00	b
	3	key settings	61	11,48	4	*	44%	0,31	0,17	0,00	f
Cig pos vs. Cig neg (2)	12	all settings	39	21,39	11	*	92%	0,74	0,50	0,13	g
	5	ecf ≥1	29	13,40	4	*	80%	0,68	0,43	0,18	
	3	key settings	19	6,72	2	*	100%	0,59	0,43	0,25	f
NSU pos vs. NSU neg (2)	16	all settings	168	37,11	15	*	69%	0,47	0,19	0,06	g
	7	ecf ≥3	121	20,02	6	*	36%	0,41	0,15	0,09	
	3	key settings	68	5,51	2	n.s.	17%	0,28	0,20	0,21	f
pos/neg (NSU and Cig pooled) (2)	16	all settings	207	52,15	15	*	68%	0,50	0,23	0,06	g
	7	ecf ≥4	149	30,02	6	*	21%	0,45	0,19	0,10	
	3	key settings	87	10,26	2	*	50%	0,34	0,24	0,22	f
Wine/beer vs. Spirits/mixers (2)	13	all settings	59	15,29	12	n.s.	91%	0,51	0,24	0,07	c, g
	8	ecf ≥1	51	11,06	7	n.s.	81%	0,47	0,25	0,08	
	3	key settings	25	7,90	2	*	50%	0,56	0,40	0,27	f
Cig&beer/wine vs. Cig&spirits/mixers (2)	10	all settings	21	10,31	9	n.s.	100%	0,70	0,60	0,00	d, g
	4	ecf ≥1	15	3,89	3	n.s.	100%	0,51	0,33	0,00	
	3	key settings	11	0,08	2	n.s.	83%	0,08	0,00	0,00	f
(Cig&)Beer/wine vs. (Cig&)Spirits/mixers (pooled) (2)	14	all settings	80	16,48	13	n.s.	88%	0,45	0,26	0,03	g
	5	ecf ≥2	6	8,68	1	n.s.	67%	0,38	0,29	0,05	
	3	key settings	36	7,91	2	*	0%	0,47	0,44	0,14	f
All detailed categories (8)	17	all settings	287	207,77	112	*	88%	0,32	0,09	0,12	a,b,e
	3	key settings	123	54,14	14	*	71%	0,47	0,11	0,35	e, f

Note. 'ecf' = expected cell frequencies. See Chapter 9 for a description of settings and Chapter 1 for a description of the situated substance use patterns. The sample size (n) refers to the number of elicited spaces, with spaces counted multiple times if they were allocated to multiple settings. Some findings were significant at a higher level (e.g., $p < 0,001$) but this table only indicates significance at $p < 0,05$.

Additional notes:
a: Highlighted in results section 12.2
b: Some contradiction between Cramer's V and lambda
c: Larger effect if including three settings (cf. including greater number of settings)
d: Larger effect if including all settings (cf. including three settings)
e: All detailed patterns: NSU pos, NSU neg, Wine/beer, Spirits/mixers, Cig pos, Cig neg, Cig&beer/wine, Cig&spirits/mixers
f: Overall most commonly reported settings (university, home, café/bar/restaurant)
g: Settings were fewer than 17 because some were not associated with the situated patterns being analysed

J.5.2 Key statistical indicators regarding the relationship between type of everyday situation and situated substance use pattern, different options for combining data

Situated substance use patterns (rows in the original bivariate table)	Number of general types of everyday situations (columns in the original bivariate	Inclusion criterion	n	χ_2	df	significance at $p < 0,05$	% of cells with expected frequencies <5	Cramer's V	λ_r (situated substance use as dependent variable)	λ_c (general type of everyday situation as dependent variable)	Notes
NSU vs. Alc/cig (2)	9	all types	351	94,61	8	*	0%	0,52	0,44	0,09	a
Alc vs. Cig vs. Alc&cig (3)	9	all types	151	63,68	16	*	59%	0,46	0,24	0,03	
	6	expected cell frequencies ≥2	133	21,26	10	*	44%	0,28	0,00	0,03	
	4	types with greatest sample size in this comparison	99	33,69	6	*	42%	0,41	0,16	0,05	
	3	types with greatest sample size in this comparison	95	14,34	4	*	22%	0,27	0,00	0,06	d
Cig pos vs. Cig neg (2)	8	all types	42	17,59	7	*	81%	0,65	0,30	0,15	g
	6	expected cell frequencies ≥1	38	17,19	5	*	75%	0,67	0,33	0,17	
	3	types with greatest sample size in this comparison	24	15,34	2	*	50%	0,80	0,60	0,33	
All detailed categories (8)	9	all types	325	258,86	56	*	78%	0,34	0,09	0,24	b,e,h
	5	expected cell frequencies ≥2	265	205,17	28	*	60%	0,44	0,10	0,64	
	4	types with greatest frequencies in this comparison	232	102,36	21	*	50%	0,38	0,05	0,29	

Note. See Chapter 9 for a description of everyday situations and Chapter 11 for the situated substance use patterns. The sample size (n) refers to the number of elicited spaces, with spaces counted multiple times if they were allocated to multiple settings. Some findings were significant at a higher level (e.g., $p < 0,001$) but this table only indicates significance at $p < 0,05$.

Additional notes:
a: Highlighted in results section 12.2
b: Some contradiction between Cramer's V and lambda
c: Larger effect if including three settings (cf. including greater number of settings)
d: Larger effect if including all settings (cf. including three settings)
e: All detailed patterns: NSU pos, NSU neg, Wine/beer, Spirits/mixers, Cig pos, Cig neg, Cig&beer/wine, Cig&spirits/mixers
f: N/A
g: General types of everyday situation were fewer than 9 because some were not associated with the situated substance use patterns being analysed
h: Easier to predict general type of everyday situation based on situated substance use pattern (λ_c) than vice versa (λ_r)

Appendix K: Analysis of situated substance use patterns

K.1 Data tables for single pattern charts

The following tables provide key data regarding the single pattern charts shown in section 11.2. Explanatory notes regarding the data tables are included in the legend below. Data tables for comparison charts are presented in Appendices K.2 and K.3.

K.1.1 Legend for subsequent tables

C … Row numbers corresponding to numbers used in charts to identify supplied constructs (C1-14) and master constructs derived from elicited constructs (C15-28)

Construct … Construct label. For details on supplied constructs, see section 6.2.3; on elicited constructs, see Chapter 10. Table 30, p. 400, gives an overview.

$\bar{x}$ … Arithmetic mean of ratings across study participants; data on a 5-point scale from 1 to 5, whereby 5 represents more frequent substance use (C1-10) or the preferred pole (C12-28). Blank cells indicate missing data.

min … lowest rating for this pattern, representing an individual study participant

max … highest rating for this pattern, representing an individual study participant

SD … Standard deviation of ratings (lower SD value indicates that study participants construed the pattern similarly)

n … Sample size per construct, i.e. number of study participants who provided ratings on a particular construct for the pattern

K.I.2 *Ideal - Subjectively defined "ideal" space*

C	Construct	$\bar{x}$	min	max	SD	n
1	Beer	2,1	1	4	0,8	18
2	Wine	2,2	1	3	0,7	20
3	Cider	1,7	1	3	0,8	9
4	Sparkling wine	1,5	1	3	0,7	15
5	Spirits	1,3	1	2	0,5	17
6	Mixed drinks	1,4	1	3	0,7	16
7	Cigarettes	2,5	1	5	1,6	13
8	Cigars, cigarillos	1,0	1	1	0,0	2
9	Waterpipe (with tobacco)	1,9	1	3	0,8	7
10	E-cigarettes (with nicotine)	1,0	1	1	0,0	1
11	*(blank on purpose)*					
12	Importance	4,8	1	5	0,8	22
13	Feelings	4,9	3	5	0,4	22
14	Frequency	4,5	1	5	0,9	22
15	Closeness to people	4,7	3	5	0,6	13
16	Orientation ('outward' preferred)	4,2	3	5	0,8	9
17	Orientation ('inward' preferred)	4,0	3	5	0,6	5
18	Togetherness of activity	4,0	4	4	0,0	3
19	Changeability ('varied' preferred)	3,8	3	5	1,0	5
20	Changeability ('same' preferred)	4,7	4	5	0,5	3
21	Enjoyment	5,0	5	5	0,0	5
22	Relaxation	4,5	3	5	0,8	11
23	Type of gathering	5,0	5	5	0,0	4
24	Substance use expectations	4,3	3	5	0,9	3
25	Freedom of choice	4,7	3	5	0,7	7
26	Self-presentation	4,8	4	5	0,4	4
27	Physical pleasantness	4,9	4	5	0,3	9
28	Sense of time	5,0	5	5	0,0	4

K.I.3 NSU - Spaces of no or rare substance use

		$\bar{x}$	min	max	SD	n
1	Beer	1,1	1,0	1,5	0,1	23
2	Wine	1,2	1,0	1,5	0,2	23
3	Cider	1,0	1,0	1,2	0,0	23
4	Sparkling wine	1,1	1,0	1,5	0,1	23
5	Spirits	1,0	1,0	1,0	0,0	23
6	Mixed drinks	1,0	1,0	1,3	0,1	23
7	Cigarettes	1,0	1,0	1,5	0,1	23
8	Cigars, cigarillos	1,0	1,0	1,0	0,0	23
9	Waterpipe (with tobacco)	1,0	1,0	1,2	0,0	23
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	23
11	*(blank on purpose)*					
12	Importance	4,1	3,2	5,0	0,5	23
13	Feelings	4,1	3,2	5,0	0,4	23
14	Frequency	4,0	2,8	5,0	0,5	23
15	Closeness to people	3,4	1,3	4,9	1,0	15
16	Orientation (‘outward’ preferred)	3,5	3,0	5,0	0,6	9
17	Orientation (‘inward’ preferred)	2,5	1,7	3,6	0,6	5
18	Togetherness of activity	3,3	1,5	4,3	1,1	4
19	Changeability (‘varied’ preferred)	2,7	2,0	3,7	0,5	6
20	Changeability (‘same’ preferred)	3,5	2,5	4,3	0,8	3
21	Enjoyment	3,9	3,3	4,4	0,4	4
22	Relaxation	2,9	2,0	3,7	0,5	10
23	Type of gathering	4,2	3,7	5,0	0,5	4
24	Substance use expectations	1,3	1,0	1,8	0,4	3
25	Freedom of choice	3,4	3,0	4,0	0,4	6
26	Self-presentation	3,5	2,7	4,5	0,7	5
27	Physical pleasantness	3,2	2,9	3,8	0,3	8
28	Sense of time	2,9	2,6	3,1	0,2	5

K.I.4 NSU pos - No or rare substance use, positive feelings

		$\bar{x}$	min	max	SD	n
1	Beer	1,1	1,0	1,7	0,2	23
2	Wine	1,2	1,0	2,0	0,3	23
3	Cider	1,0	1,0	1,3	0,1	23
4	Sparkling wine	1,1	1,0	2,0	0,2	23
5	Spirits	1,0	1,0	1,0	0,0	23
6	Mixed drinks	1,0	1,0	1,3	0,1	23
7	Cigarettes	1,0	1,0	1,7	0,1	23
8	Cigars, cigarillos	1,0	1,0	1,0	0,0	23
9	Waterpipe (with tobacco)	1,0	1,0	1,3	0,1	23
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	23
11	*(blank on purpose)*					
12	Importance	4,4	3,3	5,0	0,6	23
13	Feelings	4,6	4,0	5,0	0,3	23
14	Frequency	4,0	2,8	5,0	0,5	23
15	Closeness to people	3,9	1,3	5,0	1,1	15
16	Orientation (‘outward’ preferred)	3,8	2,8	5,0	0,7	9
17	Orientation (‘inward’ preferred)	2,6	1,8	4,0	0,7	5
18	Togetherness of activity	3,5	2,0	5,0	1,1	4
19	Changeability (‘varied’ preferred)	3,2	2,3	4,7	0,8	6
20	Changeability (‘same’ preferred)	3,8	2,2	5,0	1,2	3
21	Enjoyment	4,4	4,1	4,7	0,2	4
22	Relaxation	3,9	2,1	5,0	0,7	9
23	Type of gathering	4,3	3,7	5,0	0,5	4
24	Substance use expectations	1,3	1,0	2,0	0,5	3
25	Freedom of choice	4,1	3,5	4,7	0,4	6
26	Self-presentation	4,0	2,9	5,0	0,9	5
27	Physical pleasantness	3,4	2,7	4,1	0,4	8
28	Sense of time	3,2	2,7	4,0	0,4	5

K.I.5 NSU neg - No or rare substance use, ambivalent/negative feelings

		$\bar{x}$	min	max	SD	n
1	Beer	1,1	1,0	2,0	0,2	20
2	Wine	1,1	1,0	2,0	0,2	20
3	Cider	1,0	1,0	1,0	0,0	20
4	Sparkling wine	1,0	1,0	1,5	0,1	20
5	Spirits	1,0	1,0	1,0	0,0	20
6	Mixed drinks	1,0	1,0	1,3	0,1	20
7	Cigarettes	1,0	1,0	1,0	0,0	20
8	Cigars, cigarillos	1,0	1,0	1,0	0,0	20
9	Waterpipe (with tobacco)	1,0	1,0	1,0	0,0	20
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	20
11	*(blank on purpose)*					
12	Importance	3,5	2,0	5,0	0,9	20
13	Feelings	2,8	2,0	3,0	0,3	20
14	Frequency	4,1	3,0	5,0	0,7	20
15	Closeness to people	2,5	1,0	4,0	1,1	13
16	Orientation (‘outward’ preferred)	3,0	1,0	5,0	1,2	9
17	Orientation (‘inward’ preferred)	2,1	1,0	3,0	0,8	3
18	Togetherness of activity	2,9	1,0	4,0	1,3	3
19	Changeability (‘varied’ preferred)	1,4	1,0	2,0	0,4	4
20	Changeability (‘same’ preferred)	2,8	2,5	3,0	0,2	3
21	Enjoyment	2,7	1,0	4,0	1,1	4
22	Relaxation	1,4	1,0	2,3	0,5	9
23	Type of gathering	3,8	3,5	4,0	0,3	2
24	Substance use expectations	1,3	1,0	1,5	0,3	2
25	Freedom of choice	2,2	1,0	4,0	0,9	6
26	Self-presentation	2,4	1,3	3,0	0,7	4
27	Physical pleasantness	2,5	1,0	4,0	0,9	8
28	Sense of time	1,3	1,0	2,0	0,4	4

K.1.6 Alc/cig - Spaces of alcohol or cigarette use

		$\bar{x}$	min	max	SD	n
1	Beer	2,3	1,0	4,3	1,0	24
2	Wine	2,6	1,0	4,3	1,0	24
3	Cider	1,2	1,0	2,8	0,4	24
4	Sparkling wine	1,4	1,0	2,5	0,5	24
5	Spirits	1,7	1,0	3,0	0,6	24
6	Mixed drinks	1,6	1,0	3,7	0,7	24
7	Cigarettes	2,2	1,0	5,0	1,5	24
8	Cigars, cigarillos	1,0	1,0	1,3	0,1	24
9	Waterpipe (with tobacco)	1,2	1,0	2,6	0,4	24
10	E-cigarettes (with nicotine)	1,0	1,0	1,1	0,0	24
*	Alcohol with medicines	1,1	1	2	0,2	24
*	Ritalin	1,0	1	1,6	0,1	24
11	*(blank on purpose)*					
12	Importance	3,8	2,3	4,8	0,6	24
13	Feelings	4,4	3,9	5,0	0,4	24
14	Frequency	3,2	1,3	5,0	0,7	24
15	Closeness to people	3,9	2,5	5,0	0,7	16
16	Orientation ('outward' preferred)	4,0	3,0	5,0	0,7	10
17	Orientation ('inward' preferred)	2,0	1,0	3,3	0,8	5
18	Togetherness of activity	4,2	3,8	5,0	0,5	4
19	Changeability ('varied' preferred)	3,0	2,2	4,3	0,7	6
20	Changeability ('same' preferred)	3,6	1,8	4,7	1,3	3
21	Enjoyment	4,5	3,4	5,0	0,6	5
22	Relaxation	4,1	2,4	5,0	0,7	11
23	Type of gathering	3,3	2,0	4,0	0,8	4
24	Substance use expectations	4,7	4,4	5,0	0,2	3
25	Freedom of choice	3,9	2,3	4,8	0,8	7
26	Self-presentation	4,2	4,0	5,0	0,4	5
27	Physical pleasantness	3,6	2,0	5,0	0,8	10
28	Sense of time	4,3	3,4	5,0	0,6	5

* Spaces with any medicine use were only eligible for the type 'Alc/cig'. Data on medicine use are included here for completeness. At the individual study participant level, the data for 'Alcohol with medicines' were: 1 (n=22); 1,2 (n=1); 2 (n=1); for 'Ritalin': 1 (n=23); 1,6 (n=1).

K.I.7 Alc - Alcohol as primary substance

		$\bar{x}$	min	max	SD	n
1	Beer	2,4	1,0	4,3	1,1	19
2	Wine	2,9	1,0	5,0	1,0	19
3	Cider	1,2	1,0	2,8	0,5	19
4	Sparkling wine	1,5	1,0	3,0	0,6	19
5	Spirits	1,7	1,0	3,0	0,7	19
6	Mixed drinks	1,6	1,0	3,7	0,7	19
7	Cigarettes	1,1	1,0	1,5	0,2	19
8	Cigars, cigarillos	1,0	1,0	1,3	0,1	19
9	Waterpipe (with tobacco)	1,1	1,0	2,0	0,2	19
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	19
11	*(blank on purpose)*					
12	Importance	3,8	2,3	5,0	0,8	19
13	Feelings	4,6	3,5	5,0	0,5	19
14	Frequency	3,0	1,0	5,0	1,1	19
15	Closeness to people	4,3	2,5	5,0	0,8	12
16	Orientation (‘outward’ preferred)	3,9	2,0	5,0	1,0	9
17	Orientation (‘inward’ preferred)	2,3	1,3	3,6	0,9	4
18	Togetherness of activity	4,3	4,0	5,0	0,5	3
19	Changeability (‘varied’ preferred)	3,0	2,2	4,3	0,7	6
20	Changeability (‘same’ preferred)	2,4	1,0	4,5	1,5	3
21	Enjoyment	4,3	2,5	5,0	0,9	5
22	Relaxation	4,2	2,5	5,0	0,8	7
23	Type of gathering	3,6	1,8	5,0	1,3	3
24	Substance use expectations	5,0	5,0	5,0	0,0	1
25	Freedom of choice	3,9	2,3	5,0	1,0	6
26	Self-presentation	4,5	4,0	5,0	0,5	4
27	Physical pleasantness	3,6	2,0	5,0	1,0	6
28	Sense of time	4,2	3,4	5,0	0,6	4

K.I.8 Wine/beer - Wine or beer

		$\bar{x}$	min	max	SD	n
1	Beer	2,5	1,0	5,0	1,1	15
2	Wine	2,9	1,0	5,0	1,0	15
3	Cider	1,0	1,0	1,0	0,0	15
4	Sparkling wine	1,2	1,0	2,0	0,4	15
5	Spirits	1,2	1,0	2,0	0,3	15
6	Mixed drinks	1,1	1,0	1,7	0,2	15
7	Cigarettes	1,1	1,0	1,5	0,2	15
8	Cigars, cigarillos	1,0	1,0	1,3	0,1	15
9	Waterpipe (with tobacco)	1,1	1,0	2,0	0,3	15
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	15
11	*(blank on purpose)*					
12	Importance	4,0	2,3	4,8	0,7	15
13	Feelings	4,7	4,0	5,0	0,4	15
14	Frequency	3,1	1,0	5,0	0,9	15
15	Closeness to people	4,5	3,3	5,0	0,6	9
16	Orientation (‘outward’ preferred)	4,0	2,0	5,0	1,0	7
17	Orientation (‘inward’ preferred)	2,8	1,0	4,0	1,3	3
18	Togetherness of activity	4,3	3,3	5,0	0,7	3
19	Changeability (‘varied’ preferred)	2,6	1,5	3,5	0,7	5
20	Changeability (‘same’ preferred)	2,5	1,0	4,5	1,5	3
21	Enjoyment	4,6	4,0	5,0	0,4	4
22	Relaxation	4,0	1,0	5,0	1,5	5
23	Type of gathering	3,5	3,0	4,0	0,5	2
24	Substance use expectations	5,0	5,0	5,0	0,0	1
25	Freedom of choice	3,8	2,3	4,8	0,9	4
26	Self-presentation	4,7	4,0	5,0	0,5	3
27	Physical pleasantness	3,9	2,0	5,0	1,1	4
28	Sense of time	3,9	3,0	5,0	0,8	4

K.I.9 Spirits/mixers - Spirits or mixed drinks

		$\bar{x}$	min	max	SD	n
1	Beer	2,5	1,0	5,0	1,6	9
2	Wine	2,4	1,0	4,5	1,2	9
3	Cider	1,6	1,0	5,0	1,2	9
4	Sparkling wine	1,4	1,0	2,5	0,5	9
5	Spirits	2,8	1,0	5,0	1,2	9
6	Mixed drinks	2,7	1,0	5,0	1,2	9
7	Cigarettes	1,0	1,0	1,3	0,1	9
8	Cigars, cigarillos	1,0	1,0	1,0	0,0	9
9	Waterpipe (with tobacco)	1,1	1,0	2,0	0,3	9
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	9
11	*(blank on purpose)*					
12	Importance	3,6	1,0	5,0	1,3	9
13	Feelings	4,4	3,5	5,0	0,6	9
14	Frequency	2,7	1,0	5,0	1,2	9
15	Closeness to people	4,4	3,5	5,0	0,6	5
16	Orientation (‘outward’ preferred)	4,1	3,0	5,0	0,7	4
17	Orientation (‘inward’ preferred)	1,8	1,0	2,5	0,8	2
18	Togetherness of activity	3,8	3,0	4,7	0,8	2
19	Changeability (‘varied’ preferred)	3,6	2,3	5,0	1,1	4
20	Changeability (‘same’ preferred)	1,0	1,0	1,0	0,0	1
21	Enjoyment	5,0	5,0	5,0	0,0	3
22	Relaxation	4,3	3,5	5,0	0,6	3
23	Type of gathering	1,0	1,0	1,0	0,0	1
24	Substance use expectations					0
25	Freedom of choice	4,9	4,7	5,0	0,2	3
26	Self-presentation	4,0	3,0	5,0	1,0	2
27	Physical pleasantness	3,3	2,0	5,0	1,2	3
28	Sense of time					0

K.I.10 Cig - Cigarettes as primary product

		$\bar{x}$	min	max	SD	n
1	Beer	1,2	1,0	1,5	0,2	7
2	Wine	1,2	1,0	2,0	0,3	7
3	Cider	1,0	1,0	1,0	0,0	7
4	Sparkling wine	1,0	1,0	1,0	0,0	7
5	Spirits	1,0	1,0	1,3	0,1	7
6	Mixed drinks	1,0	1,0	1,0	0,0	7
7	Cigarettes	4,5	3,0	5,0	0,7	7
8	Cigars, cigarillos	1,0	1,0	1,0	0,0	7
9	Waterpipe (with tobacco)	1,0	1,0	1,2	0,1	7
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	7
11	*(blank on purpose)*					
12	Importance	3,8	3,5	4,0	0,2	7
13	Feelings	4,3	3,7	5,0	0,5	7
14	Frequency	4,0	3,3	4,4	0,3	7
15	Closeness to people	3,4	2,0	4,8	0,9	7
16	Orientation (‘outward’ preferred)	3,0	2,6	3,3	0,3	3
17	Orientation (‘inward’ preferred)	3,5	3,5	3,5	0,0	1
18	Togetherness of activity	4,5	4,5	4,5	0,0	1
19	Changeability (‘varied’ preferred)					0
20	Changeability (‘same’ preferred)	5,0	5,0	5,0	0,0	1
21	Enjoyment	4,0	4,0	4,0	0,0	1
22	Relaxation	3,6	3,0	4,3	0,5	4
23	Type of gathering	4,6	4,5	4,7	0,1	2
24	Substance use expectations	4,6	4,4	4,8	0,2	2
25	Freedom of choice	3,8	3,5	4,0	0,2	3
26	Self-presentation	4,2	4,0	4,4	0,2	2
27	Physical pleasantness	3,0	1,0	4,5	1,1	5
28	Sense of time					0

K.I.I I Cig pos - Cigarettes, positive feelings

		$\bar{x}$	min	max	SD	n
1	Beer	1,3	1,0	1,5	0,2	7
2	Wine	1,0	1,0	2,0	0,4	7
3	Cider	1,0	1,0	1,0	0,0	7
4	Sparkling wine	1,0	1,0	1,0	0,0	7
5	Spirits	1,0	1,0	1,3	0,1	7
6	Mixed drinks	1,0	1,0	1,0	0,0	7
7	Cigarettes	4,9	3,0	5,0	0,7	7
8	Cigars, cigarillos	1,0	1,0	1,0	0,0	7
9	Waterpipe (with tobacco)	1,0	1,0	1,3	0,1	7
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	7
11	*(blank on purpose)*					
12	Importance	4,0	3,7	4,5	0,3	7
13	Feelings	5,0	4,3	5,0	0,3	7
14	Frequency	4,0	3,0	4,3	0,4	7
15	Closeness to people	4,0	3,0	5,0	0,8	7
16	Orientation (‘outward’ preferred)	3,0	3,0	3,0	0,0	3
17	Orientation (‘inward’ preferred)	5,0	5,0	5,0	0,0	1
18	Togetherness of activity	4,7	4,7	4,7	0,0	1
19	Changeability (‘varied’ preferred)					0
20	Changeability (‘same’ preferred)	5,0	5,0	5,0	0,0	1
21	Enjoyment	5,0	5,0	5,0	0,0	1
22	Relaxation	4,3	3,9	5,0	0,4	4
23	Type of gathering	4,8	4,5	5,0	0,3	2
24	Substance use expectations	4,9	4,8	5,0	0,1	2
25	Freedom of choice	4,7	4,0	5,0	0,4	3
26	Self-presentation	4,2	4,0	4,4	0,2	2
27	Physical pleasantness	3,7	1,0	4,5	1,2	5
28	Sense of time					0

K.1.12 Cig neg - Cigarettes, ambivalent/negative feelings

		$\bar{x}$	min	max	SD	n
1	Beer	1,3	1,0	2,0	0,4	5
2	Wine	1,2	1,0	2,0	0,4	5
3	Cider	1,0	1,0	1,0	0,0	5
4	Sparkling wine	1,0	1,0	1,0	0,0	5
5	Spirits	1,0	1,0	1,0	0,0	5
6	Mixed drinks	1,0	1,0	1,0	0,0	5
7	Cigarettes	4,4	3,0	5,0	0,7	5
8	Cigars, cigarillos	1,0	1,0	1,0	0,0	5
9	Waterpipe (with tobacco)	1,0	1,0	1,0	0,0	5
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	5
11	*(blank on purpose)*					
12	Importance	3,3	2,0	4,0	0,7	5
13	Feelings	2,9	2,5	3,0	0,2	5
14	Frequency	4,4	4,0	5,0	0,4	5
15	Closeness to people	2,9	1,0	4,5	1,4	5
16	Orientation (‘outward’ preferred)	3,2	2,3	4,0	0,8	2
17	Orientation (‘inward’ preferred)	2,0	2,0	2,0	0,0	1
18	Togetherness of activity	4,0	4,0	4,0	0,0	1
19	Changeability (‘varied’ preferred)					0
20	Changeability (‘same’ preferred)	5,0	5,0	5,0	0,0	1
21	Enjoyment	3,0	3,0	3,0	0,0	1
22	Relaxation	2,3	1,3	3,0	0,6	4
23	Type of gathering	4,5	4,5	4,5	0,0	1
24	Substance use expectations	2,5	2,5	2,5	0,0	1
25	Freedom of choice	1,8	1,5	2,0	0,3	2
26	Self-presentation					0
27	Physical pleasantness	2,5	2,0	3,0	0,4	3
28	Sense of time					0

K.1.13 Alc&cig - Alcohol and cigarettes

		$\bar{x}$	min	max	SD	n
1	Beer	3,1	2,0	4,3	0,8	8
2	Wine	3,0	2,0	4,0	0,7	8
3	Cider	1,2	1,0	2,0	0,3	8
4	Sparkling wine	1,4	1,0	2,0	0,5	8
5	Spirits	1,9	1,0	3,0	0,7	8
6	Mixed drinks	2,1	1,0	4,0	1,0	8
7	Cigarettes	4,1	3,0	5,0	0,7	8
8	Cigars, cigarillos	1,0	1,0	1,0	0,0	8
9	Waterpipe (with tobacco)	1,0	1,0	1,0	0,0	8
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	8
11	*(blank on purpose)*					
12	Importance	3,5	2,0	5,0	1,0	8
13	Feelings	4,2	3,8	5,0	0,4	8
14	Frequency	3,4	2,5	4,0	0,6	8
15	Closeness to people	3,0	1,0	5,0	1,4	7
16	Orientation (‘outward’ preferred)	4,7	4,0	5,0	0,4	4
17	Orientation (‘inward’ preferred)	1,0	1,0	1,0	0,0	2
18	Togetherness of activity	3,0	3,0	3,0	0,0	1
19	Changeability (‘varied’ preferred)					0
20	Changeability (‘same’ preferred)	4,7	4,7	4,7	0,0	1
21	Enjoyment	3,0	3,0	3,0	0,0	2
22	Relaxation	4,3	3,0	5,0	0,7	5
23	Type of gathering	4,0	3,3	5,0	0,7	3
24	Substance use expectations					0
25	Freedom of choice	2,8	2,0	4,3	1,1	3
26	Self-presentation	3,9	3,9	3,9	0,0	1
27	Physical pleasantness	3,0	1,0	4,0	1,2	4
28	Sense of time	4,7	4,7	4,7	0,0	1

K.1.14 Cig&beer/wine - Cigarettes and beer or wine

		$\bar{x}$	min	max	SD	n
1	Beer	2,8	2,0	4,0	0,8	7
2	Wine	2,5	2,0	3,0	0,4	7
3	Cider	1,0	1,0	1,0	0,0	7
4	Sparkling wine	1,3	1,0	2,0	0,4	7
5	Spirits	1,4	1,0	2,0	0,4	7
6	Mixed drinks	1,3	1,0	2,0	0,5	7
7	Cigarettes	4,1	3,0	5,0	0,8	7
8	Cigars, cigarillos	1,0	1,0	1,0	0,0	7
9	Waterpipe (with tobacco)	1,0	1,0	1,0	0,0	7
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	7
11	*(blank on purpose)*					
12	Importance	3,7	2,0	5,0	1,0	7
13	Feelings	4,4	3,0	5,0	0,7	7
14	Frequency	3,5	2,3	4,5	0,7	7
15	Closeness to people	3,5	1,0	5,0	1,3	6
16	Orientation (‘outward’ preferred)	4,6	3,5	5,0	0,6	4
17	Orientation (‘inward’ preferred)	1,0	1,0	1,0	0,0	1
18	Togetherness of activity	3,7	3,7	3,7	0,0	1
19	Changeability (‘varied’ preferred)					0
20	Changeability (‘same’ preferred)	4,5	4,5	4,5	0,0	1
21	Enjoyment	3,0	3,0	3,0	0,0	1
22	Relaxation	4,1	3,0	5,0	0,7	5
23	Type of gathering	4,3	3,0	5,0	0,9	3
24	Substance use expectations					0
25	Freedom of choice	3,0	2,0	4,0	1,0	2
26	Self-presentation	4,3	4,3	4,3	0,0	1
27	Physical pleasantness	3,1	2,0	4,0	0,8	3
28	Sense of time	4,0	4,0	4,0	0,0	1

K.1.15 Cig&spirits/mixers - Cigarettes and spirits or mixed drinks

		$\bar{x}$	min	max	SD	n
1	Beer	3,8	3,0	4,3	0,5	5
2	Wine	3,8	2,0	5,0	1,0	5
3	Cider	1,3	1,0	2,0	0,4	5
4	Sparkling wine	1,2	1,0	2,0	0,4	5
5	Spirits	3,0	2,0	4,5	0,8	5
6	Mixed drinks	3,4	2,0	4,5	0,9	5
7	Cigarettes	4,1	3,5	5,0	0,6	5
8	Cigars, cigarillos	1,0	1,0	1,0	0,0	5
9	Waterpipe (with tobacco)	1,0	1,0	1,0	0,0	5
10	E-cigarettes (with nicotine)	1,0	1,0	1,0	0,0	5
11	*(blank on purpose)*					
12	Importance	3,1	2,0	4,5	0,8	5
13	Feelings	3,9	3,5	4,5	0,3	5
14	Frequency	3,0	2,0	4,0	0,6	5
15	Closeness to people	2,3	1,0	3,0	0,8	4
16	Orientation (‘outward’ preferred)	4,3	4,0	4,5	0,3	2
17	Orientation (‘inward’ preferred)	1,0	1,0	1,0	0,0	2
18	Togetherness of activity					0
19	Changeability (‘varied’ preferred)					0
20	Changeability (‘same’ preferred)	5,0	5,0	5,0	0,0	1
21	Enjoyment	3,0	3,0	3,0	0,0	1
22	Relaxation	5,0	5,0	5,0	0,0	2
23	Type of gathering	2,2	1,0	3,3	1,2	2
24	Substance use expectations					0
25	Freedom of choice	3,3	2,0	4,5	1,3	2
26	Self-presentation	3,5	3,5	3,5	0,0	1
27	Physical pleasantness	2,8	1,0	5,0	1,6	3
28	Sense of time	5,0	5,0	5,0	0,0	1

K.2 Data tables for pattern comparisons, including individual-level differences

As the comparison charts were based on averages across study participants only, it was also considered how *individual* study participants construed the differences between the of spaces. The following tables include, in addition to the means for each pattern and the mean difference (i.e., the data displayed in the charts), data on individual study participants. Large average differences between two patterns, large minimum differences at the individual level, a low standard deviation regarding the magnitude of difference and a high consensus on the direction of their relationship indicate that study participants construed the differences between two patterns of situated substance use similarly and as a consistently large (for further details on the calculation and interpretation of these tables, see section 7.4.4).

C	Construct	$\bar{x}$		MD	Differences at individual level						n
		NSU	Alc/cig		min	max$^-$	max$^+$	SD	ROC		
22	Relaxation	**2,9**	4,2	**1,3**	0,6	NA	1,6	**0,3**	**100%**	+	10

To illustrate how these data can be interpreted, construct ‘relaxation’ (C22) from Comparison 11 (‘NSU vs. Alc/cig’) is used as an example (relevant excerpt included above for ease of reference). The table shows that all (100%; column labelled ‘ROC’) of the ten study participants (who contributed to this construct in this comparison; ‘n’) construed the relationship between the two types in the same way, with spaces of alcohol or cigarette use consistently considered more relaxed (+). They also construed the distance between the two types on this construct very similarly, as indicated by a low standard deviation (0,3; column labelled ‘SD’). On average, spaces of alcohol or cigarette use were considered to be 1,3 points (on a 5-point scale) more relaxed than spaces of no or rare substance use (column labelled ‘MD’), with almost all individually construed distances ranging from 1,1 (IP6) [not shown] to 1,6 (IP17) [‘max$^+$’] (the exception being IP12 with 0,6 [‘min’]). Besides for ‘relaxation’, consistently large differences between spaces of no or rare substance use and spaces of alcohol or cigarette use were also found for the constructs ‘substance use expectations’ and ‘sense of time’. Individual study participants construed the relationship between the two types very similarly on these constructs, and as the mean differences (MD) were also relatively great, these findings can be considered noteworthy (rows shaded in dark grey).

Further notes regarding the interpretation are provided overleaf.

These data were prepared for selected comparisons only. The remaining data tables are available from Appendix K.3.

K.2.1 Legend for subsequent tables

Dark grey shaded rows: ROC ≥ 75% (+/-) plus *at least two* of the following: MD ≥ 1; min ≥ 1; SD ≤ 0,5 (constructs on which study participants consistently construed the two patterns as very different from each other)

Light grey shaded rows: ROC ≥ 75% (+/-) plus *any one* of the following: MD ≥ 1; min ≥ 1; SD ≤ 0,5 (constructs on study participants construed the two patterns as different from each other but effect sizes were not necessarily large or consistent)

C … Row numbers corresponding to numbers used in charts to identify supplied constructs (C1-14) and master constructs derived from elicited constructs (C15-28)

Construct … Construct label. For details on supplied constructs, see section 6.2.3; on elicited constructs, see Chapter 10. Table 30, p. 400, gives an overview.

$\bar{x}$ … Arithmetic mean of ratings across study participants included in the comparison; data on a 5-point scale from 1 to 5, whereby 5 represents more frequent substance use (C1-10) or the preferred pole (C12-28); values closer to the less preferred pole (i.e., below scale mid-point at 3,0) are highlighted in bold for C12-28. Blank cells indicate missing data.

'NSU' etc. … Situated substance use pattern, abbreviated in line with Chapter 11. First named space is the reference space used for calculation of differences.

MD … Difference between means (equals mean of individual-level differences); may not match the difference between arithmetic means as shown due to rounding; absolute values of 1,0 or above are highlighted in bold for C12-28

min … smallest difference (between the two patterns) representing an individual study participant; absolute values of 1,0 or above are highlighted in bold for C12-28

max^- … greatest negative difference (between the two patterns) representing an individual study participant (not applicable ['NA'] if no negative differences reported)

max^+ … greatest positive difference (between the two patterns) representing an individual study participant (not applicable ['NA'] if no positive differences reported)

SD … Standard deviation of individual-level differences (as an indicator for consensus on size of difference, whereby lower SD values indicate higher consensus); values of 0,5 or below are highlighted in bold for C12-28

ROC … Rank order consensus based on percentage of individuals who ranked the two patterns in the same way (as an indicator for consensus on direction of relationship); where consensus was 75% or over, the sign indicates if the pattern of interest was rated higher (+) or lower (-) than or the same (0) as the reference pattern; values of 75% or over are highlighted in bold for C12-28

n … Sample size per construct, i.e. number of study participants included in the comparison on a particular construct; rows with n=1 or n=2 are highlighted using italics where applicable

K.2.2 Comparison 1 'NSU pos vs. Ideal', including individual-level differences

C	Construct	$\bar{x}$		MD	Differences at individual level						n
		NSU	Ideal		min	max⁻	max⁺	SD	ROC		
1	Beer	1,1	2,1	1,0	0,0	-0,3	2,8	0,9	76%	+	17
2	Wine	1,2	2,1	0,9	0,0	-0,3	2,0	0,7	79%	+	19
3	Cider	1,0	1,7	0,6	0,0	NA	2,0	0,8	56%		9
4	Sparkling wine	1,1	1,4	0,3	0,0	-1,0	2,0	0,7	50%		14
5	Spirits	1,0	1,3	0,3	0,0	NA	1,0	0,4	75%	0	16
6	Mixed drinks	1,0	1,4	0,4	0,0	-0,3	2,0	0,7	67%		15
7	Cigarettes	1,1	2,7	1,6	0,0	-0,1	4,0	1,6	58%		12
8	Cigars, cigarillos	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	2
9	Waterpipe (with tobacco)	1,0	1,8	0,8	0,0	NA	2,0	0,9	50%		6
10	E-cigarettes (with nicotine)										0
11	*(blank on purpose)*										
12	Importance	4,4	5,0	0,5	0,0	NA	1,5	**0,5**	71%		21
13	Feelings	4,6	5,0	0,4	0,0	NA	1,0	0,3	**76%**	+	21
14	Frequency	4,0	4,5	0,5	0,0	-1,8	1,7	0,8	62%		21
15	Closeness to people	3,9	4,7	0,7	0,0	-1,3	3,7	1,4	50%		12
16	Orientation ('outward' preferred)	3,8	4,3	0,4	0,0	-1,5	1,8	0,9	**75%**	+	8
17	Orientation ('inward' preferred)	**2,6**	4,0	**1,4**	0,0	NA	2,6	0,8	**80%**	+	5
*	Orientation (pooled)	3,6	3,4	-0,3	0,0	-2,6	1,8	1,3	46%		13
18	Togetherness of activity	3,6	4,0	0,4	0,3	-1,0	2,0	1,2	67%		3
19	Changeability ('varied' preferred)	3,3	3,8	0,5	0,0	NA	1,3	**0,5**	**80%**	+	5
20	Changeability ('same' preferred)	3,8	4,7	0,9	0,0	NA	1,8	0,7	67%		3
*	Changeability (pooled)	2,9	2,9	0,0	0,0	-1,8	1,3	0,9	50%		8
21	Enjoyment	4,4	5,0	0,6	0,3	NA	0,9	**0,2**	**100%**	+	4
22	Relaxation	3,9	4,4	0,6	0,0	-0,8	1,3	0,7	67%		9
23	Type of gathering	4,3	5,0	0,7	0,0	NA	1,3	**0,5**	**75%**	+	4
24	Substance use expectations	**1,3**	4,3	**3,0**	**1,0**	NA	4,0	1,4	**100%**	+	3
25	Freedom of choice	4,1	4,7	0,5	0,3	-0,6	1,5	0,6	**83%**	+	6
26	Self-presentation	4,3	4,8	0,5	0,0	-0,5	2,0	0,9	50%		4
27	Physical pleasantness	3,4	5,0	**1,6**	0,9	NA	2,3	**0,5**	**100%**	+	7
28	Sense of time	3,4	5,0	**1,6**	**1,0**	NA	2,0	**0,4**	**100%**	+	4

* For 'changeability' and 'orientation', data were pooled to maximise use of available data. To do so, the preference was disregarded, and the numerical values were adjusted to match the meaning of the construct poles. As a result, for 'orientation', a higher value meant that a space was construed as more outward-oriented (regardless of personal preference), and for 'changeability', a higher value meant that a space was construed as more varied (regardless of personal preference).

K.2.3 Comparison 11 'NSU vs. Alc/cig', including individual-level differences

C	Construct	$\bar{x}$		MD	Differences at individual level						n
		NSU	Alc/cig		min	max⁻	max⁺	SD	ROC		
1	Beer	1,1	2,3	1,2	0,0	-0,1	3,2	1,0	78%	+	23
2	Wine	1,2	2,6	1,4	0,0	NA	3,3	0,9	87%	+	23
3	Cider	1,0	1,2	0,2	0,0	-0,2	1,6	0,4	65%		23
4	Sparkling wine	1,1	1,4	0,3	0,0	-0,1	1,5	0,4	48%		23
5	Spirits	1,0	1,7	0,7	0,0	NA	2,0	0,6	74%		23
6	Mixed drinks	1,0	1,6	0,6	0,0	NA	2,7	0,7	65%		23
7	Cigarettes	1,0	2,2	1,2	0,0	NA	4,0	1,5	57%		23
8	Cigars, cigarillos	1,0	1,0	0,0	0,0	NA	0,3	0,1	96%	0	23
9	Waterpipe (with tobacco)	1,0	1,2	0,1	0,0	NA	1,0	0,3	74%		23
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	23
*	Alcohol with medicines	1,0	1,0	0,0	0,0	NA	0,2	0,0	96%	0	23
*	Ritalin	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	23
11	*(blank on purpose)*										
12	Importance	4,1	3,8	-0,3	0,0	-1,6	1,3	0,8	48%		23
13	Feelings	4,1	4,5	0,4	0,0	-0,6	1,8	**0,5**	**78%**	+	23
14	Frequency	4,0	3,2	-0,9	0,2	-2,1	1,4	0,8	**78%**	-	23
15	Closeness to people	3,4	3,9	0,5	-0,2	-2,0	2,8	1,2	67%		15
16	Orientation ('outward' preferred)	3,5	4,0	0,4	0,0	-2,0	1,9	1,2	67%		9
17	Orientation ('inward' preferred)	**2,5**	**2,0**	-0,6	0,1	-2,6	0,8	1,1	60%		5
†	Orientation (pooled)	3,5	4,0	0,5	0,0	-2,0	2,6	1,1	64%		14
18	Togetherness of activity	3,3	4,2	**1,0**	0,1	-0,2	2,5	1,1	**75%**	+	4
19	Changeability ('varied' preferred)	**2,7**	3,0	0,3	-0,1	-1,0	1,3	0,8	50%		6
20	Changeability ('same' preferred)	3,5	3,6	0,1	0,0	-0,7	1,0	0,7	67%		3
†	Changeability (pooled)	**2,6**	**2,8**	0,2	0,0	-1,0	1,3	0,8	56%		9
21	Enjoyment	3,9	4,7	0,9	0,4	NA	1,7	**0,5**	**100%**	+	4
22	Relaxation	**2,9**	4,2	**1,3**	0,6	NA	1,6	**0,3**	**100%**	+	10
23	Type of gathering	4,2	3,3	-0,9	0,0	-2,2	0,0	0,9	**75%**	-	4
24	Substance use expectations	**1,3**	4,7	**3,5**	**3,2**	NA	3,8	**0,3**	**100%**	+	3
25	Freedom of choice	3,4	3,9	0,5	0,3	-1,2	1,8	1,1	67%		6
26	Self-presentation	3,5	4,2	0,7	0,0	-0,4	2,3	0,9	**80%**	+	5
27	Physical pleasantness	3,2	3,5	0,3	-0,3	-1,3	1,2	0,7	**75%**	+	8
28	Sense of time	**2,9**	4,3	**1,4**	0,7	NA	2,1	**0,5**	**100%**	+	5

* Spaces with any medicine use were only eligible for the type 'Alc/cig'. Data on medicine use are included here for completeness.

† Data for 'changeability' and 'orientation' were pooled to maximise use of available data (see *Comparison 1 'NSU pos vs. Ideal'* for details).

K.2.4 Comparison 14 'Alc vs. Cig', including individual-level differences

C	Construct	$\bar{x}$		MD	Differences at individual level						n
		Alc	Cig		min	max$^-$	max$^+$	SD	ROC		
1	Beer	3,3	1,3	-2,0	-1,3	-2,7	NA	0,6	100%	-	3
2	Wine	3,6	1,4	-2,2	-0,8	-3,7	NA	1,2	100%	-	3
3	Cider	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	3
4	Sparkling wine	1,5	1,0	-0,5	0,0	-1,4	0,0	0,7	67%		3
5	Spirits	1,7	1,0	-0,7	0,0	-2,0	0,0	0,9	67%		3
6	Mixed drinks	1,7	1,0	-0,7	0,0	-2,0	0,0	0,9	67%		3
7	Cigarettes	1,1	4,3	3,3	1,8	NA	4,0	1,0	100%	+	3
8	Cigars, cigarillos	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	3
9	Waterpipe (with tobacco)	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	3
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	3
11	*(blank on purpose)*										
12	Importance	3,7	3,8	0,1	0,0	-0,7	1,0	0,7	33%		3
13	Feelings	4,9	4,4	-0,4	0,0	-0,7	NA	**0,3**	67%		3
14	Frequency	**2,9**	3,8	0,9	**-1,0**	-1,0	2,3	1,4	67%		3
15	Closeness to people	4,7	3,3	**-1,4**	-0,2	-2,0	NA	0,9	**100%**	-	3
16	Orientation ('outward' preferred)	3,0	3,2	0,2	**-1,0**	-1,0	1,3	1,2	50%		2
17	*Orientation ('inward' preferred)*	*3,6*	*3,5*	*-0,1*	*-0,1*	*-0,1*	*NA*	*NA*	*NA*		*1*
*	Orientation (pooled)	**2,8**	**2,9**	0,1	0,1	*-1,0*	1,3	1,0	67%		3
18	*Togetherness of activity*										*0*
19	*Changeability ('varied' preferred)*										*0*
20	*Changeability ('same' preferred)*	***1,0***	*5,0*	***4,0***	***4,0***	*NA*	*4,0*	*NA*	*NA*		*1*
21	*Enjoyment*	*4,4*	*4,0*	*-0,4*	*-0,4*	*-0,4*	*NA*	*NA*	*NA*		*1*
22	*Relaxation*	*5,0*	*4,3*	*-0,7*	*-0,7*	*-0,7*	*NA*	*NA*	*NA*		*1*
23	*Type of gathering*	*4,0*	*4,5*	*0,5*	*0,5*	*NA*	*0,5*	*NA*	*NA*		*1*
24	*Substance use expectations*										*0*
25	*Freedom of choice*	*4,3*	*3,8*	*-0,6*	*-0,1*	*-1,0*	*NA*	***0,5***	***100%***	-	*2*
26	*Self-presentation*	*5,0*	*4,0*	***-1,0***	***-1,0***	*-1,0*	*NA*	*NA*	*NA*		*1*
27	*Physical pleasantness*	*3,9*	***2,0***	***-1,9***	***-1,8***	*-2,0*	*NA*	***0,1***	***100%***	-	*2*
28	*Sense of time*										*0*

* Data for 'orientation' were pooled to maximise use of available data (see *Comparison 1 'NSU pos vs. Ideal'* for details).
See first pages of Appendix K.2 for further explanatory notes.

K.2.5 Comparison 15 'Alc vs. Alc&cig', including individual-level differences

C	Construct	$\bar{x}$		MD	Differences at individual level						n
		Alc	Alc&Cig		min	max⁻	max⁺	SD	ROC		
1	Beer	3,1	3,4	0,3	0,3	-0,7	1,3	0,8	60%		5
2	Wine	3,0	3,0	0,0	0,0	-2,0	1,2	1,1	40%		5
3	Cider	1,0	1,3	0,3	0,0	NA	1,0	0,4	60%		5
4	Sparkling wine	2,0	1,4	-0,6	0,0	-1,4	0,0	0,6	60%		5
5	Spirits	1,6	2,0	0,4	0,0	NA	0,8	0,3	60%		5
6	Mixed drinks	1,6	2,5	0,9	0,0	-0,3	3,0	1,1	60%		5
7	Cigarettes	1,0	4,0	3,0	2,0	NA	4,0	0,7	100%	+	5
8	Cigars, cigarillos	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
9	Waterpipe (with tobacco)	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
11	*(blank on purpose)*										
12	Importance	3,7	3,0	-0,8	-0,5	-1,8	1,0	1,0	**80%**	-	5
13	Feelings	4,6	4,0	-0,6	0,5	-1,3	0,5	0,6	**80%**	-	5
14	Frequency	3,3	3,6	0,2	**1,0**	-2,5	3,0	2,0	60%		5
15	Closeness to people	4,3	**2,5**	**-1,9**	**-1,0**	-3,0	NA	0,7	**100%**	-	5
16	Orientation ('outward' preferred)	3,3	4,6	**1,2**	0,0	NA	2,7	1,1	67%		3
17	*Orientation ('inward' preferred)*	*3,6*	***1,0***	***-2,6***	***-2,6***	*-2,6*	*NA*	*NA*	*NA*		*1*
*	Orientation (pooled)	3,1	4,7	**1,6**	0,0	NA	2,7	1,1	**75%**	+	4
18	*Togetherness of activity*										*0*
19	*Changeability ('varied' preferred)*										*0*
20	*Changeability ('same' preferred)*	***1,0***	*4,7*	***3,7***	***3,7***	*NA*	*3,7*	*NA*	*NA*		*1*
21	*Enjoyment*	*3,5*	*3,0*	*-0,5*	*0,5*	*-1,4*	*0,5*	*1,0*	*50%*		*2*
22	*Relaxation*	*3,8*	*4,0*	*0,3*	*0,0*	*NA*	*0,5*	***0,3***	*50%*		*2*
23	*Type of gathering*	*4,5*	*3,5*	***-1,0***	*-0,3*	*-1,8*	*NA*	*0,7*	***100%***	-	*2*
24	*Substance use expectations*										*0*
25	Freedom of choice	3,9	**2,8**	**-1,1**	-0,8	-1,6	NA	**0,4**	**100%**	-	3
26	*Self-presentation*	*5,0*	*3,9*	***-1,1***	***-1,1***	*-1,1*	*NA*	*NA*	*NA*		*1*
27	*Physical pleasantness*	*3,9*	***2,1***	***-1,8***	*0,3*	*-3,8*	*0,3*	*2,0*	*50%*		*2*
28	*Sense of time*										*0*

* Data for 'orientation' were pooled to maximise use of available data (see *Comparison 1 'NSU pos vs. Ideal'* for details).
See first pages of Appendix K.2 for further explanatory notes.

K.2.6 Comparison 16 'Cig vs. Alc&cig', including individual-level differences

C	Construct	$\bar{x}$		MD	Differences at individual level						n
		Cig	Alc&Cig		min	max$^-$	max$^+$	SD	ROC		
1	Beer	1,3	3,2	1,9	0,7	NA	2,5	0,6	100%	+	5
2	Wine	1,3	3,1	1,8	1,3	NA	2,0	0,3	100%	+	5
3	Cider	1,0	1,3	0,3	0,0	NA	1,0	0,4	60%		5
4	Sparkling wine	1,0	1,2	0,2	0,0	NA	1,0	0,4	80%	0	5
5	Spirits	1,0	1,9	0,9	0,0	NA	2,0	0,6	80%	+	5
6	Mixed drinks	1,0	2,3	1,3	0,0	NA	3,0	1,0	80%	+	5
7	Cigarettes	4,4	4,6	0,2	0,0	-0,8	1,0	0,6	60%		5
8	Cigars, cigarillos	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
9	Waterpipe (with tobacco)	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
11	*(blank on purpose)*										
12	Importance	3,9	3,8	-0,1	0,0	-1,5	1,0	0,9	40%		5
13	Feelings	4,2	4,4	0,2	0,0	-1,3	1,3	0,9	40%		5
14	Frequency	4,0	3,4	-0,6	0,0	-1,5	0,7	0,8	60%		5
15	Closeness to people	3,3	3,5	0,2	-0,3	-1,0	2,3	1,2	60%		5
16	Orientation ('outward' preferred)	3,0	4,6	**1,6**	**1,0**	NA	2,4	0,6	**100%**	+	3
17	*Orientation ('inward' preferred)*	*3,5*	***1,0***	***-2,5***	***-2,5***	*-2,5*	*NA*	*NA*	*NA*		*1*
*	Orientation (pooled)	**2,9**	4,7	**1,8**	**1,0**	NA	2,5	0,7	**100%**	+	4
18	*Togetherness of activity*	*4,5*	*3,0*	***-1,5***	***-1,5***	*-1,5*	*NA*	*NA*	*NA*		*1*
19	*Changeability ('varied' preferred)*										*0*
20	*Changeability ('same' preferred)*	*5,0*	*4,7*	*-0,3*	*-0,3*	*-0,3*	*NA*	*NA*	*NA*		*1*
21	*Enjoyment*	*4,0*	*3,0*	***-1,0***	***-1,0***	*-1,0*	*NA*	*NA*	*NA*		*1*
22	Relaxation	3,6	4,6	0,9	0,7	NA	1,2	**0,2**	**100%**	+	3
23	*Type of gathering*	*4,6*	*4,3*	*-0,3*	*0,3*	*-0,8*	*0,3*	*0,6*	50%		*2*
24	*Substance use expectations*										*0*
25	*Freedom of choice*	*3,8*	*3,1*	*-0,6*	*0,3*	*-1,5*	*0,3*	*0,9*	*50%*		*2*
26	*Self-presentation*	*4,0*	*3,9*	*-0,1*	*-0,1*	*-0,1*	*NA*	*NA*	*NA*		*1*
27	Physical pleasantness	**2,4**	**2,7**	0,3	0,6	-2,0	2,3	1,7	67%		3
28	*Sense of time*										*0*

* Data for 'orientation' were pooled to maximise use of available data (see *Comparison 1 'NSU pos vs. Ideal'* for details).
See first pages of Appendix K.2 for further explanatory notes.

K.2.7 Comparison 2 'NSU pos vs. NSU neg', including individual-level differences

C	Construct	$\bar{x}$		MD	Differences at individual level						n
		NSU pos	NSU neg		min	max^-	max^+	SD	ROC		
1	Beer	1,1	1,1	0,0	0,0	-0,3	1,0	0,3	50%		16
2	Wine	1,3	1,1	-0,1	0,0	-1,0	1,0	0,4	53%		17
3	Cider	1,0	1,0	0,0	0,0	-0,1	NA	0,1	75%	0	8
4	Sparkling wine	1,1	1,1	-0,1	0,0	-1,0	0,5	0,3	57%		14
5	Spirits	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	14
6	Mixed drinks	1,0	1,0	0,0	0,0	-0,1	NA	0,0	93%	0	15
7	Cigarettes	1,1	1,0	-0,1	0,0	-0,7	NA	0,2	73%		11
8	Cigars, cigarillos	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	2
9	Waterpipe (with tobacco)	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
10	E-cigarettes (with nicotine)										0
11	(blank on purpose)										
12	Importance	4,4	3,5	-0,9	0,0	-2,7	1,5	1,1	74%		19
13	Feelings	4,6	**2,8**	**-1,8**	**-1,0**	-2,9	NA	**0,5**	**100%**	-	19
14	Frequency	4,0	4,1	0,1	0,0	-1,3	1,0	0,7	58%		19
15	Closeness to people	3,9	**2,5**	**-1,5**	-0,3	-3,3	1,3	1,4	**82%**	-	11
16	Orientation ('outward' preferred)	3,8	**2,9**	-0,9	0,0	-3,5	0,7	1,4	63%		8
17	Orientation ('inward' preferred)	**2,7**	**2,1**	-0,6	0,7	-1,7	0,7	1,0	67%		3
18	*Togetherness of activity*	*3,5*	***2,3***	***-1,2***	***-1,0***	*-1,3*	*NA*	***0,2***	***100%***	-	*2*
19	Changeability ('varied' preferred)	3,3	**1,4**	**-1,8**	-0,5	-2,9	NA	0,9	**100%**	-	4
20	Changeability ('same' preferred)	3,8	**2,8**	**-1,0**	0,8	-2,0	0,8	1,3	67%		3
21	Enjoyment	4,4	**2,7**	**-1,7**	-0,5	-3,7	NA	1,2	**100%**	-	4
22	Relaxation	4,1	**1,3**	**-2,8**	**-2,1**	-4,0	NA	**0,5**	**100%**	-	8
23	*Type of gathering*	*4,3*	*3,8*	*-0,6*	*0,0*	*-1,2*	*NA*	*0,6*	*50%*		*2*
24	*Substance use expectations*	***1,5***	***1,3***	*-0,3*	*0,0*	*-0,5*	*NA*	***0,3***	*50%*		*2*
25	Freedom of choice	4,1	**2,2**	**-1,9**	0,5	-3,2	0,5	1,2	**83%**	-	6
26	Self-presentation	4,2	**2,4**	**-1,7**	0,0	-3,7	NA	1,5	67%		3
27	Physical pleasantness	3,4	**2,5**	-0,9	0,0	-2,4	1,3	1,2	71%		7
28	Sense of time	3,4	**1,3**	**-2,0**	**-1,3**	-3,0	NA	0,7	**100%**	-	4

K.2.8 Comparison 12 'Cig pos vs. Cig neg', including individual-level differences

C	Construct	$\bar{x}$		MD	Differences at individual level						n
		Cig pos	Cig neg		min	max$^-$	max$^+$	SD	ROC		
1	Beer	1,2	1,3	0,1	0,0	-0,5	1,0	0,5	40%		5
2	Wine	1,3	1,2	-0,1	0,0	-0,5	NA	0,2	80%	0	5
3	Cider	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
4	Sparkling wine	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
5	Spirits	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
6	Mixed drinks	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
7	Cigarettes	4,3	4,4	0,2	0,0	-0,4	1,3	0,6	40%		5
8	Cigars, cigarillos	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
9	Waterpipe (with tobacco)	1,1	1,0	-0,1	0,0	-0,3	0,0	0,1	80%	0	5
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	5
11	(blank on purpose)										
12	Importance	4,1	3,3	-0,8	0,0	-2,1	0,3	0,9	60%		5
13	Feelings	4,6	**2,9**	**-1,7**	**-1,3**	-2,1	NA	**0,4**	**100%**	-	5
14	Frequency	3,8	4,4	0,6	0,0	NA	1,0	**0,4**	**80%**	+	5
15	Closeness to people	4,3	**2,9**	**-1,4**	0,0	-3,5	NA	1,3	**80%**	-	5
16	*Orientation ('outward' preferred)*	*3,0*	*3,2*	*0,2*	*-0,7*	*-0,7*	*1,0*	*0,8*	*50%*		*2*
17	*Orientation ('inward' preferred)*	*5,0*	***2,0***	***-3,0***	***-3,0***	*-3,0*	*NA*	*NA*	*NA*		*1*
*	Orientation (pooled)	3,0	3,1	0,1	*-0,7*	*-0,7*	3,0	1,5	67%		3
18	*Togetherness of activity*	*4,7*	*4,0*	*-0,7*	*-0,7*	*-0,7*	*NA*	*NA*	*NA*		*1*
19	*Changeability ('varied' preferred)*										*0*
20	*Changeability ('same' preferred)*	*5,0*	*5,0*	*0,0*	*0,0*	*NA*	*0,0*	*NA*	*NA*		*1*
21	*Enjoyment*	*5,0*	*3,0*	***-2,0***	***-2,0***	*-2,0*	*NA*	*NA*	*NA*		*1*
22	Relaxation	4,4	**2,3**	**-2,0**	**-1,4**	-2,9	NA	0,6	**100%**	-	4
23	*Type of gathering*	*5,0*	*4,5*	*-0,5*	*-0,5*	*-0,5*	*NA*	*NA*	*NA*		*1*
24	*Substance use expectations*	*5,0*	***2,5***	***-2,5***	***-2,5***	*-2,5*	*NA*	*NA*	*NA*		*1*
25	*Freedom of choice*	*4,9*	***1,8***	***-3,1***	***-3,0***	*-3,2*	*NA*	***0,1***	***100%***	-	*2*
26	*Self-presentation*										*0*
27	Physical pleasantness	3,7	**2,5**	**-1,2**	-0,5	-2,0	NA	0,6	**100%**	-	3
28	*Sense of time*										*0*

* Data for 'orientation' were pooled to maximise use of available data (see *Comparison 1 'NSU pos vs. Ideal'* for details).
See first pages of Appendix K.2 for further explanatory notes.

K.2.9 Comparison 19 'Wine/beer(&cig) vs. Spirits/mixers(&cig)', with individual-level differences

C	Construct	$\bar{x}$		MD	Differences at individual level						n
		W/b (&cig)	S/m (&cig)		min	max$^-$	max$^+$	SD	ROC		
1	Beer	2,8	3,1	0,3	0,0	-2,0	2,3	1,2	50%		10
2	Wine	2,5	3,0	0,5	0,0	-2,0	3,0	1,4	60%		10
3	Cider	1,0	1,6	0,6	0,0	NA	4,0	1,2	70%		10
4	Sparkling wine	1,2	1,4	0,2	0,0	NA	1,5	0,5	70%		10
5	Spirits	1,2	2,9	1,6	0,0	-0,3	4,0	1,2	80%	+	10
6	Mixed drinks	1,1	2,9	1,8	0,0	NA	4,0	1,1	90%	+	10
7	Cigarettes	2,2	2,3	0,1	0,0	-0,3	0,5	0,2	60%		10
8	Cigars, cigarillos	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	10
9	Waterpipe (with tobacco)	1,1	1,1	0,1	0,0	-0,5	1,0	0,4	80%	0	10
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	0,0	NA	0,0	0,0	100%	0	10
11	(blank on purpose)				0,0						
12	Importance	3,8	3,5	-0,4	**1,0**	-3,5	2,0	1,6	60%		10
13	Feelings	4,5	4,2	-0,3	0,0	-1,3	1,5	0,7	60%		10
14	Frequency	3,3	**2,7**	-0,6	0,0	-3,0	1,0	1,1	70%		10
15	Closeness to people	4,1	3,4	-0,6	0,0	-2,3	0,8	0,9	67%		6
16	Orientation ('outward' preferred)	4,3	4,5	0,2	0,0	-1,0	1,0	0,8	50%		4
17	*Orientation ('inward' preferred)*	***2,1***	***1,0***	***-1,1***	*0,0*	*-2,3*	NA	*1,1*	*50%*		*2*
*	Orientation (pooled)	4,2	4,7	0,5	0,0	-1,0	2,3	1,0	50%		6
18	*Togetherness of activity*	*3,9*	*3,8*	*-0,1*	***1,3***	*-1,5*	*1,3*	*1,4*	*50%*		*2*
19	Changeability ('varied' preferred)	**2,4**	3,3	0,9	-0,3	-0,7	3,5	1,9	67%		3
20	*Changeability ('same' preferred)*	*3,3*	*3,0*	*-0,3*	*0,5*	*-1,0*	*0,5*	*0,8*	*50%*		*2*
*	Changeability (pooled)	**2,6**	3,2	0,6	-0,3	-0,7	3,5	1,6	60%		5
21	*Enjoyment*	*5,0*	*5,0*	*0,0*	*0,0*	NA	*0,0*	***0,0***	***100%***	*0*	*2*
22	Relaxation	4,6	5,0	0,4	0,0	NA	1,0	**0,4**	67%		3
23	Type of gathering	3,7	**1,8**	**-1,9**	0,3	-4,0	0,3	1,8	67%		3
24	*Substance use expectations*										*0*
25	*Freedom of choice*	*4,4*	*4,8*	*0,4*	*0,3*	NA	*0,5*	***0,1***	***100%***	+	*2*
26	*Self-presentation*	*4,6*	*3,3*	***-1,4***	*-0,8*	*-2,0*	NA	*0,6*	***100%***	-	*2*
27	Physical pleasantness	3,3	3,2	-0,2	**-1,5**	-2,0	3,0	2,2	67%		3
28	*Sense of time*	*4,0*	*5,0*	***1,0***	***1,0***	NA	*1,0*	*NA*	*NA*		*1*

* Data for 'orientation' and 'changeability' were pooled to maximise use of available data (see *Comparison 1 'NSU pos vs. Ideal'* for details). See first pages of Appendix K.2 for further explanatory notes.

K.3 Further data tables for pattern comparisons

The following tables provide key data regarding the comparison charts shown in section 11.2. Explanatory notes regarding the data tables are included in the legend below.

Additional data tables are shown in Appendix K.2 (for Comparisons 1, 2, 11, 12, 14, 15, 16 and 19), in Appendix K.1 (for single pattern charts) and in Appendix K.4 (for standardised comparisons relative to reference spaces).

K.3.1 Legend for subsequent tables

C … Row numbers corresponding to numbers used in charts to identify supplied constructs (C1-14) and master constructs derived from elicited constructs (C15-28)

Construct … Construct label. For details on supplied constructs, see section 6.2.3; on elicited constructs, see Chapter 10. Table 30, p. 400, gives an overview.

$\bar{x}$ … Arithmetic mean of ratings across study participants included in the comparison; data on a 5-point scale from 1 to 5, whereby 5 represents more frequent substance use (C1-10) or the preferred pole (C12-28). Blank cells indicate missing data.

'NSU' etc. … Situated substance use pattern, abbreviated in line with Chapter 11. First named space is the reference space used for calculation of differences.

MD … Difference between means (equals mean of individual-level differences); may not match the difference between arithmetic means as shown due to rounding

n … Sample size per construct, i.e. number of study participants included in the comparison on a particular construct

K.3.2 Comparison 2 'NSU neg vs. two main reference spaces'

C	Construct	$\bar{x}$		MD	$\bar{x}$		MD	n
		NSU pos	NSU neg		Ideal	NSU neg		
1	Beer	1,1	1,1	0,0	2,1	1,1	-1,0	16
2	Wine	1,3	1,1	-0,1	2,2	1,1	-1,0	17
3	Cider	1,0	1,0	0,0	1,8	1,0	-0,8	8
4	Sparkling wine	1,1	1,1	-0,1	1,4	1,1	-0,4	14
5	Spirits	1,0	1,0	0,0	1,2	1,0	-0,2	14
6	Mixed drinks	1,0	1,0	0,0	1,4	1,0	-0,4	15
7	Cigarettes	1,1	1,0	-0,1	2,5	1,0	-1,5	11
8	Cigars, cigarillos	1,0	1,0	0,0	1,0	1,0	0,0	2
9	Waterpipe (with tobacco)	1,0	1,0	0,0	2,0	1,0	-1,0	5
10	E-cigarettes (with nicotine)							0
11	(blank on purpose)							
12	Importance	4,4	3,5	-0,9	4,9	3,5	-1,4	19
13	Feelings	4,6	2,8	-1,8	5,0	2,8	-2,2	19
14	Frequency	4,0	4,1	0,1	4,6	4,1	-0,5	19
15	Closeness to people	3,9	2,5	-1,5	4,6	2,5	-2,2	11
16	Orientation ('outward' preferred)	3,8	2,9	-0,9	4,3	2,9	-1,3	8
17	Orientation ('inward' preferred)	2,7	2,1	-0,6	3,7	2,1	-1,6	3
18	Togetherness of activity	3,5	2,3	-1,2	4,0	2,3	-1,7	2
19	Changeability ('varied' preferred)	3,3	1,4	-1,8	3,5	1,4	-2,1	4
20	Changeability ('same' preferred)	3,8	2,8	-1,0	4,7	2,8	-1,8	3
21	Enjoyment	4,4	2,7	-1,7	5,0	2,7	-2,3	4
22	Relaxation	4,1	1,3	-2,8	4,6	1,3	-3,3	8
23	Type of gathering	4,3	3,8	-0,6	5,0	3,8	-1,3	2
24	Substance use expectations	1,5	1,3	-0,3	4,0	1,3	-2,8	2
25	Freedom of choice	4,1	2,2	-1,9	4,7	2,2	-2,5	6
26	Self-presentation	4,2	2,4	-1,7	4,7	2,4	-2,2	3
27	Physical pleasantness	3,4	2,5	-0,9	5,0	2,5	-2,5	7
28	Sense of time	3,4	1,3	-2,0	5,0	1,3	-3,7	4

K.3.3 Comparison 3 'Alc vs. two main reference spaces'

C	Construct	$\bar{x}$		MD	$\bar{x}$		MD	n
		NSU pos	Alc		Ideal	Alc		
1	Beer	1,2	2,8	1,7	2,2	2,8	0,7	13
2	Wine	1,3	3,1	1,8	2,1	3,1	0,9	15
3	Cider	1,0	1,5	0,5	1,7	1,5	-0,2	9
4	Sparkling wine	1,1	1,6	0,4	1,4	1,6	0,2	12
5	Spirits	1,0	1,9	0,9	1,2	1,9	0,8	13
6	Mixed drinks	1,0	1,8	0,8	1,4	1,8	0,5	13
7	Cigarettes	1,1	1,2	0,1	2,0	1,2	-0,8	7
8	Cigars, cigarillos	1,0	1,3	0,3	1,0	1,3	0,3	1
9	Waterpipe (with tobacco)	1,0	1,1	0,1	2,0	1,1	-0,9	4
10	E-cigarettes (with nicotine)							0
11	(blank on purpose)							
12	Importance	4,5	3,8	-0,7	5,0	3,8	-1,2	16
13	Feelings	4,7	4,7	0,0	5,0	4,7	-0,3	16
14	Frequency	3,9	2,9	-1,0	4,4	2,9	-1,5	16
15	Closeness to people	3,9	4,4	0,5	4,5	4,4	-0,1	8
16	Orientation ('outward' preferred)	3,6	3,7	0,0	4,1	3,7	-0,5	7
17	Orientation ('inward' preferred)	2,3	2,3	0,0	4,0	2,3	-1,7	4
18	Togetherness of activity	3,5	4,0	0,5	4,0	4,0	0,0	2
19	Changeability ('varied' preferred)	3,3	3,2	-0,2	3,8	3,2	-0,6	5
20	Changeability ('same' preferred)	3,8	2,4	-1,4	4,7	2,4	-2,2	3
21	Enjoyment	4,4	4,8	0,4	5,0	4,8	-0,2	4
22	Relaxation	3,9	4,5	0,6	4,2	4,5	0,3	6
23	Type of gathering	4,1	3,6	-0,5	5,0	3,6	-1,4	3
24	Substance use expectations	2,0	5,0	3,0	3,0	5,0	2,0	1
25	Freedom of choice	4,1	4,1	0,0	4,6	4,1	-0,5	5
26	Self-presentation	4,2	4,3	0,2	4,7	4,3	-0,3	3
27	Physical pleasantness	3,6	4,1	0,5	5,0	4,1	-0,9	4
28	Sense of time	3,5	4,4	1,0	5,0	4,4	-0,6	3

K.3.4 Comparison 4 'Wine/beer vs. two main reference spaces'

C	Construct	$\bar{x}$		MD	$\bar{x}$		MD	n
		NSU pos	Wine/ beer		Ideal	Wine/ beer		
1	Beer	1,1	3,1	1,9	2,2	3,1	0,9	9
2	Wine	1,3	3,1	1,8	2,3	3,1	0,8	12
3	Cider	1,0	1,0	0,0	1,5	1,0	-0,5	6
4	Sparkling wine	1,1	1,2	0,1	1,4	1,2	-0,2	9
5	Spirits	1,0	1,2	0,2	1,1	1,2	0,1	9
6	Mixed drinks	1,1	1,1	0,1	1,4	1,1	-0,3	9
7	Cigarettes	1,1	1,2	0,1	2,0	1,2	-0,8	5
8	Cigars, cigarillos	1,0	1,3	0,3	1,0	1,3	0,3	1
9	Waterpipe (with tobacco)	1,0	1,1	0,1	2,0	1,1	-0,9	4
10	E-cigarettes (with nicotine)							0
11	(blank on purpose)							
12	Importance	4,5	3,9	-0,6	5,0	3,9	-1,1	12
13	Feelings	4,7	4,7	0,0	5,0	4,7	-0,3	12
14	Frequency	3,9	2,9	-1,0	4,3	2,9	-1,3	12
15	Closeness to people	3,8	4,5	0,6	4,5	4,5	0,0	6
16	Orientation ('outward' preferred)	3,6	3,8	0,2	4,2	3,8	-0,5	5
17	Orientation ('inward' preferred)	2,3	2,8	0,5	4,0	2,8	-1,3	3
18	Togetherness of activity	3,5	3,9	0,4	4,0	3,9	-0,1	2
19	Changeability ('varied' preferred)	3,0	2,7	-0,3	3,5	2,7	-0,8	4
20	Changeability ('same' preferred)	3,8	2,5	-1,3	4,7	2,5	-2,2	3
21	Enjoyment	4,5	4,8	0,3	5,0	4,8	-0,2	3
22	Relaxation	4,2	4,7	0,5	4,5	4,7	0,2	4
23	Type of gathering	4,3	3,5	-0,8	5,0	3,5	-1,5	2
24	Substance use expectations	2,0	5,0	3,0	3,0	5,0	2,0	1
25	Freedom of choice	4,1	3,7	-0,4	5,0	3,7	-1,3	3
26	Self-presentation	4,0	4,5	0,5	5,0	4,5	-0,5	2
27	Physical pleasantness	3,4	4,8	1,3	5,0	4,8	-0,3	2
28	Sense of time	3,5	4,0	0,5	5,0	4,0	-1,0	3

K.3.5 Comparison 5 'Spirits/mixers vs. two main reference spaces'

C	Construct	$\bar{x}$		MD	$\bar{x}$		MD	n
		NSU pos	Spirits/ mixers		Ideal	Spirits/ mixers		
1	Beer	1,3	3,0	1,7	2,1	3,0	0,8	7
2	Wine	1,4	2,6	1,2	1,8	2,6	0,8	8
3	Cider	1,0	1,7	0,6	1,8	1,7	-0,1	8
4	Sparkling wine	1,3	1,6	0,3	1,3	1,6	0,2	6
5	Spirits	1,0	3,0	2,0	1,3	3,0	1,8	8
6	Mixed drinks	1,1	2,9	1,8	1,5	2,9	1,4	8
7	Cigarettes	1,0	1,2	0,2	1,0	1,2	0,2	2
8	Cigars, cigarillos							0
9	Waterpipe (with tobacco)	1,0	1,3	0,3	1,7	1,3	-0,3	3
10	E-cigarettes (with nicotine)							0
11	(blank on purpose)							
12	Importance	4,7	3,6	-1,1	5,0	3,6	-1,4	9
13	Feelings	4,7	4,4	-0,3	5,0	4,4	-0,6	9
14	Frequency	3,8	2,7	-1,1	4,1	2,7	-1,4	9
15	Closeness to people	4,4	4,4	0,0	4,5	4,4	-0,1	4
16	Orientation ('outward' preferred)	3,6	4,1	0,5	4,5	4,1	-0,4	4
17	Orientation ('inward' preferred)	2,4	1,8	-0,6	4,5	1,8	-2,8	2
18	Togetherness of activity	3,5	3,8	0,3	4,0	3,8	-0,2	2
19	Changeability ('varied' preferred)	3,5	3,6	0,1	4,0	3,6	-0,4	4
20	Changeability ('same' preferred)	2,2	1,0	-1,2	4,0	1,0	-3,0	1
21	Enjoyment	4,3	5,0	0,7	5,0	5,0	0,0	3
22	Relaxation	3,6	4,3	0,7	4,0	4,3	0,3	3
23	Type of gathering	4,7	1,0	-3,7	5,0	1,0	-4,0	1
24	Substance use expectations							0
25	Freedom of choice	4,0	4,9	0,8	4,3	4,9	0,6	3
26	Self-presentation	3,8	4,0	0,3	4,5	4,0	-0,5	2
27	Physical pleasantness	3,8	4,0	0,2	5,0	4,0	-1,0	2
28	Sense of time							0

K.3.6 Comparison 6 'Cig pos vs. two main reference spaces'

C	Construct	$\bar{x}$		MD	$\bar{x}$		MD	n
		NSU pos	Cig pos		Ideal	Cig pos		
1	Beer	1,0	1,2	0,2	1,8	1,2	-0,6	6
2	Wine	1,0	1,3	0,2	2,0	1,3	-0,8	6
3	Cider	1,0	1,0	0,0	2,0	1,0	-1,0	2
4	Sparkling wine	1,1	1,0	-0,1	1,5	1,0	-0,5	4
5	Spirits	1,0	1,1	0,1	1,4	1,1	-0,4	5
6	Mixed drinks	1,0	1,0	0,0	1,0	1,0	0,0	4
7	Cigarettes	1,1	4,5	3,3	3,6	4,5	0,9	7
8	Cigars, cigarillos							0
9	Waterpipe (with tobacco)	1,0	1,1	0,1	1,5	1,1	-0,4	2
10	E-cigarettes (with nicotine)							0
11	(blank on purpose)							
12	Importance	4,4	4,0	-0,4	4,9	4,0	-0,8	7
13	Feelings	4,6	4,7	0,2	5,0	4,7	-0,3	7
14	Frequency	4,5	3,8	-0,7	4,7	3,8	-0,9	7
15	Closeness to people	3,9	3,9	0,1	4,9	3,9	-0,9	7
16	Orientation ('outward' preferred)	4,1	3,0	-1,1	3,7	3,0	-0,7	3
17	Orientation ('inward' preferred)	2,5	5,0	2,5	4,0	5,0	1,0	1
18	Togetherness of activity	3,7	4,7	1,0	4,0	4,7	0,7	1
19	Changeability ('varied' preferred)							0
20	Changeability ('same' preferred)	5,0	5,0	0,0	5,0	5,0	0,0	1
21	Enjoyment	4,7	5,0	0,3	5,0	5,0	0,0	1
22	Relaxation	4,2	4,4	0,2	5,0	4,4	-0,6	3
23	Type of gathering	4,5	4,8	0,3	5,0	4,8	-0,3	2
24	Substance use expectations	1,0	4,9	3,9	5,0	4,9	-0,1	2
25	Freedom of choice	4,3	4,6	0,3	4,3	4,6	0,2	3
26	Self-presentation	4,5	4,2	-0,3	4,5	4,2	-0,3	2
27	Physical pleasantness	3,2	3,0	-0,1	5,0	3,0	-2,0	4
28	Sense of time							0

K.3.7 Comparison 7 'Cig neg vs. two main reference spaces'

C	Construct	$\bar{x}$		MD	$\bar{x}$		MD	n
		NSU pos	Cig neg		Ideal	Cig neg		
1	Beer	1,0	1,3	0,3	1,8	1,3	-0,4	4
2	Wine	1,0	1,3	0,3	2,5	1,3	-1,3	4
3	Cider	1,0	1,0	0,0	1,0	1,0	0,0	1
4	Sparkling wine	1,1	1,0	-0,1	1,5	1,0	-0,5	4
5	Spirits	1,0	1,0	0,0	1,0	1,0	0,0	3
6	Mixed drinks	1,0	1,0	0,0	1,0	1,0	0,0	3
7	Cigarettes	1,2	4,4	3,2	4,0	4,4	0,4	5
8	Cigars, cigarillos							0
9	Waterpipe (with tobacco)	1,0	1,0	0,0	2,0	1,0	-1,0	1
10	E-cigarettes (with nicotine)							0
11	(blank on purpose)							
12	Importance	4,2	3,3	-0,9	4,8	3,3	-1,5	5
13	Feelings	4,5	2,9	-1,6	5,0	2,9	-2,1	5
14	Frequency	4,3	4,4	0,1	4,6	4,4	-0,2	5
15	Closeness to people	3,6	2,9	-0,7	5,0	2,9	-2,1	5
16	Orientation ('outward' preferred)	4,8	3,2	-1,6	4,0	3,2	-0,8	2
17	Orientation ('inward' preferred)	2,5	2,0	-0,5	4,0	2,0	-2,0	1
18	Togetherness of activity	3,7	4,0	0,3	4,0	4,0	0,0	1
19	Changeability ('varied' preferred)							0
20	Changeability ('same' preferred)	5,0	5,0	0,0	5,0	5,0	0,0	1
21	Enjoyment	4,7	3,0	-1,7	5,0	3,0	-2,0	1
22	Relaxation	4,2	2,7	-1,6	5,0	2,7	-2,3	3
23	Type of gathering	5,0	4,5	-0,5	5,0	4,5	-0,5	1
24	Substance use expectations	1,0	2,5	1,5	5,0	2,5	-2,5	1
25	Freedom of choice	4,6	1,8	-2,8	5,0	1,8	-3,3	2
26	Self-presentation							0
27	Physical pleasantness	3,1	2,5	-0,6	5,0	2,5	-2,5	3
28	Sense of time							0

K.3.8 Comparison 8 'Alc&cig vs. two main reference spaces'

C	Construct	$\bar{x}$		MD	$\bar{x}$		MD	n
		NSU pos	Alc& cig		Ideal	Alc& cig		
1	Beer	1,0	3,3	2,3	2,0	3,3	1,3	7
2	Wine	1,1	3,0	1,9	2,3	3,0	0,8	7
3	Cider	1,0	1,6	0,6	2,0	1,6	-0,4	2
4	Sparkling wine	1,1	1,4	0,3	1,4	1,4	0,0	5
5	Spirits	1,0	2,3	1,3	1,3	2,3	0,9	6
6	Mixed drinks	1,0	2,5	1,5	1,3	2,5	1,2	6
7	Cigarettes	1,2	4,3	3,1	2,9	4,3	1,4	7
8	Cigars, cigarillos	1,0	1,0	0,0	1,0	1,0	0,0	1
9	Waterpipe (with tobacco)							0
10	E-cigarettes (with nicotine)							0
11	(blank on purpose)							
12	Importance	4,4	3,8	-0,6	5,0	3,8	-1,3	7
13	Feelings	4,5	4,3	-0,2	5,0	4,3	-0,7	7
14	Frequency	4,2	3,3	-0,9	4,7	3,3	-1,4	7
15	Closeness to people	3,7	3,3	-0,4	4,8	3,3	-1,5	6
16	Orientation ('outward' preferred)	4,1	4,6	0,5	3,7	4,6	0,9	3
17	Orientation ('inward' preferred)	3,3	1,0	-2,3	4,0	1,0	-3,0	2
18	Togetherness of activity	3,7	3,0	-0,7	4,0	3,0	-1,0	1
19	Changeability ('varied' preferred)							0
20	Changeability ('same' preferred)	5,0	4,7	-0,3	5,0	4,7	-0,3	1
21	Enjoyment	4,7	3,0	-1,7	5,0	3,0	-2,0	1
22	Relaxation	4,2	4,8	0,6	5,0	4,8	-0,2	3
23	Type of gathering	4,2	4,0	-0,3	5,0	4,0	-1,0	3
24	Substance use expectations							0
25	Freedom of choice	4,1	3,1	-1,0	4,0	3,1	-0,9	2
26	Self-presentation	4,5	3,9	-0,6	4,0	3,9	-0,1	1
27	Physical pleasantness	3,4	3,0	-0,4	5,0	3,0	-2,0	4
28	Sense of time	3,0	4,7	1,7	5,0	4,7	-0,3	1

K.3.9 Comparison 9 'Cig&beer/wine vs. two main reference spaces'

C	Construct	$\bar{x}$		MD	$\bar{x}$		MD	n
		NSU pos	Cig& b/w		Ideal	Cig& b/w		
1	Beer	1,1	2,9	1,9	2,0	2,9	0,9	6
2	Wine	1,1	2,5	1,3	2,2	2,5	0,3	6
3	Cider	1,0	1,0	0,0	3,0	1,0	-2,0	1
4	Sparkling wine	1,1	1,3	0,3	1,3	1,3	0,1	4
5	Spirits	1,0	1,5	0,5	1,4	1,5	0,1	5
6	Mixed drinks	1,0	1,4	0,4	1,4	1,4	0,0	5
7	Cigarettes	1,1	4,3	3,3	3,0	4,3	1,3	6
8	Cigars, cigarillos	1,0	1,0	0,0	1,0	1,0	0,0	1
9	Waterpipe (with tobacco)							0
10	E-cigarettes (with nicotine)							0
11	(blank on purpose)							
12	Importance	4,5	4,0	-0,5	5,0	4,0	-1,0	6
13	Feelings	4,5	4,4	0,0	5,0	4,4	-0,6	6
14	Frequency	4,2	3,5	-0,7	4,8	3,5	-1,4	6
15	Closeness to people	4,2	4,0	-0,2	4,8	4,0	-0,8	5
16	Orientation ('outward' preferred)	4,1	4,5	0,4	3,7	4,5	0,8	3
17	Orientation ('inward' preferred)	4,0	1,0	-3,0	4,0	1,0	-3,0	1
18	Togetherness of activity	3,7	3,7	0,0	4,0	3,7	-0,3	1
19	Changeability ('varied' preferred)							0
20	Changeability ('same' preferred)	5,0	4,5	-0,5	5,0	4,5	-0,5	1
21	Enjoyment							0
22	Relaxation	4,2	4,6	0,4	5,0	4,6	-0,4	3
23	Type of gathering	4,2	4,3	0,1	5,0	4,3	-0,7	3
24	Substance use expectations							0
25	Freedom of choice	3,6	4,0	0,4	3,0	4,0	1,0	1
26	Self-presentation	4,5	4,3	-0,3	4,0	4,3	0,3	1
27	Physical pleasantness	3,3	3,1	-0,2	5,0	3,1	-1,9	3
28	Sense of time	3,0	4,0	1,0	5,0	4,0	-1,0	1

K.3.10 Comparison 10 'Cig&spirits/mixers vs. two main reference spaces'

C	Construct	$\bar{x}$		MD	$\bar{x}$		MD	n
		NSU pos	Cig& s/m		Ideal	Cig& s/m		
1	Beer	1,1	3,8	2,7	2,0	3,8	1,8	5
2	Wine	1,2	3,8	2,6	2,4	3,8	1,4	5
3	Cider	1,0	1,8	0,8	2,0	1,8	-0,3	2
4	Sparkling wine	1,0	1,3	0,3	1,3	1,3	0,0	3
5	Spirits	1,0	3,0	2,0	1,4	3,0	1,6	5
6	Mixed drinks	1,0	3,4	2,4	1,4	3,4	2,0	5
7	Cigarettes	1,2	4,1	3,0	2,4	4,1	1,7	5
8	Cigars, cigarillos	1,0	1,0	0,0	1,0	1,0	0,0	1
9	Waterpipe (with tobacco)							0
10	E-cigarettes (with nicotine)							0
11	(blank on purpose)							
12	Importance	4,4	3,1	-1,3	5,0	3,1	-1,9	5
13	Feelings	4,6	3,9	-0,7	5,0	3,9	-1,1	5
14	Frequency	4,2	3,0	-1,2	4,8	3,0	-1,8	5
15	Closeness to people	3,7	2,3	-1,4	4,8	2,3	-2,5	4
16	Orientation ('outward' preferred)	3,7	4,3	0,6	3,0	4,3	1,3	2
17	Orientation ('inward' preferred)	3,3	1,0	-2,3	4,0	1,0	-3,0	2
18	Togetherness of activity							0
19	Changeability ('varied' preferred)							0
20	Changeability ('same' preferred)	5,0	5,0	0,0	5,0	5,0	0,0	1
21	Enjoyment	4,7	3,0	-1,7	5,0	3,0	-2,0	1
22	Relaxation	4,4	5,0	0,6	5,0	5,0	0,0	2
23	Type of gathering	3,8	2,2	-1,7	5,0	2,2	-2,8	2
24	Substance use expectations							0
25	Freedom of choice	4,1	3,3	-0,9	4,0	3,3	-0,8	2
26	Self-presentation	4,5	3,5	-1,0	4,0	3,5	-0,5	1
27	Physical pleasantness	3,6	2,8	-0,8	5,0	2,8	-2,2	3
28	Sense of time	3,0	5,0	2,0	5,0	5,0	0,0	1

K.3.I I Comparison 13 'NSU neg vs. Cig neg'

C	Construct	$\bar{x}$		MD	n
		NSU neg	Cig neg		
1	Beer	1,2	1,3	0,1	5
2	Wine	1,2	1,2	0,0	5
3	Cider	1,0	1,0	0,0	5
4	Sparkling wine	1,0	1,0	0,0	5
5	Spirits	1,0	1,0	0,0	5
6	Mixed drinks	1,0	1,0	0,0	5
7	Cigarettes	1,0	4,4	3,4	5
8	Cigars, cigarillos	1,0	1,0	0,0	5
9	Waterpipe (with tobacco)	1,0	1,0	0,0	5
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	5
11	*(blank on purpose)*				
12	Importance	3,8	3,3	-0,5	5
13	Feelings	3,0	2,9	-0,1	5
14	Frequency	4,2	4,4	0,2	5
15	Closeness to people	2,6	2,9	0,3	5
16	Orientation ('outward' preferred)	3,0	3,2	0,2	2
17	Orientation ('inward' preferred)				0
18	Togetherness of activity				0
19	Changeability ('varied' preferred)				0
20	Changeability ('same' preferred)	3,0	5,0	2,0	1
21	Enjoyment	1,0	3,0	2,0	1
22	Relaxation	1,3	2,3	1,1	4
23	Type of gathering				0
24	Substance use expectations	1,0	2,5	1,5	1
25	Freedom of choice	2,0	1,8	-0,3	2
26	Self-presentation				0
27	Physical pleasantness	3,3	2,5	-0,8	3
28	Sense of time				0

K.3.12 Comparison 17 'Wine/beer vs. Spirits/mixers'

C	Construct	$\bar{x}$		MD	n
		Wine/ beer	Spirits/ mixers		
1	Beer	2,7	2,8	0,0	6
2	Wine	2,6	2,6	-0,1	6
3	Cider	1,0	1,8	0,8	6
4	Sparkling wine	1,1	1,5	0,4	6
5	Spirits	1,1	2,6	1,5	6
6	Mixed drinks	1,0	2,8	1,8	6
7	Cigarettes	1,0	1,1	0,1	6
8	Cigars, cigarillos	1,0	1,0	0,0	6
9	Waterpipe (with tobacco)	1,1	1,2	0,1	6
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	6
11	*(blank on purpose)*				
12	Importance	4,0	3,7	-0,3	6
13	Feelings	4,7	4,4	-0,4	6
14	Frequency	3,1	2,6	-0,5	6
15	Closeness to people	4,3	4,2	-0,1	3
16	Orientation ('outward' preferred)	4,4	4,8	0,4	2
17	Orientation ('inward' preferred)	3,3	1,0	-2,3	1
18	Togetherness of activity	3,9	3,8	-0,1	2
19	Changeability ('varied' preferred)	2,4	3,3	0,9	3
20	Changeability ('same' preferred)	2,0	1,0	-1,0	1
21	Enjoyment	5,0	5,0	0,0	2
22	Relaxation	4,8	5,0	0,3	1
23	Type of gathering	3,0	1,0	-2,0	1
24	Substance use expectations				0
25	Freedom of choice	4,8	5,0	0,3	1
26	Self-presentation	5,0	3,0	-2,0	1
27	Physical pleasantness	4,0	2,0	-2,0	1
28	Sense of time				0

K.3.13 Comparison 18 'Cig&beer/wine vs. Cig&spirits/mixers'

C	Construct	$\bar{x}$		MD	n
		Cig& b/w	Cig& s/m		
1	Beer	3,0	3,7	0,7	4
2	Wine	2,4	3,8	1,4	4
3	Cider	1,0	1,1	0,1	4
4	Sparkling wine	1,3	1,3	0,0	4
5	Spirits	1,4	3,3	1,9	4
6	Mixed drinks	1,3	3,2	2,0	4
7	Cigarettes	4,0	4,2	0,2	4
8	Cigars, cigarillos	1,0	1,0	0,0	4
9	Waterpipe (with tobacco)	1,0	1,0	0,0	4
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	4
11	*(blank on purpose)*				
12	Importance	3,6	3,1	-0,5	4
13	Feelings	4,1	3,9	-0,2	4
14	Frequency	3,6	2,8	-0,9	4
15	Closeness to people	3,9	2,7	-1,2	3
16	Orientation ('outward' preferred)	4,3	4,3	0,0	2
17	Orientation ('inward' preferred)	1,0	1,0	0,0	1
18	Togetherness of activity				0
19	Changeability ('varied' preferred)				0
20	Changeability ('same' preferred)	4,5	5,0	0,5	1
21	Enjoyment				0
22	Relaxation	4,5	5,0	0,5	2
23	Type of gathering	4,0	2,2	-1,8	2
24	Substance use expectations				0
25	Freedom of choice	4,0	4,5	0,5	1
26	Self-presentation	4,3	3,5	-0,8	1
27	Physical pleasantness	3,0	3,8	0,8	2
28	Sense of time	4,0	5,0	1,0	1

K.4 Data tables for standardised reference charts

The following tables provide key data regarding the standardised comparisons of multiple patterns of spaces relative to two reference spaces (shown in Figure 17, p. 401).

To give an overall indication of how ‘close’ or ‘far’ a particular pattern was to/from the reference type, the following indicators are used:

- Overall mean distances (between each pattern and the reference type) were calculated separately for the substance use constructs (C1-9) and for the master constructs derived from elicited constructs (i.e., socio-spatial aspects) (C15-28). They are shown in two separate rows in the tables (labelled “Mean distance”). The arithmetic means were calculated using the *absolute* values (i.e., signs removed) to obtain overall measures of distance to the reference type.

- Green shaded cells indicate similarity with the reference space (e.g., difference below 0,5 points on a 5-point scale), while pink shaded cells indicate dissimilarity from the reference space (e.g., greatest differences). The final two rows tally up the number of green cells ("Most similar") and pink cells ("Most dissimilar") in the ranges C1-9 and C15-28 to indicate how similarly or dissimilarly each pattern was construed relative to the reference type on the substance use and the elicited constructs. Blank cells (missing data) were treated as if they were neither particularly similar nor dissimilar.

The tables are based on multiple separate comparisons and are therefore based on different subsamples of study participants (including very small samples of n=1). Moreover, study participants construed reference types differently (see also Appendix M on participant differences). Although the data are therefore not directly comparable, the standardisation via common reference points (i.e., the reference types) was considered to allow an analysis of which spaces were construed similarly or dissimilarly overall (relative to reference types).

Blank cells indicate where no quantitative data was available (i.e., there was no participant who reported on the relevant types and provided relevant constructs during their repertory grid interview).

Further explanatory notes regarding the data tables are included in the legend overleaf.

K.4.I Legend for subsequent tables

C … Row numbers corresponding to numbers used in charts to identify supplied constructs (C1-14) and master constructs derived from elicited constructs (C15-28). C10 is not shown as study participants included in these comparisons did not report the use of e-cigarettes. C11 (a blank row included in other tables for layout purposes) was replaced with a border in these tables.

Construct … Construct labels, partially abbreviated for layout purposes. For details on supplied constructs, see section 6.2.3; on elicited constructs, see Chapter 10. Table 30, p. 400, gives an overview.

MD … Mean difference between the pattern shown and the reference type; data range from -4 to 4, whereby ±4 means that the two types were placed on opposite ends of a scale and 0 that they were rated the same overall; data correspond to the values in the 'MD' columns of the relevant comparison charts (Comparisons 1 to 10) in the previous sections of the appendix. Blank cells indicate that a comparison was not possible due to a sample size of n=0 for the particular comparison.

'NSU' etc. … Situated substance use pattern, abbreviated in line with Chapter 11.

$\bar{x}$ … Arithmetic mean of differences (as an indicator of how close the patterns were to the reference type of space overall)

min … smallest difference between any one pattern and the reference type

max … greatest smallest difference between any one pattern and the reference type

SD … Standard deviation of differences (as an indicator for how similarly the patterns were construed relative to the reference space), highest values are highlighted for C15-28 to identify those constructs on which the construal of patterns relative to the reference space varied the most

n … Sample size per construct, shown as a range from the smallest to the highest number of study participants included in any one of the shown comparisons (where n≥1); data correspond to the values in the 'n' columns of the relevant comparison charts (Comparisons 1 to 10) in the previous sections of the appendix

K.4.2 'Ideal': Average distances between selected patterns of situated substance use and reference space 'Ideal' (hypothetical ideal space as defined by study participants)

		MD								For all eight patterns				
C	Construct	NSU pos	NSU neg	Wine/beer	Spirits/mixers	Cig pos	Cig neg	Cig&beer/wine	Cig&spirits/mixers	$\bar{x}$	min	max	SD	n
1	Beer	-1,0	-1,0	0,9	0,8	-0,6	-0,4	0,9	1,8	0,2	-0,4	1,8	1,0	4-17
2	Wine	-0,9	-1,0	0,8	0,8	-0,8	-1,3	0,3	1,4	-0,1	0,3	1,4	1,0	4-19
3	Cider	-0,6	-0,8	-0,5	-0,1	-1,0	0,0	-2,0	-0,3	-0,7	0,0	-2,0	0,6	1-9
4	Sparkling wine	-0,3	-0,4	-0,2	0,2	-0,5	-0,5	0,1	0,0	-0,2	0,0	-0,5	0,3	3-14
5	Spirits	-0,3	-0,2	0,1	1,8	-0,4	0,0	0,1	1,6	0,3	0,0	1,8	0,8	3-16
6	Mixed drinks	-0,4	-0,4	-0,3	1,4	0,0	0,0	0,0	2,0	0,3	0,0	2,0	0,8	3-15
7	Cigarettes	-1,6	-1,5	-0,8	0,2	0,9	0,4	1,3	1,7	0,1	0,2	1,7	1,2	2-12
8	Cigars, cigarillos	0,0	0,0	0,3				0,0	0,0	0,1	0,0	0,3	0,1	1-2
9	Waterpipe	-0,8	-1,0	-0,9	-0,3	-0,4	-1,0			-0,7	-0,3	-1,0	0,3	1-6
Mean distance C1-9		0,6	0,7	0,5	0,7	0,6	0,5	0,6	1,1	0,7	0,5	1,1	0,2	
	Most similar	4x	4x	4x	4x	3x	5x	5x	3x					
	Most dissimilar	1x	2x	0x	1x	0x	2x	1x	6x					
12	Importance	-0,5	-1,4	-1,1	-1,4	-0,8	-1,5	-1,0	-1,9	-1,2	-0,5	-1,9	0,4	5-21
13	Feelings	-0,4	-2,2	-0,3	-0,6	-0,3	-2,1	-0,6	-1,1	-0,9	-0,3	-2,2	0,7	5-21
14	Frequency	-0,5	-0,5	-1,3	-1,4	-0,9	-0,2	-1,4	-1,8	-1,0	-0,2	-1,8	0,5	5-21
15	Closeness to people	-0,7	-2,2	0,0	-0,1	-0,9	-2,1	-0,8	-2,5	-1,2	0,0	-2,5	0,9	4-12
16	Orientation ('outward')	-0,4	-1,3	-0,5	-0,4	-0,7	-0,8	0,8	1,3	-0,3	-0,4	±1,3	0,8	2-8
17	Orientation ('inward')	-1,4	-1,6	-1,3	-2,8	1,0	-2,0	-3,0	-3,0	-1,7	1,0	-3,0	**1,2**	1-5
18	Togetherness	-0,4	-1,7	-0,1	-0,2	0,7	0,0	-0,3		-0,3	0,0	-1,7	0,7	1-3
19	Changeability ('varied')	-0,5	-2,1	-0,8	-0,4					-0,9	-0,4	-2,1	0,7	4-5
20	Changeability ('same')	-0,9	-1,8	-2,2	-3,0	0,0	0,0	-0,5	0,0	-1,0	0,0	-3,0	**1,1**	1-3
21	Enjoyment	-0,6	-2,3	-0,2	0,0	0,0	-2,0		-2,0	-1,0	0,0	-2,3	**1,0**	1-4
22	Relaxation	-0,6	-3,3	0,2	0,3	-0,6	-2,3	-0,4	0,0	-0,9	0,0	-3,3	**1,2**	2-9
23	Type of gathering	-0,7	-1,3	-1,5	-4,0	-0,3	-0,5	-0,7	-2,8	-1,5	-0,3	-4,0	**1,2**	1-4
24	SU expectations	-3,0	-2,8	2,0		-0,1	-2,5			-1,3	-0,1	-3,0	**1,9**	1-3
25	Freedom of choice	-0,5	-2,5	-1,3	0,6	0,2	-3,3	1,0	-0,8	-0,8	0,2	-3,3	**1,4**	1-6
26	Self-presentation	-0,5	-2,2	-0,5	-0,5	-0,3		0,3	-0,5	-0,6	±0,3	-2,2	0,7	1-4
27	Physical pleasantness	-1,6	-2,5	-0,3	-1,0	-2,0	-2,5	-1,9	-2,2	-1,7	-0,3	-2,5	0,7	2-7
28	Sense of time	-1,6	-3,7	-1,0				-1,0	0,0	-1,5	0,0	-3,7	**1,2**	1-4
Mean distance C15-28		1,0	2,2	0,8	1,1	0,6	1,6	1,0	1,4	1,2	0,6	2,2	0,5	
	Most similar	2x	0x	5x	6x	6x	2x	3x	3x					
	Most dissimilar	1x	9x	0x	3x	0x	2x	1x	3x					

K.4.3 'NSU pos': Average distances between selected patterns of situated substance use and reference space 'NSU pos' (spaces of no or rare substance use associated with positive feelings)

		MD								For six detailed substance use patterns only				
C	Construct	Ideal	NSU neg	Wine/beer	Spirits/mixers	Cig pos	Cig neg	Cig&beer/wine	Cig&spirits/mixers	$\bar{x}$	min	max	SD	n
1	Beer	1,0	0,0	1,9	1,7	0,2	0,3	1,9	2,7	1,5	0,2	2,7	0,9	4-9
2	Wine	0,9	-0,1	1,8	1,2	0,2	0,3	1,3	2,6	1,2	0,2	2,6	0,8	4-12
3	Cider	0,6	0,0	0,0	0,6	0,0	0,0	0,0	0,8	0,2	0,0	0,8	0,3	1-8
4	Sparkling wine	0,3	-0,1	0,1	0,3	-0,1	-0,1	0,3	0,3	0,1	0,1	0,3	0,2	3-9
5	Spirits	0,3	0,0	0,2	2,0	0,1	0,0	0,5	2,0	0,8	0,0	2,0	0,9	3-9
6	Mixed drinks	0,4	0,0	0,1	1,8	0,0	0,0	0,4	2,4	0,8	0,0	2,4	1,0	3-9
7	Cigarettes	1,6	-0,1	0,1	0,2	3,3	3,2	3,3	3,0	2,2	0,1	3,3	1,4	2-7
8	Cigars, cigarillos	0,0	0,0	0,3				0,0	0,0	0,1	0,0	0,3	0,2	1-1
9	Waterpipe	0,8	0,0	0,1	0,3	0,1	0,0			0,2	0,0	0,3	0,1	1-4
Mean distance C1-9		0,6	0,0	0,5	1,0	0,5	0,5	1,0	1,7	0,9	0,5	1,7	0,4	
	Most similar	4x	9x	7x	3x	7x	7x	4x	2x					
	Most dissimilar	1x	0x	0x	1x	1x	1x	1x	6x					
12	Importance	0,5	-0,9	-0,6	-1,1	-0,4	-0,9	-0,5	-1,3	-0,8	-0,4	-1,3	0,3	5-12
13	Feelings	0,4	-1,8	0,0	-0,3	0,2	-1,6	0,0	-0,7	-0,4	0,0	-1,6	0,6	5-12
14	Frequency	0,5	0,1	-1,0	-1,1	-0,7	0,1	-0,7	-1,2	-0,8	0,1	-1,2	0,4	5-12
15	Closeness to people	0,7	-1,5	0,6	0,0	0,1	-0,7	-0,2	-1,4	-0,3	0,0	-1,4	0,6	4-7
16	Orientation ('outward')	0,4	-0,9	0,2	0,5	-1,1	-1,6	0,4	0,6	-0,2	0,2	-1,6	0,9	2-5
17	Orientation ('inward')	1,4	-0,6	0,5	-0,6	2,5	-0,5	-3,0	-2,3	-0,6	0,5	-3,0	**1,8**	1-3
18	Togetherness	0,4	-1,2	0,4	0,3	1,0	0,3	0,0		0,4	0,0	1,0	0,3	1-2
19	Changeability ('varied')	0,5	-1,8	-0,3	0,1					-0,1	0,1	-0,3	0,2	4-4
20	Changeability ('same')	0,9	-1,0	-1,3	-1,2	0,0	0,0	-0,5	0,0	-0,5	0,0	-1,3	0,6	1-3
21	Enjoyment	0,6	-1,7	0,3	0,7	0,3	-1,7		-1,7	-0,4	0,3	-1,7	**1,0**	1-3
22	Relaxation	0,6	-2,8	0,5	0,7	0,2	-1,6	0,4	0,6	0,1	0,2	-1,6	0,8	2-4
23	Type of gathering	0,7	-0,6	-0,8	-3,7	0,3	-0,5	0,1	-1,7	**-1,1**	0,1	-3,7	**1,3**	1-3
24	SU expectations	3,0	-0,3	3,0		3,9	1,5			**2,8**	1,5	3,9	**1,0**	1-2
25	Freedom of choice	0,5	-1,9	-0,4	0,8	0,3	-2,8	0,4	-0,9	-0,4	0,3	-2,8	**1,2**	1-3
26	Self-presentation	0,5	-1,7	0,5	0,3	-0,3		-0,3	-1,0	-0,2	±0,3	-1,0	0,5	1-2
27	Physical pleasantness	1,6	-0,9	1,3	0,2	-0,1	-0,6	-0,2	-0,8	0,0	-0,1	1,3	0,7	2-4
28	Sense of time	1,6	-2,0	0,5				1,0	2,0	**1,2**	0,5	2,0	0,6	1-3
Mean distance C15-28		1,0	1,3	0,8	0,8	0,8	1,1	0,5	1,1	0,8	0,5	1,1	0,2	
	Most similar	2x	1x	6x	5x	8x	2x	8x	1x					
	Most dissimilar	0x	7x	2x	2x	2x	3x	1x	3x					

Note. In this table, statistical indicators (e.g., standard deviation) were calculated only for the six detailed patterns representing substance use ('Wine/beer'; 'Spirits/mixers'; 'Cig pos'; 'Cig neg'; 'Cig&beer/wine'; 'Cig&spirits/mixers') to inform the discussion of constructs in section 12.3.

K.5 Relevance of master constructs (latent dimensions) as 'predictors' of situated substance use according to different indicators

Source	'Ideal' standardised reference chart (p. 807)†	'NSU vs. Alc/cig' (p. 785)	'NSU pos' standardised reference chart (p. 808)		Ranking of constructs by participants‡	'NSU pos' standardised reference chart (p. 808)	'Alc vs. Cig' (p. 786)	'Alc vs. Alc&cig' (p. 787)	'Cig vs. Alc&cig' (p. 788)	'Wine/beer (&cig) vs. Spirits/mixers (&cig)' (p. 791)	'NSU pos vs. NSU neg' (p. 789)	'Cig pos vs. Cig neg' (p. 790)
Which constructs were most relevant to distinguish …	… patterns overall?	… alcohol/cigarette use from no or rare substance use?										
				… different patterns of situated substance use?								
											… neg from pos feelings?	
Closeness to people	* (0,9)			* (0,5)	* (25% of 16)	*	** (-)	*** (-)			** (-)	** (-)
Orientation ('outward' preferred)	* (0,8)			* (0,7)	* (20% of 10)	*			*** (+)			
Orientation ('inward' preferred)	** (1,2)		*	** (1,6)	** (40% of 5)	***						
Orientation (pooled)					* (27% of 15)			** (+)	*** (+)			
Togetherness of activity	(0,7)	** (+)	*	* (0,4)	(0% of 3)						*** (-)	
Changeability ('varied' preferred)	(0,7)			(0,2)	* (17% of 6)						** (-)	
Changeability ('same' preferred)	** (1,1)		*	* (0,5)	(0% of 3)	*						
Changeability (pooled)					* (11% of 9)							
Enjoyment	** (1)	** (+)	*	* (0,9)	* (20% of 5)	**					** (-)	
Relaxation	** (1,2)	*** (+)		* (0,7)	* (18% of 11)	*			** (+)		*** (-)	*** (-)
Type of gathering	** (1,2)	* (-)	** (-)	** (1,2)	*** (75% of 4)	**		** (-)				
Substance use expectations	*** (1,9)	*** (+)	*** (+)	*** (2,8)	*** (67% of 3)	**						
Freedom of choice	** (1,4)		*	* (0,9)	(0% of 7)	**	** (-)	*** (-)		** (+)	** (-)	*** (-)
Self-presentation	(0,7)	* (+)		* (0,5)	** (40% of 5)	*				** (-)		
Physical pleasantness	(0,7)	* (+)		* (0,5)	* (10% of 10)	*	*** (-)					** (-)
Sense of time	** (1,2)	*** (+)	** (+)	** (1,2)	* (20% of 5)	*					*** (-)	

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Source	'Ideal' standardised reference chart (p. 807)†	'NSU vs. Alc/cig' (p. 785)	'NSU pos' standardised reference chart (p. 808)		Ranking of constructs by participants‡	'NSU pos' standardised reference chart (p. 808)	'Alc vs. Cig' (p. 786)	'Alc vs. Alc&cig' (p. 787)	'Cig vs. Alc&cig' (p. 788)	'Wine/beer (&cig) vs. Spirits/mixers (&cig)' (p. 791)	'NSU pos vs. NSU neg' (p. 789)	'Cig pos vs. Cig neg' (p. 790)
Which constructs were most relevant to distinguish …	... overall?	… alcohol/cigarette use from no or rare substance use?		… different patterns of situated substance use?							… neg from pos feelings?	
Indicators:	SD [standard deviation of average distances]	MD [mean difference], min [smallest individual-level difference], SD [standard deviation of individual differences], ROC [rank order consensus]	Absolute value of $\bar{x}$ [mean of mean distances of six SU patterns relative to NSU pos]	Mean of absolute distances‡ based on individual MD for six SU patterns	% of study participants who ranked this construct as important for their substance use (out of all study participants reporting that construct)‡	SD [standard deviation of average distances]	MD, min, SD, ROC [rank order consensus]					
Criteria/Legend:	Higher SD * ≥ 0,8 ** ≥ 1 *** highest SD ≥1	* ROC ≥ 75% (+/-) ** ROC ≥ 75% (+/-) plus one of the following: MD ≥ 1; min ≥ 1; SD ≤ 0,5 *** ROC ≥ 75% (+/-) plus two of the following: MD ≥ 1; min ≥ 1; SD ≤ 0,5	Greater distances * ≥ 0,4 ** ≥ 1 *** greatest distances ≥1		* ≥ 10% of participants ranked construct in 1st place (as most important) ** ≥ 40% *** ≥ 60%	Higher SD * ≥ 0,5 ** ≥ 1 *** highest SD ≥ 1	* ROC ≥ 75% (+/-) ** ROC ≥ 75% (+/-) plus one of the following: MD ≥ 1; min ≥ 1; SD ≤ 0,5 *** ROC ≥ 75% (+/-) plus two of the following: MD ≥ 1; min ≥ 1; SD ≤ 0,5					

Note. Blank cells can be due to missing data or criteria not met. See sections 7.4.4 (methods) and 12.3 (results) for further details concerning this table.
† Data shown for illustrative purposes. ‡ Data not presented elsewhere; relevant data therefore included in this table.

K.6 A network view on the typology of situated substance use patterns

K.6.1 Substance use 'maps' (networks as combinations of patterns at participant level)

		Average number of elicited spaces allocated to each pattern (cells with ≥ 3,0 spaces are highlighted)													User characteristics				
Networks	Nr of study participants (n)	NSU pos	NSU neg	Wine/beer	Spirits/mixers	Cig pos	Cig neg	Cig&beer/wine	Cig&spirits/mixers	Waterpipe(&alc/cig)	Medicines(&alc/cig)	Average nr of spaces per IP[a]	Proportion NSU[b]	Proportion SU[c]	Group 1 ('lighter' users)	Group 2 ('heavier' users)	Group A (occasional smokers)	Group B (daily smokers)	Smokers
1	1	0,0	0,0	1,0	0,0	0,0	0,0	1,0	0,0	**4,0**	**5,0**	8,0	0%	**100%**	0	1	1	0	1
2	1	1,0	1,0	0,0	0,0	**4,0**	**3,0**	1,0	0,0	0,0	2,0	12,0	17%	**83%**	0	1	0	1	1
3	2	**3,5**	0,5	0,0	0,0	**8,5**	1,5	0,0	0,0	1,0	0,0	15,0	27%	**73%**	0	2	0	2	2
4	2	2,5	1,5	0,5	0,0	2,5	1,5	2,5	0,5	0,0	0,0	12,0	33%	**67%**	0	2	0	2	2
5	2	**4,0**	2,0	0,0	0,5	0,5	0,0	1,5	2,5	0,0	0,0	11,5	**52%**	48%	0	2	2	0	2
6	3	2,7	2,7	2,0	**3,3**	0,0	0,0	0,0	0,0	0,3	0,0	11,3	47%	**53%**	1	2	0	0	0
7	8	**5,5**	1,5	**3,0**	0,3	0,1	0,1	0,0	0,1	0,1	0,0	11,5	**61%**	39%	5	3	1	0	1
8	4	**7,8**	**3,3**	0,5	1,0	0,0	0,0	0,3	0,5	0,3	0,0	14,0	**79%**	21%	3	1	1	0	1
9	1	**6,0**	**9,0**	1,0	1,0	0,0	0,0	0,0	0,0	0,0	0,0	17,0	**88%**	12%	1	0	0	0	0
T	24	4,6	2,1	1,5	0,8	1,2	0,4	0,5	0,4	0,4	0,3	12,3	54%	46%	10	14	5	5	10

Networks (numbered in the table for layout purposes):
1 … No spaces associated with no substance use; substance use spaces also associated with additional substances/products (waterpipe, medicines)
2 … Spaces associated primarily with cigarettes dominate, with a high number associated with ambivalent or rather negative feelings
3 … Spaces associated primarily with cigarettes dominate, mostly associated with (rather) positive feelings
4 … Variety of spaces representing no or rare substance use and different combinations of alcohol and cigarettes
5 … Relatively high proportion of substance use spaces associated with alcohol *and* cigarettes
6 … Spaces associated with spirits or mixed drinks dominate
7 … High proportion of spaces associated with no or rare substance use; substance use spaces mostly associated with wine/beer
8 … Spaces associated with no or rare substance use dominate, mostly associated with (rather) positive feelings
9 … Spaces associated with no or rare substance use dominate, with a high number associated with ambivalent or rather negative feelings
(T … Data for all 24 study participants)

[a] Averaged total number of spaces elicited from study participants. It does not match the sum of columns "Average number of elicited spaces allocated to each pattern" because some elicited spaces were not allocated to the detailed patterns (e.g., spaces associated with sparkling wine or cider are not shown in the table) or are shown multiple times (e.g., spaces associated with waterpipe *and* medicines are shown in two columns).
[b] Proportion of spaces associated with no or rare substance use out of all spaces elicited from study participants)
[c] Proportion of spaces associated at least occasional substance use (including spaces not shown here, e.g. spaces associated with sparkling wine or cider) out of all spaces elicited from study participants

K.6.2 Pairwise co-occurrence of patterns (number of study participants)

Absolute and relative number of study participants	NSU pos	NSU neg	Wine/beer	Spirits/mixers	Cig pos	Cig neg	Cig&beer/wine	Cig&spirits/mixers	Waterpipe(&alc/cig)	Medicines(&alc/cig)	Total
NSU pos	.	**20 (87%)**	14 (61%)	9 (39%)	7 (30%)	6 (26%)	6 (26%)	5 (22%)	4 (17%)	1 (4%)	23
NSU neg	**20 (100%)**	.	12 (60%)	8 (40%)	6 (30%)	5 (25%)	6 (30%)	5 (25%)	3 (15%)	1 (5%)	20
Wine/beer	**14 (93%)**	**12 (80%)**	.	6 (40%)	2 (13%)	2 (13%)	2 (13%)	2 (13%)	4 (27%)	1 (7%)	15
Spirits/mixers	**9 (100%)**	**8 (89%)**	6 (67%)	.	1 (11%)	0 (0%)	1 (11%)	1 (11%)	2 (22%)	0 (0%)	9
Cig pos	**7 (100%)**	**6 (86%)**	2 (29%)	1 (14%)	.	**6 (86%)**	4 (57%)	3 (43%)	1 (14%)	1 (14%)	7
Cig neg	**6 (100%)**	**5 (83%)**	2 (33%)	0 (0%)	**6 (100%)**	.	3 (50%)	2 (33%)	1 (17%)	1 (17%)	6
Cig&beer/wine	**6 (86%)**	**6 (86%)**	2 (29%)	1 (14%)	4 (57%)	3 (43%)	.	4 (57%)	1 (14%)	2 (29%)	7
Cig&spirits/mixers	**5 (100%)**	**5 (100%)**	2 (40%)	1 (20%)	3 (60%)	2 (40%)	**4 (80%)**	.	0 (0%)	0 (0%)	5
Waterpipe(&alc/cig)	**4 (80%)**	3 (60%)	**4 (80%)**	2 (40%)	1 (20%)	1 (20%)	1 (20%)	0 (0%)	.	1 (20%)	5
Medicines(&alc/cig)	1 (50%)	1 (50%)	1 (50%)	0 (0%)	1 (50%)	1 (50%)	**2 (100%)**	0 (0%)	1 (50%)	.	2

Note. The above table shows the number of participants who had both types (as shown in top row and first column) on their map. In addition, this number is expressed as a percentage of all study participants who had a particular type (as shown in the last column). Cells with percentages of 80% and over are highlighted.

For example, 20 study participants had spaces of no or rare substance use associated with (rather) positive feelings ('NSU pos') ***and*** spaces of no or rare substance use associated with ambivalent or (rather) negative feelings ('NSU neg') on their map. The row labelled "NSU pos" shows that this corresponded to 87% of all 23 study participants who had spaces of no or rare substance use associated with (rather) positive feelings ('NSU pos') on their map. In other words, if a study participant had a space of no or rare substance use associated with (rather) positive feelings ('NSU pos') on their map, they were also likely to have at least one space of no or rare substance use associated with ambivalent or (rather) negative feelings ('NSU neg') on their map. The row labelled "NSU neg" shows that this also corresponded to 100% of all 20 study participants who had spaces of no or rare substance use associated with ambivalent or (rather) negative feelings ('NSU neg') on their map. In other words, all study participants who had spaces of no or rare substance use associated with ambivalent or (rather) negative feelings ('NSU neg') on their map also had at least one space of no or rare substance use associated with (rather) positive feelings ('NSU pos') on their map.

This table does not consider the number of spaces; these are shown in the next tables (overleaf).

K.6.3 Pairwise co-occurrence of patterns (number of spaces)

Absolute number of spaces (out of 296 elicited spaces)	NSU pos	NSU neg	Wine/beer	Spirits/mixers	Cig pos	Cig neg	Cig&beer/wine	Cig&spirits/mixers	Waterpipe(&alc/cig)	Medicines(&alc/cig)	Total (spaces)	Total (maps)
NSU pos	.	51	34	18	28	10	10	9	5	2	110	23
NSU neg	92	.	27	17	18	9	10	9	3	2	51	20
Wine/beer	72	32	.	12	3	2	3	2	7	5	35	15
Spirits/mixers	45	29	14	.	1	0	2	2	2	0	18	9
Cig pos	21	8	4	1	.	10	8	4	2	2	28	7
Cig neg	16	6	4	0	27	.	6	2	2	2	10	6
Cig&beer/wine	23	11	2	1	10	6	.	8	4	7	11	7
Cig&spirits/mixers	22	9	4	1	4	2	6	.	0	0	9	5
Waterpipe(&alc/cig)	21	8	7	6	10	1	1	0	.	5	9	5
Medicines(&alc/cig)	1	1	1	0	4	3	2	0	4	.	7	2

Note. The above table shows how many spaces representing each type (top row) were found on the maps containing a particular type (first column). For example, the maps containing spaces of no or rare substance use associated with (rather) positive feelings ('NSU pos' in first column) contained a total of 51 spaces of no or rare substance use associated with ambivalent or (rather) negative feelings ('NSU neg' in top row). In addition, the last two columns show how many spaces were elicited in total for a particular type and on how many maps. For example, the row labelled 'NSU pos' shows that there were 23 maps containing spaces of no or rare substance use associated with (rather) positive feelings, and these 23 maps contained a total of 110 such spaces.

For *one* space of the type shown in the first column, there were X spaces of the type shown in the top row (on average)	NSU pos	NSU neg	Wine/beer	Spirits/mixers	Cig pos	Cig neg	Cig&beer/wine	Cig&spirits/mixers	Waterpipe(&alc/cig)	Medicines(&alc/cig)
NSU pos	.	**0,5**	**0,3**	0,2	**0,3**	0,1	0,1	0,1	0,0	0,0
NSU neg	**1,8**	.	**0,5**	0,3	0,4	0,2	0,2	0,2	0,1	0,0
Wine/beer	**2,1**	**0,9**	.	0,3	0,1	0,1	0,1	0,1	0,2	0,1
Spirits/mixers	**2,5**	**1,6**	0,8	.	0,1	0,0	0,1	0,1	0,1	0,0
Cig pos	**0,8**	0,3	0,1	0,0	.	**0,4**	0,3	0,1	0,1	0,1
Cig neg	**1,6**	0,6	0,4	0,0	**2,7**	.	0,6	0,2	0,2	0,2
Cig&beer/wine	**2,1**	**1,0**	0,2	0,1	0,9	0,5	.	0,7	0,4	0,6
Cig&spirits/mixers	**2,4**	**1,0**	0,4	0,1	0,4	0,2	0,7	.	0,0	0,0
Waterpipe(&alc/cig)	**2,3**	0,9	0,8	0,7	**1,1**	0,1	0,1	0,0	.	0,6
Medicines(&alc/cig)	0,1	0,1	0,1	0,0	**0,6**	**0,4**	0,3	0,0	**0,6**	.

Note. Using information from the previous table, the above table expresses the relationship between two types as a ratio by showing how many spaces of each type (top row) were found, on average, per *one* space of a particular type (first column), *across* those maps containing that particular type. Cells containing highest values in a row are highlighted. For example, on average, there were 0,5 spaces of no or rare substance use associated with ambivalent or (rather) negative feelings ('NSU neg' in top row) for each space of no or rare substance use associated with (rather) positive feelings ('NSU pos' in first column). In other words, on average, there was one 'NSU neg' space for every two 'NSU pos' spaces on a map (among those study participants who had 'NSU pos' spaces on their maps, regardless of whether they also had 'NSU neg' spaces on their maps).

K.6.4 Average number of spaces per map

A map with at least one space representing the type shown in the left column contained X spaces of the type shown in the top row (on average; assuming a map of 10 elicited spaces)	NSU pos	NSU neg	Wine/beer	Spirits/mixers	Cig pos	Cig neg	Cig&beer/wine	Cig&spirits/mixers	Waterpipe(&alc/cig)	Medicines(&alc/cig)
NSU pos	**3,8**	1,7	1,3	0,7	0,9	0,3	0,4	0,3	0,2	0,1
NSU neg	**3,6**	**2,0**	1,2	0,7	0,7	0,4	0,4	0,4	0,1	0,1
Wine/beer	**4,0**	1,7	**2,1**	0,7	0,2	0,1	0,2	0,1	0,5	0,4
Spirits/mixers	**3,8**	**2,3**	**1,4**	**1,7**	0,1	0,0	0,2	0,2	0,1	0,0
Cig pos	2,3	0,9	0,5	0,1	**2,9**	**1,1**	0,9	0,5	0,2	0,2
Cig neg	2,0	0,8	0,6	0,0	**3,3**	**1,3**	0,8	0,3	0,2	0,3
Cig&beer/wine	**2,5**	1,3	0,3	0,1	1,2	0,7	**1,3**	**1,0**	0,7	1,1
Cig&spirits/mixers	**3,5**	1,5	0,7	0,2	0,7	0,4	**1,0**	**1,5**	0,0	0,0
Waterpipe(&alc/cig)	**3,0**	1,2	1,2	**0,8**	1,1	0,1	0,3	0,0	**1,7**	**1,3**
Medicines(&alc/cig)	0,4	0,4	0,6	0,0	1,7	1,3	**1,0**	0,0	**2,5**	**4,0**

Note. For the above table, data were standardised across study participants by assuming that each study participant elicited 10 spaces. Cells in rows show the average number of spaces allocated to each type (out of 10 elicited spaces) for maps containing at least one space representing the type in the first column. Diagonal cells as well as cells with the highest values per row or per column are highlighted. For example, assuming that maps contained 10 elicited spaces, maps containing spaces of no or rare substance use associated with (rather) positive feelings ('NSU pos' in left column) included 3,8 such spaces ('NSU pos' in top row) and 1,7 spaces of no or rare substance use associated with ambivalent or (rather) negative feelings ('NSU neg' in top row). The table thus shows the distribution of situated substance use patterns on maps representing different types.

K.7 Printable legend for charts

The legend below can be printed/copied and cut out to facilitate interpretation of the charts in Chapter 11.

Construct labels and poles

1 Beer never – always
2 Wine never – always
3 Cider never – always
4 Sparkling wine never – always
5 Spirits never – always
6 Mixed drinks never – always
7 Cigarettes never – always
8 Cigars/cigarillos never – always
9 Waterpipe (tobacco) never – always
10 E-cigarettes (nicotine) never – always

12 Importance: not at all important – very important
13 Feelings: negative feelings – positive feelings
14 Frequency: 1-2 times per year or less – daily or almost daily

15 Closeness to people: feeling distant – feeling close*
16 Orientation: inward/self – outward /interaction*
*17 Orientation: outward /interaction – inward/self**
18 Togetherness of activity: separate – together*
19 Changeability: the same – varied*
*20 Changeability: varied – the same**
21 Enjoyment: feeling reluctant – feeling delighted*
22 Relaxation: active/stressed mind – resting/relaxed mind*
23 Type of social gathering: party/excess – cosy get-together*
24 Substance use (SU) expectations: SU opposed – SU expected*
25 Freedom of choice: other-determined – self-determined*
26 Self-presentation: have to restrain myself – can be myself*
27 Physical pleasantness: unpleasant – physically pleasant*
28 Sense of time: time-limited – open-ended*

Note.
- Constructs 1-14: constructs supplied during interview
- Constructs 15-28: elicited constructs, summarised as latent dimensions for space construal (*preferred pole)
- Constructs 16/17 and 19/20: participants split into two groups respectively to reflect differences in preferred pole

Appendix L: Analysis of interview transcripts

L.1 Narrow set of codes applied to all interviews

Code label	Comment
Qualitative data analysis	
For extraction	For a description of these codes, see section 7.5.4 in the main text.
For context	
Not enough information	
Questionnaire items	
Most often	Refers to questionnaire at the beginning of the interview as per section 6.2.1. Each label corresponded to one questionnaire item (see Appendix H.5). Question and answer were coded in full to inform the description of study participants in section 5.1.
Preferred	
Trend	
Quitting	
Problematic substance use	
Corrections	Code used for any additional clarifications or corrections offered by the study participant regarding the above questionnaire items.
Methodological	
Draw in silence	Codes used to indicate whether study participants mapped their everyday spaces in silence or whilst talking (only one code per participant).
Draw whilst talking	
Draw mixed talking/silence	
Excluded spaces	A code used to highlight noteworthy instances (if any) where participants mentioned everyday spaces at any point during the interview that were not captured on their map, as well as explanations by the interviewer regarding 'dropped' spaces (as described in section 6.2.4).
Duration triad formulation break	Code to capture the duration of the mid-interview break (where possible, coded segment begins when the interviewer announces a short break and ends when the interviewer starts the construct elicitation instructions). Codes was usually used in annotated clickable table of contents (C-TOC) rather than the transcript.
Motivation to take part	A code used to highlight instances (if any) where participants explained why they took part in the study.
Role of voucher	A code used to highlight instances (if any) where the voucher was mentioned by the interviewer or the participant.
Learnt something	A code used to highlight instances (if any) where the participant described what any new insights she obtained during the interview (usually in response to a specific question at the end of the interview).
Other	A code used for general methodological observations. Details were specified using the comment function in MaxQDA. During the initial coding, specific codes were used for different methodological issues (resulting in dozens of codes), but during the review of all interviews, a single code was found to be more practical.
TOCtriad	A code generating using the software's autocoding function to identify mention of triads in the annotated clickable table of contents (C-TOC) created for each interview. The code captured the triad number and what spaces were presented as part of the triad.
TOCmistakes	An automatic code generated to identify mention of mistakes in the C-TOC.
TOCmethod	An automatic code generated to identify mention of methodological observations in the C-TOC.
Other	
Key statements	A code used to identify statements that appeared to "sum up" the interview or the study participant's general narrative (regardless of whether related to substance use). Aim was to identify 2-3 key statements per interview. Checked for such statements at the end of coding each interview.
Unsure/caution needed	A code used to highlight text segments that were unclear or otherwise difficult to interpret. Was often used in combination with another code. Comment function in MaxQDA was used to note the difficulty or add necessary explanations.

L.2 Prioritisation of interviews

The below table offers a summary overview of the results from the prioritisation of interviews for the qualitative data analysis (as described in section 7.5.4). To best protect study participants, individual interview data and assessment notes are not shown. Appendix M.8 provides an overview by participant subgroup.

Rank	Nr of interviews*	Comment
1	5 (5)	These interviews were considered to be essential for analysis. Study participants offered vivid and detailed descriptions of their everyday spaces and discussed their substance use at length (including reasons for use). They also offered unique insights into particular substance use patterns and socio-spatial factors. All were included in the data extraction.
2	9 (3)	These interviews included interesting and at times unique perspectives on substance use and socio-spatial aspects, but they were rather understood as offering good options for further analysis if needed. Three of these interviews were reviewed during the initial coding exercise and included in the formal data extraction.
3	4 (0)	These interviews included interesting aspects, but these were far fewer and less detailed than in the interviews ranked above. Some of these study participants still gave rich accounts, but not in relation to socio-spatial aspects of substance use.
4	6 (1)	These study participants tended to explain their substance use in very simple terms and the interviewer struggled to 'get behind the surface'. Socio-spatial factors mentioned by these study participants were often covered in more detail in the interviews ranked above. One of these interviews was reviewed during the initial coding exercise and included in the formal data extraction, which prompted the focus on data-richer interviews during subsequent analysis.
Total	24 (9)	

* The first number shows how many interviews were allocated to this rank and the second number (in parentheses) shows how many of these interviews were included in the data extraction.

L.3 Coding reliability exercise

L.3.1 Characteristics of transcripts chosen for coding reliability exercise

	Sample transcript 1	**Sample transcript 2**	**Sample transcript 3**
Substances used	Alcohol only	Alcohol and cigarettes	Alcohol, cigarettes and waterpipe/medicines
Retrospective allocation to participant subgroup by study author	'Heavier' user (relative to sample), non-smoker	'Heavier' user (relative to sample), occasional smoker	'Heavier' user (relative to sample), occasional smoker
Substance use frequency according to screening questionnaire	3-4 standard drinks on a monthly basis	3-4 standard drinks on a monthly basis, 1-5 cigarettes every other month	1-2 standard drinks on a weekly basis, 1-5 cigarettes on a monthly basis
Study participant's perception of their own use (as judged by study author based on interview)	Low to moderate use	Low use	Moderate to high use
Proportion of elicited spaces associated with no use at all in the typical situation (out of all elicited spaces)	13% (1 out of 8)	38% (5 out of 13)	0% (0 out of 8)
Envisioned frequency of substance use in a hypothetical ideal space	Wine sometimes	Cider sometimes; beer and spirits rarely (cigarettes never)	Wine, sparkling wine, Ritalin sometimes; spirits or mixed drinks, waterpipe, alcohol with medicines rarely (cigarettes never)
Envisioned overall frequency of substance use in a hypothetical ideal space	Never	Rarely	Sometimes
Interview duration	1 hr 50 min	2 hr 50 min	2 hr 10 min
Communicativeness	Low (i.e., responses tended to be concise)	High (i.e., responses tended to be elaborate)	Medium
Interview functioning	Substantial difficulties (e.g., concept of 'typical situation' made less sense to this IP)	Few difficulties	Few difficulties
Discussion of prevention-related topics	None	Yes	Yes

L.3.2 Training the second coder and technical implementation using Microsoft Excel

Taking on board DeCuir-Gunby et al.'s (2011) guidance on how to train coders, a face-to-face induction was set up to provide oral and written guidance concerning the task, including a codebook for the selected codes. This was an edited version of the codebook used by the study author. Guidance covered topics such as how to recognise relevant statements (e.g., looking for references to substance use and "if-then" clauses), how to decide which codes to apply, and how to complete the Microsoft Excel template (see below). During the meeting, excerpts from other transcripts were used to practise coding and discuss coding decisions. The process was then discussed once more after the first transcript had been coded.

Coding template for coding reliability exercise in MS Excel

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
		Nicht	Faktoren für Substanzgebrauch												Präve	Substanz						
			Sozial	Faktor	Faktor	Faktor	Faktor	Faktor	Ander	Faktor	Faktor	Faktor	Faktor	Faktor	(keine	Alkoh	Zigare	Wasse	Medik	Illegale	Sonstige	
																						Kommentar
4	I: Das heißt, wenn du jetzt an die verschiedenen Sachen die du ...hier angekreuzt hast ...also wenn du an die denkst, was würdest du sagen konsumierst du insgesamt am öftesten? #00:12:42-0#	x																				
5	B: ...Wasserpfeife, ((lacht etwas)) eindeutig. #00:12:47-9#	x																				
6	I: Und ich hab hier eine Frage, "warum", also das heißt einfach nur, was ist der Grund dafür, dass ...Wasserpfeife und nicht irgendwas anderes von der Liste? #00:12:54-6#	x																				
7	B: Weil ...die zuhause steht und ... ich weiß nicht, das-das ist so präsent, ...man kommt so heim, und ...dann (ist) so, "ich mach mir jetzt einen Kopf" und dann raucht man halt den ganzen Abend. Also... ja. #00:13:10-0#		x	Verfüg	Gewol	abend												x				
8	I: OK ((schreibt)) ok... und was würdest du sagen, konsumierst du insgesamt am liebsten? Muss ja nicht dasselbe sein aber kann. #00:13:25-0#	x																				
9	B: Also.... Wein eigentlich... (trink ich ...lieber) ((gemurmelt)) #00:13:32-4#								x	persör						x						

To make the task as simple as possible for the second coder, transcripts were prepared in Microsoft Excel (see the figure above for a template already been completed by the second coder). In the spreadsheet, each row in Column B corresponded to one paragraph of the transcript, with paragraphs resulting from a change of speaker. Further columns allowed the second coder to indicate with a cross if a paragraph contained no statements relevant to the codes in question (Column C), statements describing *socio-spatial* (Column D) and/or *other* (Column J) factors relating to the study participants' own situated substance use-related outcomes. The second coder provided labels for the factors they had identified, with one factor entered per column (Columns E-I for socio-spatial factors, and Columns K-O for other factors). Labelling of factors was important because one paragraph could refer to multiple factors. To illustrate, in the figure above, paragraph 7, the second coder identified three socio-spatial factors relating to waterpipe use but no statements regarding other factors. Finally, Columns P to V prompted the second coder to identify the substances being discussed and any prevention-related statements (not discussed further here).

L.3.3 Comparison of study author and second coder results

Segments with socio-spatial or other factors

		Ex. #1	Ex. #2	Ex. #3	Total
A	Correspondence (text segments identified as relevant by AB **and** TA)	28 (85%)	39 (76%)	25 (69%)	92 (77%)
B	Discrepancy (text segments identified as relevant by TA but not AB)	1 (3%)	4 (8%)	3 (8%)	8 (7%)
C	Discrepancy (text segments identified as relevant by AB but not TA)	4 (12%)	8 (16%)	8 (22%)	20 (17%)
D	**Total** (text segments identified as relevant by AB **or** TA)	33 (100%)	51 (100%)	36 (100%)	120 (100%)
E	Number of paragraphs in the interview transcript (i.e., rows in the MS Excel coding template)	770	868	432	2070

AB: initials of study author; TA: initials of second coder

Comparison of study author and second coder results (segments with socio-spatial factors)

		Ex. #1	Ex. #2	Ex. #3	Total
A	Correspondence (identified as relevant by AB **and** TA)	19 (76%)	30 (75%)	22 (76%)	71 (76%)
B	Discrepancy (TA but not AB)	2 (8%)	1 (3%)	2 (7%)	5 (5%)
C	Discrepancy (AB but not TA)	4 (16%)	9 (23%)	5 (17%)	18 (19%)
D	**Total** (identified as relevant by AB **or** TA)	25 (100%)	40 (100%)	29 (100%)	94 (100%)

AB: initials of study author; TA: initials of second coder

Comparison of study author and second coder results (segments with other factors)

		Ex. #1	Ex. #2	Ex. #3	Total
A	Correspondence (identified as relevant by AB **and** TA)	10 (53%)	18 (56%)	3 (17%)	31 (45%)
B	Discrepancy (TA but not AB)	6 (32%)	7 (22%)	3 (17%)	16 (23%)
C	Discrepancy (AB but not TA)	3 (16%)	7 (22%)	12 (67%)	22 (32%)
D	**Total** (identified as relevant by AB **or** TA)	19 (100%)	32 (100%)	18 (100%)	69 (100%)

AB: initials of study author; TA: initials of second coder

The tables above show the number of segments identified as relevant by both coders (row A), by one coder only (rows B and C), and by either coder (row D). The data are shown separately for each interview (columns labelled “Ex. #1”, “Ex. #2”, “Ex. #3”) and across all sample interviews (column labelled “Total”). To avoid inflating correspondence rates, the tables exclude those text segments dismissed by both coders as irrelevant, presenting instead only those segments coded by at least one coder.

Because the second coder had coded by paragraph but the study author had coded by meaning unit (which could span from a phrase to several paragraphs), the coded transcripts were matched manually. A *text segment* was typically whichever was the larger unit (i.e., the

paragraph or the meaning unit). In other words, if the meaning unit identified by the study author spanned several paragraphs, then this was considered to be one text segment; if, however, the meaning unit identified by the study author was smaller than one paragraph, then the paragraph was considered to be one text segment.

The *first table* shows all segments, regardless of whether they were considered to refer to socio-spatial or other factors. Here, the total number of interview transcripts rows in the coding template (Row E) is shown for context only. It is not appropriate to express the text segments shown in Row D as a proportion of the number of paragraphs shown in Row E because text segments did not always correspond to single paragraphs. Although the table suggests a low inter-rater agreement of 77% (agreement on 92 out of 120 segments; see last column), this figure must be seen in context of the specifics of the coding reliability exercise, which served to test and refine the analytic strategy toward the beginning of the analysis (see main text).

The *second and third* table show the data only for the socio-spatial or other factors, respectively. For these tables, it must be noted that in some cases, the coders identified the same segment and the same factor, but categorised the factor differently (i.e., one coder categorised it as 'socio-spatial' and the other coder categorised the same factor as 'other', see main text for examples).

L.3.4 Examples of coding by study author and second coder

The table on the next page provides examples of text segments that were coded differently by the two coders:

- **Examples 1 to 3 show text segments identified as relevant by the second coder but not the study author.** In terms of the analysis, they illustrate overcoding by the second coder and therefore instances in which additional text segments identified by the second coder did not really represent segments missed by the study author. The second coder had been instructed to code generously (i.e., if in doubt, to code a segment rather than not), resulting in the inclusion of segments which did not contain sufficient information for the planned analysis. However, they can be considered as 'for context' segments that were missed by the study author.

- **Examples 4 to 7 show text segments identified as relevant by the study author but not the second coder. Examples 4 and 5** illustrate segments that had been included by the study author for context (e.g., explanations regarding a factor that had been identified elsewhere in a transcript), with no expectation that they would be coded by the second coder. **Examples 6 and 7** show segments 'for extraction' that appeared to have been genuinely missed by the second coder.

- **Examples 8 to 13 highlight how different levels of interpretation (explicit/implicit) affected the coding. Examples 8** shows an instance where the second coder took a more interpretative approach than the study author. The participant did not herself mention "habit"; the factor was inferred by the second coder. **Example 9** shows an instance where both coders tapped into implicit contents. Both interpreted the segment in light of what the study participant had said earlier (Example 8) and assigned codes developed earlier ("culture", "habit"), even though there were no explicit references to culture or habit in the current segment. In **Examples 10 to 13**, participants talked about socio-spatial or other aspects but without always describing an explicit relationship with (situated) substance use. The two coders handled these instances differently. **Examples 12 and 13** shows segments where the study author took a more interpretative approach than the second coder.

Interview excerpts illustrating coding discrepancies and importance of implicit contents

	Excerpts from interview transcripts	Comment
1	*I: […] So how do you view your use of alcohol and cigarettes generally? Do <u>you</u> personally see it as a problem in any way or rather not? […]* *P: No, definitely not.* *German original: I: [...] Also wie empfindest du deinen Gebrauch von Alkohol und Zigaretten allgemein? Siehst <u>du</u> das persönlich irgendwie als Problem an oder eher nicht? [...] B: Nein, also definitiv nicht.*	**'For context' segment identified as relevant by the second coder but not the study author.** The second coder coded the response as containing an 'other' factor for substance use, labelled "consumption not seen as a 'problem'" ("Konsum nicht als 'Problem' angesehen"). However, the segment does not describe how this relates to the participant's substance use. Therefore, the study author did not identify this segment as relevant for the analysis.
2	*I: […] "Alcohol together with medication" is.. was that actually the same [as Ritalin] or are they two different things?* *P: No, actually not. These [medicines with alcohol] are mostly… pain killers, of which I take too many.. Ritalin and alcohol.. is a rare occurrence.* *German original: I: […] „Alkohol gemeinsam mit Medikamenten", ist... war das eigentlich dasselbe oder sind das unterschiedliche Sachen? B: Nein eigentlich nicht. Also da geht es größtenteils um ...Schmerzmittel, von denen ich zu viele nehme. ....Ritalin und Alkohol... kommt selten vor.*	**'For context' segment identified as relevant by the second coder but not the study author.** The second coder coded the response as containing an 'other' factor for substance use, labelled "quantity" ("Menge"). However, the segment does not contain a potential independent variable for situated substance use. Therefore, the study author did not identify this segment as relevant for extraction.
3	*P: Well… actually I prefer.. wine ((mumbles))* *German original: B: Also.... Wein eigentlich... (trink ich ...lieber) ((gemurmelt))*	**'For context' segment identified as relevant by the second coder but not the study author.** The second coder coded this segment as containing an 'other' factor for substance use, labelled "personal preference" ("persönliche Präferenz"). The study author did not identify this segment as relevant for extraction.
4	*P: And we [my relative and I] are very very close, this has to be said, so we are really best friends* *German original: B: Und wir [meine Verwandte und ich] stehen uns sehr sehr nahe, muss man auch dazu sagen, also wir sind wirklich beste Freunde*	**'For context' segment identified as relevant by the study author but not the second coder.** The study author coded this segment as containing an 'other' factor for substance use, but noted that this segment was included for context. In an earlier quotation, the participant explained that she only smokes with her [relative] and her best friend. This segment was included to highlight that she also considered her [relative] as a best friend and that it could consequently be argued that the participant only smokes with people who she perceives to be closest to her. The second coder did not identify this segment as relevant for extraction.
5	*P: Well actually I…do pay attention that I only let in rather positive things here [in the evening in the living room] and that I move all the … negative things or so also to other times of day, so I do housework only in the mornings ((mumbles something)) ((laughs))* *German original: B: Ja also ich... gebe da eigentlich auch schon darauf acht, dass ich da [am Abend im Wohnzimmer] eher nur positive Dinge reinlasse und die ganzen ...negativen Sachen oder so auch auf andere Tageszeiten auslagere, also ich mache nur in der Früh Haushalt.. ((unv, gemurmelt)) ((lacht))*	**'For context' segment identified as relevant by the study author but not the second coder.** The study author coded this segment as containing a socio-spatial factor for substance use but noted that this segment was included for context. In an earlier quotation, the participant explained that she only studies in the evenings (combined with substance use). This segment was included to provide details of what she does in the mornings. The second coder did not identify this segment as relevant for extraction.
6	*I: […] you said sometimes you go hiking and then you [and your friends/family] didn't drink anything.* *P: that is rather when I go there and come back again in the same day.* *German original: I: […] du hast gesagt, du gehst manchmal wandern und dann habt ihr auch nichts getrunken. B: das ist wiederum, wenn ich so am Tag weg bin und wieder zurückkomm*	**'For extraction' segment missed by the second coder.** The study author coded this segment as containing a socio-spatial factor for substance use labelled "length of time – day trip vs. holiday" ("Zeitspanne - Tagesausflug vs. Urlaub"). The second coder did not identify this segment as relevant for extraction.
7	*I: […] Ritalin, what… meaning does that have for you or…?* *P: Actually I only take it for studying… and for staying awake.*	**'For extraction' segment missed by the second coder.** The study author coded this segment as containing two socio-spatial factors for substance use labelled "studying" ("Lernen") and "staying awake" ("Wachbleiben)", with a note to say that they could also be considered to be other factors. The second coder did not identify this segment as relevant for extraction.

	German original: I: […] Ritalin, was hat das für dich für eine ...Bedeutung oder..? B: Ich nehme es eigentlich nur zum Lernen ...und zum Wachbleiben.	
8	*I: […] for what reason wine?* *P: Generally, first because of the culture. […] Among [people from my country of origin] actually there is wine with every meal.* *German original: I: […] aus welchem Grund Wein? B: Generell, erstens wegen der Kultur. […] Es gibt unter [Menschen aus ihrem Herkunftsland] eigentlich zu jedem Essen Wein*	**Second coder taps into implicit text contents.** Both coders coded this segment as containing a socio-spatial factor for substance use and an 'other' factor for substance use, labelled "with every meal" ("zu jedem Essen") and "culture" ("Kultur") respectively by both coders. The study author also coded this segment as containing an 'other' factor for substance use labelled "country of origin" (Herkunftsland). The second coder also coded this segment as containing an 'other' factor for substance use labelled "habit" ("Gewohnheit").
9	*P: […] in [my country of origin] when I am in.. the mountains, then there are more opportunities, so you don't drink much but.. you just get wine… yes* *German original: B: […] in [Herkunftsland], wenn ich in... den Bergen bin, dann kommt man öfters dazu, also man trinkt nicht viel, aber ...man kriegt einfach Wein, ... ja*	**Both coders tap into implicit text contents.** Both coders coded this segment as containing a socio-spatial factor for substance use, labelled "offer/supply" ("Angebot") by the study author and "availability" ("Verfügbarkeit") by the second coder (considered to correspond). In addition, the second coder coded this segment as containing two other factors for substance use, labelled "habit" ("Gewohnheit") and "place of origin" ("Herkunftsort"). The study author coded this segment as containing one other factor for substance use, labelled "culture" ("Kultur").
10	*P: I can- when I.. judge myself as a person, that I can control myself well in this regard… I set myself… wider limits and say, I can still smoke one with my [relative] without being afraid that I will keep a pack or buy myself a pack- so I would never just buy myself a pack or something like that* *German original: B: ich kann, wenn ich ...mich einschätze als Mensch, dass ich mich sehr beherrschen kann, was das betrifft .. setze ich mir da ...weitere Grenzen und sage, ich kann mit meiner [Verwandten] noch eine rauchen, ohne dass ich Angst habe, dass ich mir ein Packerl behalte oder selber ein Packerl kaufe,- also ich würde mir nie einfach ein Packerl kaufen oder sonst was*	**Co-occurrence or causal relationship? Second coder taps into implicit text contents.** The study author coded this segment as containing an 'other' factor for substance use labelled "keeping substance use under control (setting limits, self-control)" ("den Konsum unter Kontrolle haben (Grenzen, Beherrschen)"). The second coder coded this segment as containing a socio-spatial factor for substance use labelled "availability (sister has cigarettes)" ("Verfügbarkeit (Schwester hat Zigaretten)") and two other factors for substance use labelled "no own cigarette pack" ("kein eigenes Packerl") and "self-control" ("Selbstbeherrschung").
11	*I: when you think of the last time when you had something to drink. Where was that?* *P: That was at home, yes, at a female friend's place* *German original: I: wenn du an das letzte Mal denkst, als du was getrunken hast. Wo war das? B: das war zuhause, ja, bei einer Freundin.*	**Co-occurrence or causal relationship? Second coder taps into implicit text contents.** The second coder coded this segment as containing a socio-spatial factor for substance use labelled "at a female friend's place" ("bei einer Freundin"). The study author did not identify this segment as relevant for extraction, as the participant does not describe a relationship between the setting and their substance use and offers no explanation for their use in this setting.
12	*I: and at the … uni? […] how often would you say wine belongs there?* *P: actually I have never so far drunk … wine at the university* *German original: I: und auf der ....Uni? […] wie oft würdest du sagen gehört Wein da dazu? B: Ich hab noch nie auf der Uni eigentlich ... Wein getrunken*	**Co-occurrence or causal relationship? Study author taps into implicit text contents.** The participant does not describe a relationship between the setting and their substance use. Nevertheless, the study author coded this segment as containing a potential socio-spatial factor for substance use labelled "norms?" ("Normen?"), including a question mark and note to highlight that this may not be suitable for analysis, as it was inferred by the coder rather than made explicit by the participant. The second coder did not identify this segment as relevant for extraction.
13	*I: in the flat […] you pre-load... and <u>then</u>, where do you go?* *P: Erm, to [street name], that's what it's called* *German original: I: in der Wohnung […] tut ihr vorglühen... und <u>dann</u>, wo geht ihr hin? B: Ahm, in die [Straßenname], heißt das*	**Co-occurrence or causal relationship? Study author taps into implicit text contents.** The study author coded this segment as containing two socio-spatial factors labelled "a specific place" ("bestimmter Ort") and "routine/habit: first here, then there" ("Routine/Gewohnheit: zuerst hier, dann dort"). A note was included to say that although substance use was not explicitly mentioned in this segment regarding the second location, it was evident from the context that substances were consumed there. The second coder did not identify this segment as relevant for extraction.

L.4 Fields in data extraction table

The below table gives an overview of the information extracted from all interviews included in the data extraction phase. The left column shows the headings used in the table and the right column describes what information was entered under each heading.

A. Information exported from MaxQDA software	
IP	Interview participant number
Start	Paragraph number to indicate start of key segment
End	Paragraph number to indicate end of key segment
Segment	Copy of relevant segment from interview transcript (i.e., interview excerpt)
Comment/Preliminary notes	Any comments (memos) inserted during coding using MaxQDA comments function, space for making preliminary notes about quotations during data extraction
Code	Key code assigned in MaxQDA ('for analysis', 'for context', 'not enough information')
Further codes	List of any other codes assigned to the segment in MaxQDA
B. Basic information/scope (data extraction commences here)	
Substances (general)	Indicate if causal chain referred to: *alcohol; cigarettes and other nicotine products (excluding waterpipe); waterpipe*; and/or *medicines*
Substances (specific)	List specific substances/products, such as type of alcoholic beverage (e.g., *beer, wine, …)* or type of nicotine product (e.g., *cigarettes, cigars*…)
Time frame	Indicate if causal chain referred to *present* (six months prior to interview or current situation) and/or *past* (more than six months prior to interview or explicitly described as not reflecting current situation)
Where	Indicate relevant settings (multiple entries possible), pull-down options included e.g., *own home, parents' home, university, workplace, … not specified, not limited to any particular setting*
Who	Indicate relevant people/relations (multiple entries possible), pull-down options included e.g., *alone, family, parents, siblings, … in company (not further specified), not limited to any particular people/relations*
What	Indicate relevant activities (multiple entries possible), pull-down options included e.g., *food-related, going out/party, cosy get-together, ... not specified, not limited to any particular activity*
C. Causal chain / Pathway	
Entire causal chain or pathway	Describe entire chain or pathway as based on key segment and context segments, inferred factors shown in double parentheses, including label for the causal chain
Effect/result	Describe end-point of causal chain or pathway as related to substance use
Assessment (pull-down)	Indicate how study participant appeared to experience the causal chain/result (from pull-down menu: *positive, negative, ambivalent,* or *differentiated*)
Assessment (description)	Provide further details on how study participant appeared to experience the causal chain/result
D. Context	
Interpretative notes	Study author notes on e.g., open questions, apparent contradictions in the data, uncertainties, possible interview effects (e.g., social desirability)
Contextual knowledge	Study author notes on how other parts of the interview informed the causal chain
Additional segments	Copy of further segments from interview transcript that informed the development of the causal chain, including paragraph numbers to indicate start and end of segments
E. Factors	
Other (antecedent, moderating) factors (not socio-spatial)	Here, only three main categories are shown. In the data extraction table, each identified factor was shown in a separate column (total of 100 columns). Information was only entered for factors identified in the segments/causal chains. The emphasis was on highlighting each factor's position in the causal chain and noting any additional information available about the factor. Information inferred from transcripts was shown in double parentheses, with justifications for inferral provided as necessary.
Socio-spatial aspects	
Mediating events, actions, thoughts, feelings	

Appendix M: Study participants and subgroup analyses

M.1 Sample characteristics

Data are presented on key answer options only to allow a better overview.

Indicator	All	Group 1	Group 2	Group A	Group B
n	**24**	10	14	5	5
Recruitment mode					
% recruited via Facebook (cf. personal)	**21% (5)**	10% (1)	29% (4)	20% (1)	40% (2)
Field of study					
% business, economics or statistics	**29% (7)**	50% (5)	14% (2)	0% (0)	40% (2)
% mathematics	**21% (5)**	20% (2)	21% (3)	0% (0)	20% (1)
% law	**50% (12)**	30% (3)	64% (9)	100% (5)	40% (2)
% additional field of study (i.e., enrolled in two studies or more)	**29% (7)**	30% (3)	29% (4)	40% (2)	0% (0)
Socio-demographic characteristics					
% female	**100% (24)**	100% (10)	100% (14)	100% (5)	100% (5)
average age at time of sign-up	**21,7**	22,4	21,1	21,6	21,0
% born in Austria (cf. abroad)	**75% (18)**	60% (6)	86% (12)	100% (5)	80% (4)
% grew up predominantly in Austria (cf. abroad)	**83% (20)**	60% (6)	100% (14)	100% (5)	100% (5)
% at least one parent born in Austria	**58% (14)**	40% (4)	71% (10)	100% (5)	60% (3)
% both parents born abroad	**42% (10)**	60% (6)	29% (4)	0% (0)	40% (2)
% at least one parent with university or equivalent degree	**58% (14)**	80% (8)	43% (6)	40% (2)	20% (1)
% employed part-time or occasionally (cf. not working at all)	**79% (19)**	70% (7)	86% (12)	80% (4)	100% (5)
% fully/mostly have enough money to meet own needs	**71% (17)**	90% (9)	57% (8)	40% (2)	80% (4)
% never been married	**100% (24)**	100% (10)	100% (14)	100% (5)	100% (5)
% have a partner	**63% (15)**	60% (6)	64% (9)	60% (3)	80% (4)
Living circumstances					
% living with parents at least some of the week	**38% (9)**	30% (3)	43% (6)	0% (0)	80% (4)
% living alone at least some of the week	**17% (4)**	30% (3)	7% (1)	0% (0)	0% (0)
% living with partner at least some of the week	**33% (8)**	30% (3)	36% (5)	40% (2)	40% (2)
% moving between homes on a weekly basis	**21% (5)**	20% (2)	21% (3)	0% (0)	20% (1)
% living in Vienna (at least several days per week) (cf. living in another region)	**88% (21)**	100% (10)	79% (11)	80% (4)	60% (3)
% living at current address 6 months to 1 year (cf. more than 1 year)	**25% (6)**	10% (1)	36% (5)	80% (4)	0% (0)
% living at current address 10 years or more (cf. less than 10 years)	**38% (9)**	30% (3)	43% (6)	0% (0)	100% (5)
Current health					
% very good physical health (self-rated)	**46% (11)**	50% (5)	43% (6)	40% (2)	40% (2)
% very good mental health (self-rated)	**42% (10)**	40% (4)	43% (6)	20% (1)	40% (2)
Alcohol use					
% never used alcohol	**0% (0)**	0% (0)	0% (0)	0% (0)	0% (0)
average age first alcoholic beverage	**14,3**	14,2	14,4	14,0	15,2
% no alcohol use in last 3 months†	**4% (1)**	0% (0)	7% (1)	0% (0)	20% (1)
% weekly or daily alcohol use in last 3 months†	**33% (8)**	20% (2)	43% (6)	60% (3)	20% (1)
current drinkers only: average number of standard drinks per typical drinking day (estimate)*, ‡	**2,9**	1,4	4,0	3,1	5,6
Cigarette use					
% never used cigarettes	**29% (7)**	60% (6)	7% (1)	0% (0)	0% (0)
% never smoked a whole cigarette	**33% (8)**	70% (7)	7% (1)	0% (0)	0% (0)

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Indicator	All	Group 1	Group 2	Group A	Group B
Cigarette use (ctd. from previous page)					
only if ever used: average age first cigarette	**15,5**	16,7	15,2	15,4	14,6
only if ever used: % no cigarette use in last 3 months†	**24% (4)**	75% (3)	8% (1)	0% (0)	0% (0)
only if ever used: % weekly or daily cigarette use in last 3 months†	**35% (6)**	0% (0)	46% (6)	20% (1)	100% (5)
current smokers only: average number of cigarettes per typical smoking day (estimate)‡	**6,8**	2,5	7,2	2,5	14,2
Substances used in six months prior to interview					
% any (non-medical) use of … in last 6 months (cf. prior/never)					
beer	**83% (20)**	80% (8)	86% (12)	100% (5)	80% (4)
wine	**92% (22)**	90% (9)	93% (13)	100% (5)	80% (4)
cider	**42% (10)**	60% (6)	29% (4)	40% (2)	0% (0)
sparkling wine	**71% (17)**	70% (7)	71% (10)	60% (3)	60% (3)
spirits	**79% (19)**	70% (7)	86% (12)	100% (5)	60% (3)
mixed drinks	**71% (17)**	60% (6)	79% (11)	100% (5)	40% (2)
spirits or mixed drinks	**83% (20)**	80% (8)	86% (12)	100% (5)	60% (3)
cigarettes	**58% (14)**	20% (2)	86% (12)	100% (5)	100% (5)
cigars or similar	**8% (2)**	0% (0)	14% (2)	20% (1)	0% (0)
waterpipe	**38% (9)**	40% (4)	36% (5)	20% (1)	40% (2)
e-cigarettes with nicotine	**4% (1)**	0% (0)	7% (1)	20% (1)	0% (0)
alcohol with medicines	**8% (2)**	0% (0)	14% (2)	20% (1)	20% (1)
volatile substances (inhalants)	**0% (0)**	0% (0)	0% (0)	0% (0)	0% (0)
medicines for cognitive enhancement	**4% (1)**	0% (0)	7% (1)	20% (1)	0% (0)
sedatives or sleeping pills	**0% (0)**	0% (0)	0% (0)	0% (0)	0% (0)
new psychoactive substances	**0% (0)**	0% (0)	0% (0)	0% (0)	0% (0)
Substance use related problems					
% own substance use viewed as rather problematic (cf. rather unproblematic)	**21% (5)**	0% (0)	36% (5)	0% (0)	80% (4)
current drinkers only: % attempt to reduce or quit alcohol use in last 3 months (cf. no attempt)	**17% (4)**	10% (1)	23% (3)	0% (0)	50% (2)
current smokers only: % attempt to reduce or quit cigarette use in last 3 months (cf. no attempt)	**54% (7)**	0% (0)	58% (7)	60% (3)	60% (3)
% attempt to reduce or quit alc/cig use in last 3 months (cf. no attempt)	**33% (8)**	10% (1)	50% (7)	60% (3)	60% (3)
% did not feel strong desire or urge to use alc/cig in last 3 months†	**46% (11)**	80% (8)	21% (3)	20% (1)	0% (0)
% alc/cig did not lead to health, social, legal or financial problems in last 3 months†	**79% (19)**	100% (10)	64% (9)	100% (5)	60% (3)
% did not fail to do what was normally expected because of alc/cig use in last 3 months†	**92% (22)**	100% (10)	86% (12)	100% (5)	80% (4)
% friend, relative or anyone else never expressed concern about alc/cig use†	**67% (16)**	90% (9)	50% (7)	80% (4)	20% (1)
% never tried and failed to control, cut down or stop using alc/cig†	**67% (16)**	100% (10)	43% (6)	80% (4)	0% (0)
average WHO ASSIST score†	**9,6**	3,7	13,9	7,8	21,0

Note. All = all 24 study participants; Group 1 = lighter users; Group 2 = heavier users; Group A = occasional smokers; Group B = daily smokers (as described in section 5.1).

* A standard drink was defined as a small glass of wine or sparkling wine (0,125 l), a small glass of beer (0,3 l), a large glass of schnaps (0,04 l) or a mixed drink with approx. 4 cl spirits.

† The WHO ASSIST score was calculated by scoring responses to six WHO ASSIST questions (version 3.0) as recommended in the relevant guidance (e.g., 'never' = 0). In the table, the dagger symbols illustrate what items contributed to the score (note, however, that the above table does not show all answer options). In the present analysis, the calculation deviated from the WHO recommendation in that a single score was calculated for both alcohol and tobacco (whereas the recommendation is to calculate scores separately for each substance). The screening questionnaire in the present study did not distinguish between substances (e.g., to reduce questionnaire completion time) except for frequency of use, which was asked separately for alcohol and tobacco. Where the answers differed (i.e., alcoholic beverages used more frequently than cigarettes or vice versa), the more frequent value was used for this calculation. According to WHO guidance, a score of 4-26 (tobacco) or 11-26 (alcohol) would prompt a brief intervention (e.g., in a primary care setting), whereas a score of 27 and over would prompt more intensive treatment (see ASSIST Questionnaire Version 3.0 [English] at https://www.who.int/substance_abuse/activities/assist_test/en/, last accessed 31.7.2020).

‡ Data on quantity was ordinally scaled (collected using categories, e.g., '1-2 drinks', '3-4 drinks'). Number of standard drinks or cigarettes was estimated by using the category midpoints as proxies (e.g., 1,5 for '1-2 drinks'; 3,5 for '3-4 drinks').

M.2 Ex post facto identification of participant subgroups

To facilitate comparisons, study participants were assigned to subgroups. This appendix supplements section 5.1.2 with details of how these subgroups were identified and defined. Due to the small sample size, two groups – distinguishing between 'lighter' and 'heavier' users – were considered appropriate. Initially, it was intended to form these groups based only on two indicators: frequency of use (in the three months prior to sign-up) and quantity of use (on a typical use day). Rather than using external benchmarks for what constituted lighter or heavier use, a table was prepared in which the x-axis referred to cigarette use and the y-axis referred to alcohol use, with higher values representing more frequent and heavier use (see table below). Each study participant was then represented in the table to see how participants clustered together in terms of use patterns and to identify thresholds on this basis.

Taking into account how participants spoke about substance use during the interviews and how participants compared with each other, the table distinguished clearly between *the lightest and the heaviest* users in the sample, but the study participants in-between were difficult to assign to either group. For example, based on this table alone, two study participants who described completely different substance use patterns *during the interviews* (one presented herself as a non-smoker with little interest in alcohol, while the other one presented herself as going through a phase of relatively intense substance use which included, for example, drinking wine whilst studying) would have been allocated to the same group, as both reported smoking 1-5 cigarettes on a monthly basis and drinking 1-2 standard alcoholic drinks on a weekly basis. Discrepancies were also observed in other cases, for example, where, during the sign-up procedure, study participants reported smoking 1-5 cigarettes every other month (and were therefore located closest to the non-smokers in the table) but then implied much more frequent cigarette use during the personal interviews. Whilst these discrepancies are interesting findings by themselves (e.g., relating to self-perception of substance users and the validity of data collected through structured questionnaires), in this context of identifying participant groups, they highlighted the need to consider additional indicators[869].

Consequently, a second table was prepared in which each participant was classified as either a 'lighter' or 'heavier' user on *each* of four composite indicators. A detailed documentation of these indices would go beyond the limits of this thesis, but they can be summarised as follows: i) overall impression given by participant during interview (as recorded e.g., in the post-

[869] One option could have been to disregard study participants' self-presentation during the interviews and to use the self-report substance use data only. However, given the study's focus on subjective construal of everyday spaces and substance use, it was more appropriate to consider also how study participants perceived themselves, as this was likely to impact on their construal of their lifeworld.

interview protocols); ii) a combination of general frequency and quantity of substance use as indicated during sign-up (i.e., based on the table described above); iii) an index based on the everyday spaces mapped by participants during the interview (e.g., proportion of spaces featuring substance use out of all mapped everyday spaces, how often visited, what substance use frequencies were reported for those spaces); and iv) an index based on what substance use patterns study participants envisioned for their hypothetical ideal space during the interview (interview procedures are described in Chapter 6). As each indicator was considered separately, the resulting classifications of each participant could be consistent (e.g., all indicators suggested a 'lighter' user) or in conflict with each other (e.g., two indicators suggested a 'lighter' user but two indicators suggested a 'heavier' user). Assessments were consistent on all four indicators for 12 study participants. All instances with discrepancies were reviewed case-by-case and possible reasons for discrepancies considered. To give one example, one participant was clearly (and saw herself as) a 'lighter' user but reported higher substance use for her ideal space because she imagined this space as one where she would have far fewer responsibilities: she was therefore classified as a 'lighter' user overall.

On this basis, a preliminary allocation was made for each study participant, and the first table was updated using colour-coding to include this information (similar to the table below but at the level of individual study participants). The so-updated table allowed the identification of thresholds and the initial definition of groups according to quantity/frequency as follows:

- Group 1: 'Lighter' users in the sample were those who reported *no cigarette use* for the three months prior to sign-up ***and*** *no more* than *two standard drinks* per typical drinking day (regardless of use frequency, keeping in mind that no study participant reported daily alcohol use).

- Group 2: 'Heavier' users in the sample were those who reported *any cigarette use* for the three months prior to sign-up (regardless of alcohol use pattern). ***In addition***, non-smokers who drank *three standard drinks or more* per typical drinking day were also considered to be 'heavier' users.

During data analysis, a further distinction became necessary, namely *within* the group of smokers. This distinction was easier to implement, as all daily smokers reported using at least six cigarettes per smoking day, whereas all non-daily (henceforth 'occasional') smokers reported using 1-5 cigarettes per smoking day. Consequently, where subgroup analyses among smokers were required, the groups were distinguished accordingly (i.e., Group A: occasional smokers; Group B: daily smokers).

The table below supplements Table 8 in section 5.1 by showing the final allocation of study participants[870] to groups against the basic indicators of general substance use frequency and quantity. Ten study participants were allocated to Group 1 (lighter users), while 14 study participants were allocated to Group 2 (heavier users). *Within Group 2*, three study participants were classified as non-smokers (not assigned to any additional group), five study participants as occasional smokers (Group A), and five as daily smokers (Group B).

Allocation of study participants to groups, by substance use frequency/quantity (detailed)

Cigarettes / Alcohol	Frequency	Never	1-2x in three months	Monthly	Weekly	Daily or almost daily		
Frequency	*Quantity*	-	*1-5 cigs*	*1-5 cigs*	*1-5 cigs*	*6-10 cigs*	*11-20 cigs*	*>20cigs*
Never	-							•
1-2x in three months	*<1 drink*	•						
	1-2 drinks	• • • •						
	3-4 drinks		•					
	5-6 drinks					• •		
Monthly	*1-2 drinks*	• • •					•	
	3-4 drinks	• •	•					
Weekly	*1-2 drinks*	•		• (!)[a]	•			
	3-4 drinks	•	• (!)[a]	•	•			
	≥10 drinks						•	

Note. Each dot represents one study participant. All data refer to self-report substance use for the three months prior to sign-up. Colours: blue for Group 1 ('lighter' users), pink for Group 2 ('heavier' users). Different shades of pink are used to distinguish heavier users by smoking status (non-smokers, occasional smokers, daily smokers).
[a] (!) = exceptions from the general definition, as explained in main text.

Two participants were not allocated in line with the initial definitions shown earlier (indicated by the "(!)" symbol in the table above). Both instances concerned occasional smokers who were classified as non-smokers. During the interview, neither of them reported any everyday spaces associated with at least occasional cigarette use[871]. Because spaces of cigarette use were defined in the present study as those of at least occasional cigarette use, these two participants could not be considered in subgroup analyses focussed on spaces associated with cigarette use. For consistency, they were therefore treated as non-smokers throughout the analyses. The definitions shown earlier were therefore revised to *limit 'smokers' to those who reported at least one everyday space associated with at least occasional cigarette use*,

[870] For anonymisation and methodological reasons, each study participant is represented with a dot (rather than the participants codes used in the original table, e.g., IP1, IP2). Instead, Table 9 in section 5.1.2 shows to which group each study participant was assigned.
[871] One of these two study participants reported one space associated with rare cigarette use, and the other one reported two spaces associated with rare cigarette use.

meaning that, for analytical purposes, *'non-smokers' had to include two participants who reported everyday spaces associated with rare cigarette use*.

As a result of this, ten study participants were deemed to be occasional or daily smokers and 14 study participants were considered to be, for all practical purposes, non-smokers. The so-defined *'non-smokers'* included the ten participants assigned to Group 1 (i.e., lighter drinkers) and four participants assigned to Group 2 (i.e., heavier drinkers) (see the table above: first column plus the two exceptions). Of the 14 participants classified as 'non-smokers', six participants consistently indicated that they had never smoked, and four participants indicated that they had not smoked in over six months (three had not smoked in over a year). *Four 'non-smokers' indicated cigarette use in the six months prior to interview.* This included the two regular users mentioned as exceptions above and two irregular users who reported taking a puff from someone else's cigarette on very rare occasions (e.g., on holiday, at a nightclub). These four study participants reported one or two everyday spaces associated with rare cigarette use as part of the interview.

M.3 Overview of differences between participant subgroups

A number of analyses were carried out to explore differences among participants. These showed that differences in general substance use patterns corresponded to differences on other aspects, as described below. While this is not to imply any causality or that differences observed in this sample can be readily generalised to wider populations, it does emphasise that sample was heterogeneous and that this heterogeneity likely affected the study's results in a number of ways (as noted in section 13.4). In addition, the presentation of these data may inspire hypotheses that could be explored in future research. This appendix therefore provides a brief overview of the various analyses that were carried out to explore participant differences. Example differences among participants are highlighted for illustration, with further details available in the cited appendices. As subgroup analyses were not a focus of the present study, these results are reported here rather than in the main text.

Appendix M.1 presents the sample characteristics for all study participants as one group (described above) as well as by participant subgroup. By definition, 'heavier' users were more likely to report weekly or daily alcohol use (43% of 'heavier' users versus 20% of 'lighter' users) and weekly or daily cigarette use (46% versus 0%). Similarly, 'heavier' users reported a greater number of standard drinks per drinking day (an estimated average of 4,0 drinks among 'heavier' users versus 1,4 drinks among 'lighter' users) and a greater number of cigarettes per smoking day (an estimated average of 7,2 cigarettes versus 2,5 cigarettes). However, daily smokers reported a considerably higher daily average of cigarettes per smoking day than occasional smokers (14,2 versus 2,5 cigarettes). To highlight some further differences between participants on substance use related characteristics, for example, 'lighter' users were more likely to prefer drinks such as wine or cider, whereas 'heavier' users were more likely to prefer beer. Daily smokers were most likely to view their own substance use as problematic and to report problems related to their use, whereas occasional smokers did not generally report problems or view their use as problematic. The average ASSIST score (see Appendix M.1 for details) was 3,7 for the 'lighter' users, 7,8 for the occasional smokers, and 21,0 for the daily smokers in this sample[872]. To highlight some differences on general characteristics, daily smokers were more likely to have signed up to the study online (40% of daily smokers versus 10% of 'lighter' users). Compared with the 'heavier' users in this sample, 'lighter' users were more likely to have a migration background (60% of 'lighter' users reported that both parents

[872] At the individual level, the WHO ASSIST score ranged from 2 points (five 'lighter' users) to 26 points (two daily smokers). All participants were therefore under the 27-point-threshold which constitutes "high risk of experiencing severe problems" and merits "more intense treatment" (beyond a brief intervention) according to WHO guidance (see "ASSIST Questionnaire Version 3.0 (English)", https://www.who.int/substance_abuse/activities/assist_test/en/ last accessed 31.7.2020).

were born abroad, versus 29% of ‘heavier’ users), to have at least one parent with a university or an equivalent degree (80% versus 43%), and to study full-time (30% vs. 14%). That said, there were also characteristics on which study participants did not differ overall. For example, similar proportions of participants rated their physical or mental health as ‘very good’ (between 40% and 50%).

The remainder of this appendix is devoted to participant group comparisons in relation to the study’s findings. **Appendix M.4** shows the distribution of elicited and master constructs (i.e., latent dimensions for space construal as per Chapter 10) according to participant group. On average, 'heavier' users elicited slightly more constructs than 'lighter' users (4,7 versus 4,2 constructs). Although the relationship between participant group and elicited constructs was not found to be statistically significant at the $p < 0,05$ level (likely due to very small sample sizes), an inspection of the data table still suggested potential differences in how study participants construed their everyday spaces. For example, in this sample, daily smokers were more likely to elicit constructs relating to relaxation and stress than occasional smokers or non-smokers. Smokers (whether daily or occasional) were more likely than non-smokers to elicit constructs relating to physical pleasantness. ‘Heavier’ users were more likely to elicit constructs relating to whether a space represented a cosy get-together or party/excess; in fact, ‘lighter’ users did not elicit such constructs at all. Conversely, ‘lighter’ users were more likely to elicit constructs relating to the changeability of a space or relating to sense of time. An additional analysis (data not shown) considered differences regarding the order in which constructs were elicited during the interviews. This showed, for example, that constructs describing closeness to people were more likely to be elicited first by daily smokers (while other participants were more likely to elicit them later in the interview).

'Lighter' and 'heavier' users elicited approximately the same number of everyday spaces during the interviews (12,5 versus 12,2 spaces on average). **Appendix M.5** shows the distribution of situated substance use patterns (see Chapter 11) within those spaces according to participant group. By definition, ‘lighter’ users reported no spaces associated with at least occasional cigarette use. Compared with ‘lighter’ users, ‘heavier’ users were less likely to report spaces associated with alcohol but not cigarettes. However, there were further differences among smokers in this regard, as occasional smokers were more likely than daily smokers to report spaces associated with alcohol but not cigarettes. Among the daily smokers, only one such space was reported, and this referred to a situation abroad on holiday (as described in Chapter 11). In this sample, occasional smokers were also more likely to report spaces associated with cigarettes *and* alcohol (particularly when considering spirits and mixed drinks), whereas daily smokers were more likely to report spaces associated with cigarettes but not alcohol (further

described in section 11.6). To complement these results, Appendix K.6.1 also shows different situated substance use ‘networks’ by participant group (see also section 11.7).

Regarding the overall number of elicited spaces (Appendix M.5.2), ‘heavier’ users reported a much higher proportion of spaces associated with substance use than ‘lighter’ users (58% versus 26%), with the highest proportion of spaces of substance use reported by daily smokers (73% of spaces elicited by daily smokers were associated with at least occasional substance use). A Mann-Whitney *U*-test showed these differences between ‘lighter’ users and daily smokers to be highly significant ($U = 0$, $n_1=10$, $n_2=5$, $p<0.01$). Another way of interpreting these data is that, on average, 'lighter' users elicited almost twice as many spaces of no or rare substance use than 'heavier' users, while ‘heavier’ users elicited more than twice as many spaces of at least occasional substance use than ‘lighter’ users (note, however, that these data informed the identification of groups as described earlier). Counter to what might be expected, ‘heavier’ users or daily smokers were *not* more likely than ‘lighter’ users or occasional smokers to associate spaces of no or rare substance use with ambivalent or (rather) negative feelings. Overall, ‘heavier’ and ‘lighter’ users appeared to construe spaces of no or rare substance use similarly, including on aspects such as enjoyment, relaxation, and freedom of choice (rows 21, 22 and 25 in Appendix M.6.2, left chart labelled ‘NSU’).

Appendix M.6 shows how different participant groups construed their subjectively defined hypothetical ideal space as well as broad situated substance use patterns (corresponding data tables shown in Appendix M.7). In terms of the substance use envisioned for the ideal space, 'lighter' and 'heavier' users did not differ much overall. Although this may be surprising, it reflected the fact that some ‘lighter’ users imagined their ideal space as one where they could ‘let go’ and hence use substances more frequently than in actuality, while some ‘heavier’ users imagined their ideal space as one where they would feel less need to use substances than in actuality. Hence, the two groups’ ratings of their ideal spaces converged (which may also point toward perceived social norms on what is ‘ideal’ substance use). Nevertheless, a comparison of occasional and daily smokers showed that, on average, daily smokers envisioned frequent cigarette use also in their ideal spaces, whereas occasional users envisioned only rare cigarette use. For the elicited constructs, it was noteworthy that, on constructs relating to relaxation and stress, ‘heavier’ users expressed a preference for complete relaxation, whereas ‘lighter’ users were more likely to prefer a mixture of stress and relaxation.

In terms of how spaces representing different situated substance use patterns were construed, it was difficult to compare participant groups due to missing data at the construct level (as explained in section 7.4). However, one interesting observation was that, in this sample, daily smokers appeared to construe spaces associated with alcohol and cigarette use more similarly

to how non-smokers construe spaces associated with alcohol use, whereas occasional and daily smokers' construal of spaces associated with alcohol and cigarette use appeared to differ (right chart in Appendix M.6.3, further discussed in section 11.6).

Finally, **Appendix M.8** shows the results from the prioritisation of interviews for the qualitative analysis by participant group. These data suggest that, compared with 'lighter' users, 'heavier' users (and daily smokers in particular) were more likely to give detailed descriptions of their situated substance use practices and to describe a broader range of socio-spatial factors during the interviews carried out for this research (see section 7.5.4 and Appendix L.2 for prioritisation criteria). They were therefore more likely to be selected for the qualitative analysis.

M.4 Frequency of elicited constructs by master construct and participant subgroup

M.4.1 Number of individual study participants

		Participant group						All
		'Lighter' users (Group 1)	'Heavier' users (Group 2)	Occasional smokers (Group A)	Daily smokers (Group B)	'Non-smokers'[a]	Smokers[b]	
Master construct based on elicited constructs	Closeness to people	5 (50%)	11 (79%)	4 (80%)	5 (100%)	7 (50%)	9 (90%)	16 (67%)
	Orientation	7 (70%)	8 (57%)	**4 (80%)**	2 (40%)	9 (64%)	6 (60%)	15 (63%)
	Orientation ('outward' preferred)	4 (40%)	6 (43%)	2 (40%)	2 (40%)	6 (43%)	4 (40%)	10 (42%)
	Orientation ('inward' preferred)	**3 (30%)**	2 (14%)	**2 (40%)**	0 (0%)	3 (21%)	2 (20%)	5 (21%)
	Togetherness of activity	1 (10%)	**3 (21%)**	0 (0%)	1 (20%)	**3 (21%)**	1 (10%)	4 (17%)
	Changeability	**6 (60%)**	3 (21%)	0 (0%)	1 (20%)	**8 (57%)**	1 (10%)	9 (38%)
	Changeability ('varied' preferred)	**5 (50%)**	1 (7%)	0 (0%)	0 (0%)	**6 (43%)**	0 (0%)	6 (25%)
	Changeability ('the same' preferred)	1 (10%)	2 (14%)	0 (0%)	1 (20%)	2 (14%)	1 (10%)	3 (13%)
	Enjoyment	**3 (30%)**	2 (14%)	**2 (40%)**	0 (0%)	3 (21%)	2 (20%)	5 (21%)
	Relaxation	3 (30%)	**8 (57%)**	2 (40%)	**4 (80%)**	5 (36%)	**6 (60%)**	11 (46%)
	Type of social gathering	0 (0%)	**4 (29%)**	1 (20%)	2 (40%)	1 (7%)	**3 (30%)**	4 (17%)
	Substance use expectations	1 (10%)	2 (14%)	0 (0%)	**2 (40%)**	1 (7%)	**2 (20%)**	3 (13%)
	Freedom of choice	2 (20%)	5 (36%)	**3 (60%)**	1 (20%)	3 (21%)	**4 (40%)**	7 (29%)
	Self-presentation	1 (10%)	**4 (29%)**	1 (20%)	1 (20%)	3 (21%)	2 (20%)	5 (21%)
	Physical pleasantness	3 (30%)	7 (50%)	3 (60%)	3 (60%)	4 (29%)	**6 (60%)**	10 (42%)
	Sense of time	**3 (30%)**	2 (14%)	1 (20%)	0 (0%)	**4 (29%)**	1 (10%)	5 (21%)
	Study participants	10	14	5	5	14	10	24

Note. In the above table, numbers show the *number of study participants* in a given participant group who reported at least one elicited construct subsequently allocated to a particular master construct (i.e., socio-spatial aspect). Cells representing a notable increase vis-à-vis the percentages in the reference group (e.g., doubling of percentages) are highlighted. The next page gives an overview regarding the number of elicited constructs.

[a] 'Non-smokers' … Group 1 plus four 'non-smokers' from Group 2 (includes smokers who did not report spaces associated with at least occasional cigarette use, as explained in section 5.1)

[b] Smokers … Groups A & B.

M.4.2 Number of elicited constructs

		Participant group						All
		'Lighter' users (Group 1, n=10)	'Heavier' users (Group 2, n=14)	Occasional smokers (Group A, n=5)	Daily smokers (Group B, n=5)	'Non-smokers'[a] (n=14)	Smokers[b] (n=10)	
Master construct based on elicited constructs	Closeness to people	7 (17%)	13 (20%)	5 (22%)	6 (25%)	9 (15%)	11 (23%)	20 (19%)
	Orientation	9 (21%)	8 (12%)	**4 (17%)**	2 (8%)	11 (18%)	6 (13%)	17 (16%)
	Orientation ('outward' preferred)	5 (12%)	6 (9%)	2 (9%)	2 (8%)	7 (11%)	4 (9%)	11 (10%)
	Orientation ('inward' preferred)	**4 (10%)**	2 (3%)	**2 (9%)**	0 (0%)	4 (7%)	2 (4%)	6 (6%)
	Togetherness of activity	1 (2%)	**4 (6%)**	0 (0%)	1 (4%)	**4 (7%)**	1 (2%)	5 (5%)
	Changeability	**8 (19%)**	4 (6%)	0 (0%)	1 (4%)	**11 (18%)**	1 (2%)	12 (11%)
	Changeability ('varied' preferred)	**7 (17%)**	2 (3%)	0 (0%)	0 (0%)	**9 (15%)**	0 (0%)	9 (8%)
	Changeability ('the same' preferred)	1 (2%)	2 (3%)	0 (0%)	1 (4%)	2 (3%)	1 (2%)	3 (3%)
	Enjoyment	**4 (10%)**	2 (3%)	**2 (9%)**	0 (0%)	4 (7%)	2 (4%)	6 (6%)
	Relaxation	3 (7%)	**9 (14%)**	2 (9%)	**5 (21%)**	5 (8%)	**7 (15%)**	12 (11%)
	Type of social gathering	0 (0%)	**5 (8%)**	1 (4%)	2 (8%)	2 (3%)	3 (6%)	5 (5%)
	Substance use expectations	1 (2%)	2 (3%)	0 (0%)	**2 (8%)**	1 (2%)	2 (4%)	3 (3%)
	Freedom of choice	2 (5%)	5 (8%)	**3 (13%)**	1 (4%)	3 (5%)	4 (9%)	7 (6%)
	Self-presentation	1 (2%)	**5 (8%)**	2 (9%)	1 (4%)	3 (5%)	3 (6%)	6 (6%)
	Physical pleasantness	3 (7%)	7 (11%)	3 (13%)	3 (13%)	4 (7%)	6 (13%)	10 (9%)
	Sense of time	**3 (7%)**	2 (3%)	1 (4%)	0 (0%)	**4 (7%)**	1 (2%)	5 (5%)
	Elicited constructs	42	66	23	24	61	47	108

Note. In this table, numbers show the *number of elicited constructs from all study participants* in a given participant group for a particular master construct (i.e., socio-spatial aspect). Cells representing a notable increase vis-à-vis the percentages in the reference group (e.g., doubling of percentages) are highlighted. When interpreting this table, it must be considered that some (but not all) participants elicited multiple constructs allocated to the same master construct category. The table on the previous page accounts for this by showing only the number of participants per cell.

[a] 'Non-smokers' … Group 1 plus four 'non-smokers' from Group 2 (includes smokers who did not report spaces associated with at least occasional cigarette use, as explained in section 5.1)

[b] Smokers … Groups A & B.

M.5 Frequency of situated substance use patterns by participant subgroup

M.5.1 Number of individual study participants

		Participant group					
		'Lighter' users (Group 1)	'Heavier' users (Group 2)	Occasional smokers (Group A)	Daily smokers (Group B)	'Non-smokers'[a]	Smokers[b]
Pattern of situated substance use	NSU	10 (100%)	13 (93%)	4 (80%)	5 (100%)	14 (100%)	9 (90%)
	NSU pos	10 (100%)	13 (93%)	4 (80%)	5 (100%)	14 (100%)	9 (90%)
	NSU neg	8 (80%)	12 (86%)	4 (80%)	4 (80%)	12 (86%)	8 (80%)
	Alc/cig	10 (100%)	14 (100%)	5 (100%)	5 (100%)	14 (100%)	10 (100%)
	Alc	**10 (100%)**	9 (64%)	**4 (80%)**	1 (20%)	**14 (100%)**	5 (50%)
	Wine/beer	**8 (80%)**	7 (50%)	2 (40%)	1 (20%)	**12 (86%)**	3 (30%)
	Spirits/mixers	**5 (50%)**	4 (29%)	1 (20%)	0 (0%)	**8 (57%)**	1 (10%)
	Cig	0 (0%)	**7 (50%)**	2 (40%)	**5 (100%)**	0 (0%)	**7 (70%)**
	Cig pos	0 (0%)	**7 (50%)**	2 (40%)	**5 (100%)**	0 (0%)	**7 (70%)**
	Cig neg	0 (0%)	**6 (43%)**	1 (20%)	**5 (100%)**	0 (0%)	**6 (60%)**
	Alc&cig	0 (0%)	**8 (57%)**	**5 (100%)**	3 (60%)	0 (0%)	**8 (80%)**
	Cig&beer/wine	0 (0%)	**7 (50%)**	4 (80%)	3 (60%)	0 (0%)	**7 (70%)**
	Cig&spirits/mixers	0 (0%)	**5 (36%)**	**4 (80%)**	1 (20%)	0 (0%)	**5 (50%)**
	Waterpipe(&alc/cig)	2 (20%)	3 (21%)	1 (20%)	1 (20%)	3 (21%)	2 (20%)
	Medication(&alc/cig)	0 (0%)	**2 (14%)**	1 (20%)	1 (20%)	0 (0%)	**2 (20%)**
	Study participants	10	14	5	5	14	10

M.5.2 Number of spaces

		Participant group					
		'Lighter' users (Group 1, n=10)	'Heavier' users (Group 2, n=14)	Occasional smokers (Group A, n=5)	Daily smokers (Group B, n=5)	'Non-smokers'[a] (n=14)	Smokers[b] (n=10)
Pattern of situated substance use	NSU	**91 (73%)**	70 (41%)	**28 (48%)**	18 (27%)	**115 (67%)**	46 (37%)
	NSU pos	**63 (50%)**	47 (27%)	**20 (34%)**	13 (20%)	**77 (45%)**	33 (27%)
	NSU neg	**28 (22%)**	23 (13%)	**8 (14%)**	5 (8%)	**38 (22%)**	13 (10%)
	Alc/cig	33 (26%)	**100 (58%)**	29 (50%)	**48 (73%)**	56 (33%)	**77 (62%)**
	Alc	32 (26%)	32 (19%)	**9 (16%)**	1 (2%)	**54 (31%)**	10 (8%)
	Wine/beer	17 (14%)	18 (11%)	**4 (7%)**	1 (2%)	**30 (17%)**	5 (4%)
	Spirits/mixers	9 (7%)	9 (5%)	**1 (2%)**	0 (0%)	**17 (10%)**	1 (1%)
	Cig	0 (0%)	**38 (22%)**	3 (5%)	**35 (53%)**	0 (0%)	**38 (31%)**
	Cig pos	0 (0%)	**28 (16%)**	2 (3%)	**26 (39%)**	0 (0%)	**28 (23%)**
	Cig neg	0 (0%)	**10 (6%)**	1 (2%)	**9 (14%)**	0 (0%)	**10 (8%)**
	Alc&cig	0 (0%)	**21 (12%)**	**13 (22%)**	8 (12%)	0 (0%)	**21 (17%)**
	Cig&beer/wine	0 (0%)	**11 (6%)**	5 (9%)	6 (9%)	0 (0%)	**11 (9%)**
	Cig&spirits/mixers	0 (0%)	**9 (5%)**	**8 (14%)**	1 (2%)	0 (0%)	**9 (7%)**
	Waterpipe(&alc/cig)	2 (2%)	**7 (4%)**	**4 (7%)**	2 (3%)	3 (2%)	**6 (5%)**
	Medication(&alc/cig)	0 (0%)	**7 (4%)**	**5 (9%)**	2 (3%)	0 (0%)	**7 (6%)**
	Elicited spaces	125	171	58	66	172	124

Note. Numbers in the top table show the *number of study participants* in a given participant group who reported at least one elicited space subsequently allocated to a particular pattern of situated substance use. Numbers in the bottom table show the *number of elicited spaces from all study participants* in a given participant group for a particular pattern of situated substance use. Cells representing a notable increase vis-à-vis the percentages in the reference group (e.g., doubling of percentages) are highlighted. The types 'Waterpipe' and 'Medication' also included alcohol and cigarette use. Only the 273 spaces included in the quantitative analyses are shown.

[a] 'Non-smokers' … Group 1 plus four 'non-smokers' from Group 2 (includes smokers who did not report spaces associated with at least occasional cigarette use, as explained in section 5.1) [b] Smokers … Groups A & B.

M.5.3 Overview of study participants by pattern comparison and participant subgroup

Comparison	Participant group						n
	'Lighter' users (Group 1)	'Heavier' users (Group 2)	Occasional smokers (Group A)	Daily smokers (Group B)	'Non-smokers'[a]	Smokers[b]	
1 'NSU pos vs. Ideal'	8	13	4	5	12	9	**21**
2 'NSU neg vs. two main reference spaces'	7	12	4	4	11	8	**19**
3 'Alc vs. two main reference spaces'	8	8	3	1	12	4	**16**
4 'Wine/beer vs. two main reference spaces'	6	6	1	1	10	2	**12**
5 'Spirits/mixers vs. two main reference spaces'	5	4	1	0	8	1	**9**
6 'Cig pos vs. two main reference spaces'	0	7	2	5	0	7	**7**
7 'Cig neg vs. two main reference spaces'	0	5	1	4	0	5	**5**
8 'Alc&cig vs. two main reference spaces'	0	7	4	3	0	7	**7**
9 'Cig&beer/wine vs. two main reference spaces'	0	6	3	3	0	6	**6**
10 'Cig&spirits/mixers vs. reference spaces'	0	5	4	1	0	5	**5**
11 'NSU vs. Alc/cig'	10	13	4	5	14	9	**23**
12 'Cig pos vs. Cig neg'	0	5	1	4	0	5	**5**
13 'NSU neg vs. Cig neg'	0	5	1	4	0	5	**5**
14 'Alc vs. Cig'	0	3	2	1	0	3	**3**
15 'Alc vs. Alc&cig'	0	5	4	1	0	5	**5**
16 'Cig vs. Alc&cig'	0	5	2	3	0	5	**5**
17 'Wine/beer vs. Spirits/mixers'	3	3	0	0	6	0	**6**
18 'Cig&beer/wine vs. Cig&spirits/mixers'	0	4	3	1	0	4	**4**
19 'Wine/beer(&cig) vs. Spirits/mixers(&cig)'	3	7	3	1	6	4	**10**
Study participants	**10**	**14**	**5**	**5**	**14**	**10**	**24**

Note. Numbers in this table show the *number of study participants* included in a given comparison (per participant group and total in last column). These study participants reported on at least one space for each pattern of situated substance use considered in the comparison.

[a] 'Non-smokers' … Group 1 plus four 'non-smokers' from Group 2 (includes smokers who did not report spaces associated with at least occasional cigarette use, as explained in section 5.1)

[b] Smokers … Groups A & B.

M.6 Participant comparison charts for broad patterns of situated substance use

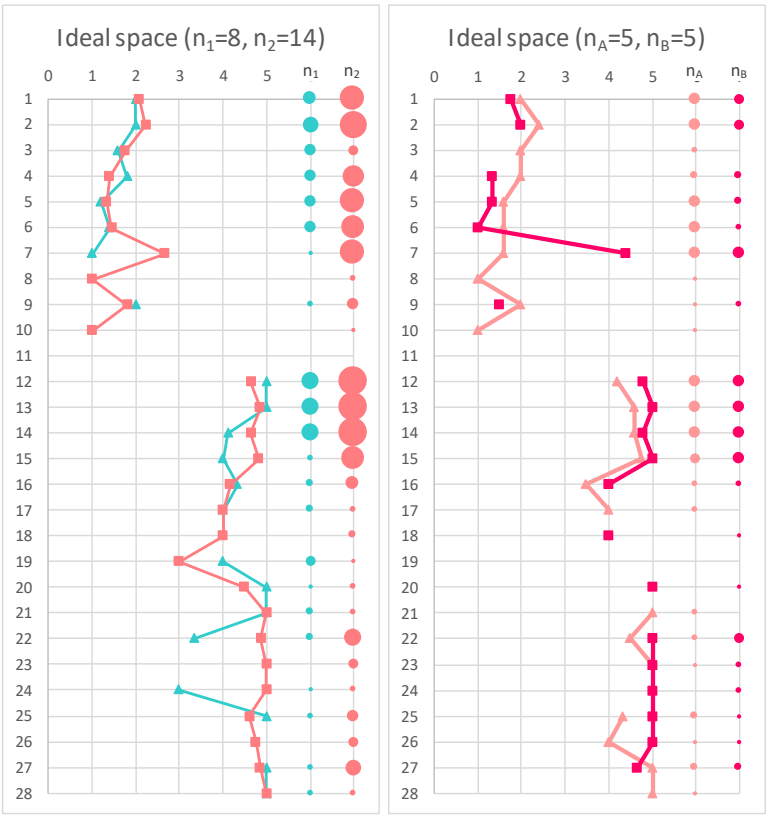
This appendix displays the charts resulting from the comparison of participant groups (see section 7.4.3). Participant comparisons were limited to main types. Each chart focusses on *one* pattern (as identified in Chapter 11) and shows the average ratings (arithmetic means of ratings) by participant group, comparing either 'lighter' and 'heavier' users to each other or, for the spaces associated with cigarette use, occasional and daily smokers. As such, the charts complement the single pattern charts shown in section 11.2.

In general, the format of the charts corresponds to that used in Chapter 11. The following sentences therefore highlight unique features of the participant comparison charts (for further details on formatting, see section 11.2). In the charts, *participant groups* (rather than types of spaces) are identified by numbers/letters, colours and symbols, as follows (for a description of the participant groups, see section 5.1.2):

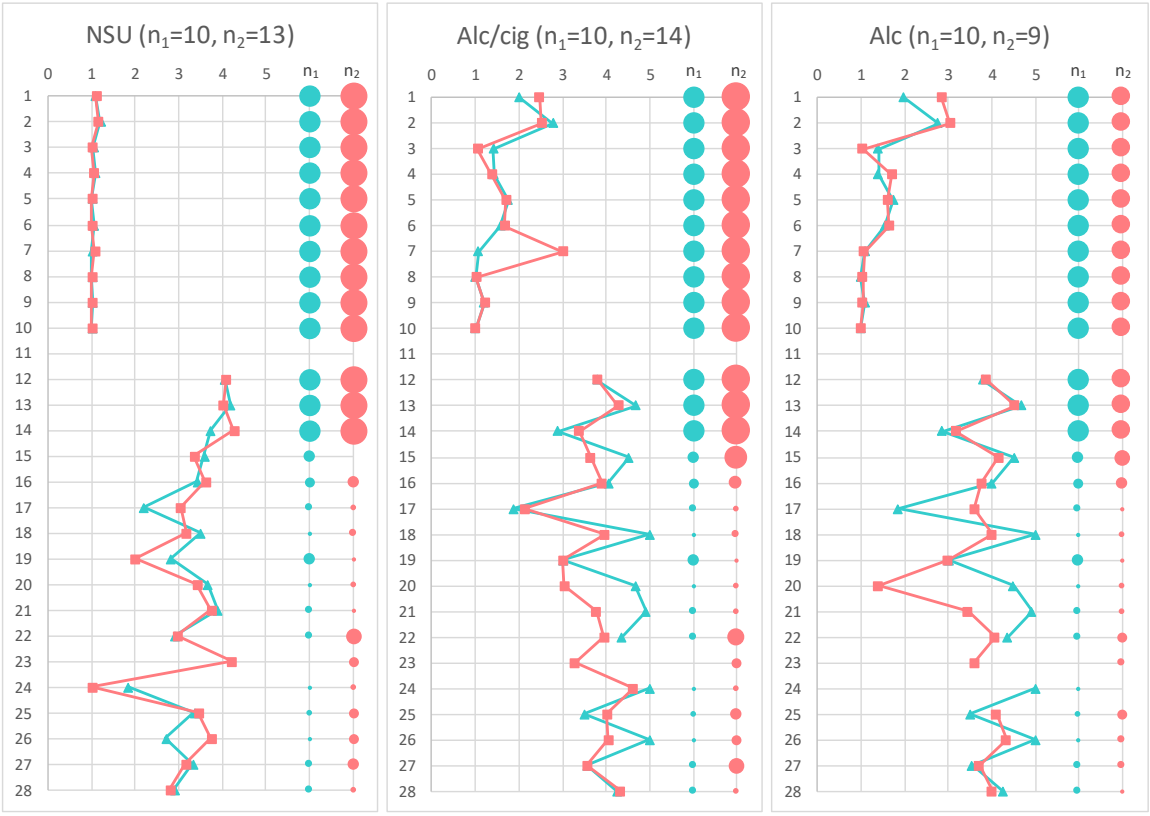
1 …	'Lighter' users …	blue, triangle marker
2 …	'Heavier' users ..	rose, square marker
A …	Occasional smokers …	light rose, triangle marker
B…	Daily smokers …	dark pink, square marker

At the top of the charts, *two* sample sizes are provided, one for each participant group (i.e., the number of study participants in each group reporting on such a space during the repertory grid interview). The participant groups are identified using the numbers/letters shown above in a subscript font. On the horizontal axis, the last *two* columns (what would be values '6' and '7' but is shown as 'n') indicate the sample size per participant group for each construct. Correspondingly, the sample size per participant group is visualised for each construct using dots on the far right in the chart area. The final chart is slightly different, as it combines data from other charts to compare three participant groups. It is described in the main text in section 11.6. Supporting data tables are shown in the next appendix. Appendix K.7 contains a printable legend for the construct numbers. Participant differences are highlighted in Chapter 11 where they were particularly notable during analysis.

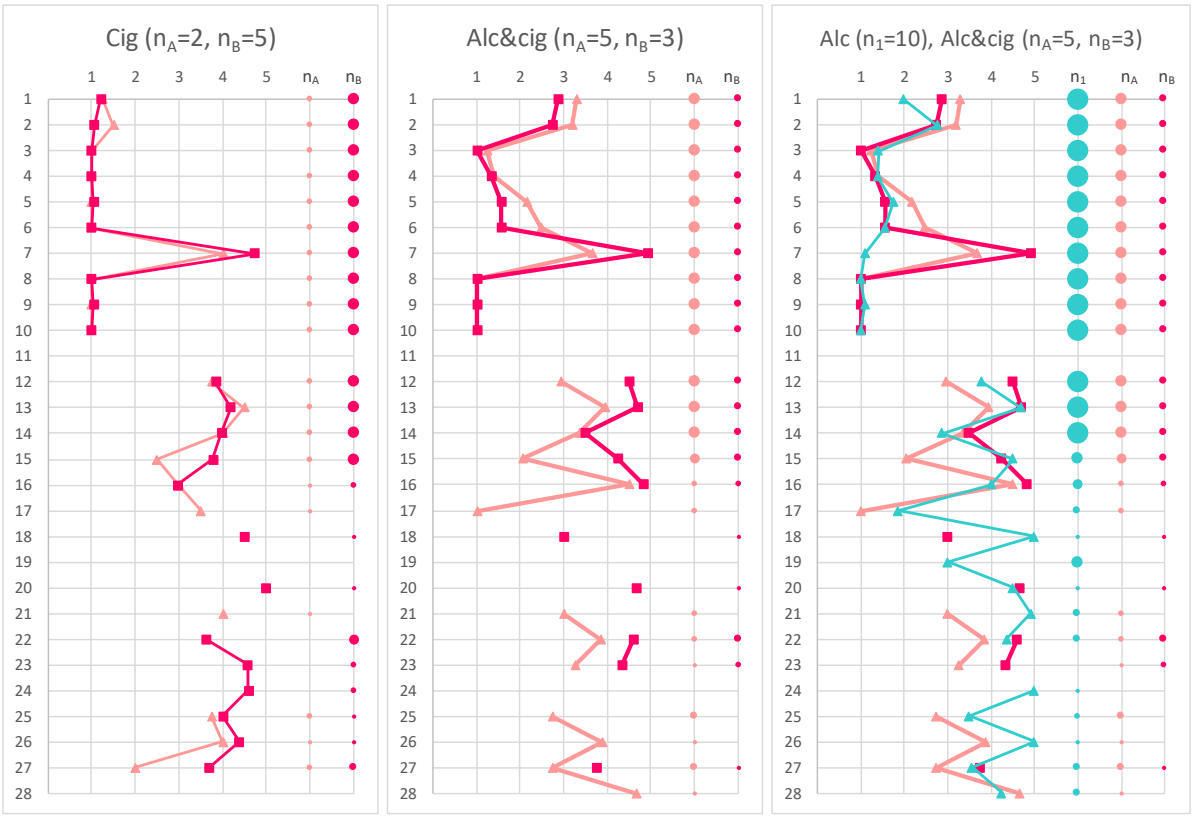
M.6.1 Study participants' hypothetical ideal space ('Ideal')



M.6.2 Further comparisons between 'lighter' and 'heavier' users



M.6.3 Further comparisons between occasional and daily smokers



M.7 Data tables to support participant comparison charts

The following tables provide key data regarding the comparison charts shown in the previous appendix.

Explanatory notes regarding the data tables are provided below:

C … Row numbers corresponding to numbers used in charts to identify supplied constructs (C1-14) and master constructs derived from elicited constructs (C15-28).

Construct … Construct label. For details on supplied constructs, see section 6.2.3; on elicited constructs, see Chapter 10. Table 30, p. 400, gives an overview.

$\bar{x}$ … Arithmetic mean of ratings across study participants in a group; data on a 5-point scale from 1 to 5, whereby 5 represents more frequent substance use (C1-10) or the preferred pole (C12-28). The participant groups are identified using numbers/letters in a subscript font (1… 'lighter' users; 2… 'heavier' users; A… occasional smokers; B… daily smokers). Blank cells indicate missing data. First named group is the reference group used for calculation of differences.

MD … Difference between means; may not match the difference between arithmetic means as shown due to rounding

n … Sample size per construct, i.e. number of study participants from each group who provided data for the type and construct. The participant groups are identified using numbers/letters in a subscript font as indicated above.

M.7.I Comparison 'Study participants' hypothetical ideal spaces – Ideal', major participant groups

		'Lighter' versus 'heavier' users					Occasional versus daily smokers				
C	Construct	$\bar{x}_1$	$\bar{x}_2$	MD	n_1	n_2	$\bar{x}_A$	$\bar{x}_B$	MD	N_A	N_B
1	Beer	2,0	2,1	0,1	6	12	2,0	1,8	-0,3	5	4
2	Wine	2,0	2,2	0,2	7	13	2,4	2,0	-0,4	5	4
3	Cider	1,6	1,8	0,2	5	4	2,0			2	0
4	Sparkling wine	1,8	1,4	-0,4	5	10	2,0	1,3	-0,7	3	3
5	Spirits	1,2	1,3	0,1	5	12	1,6	1,3	-0,3	5	3
6	Mixed drinks	1,4	1,5	0,1	5	11	1,6	1,0	-0,6	5	2
7	Cigarettes	1,0	2,7	1,7	1	12	1,6	4,4	2,8	5	5
8	Cigars, cigarillos		1,0		0	2	1,0			1	0
9	Waterpipe (with tobacco)	2,0	1,8	-0,2	2	5	2,0	1,5	-0,5	1	2
10	E-cigarettes (with nicotine)		1,0		0	1	1,0			1	0
11	(blank on purpose)										
12	Importance	5,0	4,6	-0,4	8	14	4,2	4,8	0,6	5	5
13	Feelings	5,0	4,9	-0,1	8	14	4,6	5,0	0,4	5	5
14	Frequency	4,1	4,6	0,5	8	14	4,6	4,8	0,2	5	5
15	Closeness to people	4,0	4,8	0,8	2	11	4,8	5,0	0,3	4	5
16	Orientation ('outward' preferred)	4,3	4,2	-0,2	3	6	3,5	4,0	0,5	2	2
17	Orientation ('inward' preferred)	4,0	4,0	0,0	3	2	4,0			2	0
18	Togetherness of activity		4,0		0	3		4,0		0	1
19	Changeability ('varied' preferred)	4,0	3,0	-1,0	4	1				0	0
20	Changeability ('same' preferred)	5,0	4,5	-0,5	1	2		5,0		0	1
21	Enjoyment	5,0	5,0	0,0	3	2	5,0			2	0
22	Relaxation	3,3	4,9	1,5	3	8	4,5	5,0	0,5	2	4
23	Type of gathering		5,0		0	4	5,0	5,0	0,0	1	2
24	Substance use expectations	3,0	5,0	2,0	1	2		5,0		0	2
25	Freedom of choice	5,0	4,6	-0,4	2	5	4,3	5,0	0,7	3	1
26	Self-presentation		4,8		0	4	4,0	5,0	1,0	1	1
27	Physical pleasantness	5,0	4,9	-0,1	2	7	5,0	4,7	-0,3	3	3
28	Sense of time	5,0	5,0	0,0	2	2	5,0			1	0

M.7.2 Comparison 'Spaces of no of rare substance use – NSU', 'lighter' versus 'heavier' users

C	Construct	$\bar{x}_1$	$\bar{x}_2$	MD	n_1	n_2
1	Beer	1,1	1,1	0,0	10	13
2	Wine	1,2	1,2	0,0	10	13
3	Cider	1,0	1,0	0,0	10	13
4	Sparkling wine	1,1	1,1	0,0	10	13
5	Spirits	1,0	1,0	0,0	10	13
6	Mixed drinks	1,1	1,0	-0,1	10	13
7	Cigarettes	1,0	1,1	0,1	10	13
8	Cigars, cigarillos	1,0	1,0	0,0	10	13
9	Waterpipe (with tobacco)	1,0	1,0	0,0	10	13
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	10	13
11	(blank on purpose)					
12	Importance	4,1	4,1	0,0	10	13
13	Feelings	4,2	4,0	-0,2	10	13
14	Frequency	3,7	4,3	0,5	10	13
15	Closeness to people	3,6	3,4	-0,2	5	10
16	Orientation ('outward' preferred)	3,4	3,6	0,2	4	5
17	Orientation ('inward' preferred)	2,2	3,0	0,8	3	2
18	Togetherness of activity	3,5	3,2	-0,3	1	3
19	Changeability ('varied' preferred)	2,8	2,0	-0,8	5	1
20	Changeability ('same' preferred)	3,7	3,4	-0,3	1	2
21	Enjoyment	3,9	3,8	-0,1	3	1
22	Relaxation	2,9	3,0	0,1	3	7
23	Type of gathering		4,2		0	4
24	Substance use expectations	1,8	1,0	-0,8	1	2
25	Freedom of choice	3,3	3,5	0,1	2	4
26	Self-presentation	2,7	3,8	1,1	1	4
27	Physical pleasantness	3,3	3,2	-0,1	3	5
28	Sense of time	2,9	2,8	-0,1	3	2

M.7.3 Comparison 'Spaces associated with alcohol or cigarette use – Alc/cig, 'lighter' versus 'heavier' users

C	Construct	$\bar{x}_1$	$\bar{x}_2$	MD	n_1	n_2
1	Beer	2,0	2,5	0,5	10	14
2	Wine	2,8	2,5	-0,3	10	14
3	Cider	1,4	1,0	-0,4	10	14
4	Sparkling wine	1,4	1,4	-0,1	10	14
5	Spirits	1,8	1,7	-0,1	10	14
6	Mixed drinks	1,6	1,7	0,1	10	14
7	Cigarettes	1,1	3,0	1,9	10	14
8	Cigars, cigarillos	1,0	1,0	0,0	10	14
9	Waterpipe (with tobacco)	1,2	1,2	0,0	10	14
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	10	14
11	(blank on purpose)					
12	Importance	3,8	3,8	0,0	10	14
13	Feelings	4,7	4,3	-0,4	10	14
14	Frequency	2,9	3,4	0,5	10	14
15	Closeness to people	4,5	3,6	-0,9	5	11
16	Orientation ('outward' preferred)	4,0	3,9	-0,1	4	6
17	Orientation ('inward' preferred)	1,9	2,1	0,3	3	2
18	Togetherness of activity	5,0	4,0	-1,0	1	3
19	Changeability ('varied' preferred)	3,0	3,0	0,0	5	1
20	Changeability ('same' preferred)	4,7	3,0	-1,6	1	2
21	Enjoyment	4,9	3,8	-1,1	3	2
22	Relaxation	4,4	3,9	-0,4	3	8
23	Type of gathering		3,3		0	4
24	Substance use expectations	5,0	4,6	-0,4	1	2
25	Freedom of choice	3,5	4,0	0,5	2	5
26	Self-presentation	5,0	4,0	-1,0	1	4
27	Physical pleasantness	3,6	3,6	0,0	3	7
28	Sense of time	4,2	4,3	0,1	3	2

M.7.4 Comparison 'Spaces associated primarily with alcohol – Alc', 'lighter' versus 'heavier' users

C	Construct	$\bar{x}_1$	$\bar{x}_2$	MD	n_1	n_2
1	Beer	2,0	2,9	0,9	10	9
2	Wine	2,8	3,0	0,3	10	9
3	Cider	1,4	1,0	-0,4	10	9
4	Sparkling wine	1,4	1,7	0,3	10	9
5	Spirits	1,7	1,6	-0,1	10	9
6	Mixed drinks	1,6	1,7	0,1	10	9
7	Cigarettes	1,1	1,1	0,0	10	9
8	Cigars, cigarillos	1,0	1,0	0,0	10	9
9	Waterpipe (with tobacco)	1,1	1,0	-0,1	10	9
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	10	9
11	(blank on purpose)					
12	Importance	3,8	3,9	0,1	10	9
13	Feelings	4,7	4,5	-0,2	10	9
14	Frequency	2,9	3,2	0,3	10	9
15	Closeness to people	4,5	4,2	-0,4	5	7
16	Orientation ('outward' preferred)	4,0	3,8	-0,2	4	5
17	Orientation ('inward' preferred)	1,9	3,6	1,7	3	1
18	Togetherness of activity	5,0	4,0	-1,0	1	2
19	Changeability ('varied' preferred)	3,0	3,0	0,0	5	1
20	Changeability ('same' preferred)	4,5	1,4	-3,1	1	2
21	Enjoyment	4,9	3,5	-1,5	3	2
22	Relaxation	4,4	4,1	-0,3	3	4
23	Type of gathering		3,6		0	3
24	Substance use expectations	5,0			1	0
25	Freedom of choice	3,5	4,1	0,6	2	4
26	Self-presentation	5,0	4,3	-0,7	1	3
27	Physical pleasantness	3,6	3,7	0,2	3	3
28	Sense of time	4,2	4,0	-0,2	3	1

M.7.5 Comparison 'Spaces associated primarily with cigarettes – Cig', occasional versus daily smokers

C	Construct	$\bar{x}_A$	$\bar{x}_B$	MD	n_A	n_B
1	Beer	1,3	1,2	0,0	2	5
2	Wine	1,5	1,1	-0,4	2	5
3	Cider	1,0	1,0	0,0	2	5
4	Sparkling wine	1,0	1,0	0,0	2	5
5	Spirits	1,0	1,1	0,1	2	5
6	Mixed drinks	1,0	1,0	0,0	2	5
7	Cigarettes	4,0	4,7	0,7	2	5
8	Cigars, cigarillos	1,0	1,0	0,0	2	5
9	Waterpipe (with tobacco)	1,0	1,0	0,0	2	5
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	2	5
11	(blank on purpose)					
12	Importance	3,8	3,8	0,1	2	5
13	Feelings	4,5	4,2	-0,3	2	5
14	Frequency	4,0	4,0	0,0	2	5
15	Closeness to people	2,5	3,8	1,3	2	5
16	Orientation ('outward' preferred)	3,0	3,0	0,0	1	2
17	Orientation ('inward' preferred)	3,5			1	0
18	Togetherness of activity		4,5		0	1
19	Changeability ('varied' preferred)				0	0
20	Changeability ('same' preferred)		5,0		0	1
21	Enjoyment	4,0			1	0
22	Relaxation		3,6		0	4
23	Type of gathering		4,6		0	2
24	Substance use expectations		4,6		0	2
25	Freedom of choice	3,8	4,0	0,3	2	1
26	Self-presentation	4,0	4,4	0,4	1	1
27	Physical pleasantness	2,0	3,7	1,7	2	3
28	Sense of time				0	0

M.7.6 Comparison 'Spaces associated with alcohol and cigarettes – Alc&cig', occasional versus daily smokers

C	Construct	$\bar{x}_A$	$\bar{x}_B$	MD	n_A	n_B
1	Beer	3,3	2,9	-0,4	5	3
2	Wine	3,2	2,8	-0,5	5	3
3	Cider	1,3	1,0	-0,3	5	3
4	Sparkling wine	1,4	1,3	-0,1	5	3
5	Spirits	2,2	1,6	-0,6	5	3
6	Mixed drinks	2,5	1,6	-0,9	5	3
7	Cigarettes	3,7	4,9	1,3	5	3
8	Cigars, cigarillos	1,0	1,0	0,0	5	3
9	Waterpipe (with tobacco)	1,0	1,0	0,0	5	3
10	E-cigarettes (with nicotine)	1,0	1,0	0,0	5	3
11	(blank on purpose)			0,0		
12	Importance	3,0	4,5	1,6	5	3
13	Feelings	4,0	4,7	0,7	5	3
14	Frequency	3,4	3,5	0,2	5	3
15	Closeness to people	2,1	4,3	2,2	4	3
16	Orientation ('outward' preferred)	4,5	4,8	0,3	2	2
17	Orientation ('inward' preferred)	1,0			2	0
18	Togetherness of activity		3,0		0	1
19	Changeability ('varied' preferred)				0	0
20	Changeability ('same' preferred)		4,7		0	1
21	Enjoyment	3,0			2	0
22	Relaxation	3,8	4,6	0,8	2	3
23	Type of gathering	3,3	4,3	1,1	1	2
24	Substance use expectations				0	0
25	Freedom of choice	2,8			3	0
26	Self-presentation	3,9			1	0
27	Physical pleasantness	2,8	3,8	1,0	3	1
28	Sense of time	4,7			1	0

M.8 Prioritisation of interviews for qualitative analysis, by participant subgroup

	Nr of interviews*, by participant group						
Rank†	'Lighter' users (Group 1, n=10)	'Heavier' users (Group 2, n=14)	Occasional smokers (Group A, n=5)	Daily smokers (Group B, n=5)	'Non-smokers' (n=14)‡	Smokers (n=10)‡	Total
1 - Essential	0 (0)	5 (5)	2 (2)	3 (3)	0 (0)	5 (5)	5 (5)
2	5 (2)	4 (1)	0 (0)	1 (0)	8 (3)	1 (0)	9 (3)
3	0 (0)	4 (0)	2 (0)	1 (0)	1 (0)	3 (0)	4 (0)
4 - Not essential	5 (1)	1 (0)	1 (0)	0 (0)	5 (1)	1 (0)	6 (1)
Total	**10 (3)**	**14 (6)**	**5 (2)**	**5 (3)**	**14 (4)**	**10 (5)**	**24 (9)**

* The first number shows how many interviews were allocated to this rank and the second number (in parentheses) shows how many of these interviews were included in the data extraction.
† See Appendix L.2 for more information on each rank.
‡ 'Non-smokers' … Group 1 plus four 'non-smokers' from Group 2 (includes smokers who did not report spaces associated with at least occasional cigarette use, as explained in section 5.1); Smokers … Groups A & B

See section 7.5.4 and Appendix L.2 for further information on the prioritisation of interviews.