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Abstract

Whilst personality's association to life outcomes, life events and the prediction thereof has been studied extensively so far, little research has shed light on the usage of biographic information to measure personality. If done so, research focused on narrow defined biographic subdisciplines or leveraged data provided on the internet, mainly social media, to determine personality. This study expects, based on previous findings in life-cycle analysis, sociology and economical psychology, that biographic information represents a valid proxy to determine personality. The results base on an Austrian sample with over N=240 valid survey participants and shows significant relationships for all personality traits to various biographic variables. Additionally, five meaningful models – one per trait – are introduced. Showing that the variance of personality can be explained through biographic data with $r=0.28$ for Neuroticism, $r=0.25$ for Openness to Experience, $r=0.22$ for Conscientiousness, $r=0.18$ for Agreeableness and $r=0.15$ for Extroversion. The reported results show that there is considerable potential for personality assessment through biographic information. In the end, this study builds a solid fundament for future investigations. It contributes to the extant literature by exploring and proposing a new, promising and hard-to-bias method to unobtrusively measure personality.

Abstrakt

Während der Zusammenhang zwischen der Persönlichkeit und Lebensergebnissen und -ereignissen, sowie deren Vorhersage seit Jahrzehnten eingehend untersucht wird, gibt es nur wenige Forschungsarbeiten, welche die Nutzung biografischer Informationen zur Messung der Persönlichkeit beleuchten. Bisher konzentrierte sich die Forschung in diesem Bezug nur auf eng definierte biografische Teildisziplinen oder nutzte Daten aus dem Internet, vor allem aus sozialen Medien, zur Bestimmung der Persönlichkeit. Die vorliegende Studie geht davon aus, dass biografische Informationen, basierend auf früheren Erkenntnissen aus der Lebenszyklusanalyse, der Soziologie und der Wirtschaftspsychologie, einen validen Ansatz zur Bestimmung der Persönlichkeit darstellen. Die Ergebnisse, die auf einer österreichischen Stichprobe mit über N=240 gültigen Teilnehmern basieren, zeigen signifikante Zusammenhänge für alle Persönlichkeitsmerkmale mit verschiedenen biografischen Variablen. Zudem werden fünf aussagekräftige Modelle - eines je Persönlichkeitsmerkmal - zur Messung der

Persönlichkeit vorgestellt. Die Ergebnisse zeigen, dass die Varianz von Persönlichkeit durch biografische Daten wie folgt erklärt werden kann: $r=0.28$ für Neurotizismus, $r=0.25$ für Offenheit für Erfahrungen, $r=0.22$ für Gewissenhaftigkeit, $r=0.18$ für Verträglichkeit und $r=0.15$ für Extrovertiertheit. Die berichteten Ergebnisse zeigen, dass es ein beträchtliches Potenzial für die Persönlichkeitsbeurteilung durch biografische Informationen gibt. Letztendlich bildet diese Studie eine solide Grundlage für zukünftige Untersuchungen. Sie leistet einen Beitrag zur bestehenden Literatur, indem sie eine neue, vielversprechende und schwer zu beeinflussende Methode zur unauffälligen Messung der Persönlichkeit erforscht und vorschlägt.

1. Introduction and motivation

Personality matters! Why this is the case will be thoroughly elaborated in the following paragraphs, after a short introduction of why we are how we are, and, a proposition to increase the effectiveness in personnel selection processes and a suggestion of theory that personality corresponds to the course of life through self-selection and life transitions (Lüdtke et al., 2011; Specht et al., 2011).

Latest theory vastly suggests that personality is 50% inherited but the other 50% are shaped through environmental influences – opposed to earlier which assumed higher influence of genetics e.g. McCrae et al., 2000. However, dependent on what literature suggest we are largely defined by what we experience in our course of life. These life contexts are very ordinary like family, partnerships, work or life events such as a diagnosis of chronic illness. Nonetheless, environmental influences and genetic pose not only the main effects, but they also interact and covary with each other (Ardelt, 2000; Herzberg & Roth, 2014). This investigation is trying to leverage both categories to obtain insights into personality. On the one hand by looking at environmental influences and their effect on personality. On the other hand, where personality shapes our course of life by affecting important life decisions.

Organizational performance and outcome are largely defined by its employees, especially when covering key positions. In 1984 Hambrick and Mason already discovered the importance of the topic and investigated this field stating that organizational outcomes such as performance and strategic choices are reflections of individuals' values and characteristics (Hambrick & Mason, 1984). For many years personality psychology has profoundly shown that the characterization of personality into traits is a determinant of future affective and behavioural outcomes. Therefore, it allows us to predict the dispositional qualities of individuals, which is indeed very valuable information for organizational practitioners for successful employee development and effectiveness (Hogan, 1991). Since a company is just as good as its employees it is crucial to find ways to effectively evaluate and understand the potential workforce's quality. This issue was already thoroughly investigated by remunerated authors who showed that personality is a significant predictor of future job performance (TETT et al., 1991). Moreover, Barrick and Mount disclosed this relationship from a more granular perspective, showing which personality traits foster job performance in 4 different job positions, as Extroversion was a

considerable positive determinant of sales performance (Murray R. Barrick & Michael K. Mount, 2005). Additionally, the fit into an organization is highly dependent on personality and in the end influence performance (Hollenbeck et al., 2002), all these aspects will be explained more thoroughly at a later stage of the study. Application processes focus vastly on cognitive and motivational aspects. In contrast individual's personality is assessed only in 19% (Piotrowski & Armstrong, 2006), despite the extant knowledge that it is associated with many aspects such as motivation and job performance. This could be reasoned that personality assessment may require too much effort and would emphasize the importance to discover alternative (unobtrusive) measurements and highlights the relevance of this investigation.

The assumption that personality can be measured is proposed by recommended authors like (Lüdtke et al., 2011; Specht et al., 2011) who proposes that personality is formed over the course of life. The authors highlighted that personality traits are formed through vocational behaviour, maturity and life events which have a considerable effect on one's personality, which will be elaborated on in the literature paragraph more thoroughly. In the end, exploring relationships in this domain brings us a step further to understanding biographical relation to personality and compiling more harmonized teams within the organizations itself but also consonant with its vision, values and goals. This may open organizations new ways of assessment and in the future could turn personnel selection more precise and efficient to maintain a positive long-term performance due to more capable human capital and harmonized teams.

2. Relevance for strategic management

Assuming that individuals find themselves in an environment consistent with their interests, personality is the determining factor of the person's interaction and motivation. Therefore, knowledge about personality allows us to reduce uncertainty of future events, as thoroughly demonstrated in the paragraph before. Generally, spoken personality traits are helpful to predict a wide range of emotions and behaviour of individuals, this paragraph describes its usefulness in the professional context. This is also emphasized by extant literature where authors investigated in personnel-selection for long-term success of organizations and highlighted on the one hand personality and on the other hand the alignment from

employer to an employee for their best development. This is also recognized from practice, managers perceive the general cognitive ability and high level of Conscientiousness as the most important attributes applicants should possess (Dunn et al., 1995).

The first paragraph elaborates on finding a good alignment between an organisation and a potential employee, which builds the fundament to foster the most crucial factor – future job performance, subsequently job performance and the personality of CEOs will be specifically treated.

2.1 Fit of organisation and employees as a fundament of job performance

Organizations have to select applicants in a very short period of time and find an appropriate trade-off between quickness and thoroughness. Since, unemployed experts are highly demanded on the job market, being swifter than others is key in the competition of hiring the best human capital. Even though companies are well advised to undergo a thorough assessment to determine applicants' skills, goals and probably most importantly personality should be considered. Since (certain) values of the individual and the alignment with the organization's values are found to be fundamental. That is especially for specific value clusters the case according to previous studies, where a significant positive impact on commitment was highlighted when the organization and employee fit is given (Finegan, 2000). There is rising evidence that the fit between environment and a person influences commitment to the organization; but also has a considerable effect on job performance and satisfaction (Chan, 2005). Moreover, it is important to consider bottom-up perception of company values when developing or adapting them to foster or at least maintain the fit from organisation to employees (Finegan, 2000). Nonetheless, there is some criticism that research focuses too much on the individual level, it is advised to go beyond the group and organizational level since tasks are increasingly accomplished through working groups. However, selection research moves beyond the assessment of which test best predicts job performance, to a more granular and interdisciplinary evaluation, considering timing, method and the field of job performance (Chan, 2005).

The alignment of the potential employee with the organisation's values and goals builds the base for future job performance. Nonetheless, this is to a considerable degree determined by the personality of the individual.

2.2 Personality as a determinant of job performance

The following paragraph highlights the importance of personality in personnel selection. Literature considers personality equally important as cognitive abilities for job performance (Murray R. Barrick & Michael K. Mount, 2005).

A lot of research in the field has been done to predict job performance, to my best knowledge personality traits are the best proxy to determine it, besides cognitive abilities. Where high levels of Conscientiousness and Emotional Stability seemed to be the most promising factors of work-related achievement (Barrick & Mount, 1991; Dunn et al., 1995; Salgado, 1997). Whereas the mentioned combination of traits is vital for all sorts of occupations and therefore job performance, the remaining traits - Extroversion, Agreeableness and Openness to Experience - cannot be generally classified in high or low performance indicators; the optimal level depends on job requirements (Barrick & Mount, 1991; Salgado, 1997). More specifically, Extroversion is a determining factor of future performance in sales or management jobs, whereas Agreeableness matters most when nurturing or helping others, for example, a nurse. In conclusion, literature proposes that personality is even more important in personnel selection than general mental abilities (Murray R. Barrick & Michael K. Mount, 2005). In 1991 Tett, Jackson and Rothstein performed a Meta-analysis where nearly 100 independent samples were investigated to assess the validity of personality as a proxy to predict job performance. The authors suggested that job performance can be predicted, and reported a mean validity for the Five Factor Model (FFM) ranging from Extroversion 0.16 to Agreeableness 0.33 (TETT et al., 1991). Nonetheless, these results could appear rather low, one must not forget, that job performance relies on an immense number of factors, beginning with the work environment to the private situation individuals find themselves in, which have a considerable impact on job performance as previously described.

There is a common tenet in personality research that the application of FFM categories to predict job performance is widely favoured over non-FFM factors (Salgado, 2003). Opposed to that, authors within the field raise concerns about the validity of the application. It is stated that some of the highest reported validities in the literature is overstated through either weak methodological frameworks or considerable corrections. The criticism is that it constitutes no practically justifiable method to base crucial personnel decisions on. Apart from the methodological criticism, a major concern is that faking plays a considerable role in self-reported assessments and the authors proposed that future research should focus on alternatives to self-reported personality assessments (MORGESON et al., 2007). This again underlines the importance to investigate in this field to explore complementary or alternative methods to traditional personality measurement. In the end diverse harvesting of information – in this context unobtrusively assessing biographic data based on the applicant's submitted documents, since it secures a more holistic assessment (Kluemper et al., 2012). One of the biggest advantages is that the measurement of personality based on biographic data can be pursued without active participation, which enables quicker and better results through the non-reactive measurement. Additionally, it is less prone to be biased since the subject cannot anticipate and adapt to the requested outcomes (Kazdin, 1979), which invalidates the concern – at least to a certain degree - of faking in application interviews expressed by Morgeson et al.. In conclusion, the approach represents an alternative to broaden the portfolio of personality assessment in order to strategically recruit and find people most congruent with the organization's needs and a prediction tool for future job performance.

2.3 Personality and its impact on the organisation, especially for leading positions

So far it was thoroughly explained that personality traits influence behavioural and affective outcomes significantly. And so it does influence the effectiveness of leadership for CEOs, which is crucial for companies' success since it influences employee's commitment and subsequent organizational outcomes such as financial performance, flexibility, strategic risk-taking and -change (Benischke et al., 2019; Colbert et al., 2014; Harrison et al., 2019; Herrmann & Nadkarni, 2014; Nadkarni & Herrmann, 2010).

Nadkarni and Hermann stated that CEO's level of Conscientiousness may result in an inverted u-shaped relationship, as the short-term performance may be related negatively but long-term performance positively. The authors concluded that a high level of Conscientiousness leads to inertia and adverse performance, very low levels may create uncertainty and instability for organizations. It was reasoned that Conscientiousness decreases firm performance by hampering strategic flexibility and pointed out that a medium level is assumed to be most promising (Musteen et al., 2009; NADKARNI & HERRMANN, 2010). Even though, studies in this area are limited in number and sample size the results raised considerable attention, which underlines the relevance of the issue in theory but also in practice. Additionally, it puts the finger on a limiting factor, as the availability of CEOs for extensive interviews is rare and even worse so for psychologic analysis (Harrison et al., 2019), which again underpins the demand for alternative methods.

At this stage, I want to shortly introduce a study that on the one hand highlights the strategic relevance of personality and on the other hand shows the application of unobtrusive measurement in this context. In 2019 Harrison et. al applied an unobtrusive measurement to automatically assess the personality of CEOs and subsequently analysed organizational properties. The personality evaluation was based on a sample of CEO speeches and personality scores thereof, to develop and validate a language-based model. The model was trained using a machine-learning algorithm by determining personality traits based on their speech and comparing the results to the individual personality score based on a psychometrically-validated study by Hill et. al. in 2019. The educated model then was applied to a much larger sample of more than 100.000 CEO speeches on earning calls of S&O 1500 companies. Within the same study, the predictive power of using personality traits in combination with firm performance to predict strategic change in the future was tested. Consistent with previous work they found that their unobtrusively measured personality traits of CEO's Agreeableness level negatively and Openness positively correlates with strategic change, the same phenomenon was reported for firm performance (Harrison et al., 2019) this approach is widely supported and applied in newest investigations such as Hill et al., 2019.

3. Literature review

In the following paragraph, the author elaborates on theory originating from different disciplines, to build the fundamental knowledge required to establish an appropriate research design. Moreover, extant literature allows us to define expectations and provides recommendations to avoid potential upcoming pitfalls. It does not only help the author for the mentioned reasons, but it also guides the reader through the rationale of the procedure.

3.1 Five Factor Model

Personality psychologists assume that independently of a situation – at least to a certain degree – individuals display stable behavioural patterns. Hence, their main goal is to infer “*internal properties*” through externalized behaviour to discover a causal relationship. These properties constitute the personality basis, these are discovered from the “*psychoanalytic-, biographical-, behaviourist-, cognitive-, humanistic perspective*” (Vinciarelli & Mohammadi, 2014), based on the assumption that personality traits are most promising to predict aspects in life (Vinciarelli & Mohammadi, 2014).

To describe the personality of a person our language provides thousands of different terms. In this broad variety of terms, overlaps of various traits have been identified by psychologists. For example, persons who are described as being nervous are likely to be held anxious, fearful, jittery and worried too. Psychologists recognized that these traits are related beyond semantic similarity, there is a clear distinction between being often scared and often sad, but these traits are interconnected since persons who are often scared are also often sad. To create a parsimonious construct, psychologists summarized trait information into groups that are more or less mutually exclusive from each other. In the end, an individual’s personality can be determined in a framework of five personality traits, which have emerged as the dominant taxonomy in the field. It is analogue to specifying a geographic position in latitude, longitude and altitude dimension and is named the Five Factor Model (FFM). To conclude with the introductory example sad and scared, they define a high score of “*Neuroticism*” dimension, which is named after neurosis which was first discovered and diagnosed in psychiatric patients when one score low in this dimension the person is held to be emotionally stable and calm. The second factor in the construct is “*Extroversion*”, in this dimension, one is described as being outgoing, cheerful and warm.

Another dimension is “*Openness to Experience*”, a high level of this trait is associated with being curious and imaginative in contrast to being closed, rigid and catering to traditional tendencies. The fourth dimension in the construct “*Agreeableness*” accommodates traits like honesty and generosity. The fifth and last dimension is “*Conscientiousness*”, people scoring high are characterized as very disciplined, focused and hardworking in contrast to people with low scores who are described as being unambitious and weak-willed (McCrae & Costa Jr, 2008).

In conclusion, the FFM is often used to describe relationships but does not imply causality, nonetheless, the correlative method is mostly used in combination with other investigations. Albeit with generally weaker explanatory value. However, some studies tried to extend the method which led to a more complex approach and concurrently was not as stable as the original version, hence it is mostly used as a base and - if necessary - complemented with additional variables. In the end, the FFM has a considerable position in research and prevailed best against other used methods (Herzberg & Roth, 2014; McCrae & Costa Jr, 2008; Vinciarelli & Mohammadi, 2014). Since its publication it was used by countless renowned authors, to my best knowledge it is the most famous and most used tool in assessing personality traits, and it constitutes a focal pillar in this investigation.

3.2 Classification of unobtrusive measurement

This paragraph begins with the general disadvantages of unobtrusive measurement and proceeds by elaborating why some of them are mitigated in this investigation and concludes with the advantages of the method.

An often mentioned downside of unobtrusive measurements is that it implies a potential threat of misinterpretation of certain behaviour, while unobtrusively gathering data the researcher can only observe an individual’s behaviour and draw conclusions from it, without intervening or interviewing the person to shed light on the underlying intention of the behaviour (Babin & Zikmund, 2016). Another associated threat to the validity of unobtrusive measures is that individuals behave as they *want* to be perceived and not as a reflection of their character. Additionally, social desirability factors or other biases may also be a potential danger of unobtrusive measurement (Hill et al., 2014). While the first

threat cannot be mitigated, the second is just a problem in the personality trait domain of the investigation but not in the domain of biographic data, as biographic data can hardly be influenced by individuals to suggest a certain outcome to influence their personality assessment score into a favourable direction, hence this investigation has the potential to elevate validity levels in personality assessment. Additionally, further improvements may be the mitigation of situational influence present in ordinary personality tests - which has a substantial impact on the outcome in ordinary personality tests - is not present (Murray R. Barrick & Michael K. Mount, 2005). Although this poses an advantage, it concurrently alludes to the limitation of predicting future behaviour, since the situation a person finds itself in is the vast determining factor of behaviour before personality.

Connelly and Ones inferred in a study in 2010 that personality evaluations applied through observation were strong predictors of behaviour respectively life outcomes. The authors inferred that prediction of job- or academic achievement through personality observation rendered substantially higher validity than self-evaluations. It was concluded that personality theory can enormously benefit from additional measurements not self-reported but instead pursued by others (Connelly & Ones, 2010).

3.3 Unobtrusive measurement to assess personality traits

The following paragraph is intended to introduce different methods of unobtrusive measurement, on the one hand, to demonstrate the usability of unobtrusive measurement and on the other hand to discover potential approaches and possible pitfalls thereof.

One method to measure personality traits unobtrusively is widely known but not recognized as such, namely Graphology science. Hand-written texts are analysed to infer particular personality traits from the originator of the artefact. Particular traits have certain neurological brain patterns and lead to a neuromuscular movement which includes valuable information for graphologists for example the pressure with which the text was written, the letter size, patterns or strokes within the text. The mentioned movement occurs unintentionally while writing and therefore can be used to derive information about the writer's neurological brain patterns and hence personality. As experts within the area are very costly and vary in capabilities some researchers automatized the process with scanned

images of handwritten samples (Rahiman et al., 2013). Prasad et. al for example had over 100 handwritten samples and a psychological assessment of the respective owner. The authors used over 60 samples to train their system with the hand-written and psychological test scores. The rest of the sample was then used to test the accuracy of the system. The system was then able to predict personality traits derived from hand-written samples with an accuracy of over 90% (Prasad et al., 2010).

Extending the science of unobtrusive measurement with a somehow related but more timeliness methodology Kluemper and Rosen investigated new employment selection methods by using personal information provided on social network websites. Well known of the fact that personality has a significant effect on working performance - as mentioned in the introduction. Hereby, the findings of Barrick in 2000 or Campion in 1997 found that an interviewer can determine an applicant's personality very accurately – probably as close as an acquaintance of the applicant - in a short period. Based on these findings the authors intended to find an unobtrusive measure which allows an applicant selection based on personality, without interaction. The study concluded that judges were able to accurately distinguish individuals performing high or low in the five personality dimensions, by solely looking at the information provided on social network websites, for example, individual's friends, comments, tags and posted photos. Even though the procedure of assessing an individual's personality based on social network websites within 5 to 10 minutes is very effective, the authors raised legal concerns and also emphasized that further research on the topic is needed, but meanwhile, it can be used as an additional source of information (Kluemper et al., 2012; Kluemper & Rosen, 2009).

The use of Automatic Personality Recognition (APR) is a rising field, through the continuous transformation to a more digital world millions of binary artefacts are produced daily and can – if capable – be used to analyse specific patterns from a macro and a micro perspective. Staying with the ladder, one can infer a wide range about the originator of the data, which of course depends on the scope of data available. The exploitation and systematic review of (big) data are one of the biggest trends nowadays and its importance will further increase. It constitutes the fundament for applying artificial intelligence in various industries, elevating outward performance shifting to a more customer-centric orientation, inwards – e.g. in process optimization - and research by leveraging it to get access to fields, which have

not been able to study yet, due to several constraints as limited resources for example (Zhuang et al., 2017). Therefore, research using APR is already relatively large substituting to a certain extent preceding research methods like analysing handwriting styles or reading behaviour, although the field is still rather new. APR is one of three main disciplines which engages in personality computing. While APR derives the underlying personality of an individual from behavioural evidence, the second discipline Automatic Personality Perception (APP) investigates and forecasts the judgement of individuals about others, namely the assumed personality individuals attribute to other individuals based on their observable behaviour. And lastly, for the sake of completeness, Automatic Personality Synthesis (APS) generates artificial personalities with body similar agents addressing a widely known phenomenon that humans attribute personality to anything having similar attributes as eyes and mouth (Vinciarelli & Mohammadi, 2014), e.g., cars.

Vinciarelli and Mohammadi summarized the portfolio of technology-supported personality detection respectively APR through *distal cues* by nonverbal behaviour, texts, social media and information collected through online games, wearable devices or mobile phones. According to language psychology, the selection of words allows us to infer psychological states such as personality traits, power status, emotions and relational attitudes. In conclusion, personality traits can be derived from written scripts by using sociolinguistic techniques in automatized mechanisms to analyse wording in texts (Vinciarelli & Mohammadi, 2014).

Batrinca and Mana were able to assess personality traits based on short self-presentations ranging from 30 to 120 seconds, they argued that personality is the main determinant of how individuals represent themselves in employment interviews or self-presentations in order to shape the other's first impression. The study classified the measured traits in two blocks (high/low) along the median in the respective class. With a significance level lower than 0.01 they recognized traits such as Neuroticism, Extroversion, and Consciousness with an accuracy level equal to or greater than 70%. The authors concluded that Neuroticism and Consciousness are easier to elicit, where the first can be easily measured by expressed emotions such as nervousity, the latter by engagement in tasks, as for example intrinsic motivation. Less accurate measures were found for Agreeableness and Extroversion, as they were held to be more prone

to situational interaction and different activation, and hence, distorted externalized behaviour (Batrincea et al., 2011).

To sum up this paragraph, I want to conclude by elaborating on a meta-analysis done in 2018, which summarized previous literature on personality prediction based on digital artefacts provided on social media. It was concluded that the FFM traits were predicted with correlation ranges starting from Agreeableness $r=0.29$ to Extroversion $r=0.40$. Additionally, the authors recommended that accuracy is significantly improved when demographics and other digital artefacts are used (Azucar et al., 2018). This again emphasizes the urgency of additional factors delivering explanatory power for personality assessment and underlines, therefore, the importance of this investigation to find complementary ways to infer personality.

3.4 Biographic data and their relation to personality

This paragraph aims to explain the linkage between biographic data of a person to their personality. In order to describe it in a comprehensible manner, the article elaborates shortly into the decision-making process, continues with personality as a determinant of behaviour and finally why this has an influence on important life outcomes, which literature calls “self-selection” based on personality (Lüdtke et al., 2011; Specht et al., 2011) and also shortly elaborates on “*formative events*” (Löckenhoff et al., 2009).

3.4.1 Decision-making process

The way life goes is to a certain degree dependent on what opportunities, options, and resources an individual decides to take and which not. The width of choices is further growing with the ongoing economic prosperity, and so is the intensity of decision-making.

Extensive research has been done so far on various topics ranging from financial- to psychology research. The process of decision-making is very complex and will not be exhaustively explained here but shortly touched upon for the sake of understanding. The process of how a decision is made is influenced by the decision itself, while individuals tend to decide more rationally in a business context (e.g., in which company to invest) they make a more emotional choice in a sentimental setting (e.g. decision to marry someone) or to put in the naming of Kahneman and Tversky “*System I*” for emotional

and more ad-hoc processed decisions. In contrast, “*System 2*” is for more rationally processed information (Kahneman & Tversky, 1979; Savioni et al., 2022). Nevertheless, decision-making is to a large degree characterized by the individual and hence strongly dependent on personality. Hence, certain decision-making styles were found to be strongly related to personality. As for example Extroversion and Openness to Experience were positively related to intuitive and rational decision-making styles. Individuals who scored low in Agreeableness were more spontaneous. In decision science, personality plays a key role in assessing decision-making styles (Bayram & Aydemir, 2017). In an investment context, certain traits are significantly correlated with well-known biases, such as Conscientiousness correlates with risk aversion and Openness to Experience with cognitive bias (Nga & Ken Yien, 2013).

3.4.2 Personality traits as a determinant of behaviour

Various types of behaviour are used to determine an individual’s underlying psychological construct. Every source of information, which describes an individual’s behaviour poses a potential source to further evaluate and assess the individual’s character. These sources range from a person’s investment decision, over war entry or avoidance decisions of presidents or if a person has children or not (Dahl et al., 2012; Hill et al., 2014). As early as 1915 Webb stated not only the cognitive ability in academic performances matter but also the “character” is as important to academic success as intelligence. The topic was thoroughly investigated and overall studies reported a correlation of 0.19 - 0.27 between Conscientiousness and GPA (Vedel, 2014). Many other scientists are driven by the same motivation, using the same approach in the reverse direction. Instead of drawing information about the personality from behaviour, the ultimate goal is to predict future behaviour from personality, as important life outcomes, for example, career success or (mental) health (Spengler et al., 2013). Another examination in this field showed that Extroversion is positively related to promotions, and salary level, whereas Neuroticism is negatively correlated with career satisfaction (Seibert & Kraimer, 2001).

Motivated by lifecycle psychology and sociology of family; stating that, especially man’s transition to fatherhood has a significant impact on man’s values – which is assumed to affect a firm’s wage policies, Dahl et al investigated the subsequent effects of the transition to fathering proposing that the subsequent change in values affects wage policies. They found that CEOs fathering a child has a negative impact

on the led company's wages, but less so if the child is female. That is assumed to be so, as an earlier study of Warner in 1991 found that values are transmitted from parent to children and vice versa. Hence, men parenting a daughter acquire more feminine values – for example, striving for more equality - compared to men parenting a son. Especially, for men becoming a father changes their role in society, it is like a catalyst for personal growth and changes (Dahl et al., 2012; Warner, 1991). As thoroughly demonstrated throughout the literature review a considerable number of distinguished researchers found significant relationships between personality traits and biographic data, notably in academic, career and other related topics.

3.4.3 How personality traits are related and influence important life decisions

Various well-known researchers dealt with the topic so far and disclosed various parameters, where personality was responsible for future behaviour due to self-selection and additionally was formed through the experience made the authors called it “*socialization effects*”. Based on a longitudinal German sample (Specht et al., 2011) found that all FFM traits rise until 40 to 60 and then decrease again, except Conscientiousness which constantly rises through the course of life. Moreover, and most importantly, the authors suggested that personality predicted important life events, as certain traits determine the outcome of important life decisions it has a considerable influence on life trajectory, called self-selection. But conversely, these experienced events have again an influence on personality and in conclusion, the authors suggested that personality does not solely change through intrinsic factors but also through external influences what they called “*socialization effects*” (Specht et al., 2011). These findings raised a lot of attention than earlier work that stated that personality is held to be very stable and, hence, difficult to change (Roberts & Jackson, 2008). Also, other investigations showed that personality changes with age and more so in younger and older ages, but with marginal differences which will not be further elaborated on here. However, other authors also concluded that important life decisions and events, especially extreme adverse life events, such as sudden death or the discloser of a chronic illness, considerably increase the level of Neuroticism and decrease Agreeableness and Openness (Löckenhoff et al., 2009). Finally, it is reasoned that the life path substantially forms personality. The results showed that individuals on a more job-oriented path had lower levels of

Agreeableness but a higher level of Conscientiousness compared to their academic peers at university. In line with extant and previously described literature, the authors disclosed associations from personality to single or aggregated events and concluded that personality is formed through the course of life and positive and negative experiences (Lüdtke et al., 2011).

The originally purely psychological discipline was more and more recognized by economists trying to find potential means to explain the economical relevant phenomenon (Caliendo et al., 2014). This section will be further extended by showing relationships to important life decisions and -outcomes in different domains relevant to this study. Such as employment, vocational behaviour, family, education, interests and time abroad.

3.4.3.1 Personality and unemployment

Job search behaviour varies considerably from person to person and so does unemployment duration from individual to individual. It is determined by various parameters, according to the literature it seems that the most important are; attitude towards unemployment, work performance or reliability. Which are certainly based and defined by the underlying personality of the individual. Whereas the uncertainty which comes with unemployment is more uncomfortable for individuals scoring high in Neuroticism and probably also for more conscientious persons (Egan et al., 2017; Kanfer et al., 2001; Uysal & Pohlmeier, 2011).

The intensity one is looking for a job is mainly determined by socioeconomic factors such as financial situation, for example, life phase, but also and very important its personality. The intensity with which an unemployed person is searching for a new job varies considerably due to the intrinsic motivation to do so (Viinikainen & Kokko, 2012). This is also in line with the finding from a meta-analytic approach of personality-motivational analysis by Kanfer Wanberg and Kantrowitz. It was eluded on the prevalent relationship between personality, motives, social, expectancies and biographical variables which were all found to be a determinant of individual differences in job search behaviour and also impacts employment outcomes (Kanfer et al., 2001). Whereas a neurotic person is assumed to avoid unemployment considering that neurotic persons avoid uncertainty, in contrast, a less neurotic person hesitates less to quit a job when the current occupation seems not appropriate. Moreover, people scoring

high in openness are more frequently unemployed than others (Viinikainen & Kokko, 2012). Uysal and Pohlmeier performed an empirical study with a German cohort, where a significant relationship between Conscientiousness (positive) and Neuroticism (negative) and the probability to find a job arose. Whereas the relationship of the mentioned traits to the employment duration was found to be diametral (Uysal & Pohlmeier, 2011). The results are in line with a similar performed study in the United Kingdom, where Conscientiousness in adolescents was used as a proxy to predict the rate of unemployment as an adult, besides other control factors such as intelligence, educational attainment, gender and other socioeconomic factors (Egan et al., 2017).

3.4.3.2 Personality and vocational behaviour

Motivated by Barrick et. al findings on personality and the valuable insights it provides on employment several researchers extended these thoughts. For this thesis one work is specifically relevant, Wille et. al developed predictors in form of personality traits to prospect job change. It was done by a longitudinal study over 15 years. A significant predictor of higher job instability was found when individuals scored low in Agreeableness. It was reasoned that, firstly, changing the organization can be perceived as letting down the employer and rejecting teammates. Whereas persons who score low on Agreeableness are less sensitive to interpersonal feelings and face fewer difficulties with the loss effects to end the relationship with organizations and colleagues. Secondly, an alternative explanation can be that people with higher scores in Agreeableness are tied more closely to the organization as they are highly valued due to their higher team performance. The last trait significantly related to job instability was found to be Openness to Experience. The authors discussed that external factors such as the involuntary change of occupation can distort the results and also stated that some traits are probably too broadly defined to predict job change. Emotional stability includes angeriness, impulsiveness and hostility which were found to weaken job stability, whereas within the same trait self-consciousness and anxiety fostered job stability. Similar counteracting phenomena were also observed in the Conscientiousness trait (Wille et al., 2010). Hence it will be crucial to take this as a learning for this investigation, to additionally shed light on the issue more granular, which means that additionally to the relationship between personality trait domains and biographic data also the individual facets within the domain should be analysed. At this point the validity

of the measure should also be discussed, since not only the authors have expressed some doubts, it also stands out from other sources that there are methods which are probably better suited to measure or predict the job changes of individuals. Organizational turnover and career research propose two distinct motives for increased job turnover or a propensity for a job change. The first motive for job change is career advancement and the second is to leave disliked work environment. Whereas, the first is positively associated with persistence and intrinsic growth ambitions and the latter negatively with impulsivity. These job changing motives were found to predict the turnover rate better than other demographic or career variables (Lake et al., 2018). At this point, it needs to be discussed whether job turnover rate is a valid predictor of personality traits. Even though, the described motives to switch to another employer – impulsiveness and persistency - are in the wider sense based on personality. It was also stated by the authors measuring personality domains and job turnover rate, that the effects of some facets were held to compensate the other facet within the same domain of a personality, which goes into the same direction. It could be that job change behaviour is an agglomeration of certain facet traits out of different personality domains. Additionally, characteristics as the industry, industry period, education etc. are crucial determinants and could overshadow the underlying relation between job turnover and personality. This is also confirmed by another research where industry-related influence was assumed to distort the relationship of personality and organization switching. Although there was found just a modest relation between organization switching and personality – strongest for achievement orientation out of domain Conscientiousness - the results were held to be a very valuable indicator for utility calculation of employees for the respective organizations. An interesting point was raised that cross-cultural differences could invert the results compared to the US based study. For example, in a more collectivist culture, the team performance and -loyalty is preferred over the own, which could lead to people in these cultures behaving in exactly the opposite way. More extroverted people are more social and maintain larger work-related networks leading to a higher job change rate (Vinson et al., 2007).

As an empirical phenomenon personality's impact on job change behaviour has been observed repeatedly but it was often reported to be limited or discovered just in certain facets. Generally, other proxies were found to be more valuable in predicting vocational behaviour. In conclusion, the

phenomenon is held to be a little weak and more so in a smaller sample. Although, from my point of view it could contribute to rounding off the whole model to measure personality based on biographic data, albeit with a higher expectation of spotting correlation with certain personality facets.

3.4.3.3 Implications of personality and leadership in forms of self-employment management and start-up

As elaborated beforehand personality has a considerable effect on job performance, specifically Conscientiousness and low levels of Neuroticism (Barrick & Mount, 1991; Dunn et al., 1995; Salgado, 1997). Therefore, it may be related to leadership and will be further investigated in the empirical section. More concisely Zhao and Seibert studied the domain of leadership, they not only showed that managers inherent different personality structures compared to normal level employment, but they also suggested differences in personality structures of self-employed managers (Zhao & Seibert, 2006). This then was further examined by Caliendo et al. in a large study based on a German panel to examine the entry- and exit decisions from self-employment and to what degree it is related to personality. The model presented in the study was able to explain up to 30% based on the observed traits, whereas about 14% were explained through the FFM. The authors stated that different traits lead to entry or exit decisions. Where the first is mainly determined by Openness to Experience, Extroversion and low levels of Neuroticism, when the study did not control for further personal characteristics, such as the tolerance of risk. The FFM was found to be weakly related to exit self-employment, except for individuals scoring high in Agreeableness, which increases the probability to exit self-employment, the authors deduce that a low level of Agreeableness leads to a higher entrepreneurial survival rate (Caliendo et al., 2014).

Numerous studies tried to predict business success based on personality traits, this motivated Frank et al. to compare conceptually related studies in the field to test the influence of personality traits in all start up stages. The evaluation included the very first stage the intention to establish a start-up, then its realisation and finally - which would constitute the most valuable results for various stakeholders as for example governments, business angels and the founder itself if it – the future performance in terms of persistence and growth. The authors found that start-up intentions can be predicted up to 20% by personality traits and suggested that these results should be leveraged in schools and universities in order

to promote start-up establishments by building on specific personality traits. The authors were not able to determine business success based on personality (Frank et al., 2007).

To sum up the relation between personality and entrepreneurship, start-up, self-employed or management – which will not be further distinguished at this place - the literature has a common tenet, which assumes that Openness to Experience fosters entrepreneurship since these individuals are held to be more open to creativity and excitement seeking. Being an entrepreneur provides more diverse topics and excitement than the routine tasks of production for example (Koe Hwee Nga & Shamuganathan, 2010; Nordvik & Brovold, 1998). Extroversion is needed to be a charismatic leader and to transmit the vision, mission and values of a company to the employees and another stakeholder (Crant, 1996). Due to the uncertainty covering these positions leaders generally are held to be emotionally stable to handle the complexity and diversity it brings adequately (Koe Hwee Nga & Shamuganathan, 2010; Zhao & Seibert, 2006). When one comes beyond the boundaries of personality traits, literature is relatively ambiguous about whether the inclusion of additional variables adds value or not. Whereas, Zhao and Seibert state that the FFM is a parsimonious and concise construct, others reason that additional parameters should be considered to assess entrepreneurship and management, to increase validity and reliability, it is proposed to include locus of control, tolerance for risk and aiming for achievement (Caliendo et al., 2014; Murray R. Barrick & Michael K. Mount, 2005; Zhao & Seibert, 2006).

3.4.3.4 Volunteering driven by self-selection

Volunteering has been investigated in various fields so far. As people engaging in voluntary services were found to show common characteristics in terms of values and attitudes. It was suggested that socioeconomic factors played a considerable role in participating in volunteering engagements. Also, personality in form of Extroversion is suggested to be a valid predictor of volunteering, mediated by religion, income, and education (Bekkers, 2005). This is in line with a later study performed on over a dataset of 600 volunteers, where Extroversion was found to be significantly responsible in explaining volunteering, Neuroticism contributed marginal explanatory power and just a significance of 90%. (Omoto et al., 2010). Why Extroversion is associated with volunteering was investigated in 2007, the authors reasoned that there is a direct relationship between Extroversion to friendship intensity and

participation in clubs or church organizations, so in conclusion a more outgoing, social contact seeking and active personality fosters participation in volunteering and chances to get asked pursuing a voluntary service increases with a larger social network (Okun et al., 2007).

3.4.3.5 Military service and its effect on Agreeableness

To my best knowledge the only study pursued to identify the effects of military service on personality - without war experience – was done by Jackson, Thoemmes and Jonkmann. Who found through a longitudinal study that military experience is an important phase in life and is associated with significant life outcomes. Besides the quite intuitive finding that personality traits were the main determinant of whether individuals chose military- or civilian service, it was found that military service significantly changed their personality compared to a control group with similar characteristics. These changes are held to be long-lasting as it persisted even five years later, and after experiencing other impactful events such as entering into the labour market or college (Jackson et al., 2012). The information on whether an individual – mostly men – decided to do military or public service can be easily retrieved from a curriculum vitae (CV) and hence it makes sense to also include it in this investigation.

3.4.3.6 Personality and its relation to learn or work abroad

It is generally agreed today that being abroad either for educational or work purposes has a considerable effect on one's personality. The general knowledge is that it increases independence and confidence. Being abroad starts even earlier, namely with the decision to do so, and here probably everyone knows a person who would love to be abroad for a specific time and others who think diametral to that. In this paragraph, the topic will be eluded from a theoretical perspective to frame profound expectations about the effect and consequences of being abroad.

Various social scientists dealt with that issue and tried to determine psychological causes (the decision to do so) and consequences (the influence of being abroad on personality) (Winch & Carment, 1988). Extending previous findings in the domain Furnham performed a study with a sample of more than 13.000 British individuals. Where personality traits were examined and split into two groups distinct by a given work experience abroad or not. The study showed that personality played a considerable role in whether individuals chose jobs and companies with abroad opportunities (Furnham, 2017). Which is

conform with extant theory (Canache et al., 2013; Ward et al., 2020). It was derived that the group abroad tended to be less neurotic and showed higher levels of openness and Conscientiousness compared to the control group. Moreover, the study investigated, if the duration spent abroad moderates the suggested traits. The authors found some significant associations but rather weak ones. The highest correlation is found between extroverts and introverts (out of the Myers-Briggs type indicator), where introverts spent less time abroad (Furnham, 2017).

A similar topic to working abroad is educational training abroad and so are the results. Students pursued personality tests before and after their semester abroad. Comparable to the associated traits for individuals who worked abroad, Openness was found to be positively and Neuroticism negatively influenced, however, in this context Agreeableness instead of Extroversion was positively influenced by the semester abroad. Additionally, some interesting findings were made in the decision stage of going abroad. Personality is assumed to largely determine the time students choose to spend abroad, mainly influenced by Extroversion and Conscientiousness for shorter time abroad and Extroversion and Openness predicted longer stays abroad (Zimmermann & Neyer, 2013).

3.4.3.7 Education

Educational performance seems to base on related criteria as reported for job performance, then also in this regard it is not just the ability or cognitive skills that determine job performance, it is considerably determined by personality. Especially, the traits Conscientiousness, Neuroticism and Extroversion were found to be significantly related to academic achievements (Busato et al., 1998; Chamorro-Premuzic & Furnham, 2003; Furnham, 1992). However, theory is ambiguous on whether the effects are positive or negative. Eysenck states that Neuroticism and Extroversion are generally found to be related to ability and so for academic performance (Eysenck, 1967). In contrast to others authors who found a negative correlation through knowledge tests and reasoned that extroverted people spend more time socializing, whereas, in contrast, people scoring low in this trait spend more time on their studies (Rolfhus & Ackerman, 1999). Another reason for the ambiguous influence of Extroversion to academic achievement can be the moderating influence of age. A study found that Extroversion has a positive influence in elementary school, but changes to a negative association in higher educational levels (Dunsmore, 2005).

However, there are numerous studies on academic achievement and -performance, but to my best knowledge, there is no direct evidence that one can predict the highest academic level one will achieve through personality. The mentioned studies are showing ways to assess the ability to achieve these levels, but to my best knowledge, none elaborated on personality as a predictor of how far individuals want to get in their academic career. It is not directly investigated at this stage if there is set of personality leading to a higher educational level compared to other. Even though it was not directly stated that personality leads to a certain education-level, the information of the highest educational level will be included and tested, if it adds variance in predicting personality.

3.4.3.8 Personality and Interests

Generally, hobbies or leisure activities are pursued for joy and creativity, for others it is not just spending their spare time; they feel passion doing sports or other activities. But only a few questioning the background of following one's interests and how it is connected to personality. In contrast to organizations which already discovered their value. It is a core element in some professional HR selection processes, since hobbies and leisure activities provided on social media can be used to derive personality of potential candidates and to recruit talents who fit best into the organization (Hegde, 2016). Even though, there is a declining trend towards listing hobbies in CVs, it is still often asked in application interviews to understand the background and private environment of the applicant, and so it will be taken into consideration for this study.

Common knowledge suggests that movement behaviour influences a character, also literature provides evidence in the same direction. A study in 1975 with 230 students showed that participants with a more intense movement behaviour were less neurotic and more extroverted than their peers who were less engaged in physical activities, this effect was positively moderated (increased considerably) for competitive students. Additionally, for men, a positive relation to social skills was found (Hendry, 1975).

This is in line with Eysenck's view, since he stated that sport is an indicator of personality but can vary considerably not only between different types of sport but within a sport too. He exemplified in describing that footballer are rather extroverted, whereas a football goalkeeper is more introverted, the

same phenomenon for short- and long-distance runners. In the end, it emphasize again that hobbies should be defined tightly to increase validity for personality (Eysenck et al., 1982).

The proposed findings were mainly tailored to the hobby of interest; therefore, it is difficult to determine an appropriate methodology to leverage information about hobbies to determine personality. one is very much inclined to approach the problem from the categorization of competitive, combative and creative leisure. Where the first one is connected with Extroversion, and the second with psychoticism (Furnham, 2004). Moreover, to subgroup leisure activities most authors categorized similar types of sports into groups as for example outdoor activities (hiking, camping, etc.), competitive sports (tennis, soccer, football, etc.), intellectual activities (reading, writing, etc.) recreational or fitness activities (Eysenck et al., 1982; Kuo & Tang, 2014).

To my best knowledge extant theory experienced rather difficulties in finding significant relationships between personality traits and leisure activities. Mostly, Neuroticism and Extroversion were investigated, where the latter was related to highly stimulating hobbies. Some studies suggested that openness is positively related to team activities and fitness. Although, it was often stated that thorough research is inhibited in this domain. (Furnham, 1981, 2004; Ibrahim, 1969; Kuo & Tang, 2014; Wolfradt & Pretz, 2001). However, due to suggestions from literature, a quantitative consideration of interests and hobbies will be done in this study. Moreover, to increase the response rate and prevent displaying too much information grouping into similar categories will be done.

3.4.3.9 Family status

Although family status is not mandatory in a CV it is often disclosed voluntarily by applicants. Family status constitutes a decision which cannot be easily reverted, and due to the already elaborated selection and formative effects on the individual, it contains valuable information. The decision to get a child or to wed constitute such a decision. Extant theory suggests that a certain combination of personality traits leads to a higher number of children independent of gender and marital status. It was found that individuals scoring high in Openness to Experience and Extroversion but low in Neuroticism were found to have more children, a positive relationship between number of children and Agreeableness and

negative with Conscientiousness was found for women only (Dijkstra & Barelds, 2009; Jokela et al., 2011; Roberts & Bogg, 2004).

Another important life decision is marriage, the odds of doing so increases with higher Extroversion, especially for men. In contrast, individuals with higher Openness to Experience were held to be more likely to postpone their first marriage and less likely to marry at all. Also, Agreeableness let women enter marriage a bit earlier than peers with a lower score (Jokela et al., 2011).

However, one must not forget that even though personality is held to be relatively stable -especially from 30 to 60 years - there are indeed some other factors influencing it. Roberts et al. suggest that besides age also factors like ethnicity, gender, the environment of people and education have a moderating effect on personality scores, as males' personality seems to be more stable (Ardelt, 2000; Roberts et al., 2006). However, the further investigation will control for all these variables except ethnicity and environment.

4. Research gap

To my best knowledge, the determination of personality traits based on biographic information has not been done yet. A lot of studies investigated in linkages of variables to an underlying personality trait focusing on narrowly defined disciplines such as vocational behaviour, volunteering, education or abroad experience. Nonetheless, theory has not applied an interdisciplinary approach leveraging all this segregated theoretical information to summarize and establish a model predicting personality traits based on biographic data.

So far the focus in literature was on describing relationships of certain events and their causal reason, namely self-selection and formative effects, but no study leveraged this extant knowledge to measure personality. As elaborated in the literature paragraph, different life courses and outcomes (self-selection) are substantially dependent on personality, and, the experienced life events in return influence and form personality. Therefore, this work hypothesises that certain events shape us as individuals the way we are (passive perspective) which can be observed, or that personality is externalized through specific behaviour (active perspective). This is a very simplified depiction and has not been classified likewise

from extant literature as far as I know, however, it should help to better understand why biographic information is held to be a valid predictor of personality.

In summary, the intention of this work is, therefore, to leverage extant theory in different disciplines to assess if this segregated information can be summarized, to eventually derive personality. In the end, it is explored if it is feasible to measure personality by solely looking at biographic data of an individual. Finally, this study aims to contribute to the extant literature by exploring and proposing a new personality assessment method. Which can complement traditional measurements and adds additional validity due to the mentioned advantages of unobtrusive measurement – as bias results towards an aspired favourable outcome for example.

5. Hypotheses and expectations

So far, the article introduced various investigations about biographic information and significant correlation with different personality traits. Even though, personality is held to be relatively stable it evolves over a lifetime. This is assumed to be so mainly due to experience of formative events, which are considerably influenced by important life decisions, which again depend on personality. Hence, this work hypothesizes and tries to explore, whether the mentioned course of life respectively biographic data can be used to assess personality.

As elaborated in the literature paragraph job instability and frequent unemployment is expected to be related to low levels of Agreeableness – reasoned through weaker relationship with employer and colleagues (Viinikainen & Kokko, 2012; Wille et al., 2010). Additionally, high levels of Extroversion – larger professional networks leads to a higher chance of receiving job offerings (Vinson et al., 2007) and people with elevated levels of Openness to Experience are more inclined to change employer respectively job through intelligent curiosity (Vinson et al., 2007). Through rising evidence, the longest unemployment duration per individual is associated with Neuroticism and Conscientiousness, reasoned by many factors as cautiousness and mental strain of unemployment and intrinsic motivation, drives one back into employment, also a distinct relation could be reasoned for the number of employers and jobs (Egan et al., 2017; Kanfer et al., 2001; Uysal & Pohlmeier, 2011). Since Conscientiousness and

Emotional Stability is commonly suggested by theory to be related to job performance (Barrick & Mount, 1991; Dunn et al., 1995; Salgado, 1997), it is expected that these traits can be measured by a number of positions and finally and foremost through leadership positions.

Leading positions are associated with certain personality structures, whether one is self-employed, a manager or a founder of a start-up. Literature suggests that these positions are occupied by specific personality structures. The stereotype is assumed to have elevated levels of Extroversion, Openness to Experience and stable characters, which means decreased levels of Neuroticism – the background is thoroughly elaborated in the literature paragraph (Caliendo et al., 2014; Frank et al., 2007; Koe Hwee Nga & Shamuganathan, 2010; Nordvik & Brovold, 1998; Zhao & Seibert, 2006). Even though, these groups show a similar propensity in personality structure, studies showed that personality determines considerably if individuals get self-employment, are founders of start-up or become a manager (Caliendo et al., 2014; Zhao & Seibert, 2006). Therefore, asking specifically for the mentioned experience is expected to contribute explanatory power for certain trait aspects.

Engagement additionally to one's focal occupation relies substantially on Extroversion and also weak evidence for Neuroticism has been suggested from literature (Bekkers, 2005; Omoto et al., 2010). Nevertheless, this study will consider information about volunteering or participation in club services in expectation to find some explanatory power for Extroversion and probably Neuroticism. Although, this and previous formulated expectations are rather based on self-selection through personality, the mentioned experiences have of course – in return - also formative effects on individuals. Whereas, the expectations for military service are considered to be inherent information more through formative events since evidence was found that performing military service has long-lasting negative effects on individuals' Agreeableness levels (Jackson et al., 2012).

Working abroad is in most cases bound to the aspired position or even company, hence individuals consciously decide to go abroad or at least spend a lot of time abroad during work in the end it is the classical self-selected path one wants to go. Therefore, it comes with less surprise that evidence came up showing that traits elevated levels of consciences and Openness to Experience and lower levels of Neuroticism are associated with working abroad (Canache et al., 2013; Furnham, 2017; Ward et al.,

2020). Whereas the traits for learning abroad remain the same, but literature shows more longitudinal data, where selective and formative effects can be investigated more separately with interesting findings (Zimmermann & Neyer, 2013). Nonetheless, abroad experience is expected to be related to Openness to Experience, Conscientiousness and lower levels of Neuroticism.

Educational background is eluded – to my best knowledge – vastly from a performance prediction perspective and less from predicting an individual's aspirational levels of academic achievement, simply since it is less relevant. Although, since there are a lot of other influences such as the financial capability, for example, expectations at this stage are defined based on potential performance certain traits bring with them. There is the common tenet that Conscientiousness is considerably positive related to academic performance; Neuroticism and Extroversion are also found to predict academic performance (Busato et al., 1998; Chamorro-Premuzic & Furnham, 2003; Eysenck, 1967; Furnham, 1992), but theory is ambiguous which sense it is influenced. Explanations for this phenomenon were suggested in other studies, where age was reasoned as a moderating factor ending up in a reverse u-shaped relation between school performance and Extroversion (Dunsmore, 2005). Others reasoned that the contradiction between positive influence on knowledge tests (Eysenck, 1967) but negative on school performance is negatively influenced by elevated levels of Extroversion, as it leads to spending more time on social activities than studies (Dunsmore, 2005).

Theory in leisure activities is limited and rather inhibited, nonetheless, the externalized behaviour indicates interests and preferences of individuals and so could provide valuable insights on personality. Generally, movement intensity was associated positively with Extroversion and negatively with Neuroticism (Hendry, 1975). Apart from that theory rather suggested categorizing it, but also indicated that it can vary considerably within a sport dependent on the position or the way it is pursued (Eysenck et al., 1982; Howard, 1976). Since literature provides methodologies and results tailored to the investigated hobby and no general suggestion of the effect of hobbies it will be considered more from a quantitative approach, and expected that the number of different hobbies correlates with Extroversion and Openness to Experience since it is distinctly related to the intensity it could be negatively related to Neuroticism.

Although family status is not necessarily disclosed in application processes, it is a life outcome and – decision, which cannot be easily reverted. Timing and intensity are according to theory considerably defined by personality and as already mentioned, the experience has in return a formative effect on personality. Extroversion is suggested to increase the odds of getting married, whereas Openness to Experience leads to enter later into marriage (Jokela et al., 2011). Regarding the number of children and the timing thereof, literature associate the following three traits: Extroversion, Openness to Experience and Neuroticism are associated to the number of children and timing thereof. Whereas for women higher levels of Agreeableness and decreased levels of Conscientiousness were suggested (Dijkstra & Barelds, 2009; Jokela et al., 2011; Roberts & Bogg, 2004). Nevertheless, the effects of gender and age are expected to influence traits (Lehmann et al., 2013) and, hence, they will be controlled for in every investigation.

6. Methodology

The personality will be assessed through a survey in format of a digital questionnaire based on a short version of the NEO-PI-R. Additionally, for the personality assessment relevant biographic information will be gathered from participants. It is intended to keep the questionnaire as short as possible to prevent participant frustration, careless responding or fatigue in order to meet qualitative but also quantitative appropriate results. As these constraints are prevalent in research, several researchers developed leaner methods. These methods were then validated, and reliability measures were taken and compared to the extended version. Two shorter versions of the Big Five Inventory-2 (BFI-2) (Danner et al., 2016; Soto & John, 2017b) meet these requirements and are therefore of certain relevance for this investigation. These versions require less input, the so called “BFI-2-S” only need 30 questions and the shortest version “BFI-2-XS” requires as less as 15 questions. Soto and John found in 2017 that the methods retain most of the full measure’s validity and reliability of the original measurement - 90% for the former and the latter 80% - on the level of Big Five domains. However, the authors highlighted some limitations of the extra-short version for investigations in trait-facets (Soto & John, 2017a).

The sample is drawn vastly from the Austrian population, the questionnaire format is an online survey in German. Since a mere translation of established methods is prone to distort or bias the results, it is

particularly important to note that there has already been researching on a German counterpart. Two German researchers cooperated with the originators to establish and verify translated versions of “BFI-2-S“ and “BFI-2-XS“. It was shown that the translation of the brief version is consistent and its adaptations are convergent with those of the Anglo-American original. Quantitatively speaking the shorter version correlated to more than 90% and the extra short version with 75% with the German full version of the BFI-2, in terms of domain level determination (Rammstedt et al., 2020). This method constitutes an appropriate framework for the personality assessment in this investigation. To increase validity and to keep the option for further traits-facets analysis in this study the 30-item questionnaire of Rammstedt et al. will be used. Answers will be provided through a five factor likert-scale, ranging from;” (5) *Stimme voll und ganz zu*, (4) *stimme eher zu*, (3) *teils teils*, (2) *stimme eher nicht zu*, (1) *stimme überhaupt nicht zu*”(Rammstedt et al., 2020).

After gathering the data, the personality per questionnaire can be categorized into the FFM traits, namely *Extroversion*, *Conscientiousness*, *Agreeableness*, *Neuroticism* and *Openness to Experience* (Soto & John, 2017a, 2017b). If the question was asked in a reversal manner, then the answer will be categorized with “6 – points of answer” if the answer is for example “stimme eher zu” = 4 then it would be taken into account with 2. The answers will be assessed as follows, reversed asked questions are indicated with an “R” (Rammstedt et al., 2020):

“*Extroversion: 1R, 6, 11, 16, 21R, 26R, Agreeableness: 2, 7R, 12, 17R, 22, 27R, Conscientiousness: 3R, 8R, 13, 18, 23, 28R, Neuroticism: 4, 9, 14R, 19R, 24R, 29, Openness to Experience: 5, 10R, 15, 20R, 25, 30R*” (Rammstedt et al., 2020)

The measurement of biographic information will be done in the most effortless way possible. Most answers will be framed in multiple-choice format or yes / no questions where possible. However, whenever there is the chance that not all options can be covered an additional field with open answers is provided. Which biographic information participants are asked to fill out in the questionnaire can be retrieved from the formulated expectations in the hypotheses paragraph, the domains are vocational behaviour, family status, abroad experience, interests in activities and demographic variables.

After collecting all data, the dataset will be cleaned and variables will be calculated, as described above. Afterwards, to get an understanding of the data, it will be investigated through descriptive analysis, in an uni- and bivariate manner. This enables to spot possible outliers, skewness and unexpected relationships between variables. After the pre-analysis and correction of possible incidents, the study will conclude its results by discovering and explaining the relation between personality traits to biographic information. This will be done through Pearson's correlation and regressions, allowing first insights into what degree personality traits can be predicted through the gathered data. Since data is gathered from over 250 participants, normality in data can be assumed according to Markov assumption – thanks to the large number. Therefore F-test and t-values can be interpreted normally, also the coefficients are meaningful and interpretable as the parameters are in a linear relationship, although some variables enter in a non-linear form to correct for skewness.

7. Results

In this paragraph, the gathered data will be first descriptively analysed to understand the data and to assess relationships between the variables. It was done through an uni- and bivariate pre-analysis mainly using histograms, grouped box plots and scatterplots. Afterwards, the data is examined in a numerical manner using Pearson's correlations, variance analysis, t-tests and regressions.

7.1 Pre-Analysis (Univariate)

After correction for incomplete and invalid observations, a data set with N=242 participants remained which amounts to over 15.000 datapoints of gathered data. The average time to complete the survey was seven to eight minutes per participant.

The sample consisted of over 96% Austrians, where 135 participants are males (55%) and 107 females. Most participants are between 25 and 34 years old, this range represents approximately 60% of the sample. Where nearly a third is above that age and 15% thereof are 51 years or older.

Their educational background was assessed by asking participants for their highest training respectively academic degree they possess.

As one can see from the descriptive results even though the sample was randomly collected this sample does not perfectly reflect the population of Austria, as mentioned in the Methodology paragraph it is rather a convenient sample due to resource constraints, which is a commonly used approach in research.

The dependent variables representing the calculated personality traits collected through the BFI 30 item questionnaire were translated and validated into German (Soto & John, 2017a). The values range from 1 lowest to 5 highest level of the respective trait. Extroversion, Openness to Experience, Conscientiousness and Agreeableness means hover around 3.4-3.7 with a standard deviation of approximately 0.5-0.6. Neuroticism in contrast has a mean value of 2.5 but also the widest spread with a standard deviation of over 0.7.

7.2 Pre-Analysis (Bivariate)

Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Extraversion	1.000												
(2) Agreeableness	0.084 (0.190)	1.000											
(3) Conscientiousness	0.151** (0.019)	0.250*** (0.000)	1.000										
(4) Neuroticism	-0.280*** (0.000)	-0.093 (0.147)	-0.148** (0.022)	1.000									
(5) OpennessToExperien.	0.200*** (0.002)	0.088 (0.172)	-0.024 (0.705)	-0.187*** (0.003)	1.000								
(6) employer_nb	0.050 (0.442)	0.007 (0.915)	-0.207*** (0.001)	0.032 (0.622)	0.220*** (0.001)	1.000							
(7) position_nb_logarithm.	0.192*** (0.004)	-0.154** (0.022)	-0.081 (0.232)	-0.143** (0.034)	0.196*** (0.003)	0.458*** (0.000)	1.000						
(8) branchen_nb	0.056 (0.402)	0.042 (0.524)	-0.136** (0.039)	-0.050 (0.447)	0.164** (0.013)	0.735*** (0.000)	0.416*** (0.000)	1.000					
(9) unemployment_cat	-0.134** (0.040)	-0.054 (0.409)	-0.214*** (0.001)	0.086 (0.189)	0.066 (0.310)	0.266*** (0.000)	0.123* (0.068)	0.355*** (0.000)	1.000				
(10) leadership	0.197*** (0.002)	0.093 (0.151)	0.116* (0.071)	-0.049 (0.448)	0.140** (0.030)	0.143** (0.028)	0.121* (0.073)	0.088 (0.184)	-0.080 (0.221)	1.000			
(11) voluntary	0.137** (0.033)	-0.050 (0.439)	-0.025 (0.696)	0.039 (0.546)	0.029 (0.651)	0.214*** (0.001)	0.151** (0.025)	0.190*** (0.004)	0.074 (0.255)	0.013 (0.842)	1.000		
(12) public_service	0.052 (0.428)	-0.004 (0.955)	0.013 (0.838)	0.182*** (0.005)	-0.089 (0.170)	0.026 (0.690)	-0.096 (0.157)	0.016 (0.812)	0.014 (0.827)	-0.065 (0.321)	0.050 (0.438)	1.000	
(13) education	0.152** (0.018)	0.035 (0.591)	-0.027 (0.679)	-0.071 (0.273)	0.255*** (0.000)	0.051 (0.439)	-0.018 (0.785)	0.051 (0.442)	-0.051 (0.435)	-0.053 (0.409)	0.125* (0.051)	0.054 (0.406)	1.000
(14) studies_nb	0.117* (0.069)	-0.023 (0.723)	-0.107* (0.098)	0.046 (0.478)	0.238*** (0.000)	0.130** (0.047)	0.016 (0.810)	0.162** (0.014)	0.011 (0.866)	-0.009 (0.886)	0.131** (0.041)	0.086 (0.186)	0.709*** (0.000)
(15) hobbies_nb	0.183*** (0.004)	0.278*** (0.000)	0.056 (0.382)	-0.201*** (0.002)	0.373*** (0.000)	0.149** (0.022)	0.084 (0.212)	0.166** (0.012)	-0.005 (0.934)	0.103 (0.109)	0.174*** (0.007)	-0.040 (0.536)	0.206*** (0.001)
(16) age_logarithmized	0.008 (0.897)	0.105 (0.104)	0.275*** (0.000)	-0.137** (0.034)	0.018 (0.780)	0.040 (0.537)	0.079 (0.243)	-0.045 (0.495)	-0.114* (0.082)	0.176*** (0.006)	-0.018 (0.781)	-0.218*** (0.001)	-0.301*** (0.000)
(17) gender	-0.102 (0.112)	0.226*** (0.000)	0.094 (0.146)	0.414*** (0.000)	0.012 (0.856)	0.153** (0.019)	-0.125* (0.064)	0.039 (0.556)	0.051 (0.437)	-0.037 (0.562)	0.089 (0.169)	0.171*** (0.008)	0.023 (0.723)

Significance levels in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 1: Pearson's correlation of personality traits and an excerpt of biographic information

Depending on extant literature this investigation is designed to find associations between biographic data and personality traits. To do so data is gathered in five categories employment, experience abroad, interests, education and family status. Due to the large number of observations $N=242$, a normal distribution can be assumed and statistical inferences like exact t-tests and F-tests on the finite sample can be processed without being biased.

7.2.1.1 Vocational behaviour:

Through a Pearson's correlation test significant correlation within the variables above a certainty level of 95% can easily be determined, see correlation Table 1: Pearson's correlation of personality traits and an excerpt of biographic information appended under the section "Figures". The number of different *employers* a person had in a lifetime is significantly positively correlated $r= 0.22$ level with Openness to Experience and negatively $r= -0.20$ with Conscientiousness. This is in line with theory, which suggested that *employer* change is positively associated with Openness to Experience and negatively associated with Conscientiousness (Vinson et al., 2007). However, Wille et al.'s and other authors suggested that the number of different employers should be related to Extroversion – remember larger professional network – for which no evidence is found here (Seibert & Kraimer, 2001; Spengler et al., 2013; Wille et al., 2010).

In contrast, it is assumed that the solidarity among employers was very high, the main reason for an *employer* change is assumed due to an aspired change of industry since the number of employers and branches are intercorrelated as high as $r=0.75$. The number of *different positions* a person has covered so far was asked. The sample had two outliers with individuals covering up to 32 positions while having only 2 employers, which seems not plausible, that is why the outliers were removed from the sample. The number of *positions* is significantly correlated to three traits over $r= 0.17$ with Extroversion, $r= 0.23$ for Openness to Experience and $r= -0.15$ for Neuroticism. Even though the category *unemployment* assessed only the longest duration of *unemployment* and neglected its frequency some considerable relationships were found. The relation is negatively for participants scoring higher in Extravertedness reported shorter Unemployment $r = -0.13$ even more intense for Conscientiousness $r= -0.22$, also in line with what theory suggested (Egan et al., 2017; Kanfer et al., 2001; Uysal & Pohlmeier, 2011). The

correlation of *branch number* is a similar picture as employer number but in a weaker form $r = -0.13$ for Conscientiousness and Openness to Experience $r = 0.16$.

To summarize job related quantitative factors - besides the above mentioned assumptions - it seems that, as orderliness, diligence and reliability (subtraits of Conscientiousness) leads to a lower *employer change* and *unemployment*, which may be due to a prevention from extraneous factors such as termination. An alternative explanation for employer change could be that employers invest more effort to prevent these individuals to change to another firm. The association of Openness to Experience to employer change is reasoned from theory by intelligent curiosity and the desire for something new (Vinson et al., 2007).

7.2.1.2 Leadership

Moreover, moving from the quantitative consideration of job-related information to a more qualitative approach. *CEO* $N=24$, *self employed* $N=34$ and *founder start up* $N=10$, were summarized into a group and through a two-sample t-test compared to the remaining sample. The results show that individuals in *leadership* positions are considerably different in traits as Extravertedness $p < 0.01$ and Openness to Experience $p < 0.05$, which conforms with literature (Caliendo et al., 2014; Frank et al., 2007; Koe Hwee Nga & Shamuganathan, 2010; Nordvik & Brovold, 1998; Zhao & Seibert, 2006), whereas for Neuroticism no support was found.

This part of the paragraph dives deep into the respective group, but the results should not be weighted too heavily on the small group size, however, it gives a tendency for future exploration. A significant positive difference $p < 0.05$ for *CEOs* compared to non-CEOs was found for Conscientiousness and Openness to Experience. Whereas for *Founder start-ups* $N=10$ and *Employees start-up* $N=17$, a significant positive difference was found to Openness to Experience.

7.2.1.3 Experience in addition to normal employment

In line with theory is that participation in a *volunteering program* $N=47$ is related $r=0.13$ on $p < 0.05$ to Extroversion (Bekkers, 2005; Omoto et al., 2010). The biggest group within the category is represented by individuals who have done or still working beside their normal job in a *club, association or*

community service N=102 has a considerable lower level of $p<0.001$ of Neuroticism compared to individuals taking not part in it. For *military service* literature proposed that even years after completion thereof, individuals showed differences in Agreeableness (Jackson et al., 2012). In this sample where *military*-, *public*- or *no service* is distinguished no noticeable difference is discovered. Nevertheless, Bartlett's test for equal variances showed some difference in Neuroticism between *public* and *military service*. The group with *no service* at all will not be further elaborated, since most differences originate through different obligations depend on gender. Men are obliged to do either *military*- or *public service* - with health exceptions - whereas women are not.

7.2.1.4 *Abroad experience*

Participants were asked to disclose their *experience abroad* either for *educational* purposes like a language travel or internships and also for an *experience abroad* related to *work*. The answers were categorized into participants who have not been abroad separately for study and for work, for the group abroad the time spent abroad was further grouped into three similar sized groups, resulting into less than two months, within two to six months and above – the results show that the duration of the period abroad does not disclose specific pattern related to personality, but the dichotomous information if a person has been *abroad* doing. In conclusion a significant difference of $p<0.05$ in Openness to Experience of participants *educated abroad* N=74 for more than a month – which confirms from literature already suggested relation (Zimmermann & Neyer, 2013) and $p<0.01$ in Extroversion for participants who *worked abroad* N=59 more than a month can be demonstrated.

7.2.1.5 *Education*

Generally, *education* is held to be very formative and was therefore considered a very promising proxy for personality. A certain tendency can be seen, although there is an effect, it is weaker than expected. Results show that the level of Extroversion and Openness to Experience rise with the *educational level*, which is also confirmed by a variance analysis that a significant difference between the groups and especially from the A-levels N=41 to a graduate level N=39 is present in the sample. As already elaborated theory is ambiguous about the influence of education on personality or vice versa, however,

there is profound evidence that Extroversion is positively related to performance in knowledge tests and may be distinctly related to academic achievement (Eysenck, 1967).

7.2.1.6 *Interest width*

The highest Pearson's correlation (see Table 1: Pearson's correlation of personality traits and an excerpt of biographic information) is discovered for the number of different *hobbies* individuals pursue. It significantly correlates with $r=0.37$ with Openness to Experience, $r=0.28$ with Agreeableness, $r=-0.2$ with Neuroticism and $r=0.18$ with Extroversion. All of them with a significance level lower than $p<0.01$ and Agreeableness and Openness to Experience even less than $p<0.001$. These results are in line with what Hendry reported in a similar-sized study, where the intensity of movement behaviour was found to be related negatively to Neuroticism and positive to Extroversion (Hendry, 1975). Although certain hobbies such as team activities or computer games showed explanatory power, specific hobbies will not be part of further analysis, as it does not serve the purpose of this study.

7.2.1.7 *Family status*

An interesting predictor for Agreeableness and Conscientiousness is the age of marriage. From Figure 1 and Figure 2 it can be easily derived, that the older one is at their first marriage the lower one's level of Agreeableness and Conscientiousness – where the isolated effect of age on these traits is positive. Especially, when individuals married under the age of 24 “young marriage” $N=11$ they are considerably more Conscientious $p<0.01$ compared to people married after the age of 33 “old marriage” $N=9$ or who have not married at all $N=149$, also $p<0.05$ to couples in the category “normal marriage” $N=73$, (24 to 33 years old) can be derived from the data. Where, comparable results were found for marriages of higher ages, which are an indication of a lower level of Agreeableness according to the peer groups. This result is in line with what was suggested that higher levels of Agreeableness lead to younger marriages (Jokela et al., 2011).

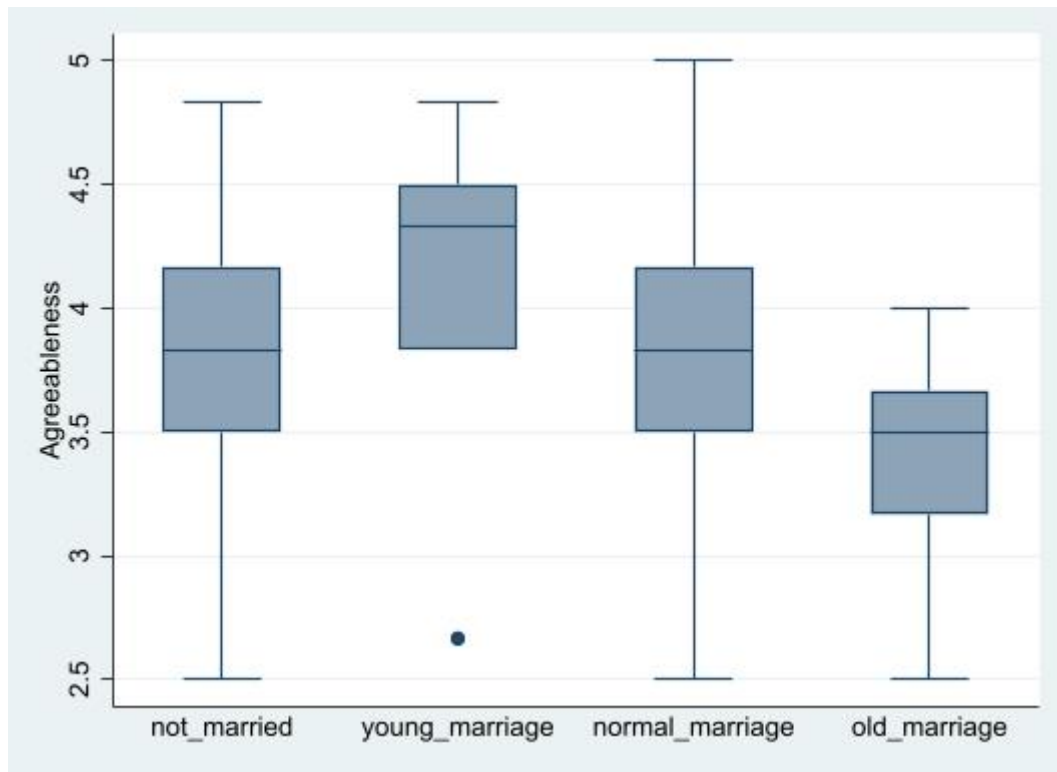


Figure 1: Grouped Boxplott showing Agreeableness level over marriage-categories

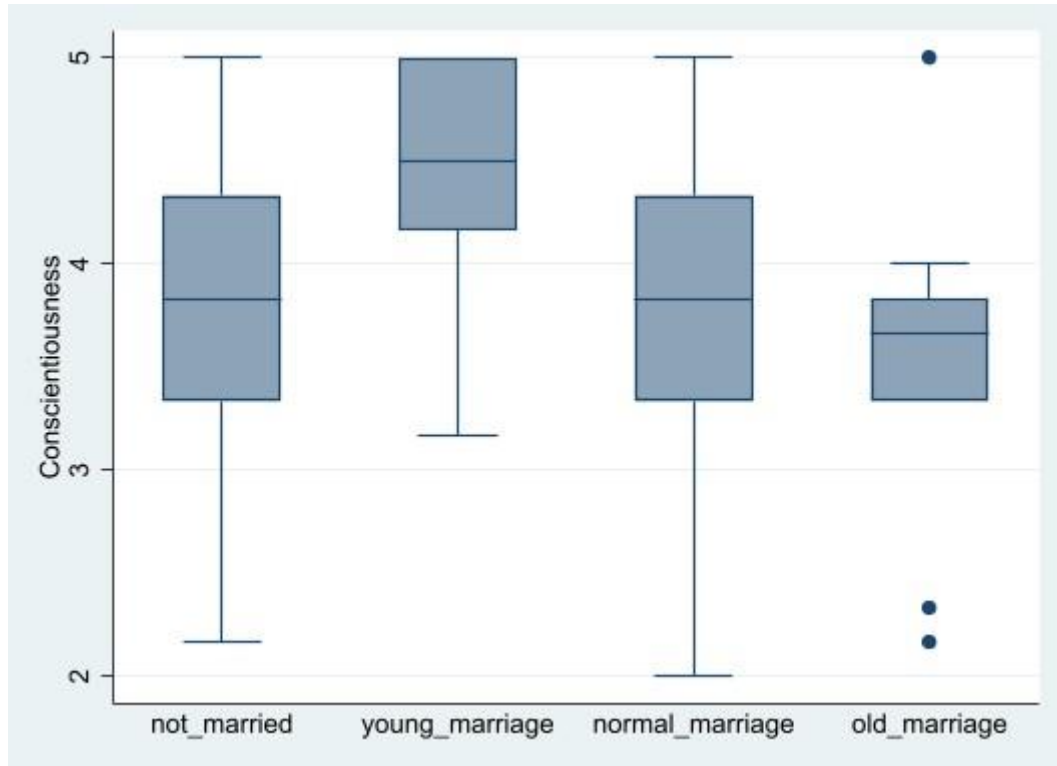


Figure 2: Grouped Boxplott showing Conscientiousness level over marriage-categories

The categorization boundaries for *parenthood* are used identically to marriage – see upper paragraph for further information. In contrast to propositions from theory the statistical analysis has shown that the age individuals became *parents* had no considerable relation to personality, except when individuals got ascendants at a very young age data indicates that a higher level of Agreeableness could be present compared to late bloomer parents. In contrast to the proposition of Warner in 1991, no mutual value nor personality exchange dependent on the gender of the firstborn to parents can be found. Although, the information about ascendants shows in the bivariate analysis significant differences for Agreeableness, Conscientiousness and lower levels of Neuroticism. Nonetheless, these variables correlate considerable with the age of the respective person and hence it is assumed that age drives the explanatory power in this case, hence the older one gets the higher the chances of having children. This must be taken into account in the multivariate analysis when it comes to the interpretation of the results.

As proposed from theory (Lehmann et al., 2013) the level of Conscientiousness rise with age.

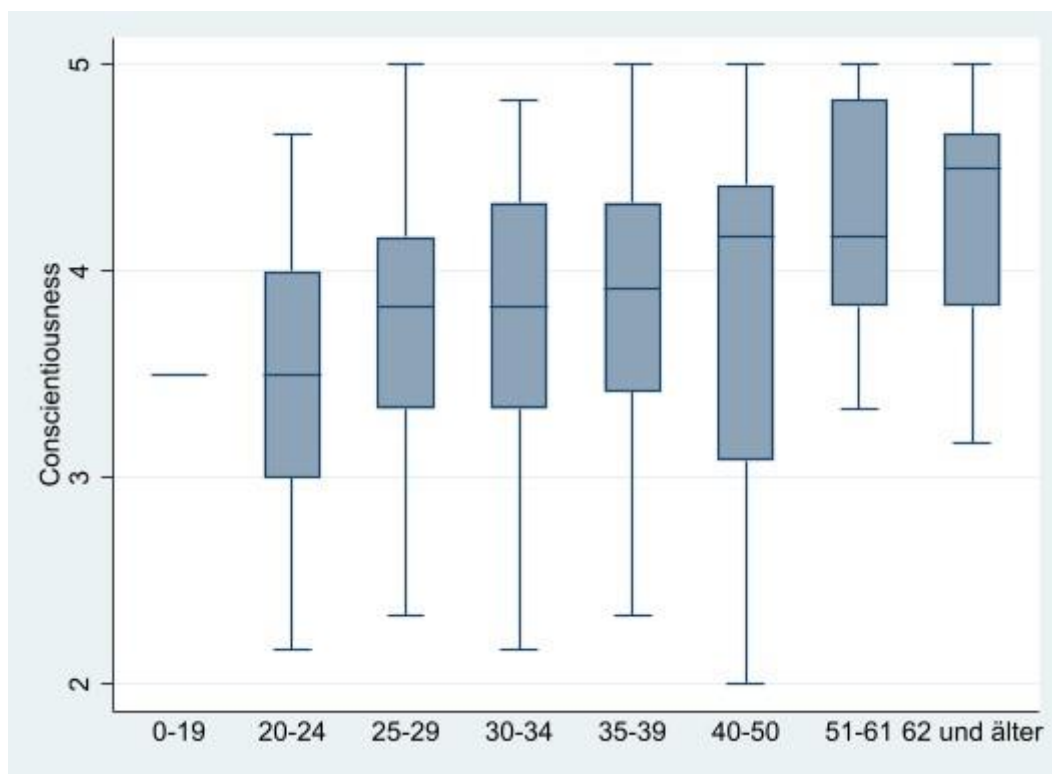


Figure 3: Grouped Box Plot Conscientiousness over Age

7.3 Analysis (Multivariate)

7.3.1 Extroversion

VARIABLES	(1) Extroversion
position_nb_logarithmized	0.20** (0.09)
1.leadership	0.24** (0.10)
1.work_abroad_binary	0.20** (0.10)
hobbies_nb	0.04** (0.02)
gender	-0.17* (0.09)
study_binary	0.21** (0.09)
ascendents_nb	0.19** (0.09)
public_service	0.10 (0.06)
Constant	2.45*** (0.24)
Observations	214
R-squared	0.18

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Table 2: Biographic data describing Extroversion

As suggested by theory, *leadership* seems to significantly $p<0.05$ explain Extroversion, in the multivariate case it elevates the level of Extroversion by 0.22.

Wille et al. suggested that Extroversion leads to higher job instability, their finding was justified by the assumption that it leads to a larger maintained professional network and, hence, to a larger exposure to job offerings (Wille et al., 2010). This effect can also be observed in the multivariate case, the coefficient representing the number of different positions is significantly $p<0.05$ at 0.21 and contributes considerably – albeit in a logarithmized form due to skewed data – in the multivariate model (see Table 2: Biographic data describing Extroversion). Another finding distantly related to the aforementioned theory, however, can be a negative association for the longest unemployment period per person. Due to the larger potential job exposure (Wille et al., 2010), which is higher for more extroverted people. Even

though, the coefficient is not significant in the multivariate model, it can be logically reasoned and contributes explanatory power, therefore, it is included in the model. However, the number of different employers showed no explanatory power for Extroversion in the multivariate case, contradicting suggestions from theory here. An alternative explanation could be the intercorrelation of branch and employer mentioned beforehand. Nonetheless, in the multivariate model self employment is the only characteristic of leadership with a significant contribution. As expected (Eysenck, 1967) *education* in a dichotomous form –if an individual studied - significantly elevates the level of Extroversion by 0.1 and has therefore a higher influence than gender on the trait. Another expectation which is supported is that *children's number* is associated with Extroversion (Dijkstra & Barelds, 2009; Jokela et al., 2011; Roberts & Bogg, 2004). Individuals having one or two children show 0.18, and individuals with three to four children have 0.36 higher levels than peers without children. A similar phenomenon is observed with *hobbies*, which were assumed to be distinctly related to movement intensity and hence related to Extroversion (Hendry, 1975). Individuals, who *worked abroad* or still work abroad show also considerable higher levels of Extroversion, which is not – to my best knowledge - suggested from literature so far.

In conclusion, in this sample Extroversion leads to a higher number in different positions and shorter unemployment, where the first is mostly associated with climbing up the carrier ladder. This would be in line with the association between leadership and Extroversion proposed from the extant literature.

7.3.2 Agreeableness

VARIABLES	(1) Agreeableness
gender	0.12* (0.07)
hobbies_nb	0.07*** (0.01)
position_nb_logarithmized	-0.24*** (0.07)
branchen_nb	0.05* (0.03)
1.parent_age	0.39** (0.18)
2.parent_age	0.26*** (0.08)
3.parent_age	-0.16 (0.18)
Constant	3.53*** (0.11)
Observations	220
R-squared	0.21

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Biographic data describing Agreeableness

As suggested by theory job instability, namely the *number of positions* increases with lower levels of Agreeableness – less popular in team, or less mental strain to change it - (Viinikainen & Kokko, 2012; Wille et al., 2010). With a T-value greater than three it considerably contributes explanatory power to determine Agreeableness. Surprising is the association of a number of *different branches or industries* to Agreeableness. A possible assumption for this phenomenon could be that more Agreeable people may be easier persuaded by employers to try a new industry, however, it is only significant at a 10% level. Another surprising result is that the number of different hobbies disclosed in the questionnaire is tightly related to Agreeableness with a T-value greater than 4.5. This result should be further scrutinized in future since theory has no explanation for this. It may also be that more agreeable people only tend to be more likely to approve suggestions in the questionnaire. The relation between children to Agreeableness was already discovered from theory, but rather in the context of the number of offspring, rather than it leads to entering parenthood earlier (Dijkstra & Barelds, 2009; Jokela et al., 2011; Roberts & Bogg, 2004). The regression shows that getting ascendants at younger ages significantly elevates the

determined level of Agreeableness with a coefficient of 0.4, also normal parenthood show association with higher Agreeableness compared to having no ascendants at all or getting them in higher ages.

7.3.3 Conscientiousness

VARIABLES	(1) Conscientiousness
employer_nb	-0.09*** (0.03)
unemployment_cat	-0.08** (0.03)
branchen_nb	0.06 (0.04)
CEO	0.31** (0.14)
1.cat_married	0.15 (0.23)
2.cat_married	-0.22** (0.10)
3.cat_married	-0.66*** (0.22)
gender	0.19** (0.08)
age_log	0.65*** (0.14)
study_binary	0.17* (0.09)
Constant	3.14*** (0.20)
Observations	225
R-squared	0.26

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Biographic data describing Conscientiousness

As indicated by literature the more Conscientious people are the fewer and shorter unemployment periods they have (Egan et al., 2017; Kanfer et al., 2001; Uysal & Pohlmeier, 2011). The biographic information contributes considerable explanatory power with a T-value greater than 2 and is significant on a 95% level. Since extant theory commonly suggests that job performance is associated with Conscientiousness (Barrick & Mount, 1991; Dunn et al., 1995; Salgado, 1997), it was distinctly expected that if a person is or has been in a CEO position it is expected to be associated to Conscientiousness. The information on educational achievement does not show an increasing effect from lower to higher

education, what was found to contribute to the model is the information if a person has studied or not, albeit on a 10% level in the multivariate case. The older one was at their first marriage the less Conscientious compared to peers who have not married yet or at younger ages (see 7.2). Demographic variables, namely gender and age (Lehmann et al., 2013) also significantly determine Conscientiousness.

7.3.4 Neuroticism

VARIABLES	(1) Neuroticism
hobbies_nb	-0.06*** (0.02)
gender	0.56*** (0.12)
1.parent_age	-0.87*** (0.22)
2.parent_age	-0.17* (0.10)
3.parent_age	-0.02 (0.23)
2.public_service	0.20 (0.14)
3.public_service	0.19 (0.13)
position_nb_logarithmized	-0.09 (0.08)
study_binary	-0.11 (0.09)
Constant	2.66*** (0.16)
Observations	220
R-squared	0.31

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Table 5: Biographic data describing Neuroticism

The multivariate analysis of Neuroticism shows that individuals who were abroad for educational purposes are less Neurotic compared to peers – what was expected based on (Zimmermann & Neyer, 2013), however, this can be predicted with a certainty level of just 90%. Another biographic indicator for lower levels of Neuroticism could be military service, here the multivariate model indicates – and as formulated in expectations - that individuals have a higher Neurotic level if a social- (Bekkers, 2005;

Omoto et al., 2010) or no service at all was done. Also, parenthood below 24 indicates a significantly lower level, which is in line with what Dijkstra & Barelds, 2009; Jokela et al., 2011; Roberts & Bogg, 2004 suggested. It was reasoned from theory that the more Neurotic a person is the less the higher the personal perceived barrier to changing job environment, this cannot be significantly shown in the multivariate case As expected, due to the literature (Hendry, 1975) and the pre-analysis is that the number of hobbies has a substantial negative association with Neuroticism is highly significant $p < 0.001$. Gender shows a significant higher level of Neuroticism for women compared to men (Lehmann et al., 2013).

7.3.5 Openness to Experience

VARIABLES	(1) Openness_to_Experience
position_nb_logarithmized	0.18** (0.08)
founder_start_up	0.50** (0.20)
hobbies_nb	0.09*** (0.02)
studies_nb	0.27*** (0.07)
1.parent_age	0.56*** (0.21)
2.parent_age	0.12 (0.10)
3.parent_age	0.31 (0.20)
Constant	2.56*** (0.13)
Observations	221
R-squared	0.28

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6: Biographic data describing Openness to Experience

Openness to Experience is generally associated, with cognitive curiosity and the demand to learn new. Hence it was expected that it will be reflected in qualitative parameters of the survey. Especially, in vocational- and educational behaviour (Caliendo et al., 2014; Nordvik & Brovold, 1998; Vinson et al., 2007; Wille et al., 2010), we can see that per field of study the prediction of Openness to Experience is

elevated one quarter, with the highest significance and considerable T-value. Additionally, the *number of different positions* has a comparable effect to the number of *different studies*. As suggested *founders of a start up* are more Open to Experience with nearly 0.5 higher than others, although one has to take this result with caution, since the sample size of this category is very low. Literature has not proposed a link between hobbies to Openness to Experience, although it seems quit intuitive that the more open a person the higher the chances of trying new things. The model predicts a 0.08 increase in Openness per indicated interest, with the highest significance and T-value. Suggested from theory (Dijkstra & Barelds, 2009; Jokela et al., 2011; Roberts & Bogg, 2004) the information about *ascendents* delivers valuable insights. Especially, younger parents are showing significantly higher levels compared to their peer group.

8. Discussion and conclusion

The aim of this study is to explore biographic data as a potential proxy to measure personality. The assumption bases on self-selection (Lüdtke et al., 2011; Specht et al., 2011) and formative effects (Löckenhoff et al., 2009) in interaction with life outcomes and personality. Several noteworthy results have underpinned the potential of biographic data in measuring personality traits. On the one hand, several significant correlation are discovered in the bivariate analysis. On the other hand, a multivariate analysis allowed us to get a first impression of the functioning of the measurements, and its potential and shed light on interaction parameters and their effects on the respective traits.

All in all, results suggests that the most relevant biographic domains are education and work-related information. These domains were highly relevant in all traits, except Neuroticism which was vastly determined by demographic variables, interests respectively social environment, which is mostly disclosed in interviews. If further investigations confirm these results, it would pose a high reward for research and practice. Additionally, information on these domains is accessed easily in an application process - especially educational and work related - could supplement traditional pre-selection tools in personnel selection.

To my best knowledge, the most recent and extensive research to unobtrusively measure personality has been done through APR – mentioned earlier in the literature review. Therefore, this paragraph compares, discusses and refers heavily to literature originating out of this domain. When one looks at the statistics, one can see that there is potential in the usage of biographic information to measure personality. The foregoing result paragraph introduced various meaningful models of this study with F-values from <12 to >5 . Although, it was focused on economical significance rather than statistical significance, to achieve theoretical meaningful and justifiable models. The explained variance hovers around 0.28 for Neuroticism to less than 0.16 for Extroversion. If one compares the results on extant literature in APR, where traits are mostly classified into “low” or “high”, which elevated accuracy levels in contrast to studies with a continuous scale, results around 0.20 to 0.40 of explanatory power are reported (Azucar et al., 2018; Phan & Rauthmann, 2021; Vinciarelli & Mohammadi, 2014). Nonetheless, these results should be taken with caution, since the APR is inclined to overfitting (Phan & Rauthmann, 2021). This shows that the assessment in this study can already compete with extant theory in related disciplines. Theory’s suggested benchmark from self-other assessment is within a correlational level of 0.29 to 0.41, in order to replace traditional personality evaluations (Connelly & Ones, 2010; Phan & Rauthmann, 2021), if it is intended to complement traditional personality assessments accuracy levels can be lower (Stachl et al., 2021). Theory generally suggests a diversified harvesting of information by including additional variables such as demographic and digital artefacts to increase accuracy (Azucar et al., 2018). The advantages of unobtrusive measurement in combination with traditional measurements were extensively explained in the literature paragraph see 3.2 and will not be further elaborated here. At this stage, it is important to mention that the results in this study and its ability to explain the variance, are solely based on the existing sample. The established models are not tested with additional biographic information in return and predictions were not compared and validated afterwards to a personality test, this would exceed the boundaries of this study. However, there were some outstanding explanatory variables, represented in three out of five models with a T-value ranging from 2-5, namely *the number of positions*, also the binary information if a person has *studied* seems to make a considerable difference – except for Openness the number of the different studies was leveraged - and last but not least the number of *hobbies* one reported in the survey. Various other

parameters showed considerable associations to personality but will not repeat in this section again, since they have been extensively explained in the resulting paragraph.

However, as thoroughly elaborated in the upper paragraph, the results of this study show comparable results with APR assessment and accuracy is already situated in the proposed range (Connelly & Ones, 2010; Phan & Rauthmann, 2021; Stachl et al., 2021) to complement traditional personality measurement and with further research potentially replace traditional methods. By and large, this study builds a solid fundament for future investigations. It contributes to the extant literature by exploring and proposing a new, promising and hard to bias method to unobtrusively measure personality with profound results.

9. Limitations and future directions

An obvious limitation of this study is that personality tests solely base on self-reported assessments. Comparable, disciplines where job- or academic achievement was predicted through personality scores, reported that personality observation rendered substantially higher validity compared to self-evaluations. It is suggested that personality theory can enormously benefit from additional external ratings since wrong responses through distorted self-perception or biases like social desirability were diminished (Connelly & Ones, 2010; Edwards, 1957). The second limitation is that the environment the participants were in was not controlled for since the questionnaire was performed online. As mentioned in the literature review the substantial situational effects on personality tests are dependent on the situation one finds. If participants participated in uncomfortable situations for example on the way to public transport, the answer behaviour may vary considerably in comparison to answers from participants taking part from home. Thirdly, although the researcher tried to collect a sample as diverse as possible through random sampling, participants are still, directly or indirectly out of the researcher's environment and hence rather represent a convenient sample. Fourthly, the causality of the event, since it has a considerable influence on the effect. To put that in context a voluntary job change is diametral compared to an involuntary change through external factors for example (Wille et al., 2010). Also, the social background of participants was not thoroughly considered, although it could distort the results, at least bias self-selection effects. For example ascendants whose parents studied abroad in their

academical career, maybe also more inclined to study abroad, compared to peers whose parents have no academic background at all.

An important implication for future research is to consider transitional effects, namely the point in time of biographic events that could be considered in a weighted form. There is probably a considerable difference in the personality of a person still being CEO to a person, who was a CEO but changed their life dramatically since then. Albeit, personality is considered to be relatively stable, experiences as covering a CEO position shape our personality. Therefore, the point in time and the duration can provide further insights by weighing later experience more heavily than preceding ones. Besides the timing of events, the frequency it occurs may provide even higher explanatory power. In this study, only the longest phase of unemployment was considered, whereas unemployment frequency was neglected, which in this case may be equally important. Clontz stated that no discipline will be able to thoroughly understand an individual without using a multidisciplinary approach and proposed that a method summarizing knowledge out of sociology, political and psychology disciplines should be established (Clontz, 1984). Consequently, additionally, to further improvements to the existing models, with additional variables and higher granularity, it is supposed that future research should concentrate on other complementary (unobtrusive) measurements. A combination of different methods, for example APR with this approach can yield higher validity and explanatory power through a diverse harvesting of information.

10. Literature

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