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Risk, Trust, Tax
How Climate Risk Perception influences the Acceptance of Climate Taxes

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Abstract

Greenhouse gas (GHG) emission taxation is considered to be an efficient and comparatively easy to implement climate mitigation policy. Which mechanisms constitute the acceptance of these taxes in the general public, making them viable for governments to be realized effectively? While the trust in the state is regarded as a major driving force for general tax acceptance, and therefore also for GHG emission taxes, the importance of affective psychological factors are often disregarded. Using a sample (N=656) from DACH countries, this thesis considers climate risk perception as the main influence on the acceptance and willingness-to-pay (WTP) of GHG emission taxes, assigning trust in the state a subordinate role. Strong influences—outweighing trust in the state—of climate risk perception on acceptance of GHG emission taxes and their WTP were found, as well as differentiated views on the constitution of trust in state. The division between soft and hard state showed to be relevant to the influence on acceptance of tax-related climate mitigation policies. Demographic differences were examined, as well as the influence of political views on the climate debate, pointing out leftist political views being strong predictors of GHG emission taxation acceptance. Consequently, a high climate risk perception in the population allows for harsher and faster tax measures, even if they go against stakeholder interests. The design of GHG emission taxation plays a pivotal role, with the additional revenue being earmarked for climate projects or redistributed as a Pigouvian tax showing the highest acceptance and WTP results. Policy recommendations for governments are explored in the discussion, as well as the role model example low net-emitting countries like Austria can set on the global political stage.

Keywords: Carbon tax, environmental psychology, tax acceptance, willingness-to-pay, Pigouvian tax, risk perception, climate change

Kurzzusammenfassung

Die Besteuerung von Treibhausgasen ist eine effiziente und vergleichsweise einfach zu implementierende Maßnahme, um den Ausstoß von Treibhausgasen auf nationaler Ebene zu reduzieren. Welche Mechanismen tragen zur Akzeptanz solcher Maßnahmen in der Bevölkerung bei und machen sie dadurch für Regierungen umsetzbar? Das Vertrauen in den Staat wird weitgehend als Haupteinflussfaktor im Bezug auf Steuerakzeptanz betrachtet, und wird deshalb in zahlreichen Studien für die Ökosoziale-Klimasteuer als ausschlaggebend angesehen. Affektiv-psychologische Einflussgrößen werden hierbei vernachlässigt. Mit einer Stichprobe (N=656) aus dem deutschsprachigen DACH-Raum, rückt diese Arbeit die klimabezogene Risikowahrnehmung als Haupteinflussgröße für die Akzeptanz und die Zahlungsbereitschaft für Ökosoziale-Klimasteuern in den Fokus. Es konnten starke Effekte zwischen klimabezogener Risikowahrnehmung und der Akzeptanz und Zahlungsbereitschaft gefunden werden, während das Vertrauen in den Staat untergeordnete, mediierende Effekte zeigte. Weiters wurde die Zusammensetzung des Vertrauens in den Staats betrachtet, resultierend in der Aufteilung des Vertrauens in exekutiven und legislativ-judikativen Staat. Der letztere zeigte einen relevanten Einfluss auf die Akzeptanz von steuerbezogenen Klimaminderungsmaßnahmen. Demografische Unterschiede wurden betrachtet, als auch der Einfluss der politischen Gesinnung auf die Klimadebatte, resultierend in einer höheren Akzeptanz von Klimasteuern und einer höheren Zahlungsbereitschaft bei politisch links verorteten Proband:innen. Schlussfolgernd erlaubt eine hohe klimabezogene Risikowahrnehmung die schnelle Umsetzung von spürbaren steuerbezogenen Klimamaßnahmen, selbst wenn sie gegen die Interessen von Stakeholder:innen gehen. Die Gestaltung der Klimasteuern ist von Relevanz: Zusätzliche Steuern, deren Einnahmen für Klima-Projekte dezidiert oder an die Bevölkerung im Sinne einer Pigou-Steuer rückverteilt werden erfahren die höchste Akzeptanz. Empfehlungen für politische Maßnahmen, als auch die potentiell wegweisende Rolle von kleinen Netto-Emittenten wie Österreich auf der globalen politischen Bühne werden diskutiert.

Schlagwörter: Ökosoziale-Klimasteuer, Umweltpsychologie, Steuerakzeptanz, Zahlungsbereitschaft, Pigou-Steuer, Risikowahrnehmung, Klimawandel

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1. Introduction

Fighting climate change stands out as one of humanities most demanding problems, imposing challenges in almost every imaginable scientific and cultural discipline. It needs to be addressed quickly, as every year without significant reductions in carbon emissions and feasible strategies for climate change mitigation lowers the probability to reach the goals defined in the 2015 Paris Agreements. Within the context of the COP26 Climate Summit in Glasgow 2021, the United Nations Framework Convention on Climate Change released a synthesis report (UNFCCC, 2021) on the current state of Nationally Determined Contributions (NDCs). NDCs constitute the central, country specific part of the Paris Agreements, coming to a pessimistic conclusion of staying within the Paris Agreement's temperature rise threshold of below 2°C. Despite the negative outlook, the COP26 came to an end with a unified pledge to keep the 1,5°C goal alive and therefore in commitments to reduce greenhouse gas (GHG) emissions drastically. Parallel to the introduction of green energy alternatives, considerations of the socio-economic aspects of these changes are of high importance, as energy and transportation costs tend to be regressive and hit low-income households the hardest, threatening the fabric of our society.

Bridging scientific evidence and policy professionals is an important step in the fight against climate change on the cultural and societal level. From a policy making perspective, carbon taxation is a fast, cheap and beneficial measure to curb the emissions of a country significantly (Klenert et al., 2018). As of 2021, there is a significant number of countries and/or administrative regions imposing such taxes in various forms and scales (European Court of Auditors, 2022). The two biggest pillars of carbon taxation in Europe consist of the European Union Emissions Trading System, which is an indirect way of taxing consumption by regulating industry emissions by the sale of certificates, and of the direct taxation of consumption goods (Perry, 2020). More recently, Germany and Austria announced the introduction of a direct GHG emission tax. Being set at 30€ per ton CO2 equivalents (tCO2e) as a base price and being raised yearly, it is criticized as being too low of an incentive to change consumption behavior in a meaningful way (Pretis, 2019). For comparison, Sweden has introduced a carbon tax at 30USD/tCO2e in 1991 (Andersson, 2019), with yearly rises to the current level of 114€/tCO2e in 2021 (IEA, 2021).

With the current amount of taxation being too low for a behavioral change, it is appropriate to ask why emission prices cannot be raised significantly. On the one hand, there is evidence that such a taxation should be introduced in trial periods to support the adaptation in the general public (Cherry et al., 2014), on the other, policy makers base their decisions on the acceptance by the general public, trying to leverage interests of all stakeholders (Elliott et al., 1997). Pigouvian taxation is a way of pricing external costs that are not weighted in in the market prices, making it a preferred tax design choice for GHG emission taxes. In the case of greenhouse gases, those costs occur due to their destructive impact on the environment, like reduced crop yields, negative health effects etc. Preferably, distributing the additional tax revenue back to the public with lump sums, is, at least in the literature, the preferred, most efficient and progressive way of GHG emission tax design (Klenert et al., 2018). A Pigouvian tax may be effective in its own terms, without additional interventions or directives imposed by the state. More detailed analyses have been made on country specific cases (e.g. Austria in Six & Lechinger, 2021), with advices for sector specific financial support and the development in carbon neutral infrastructure.

Besides the economic consequences, the discourse about socio-economical taxation measures needs to count in psychological components. Tax Psychology works on the interrelation between individual emotional aspects of tax compliance, e.g. trust in tax authorities and the acceptance of taxes, and the exercise of power from the state. This fine balance has been thoroughly described in the slippery-slope framework (Kirchler et al., 2008), using synergetic and antagonistic dimensions as key measures. The link between trust in authorities and the support for climate mitigation measures in specific has been widely investigated (Hammar & Jagers, 2006; Maestre-Andrés et al., 2019; Fairbrother et al. 2019). Those studies tend to use methodologies that are of a sociological nature, with psychological considerations like worry (Leiserowitz, 2006) or risk perception playing a minor role.

For this thesis, the individual perception of risk in relation to climate change is of particular interest. Therefore, the goal of this thesis is to investigate the relationship between the psychological perception of climate change and the acceptance of emission taxes in various forms in respect to the trust in authorities and the state. I will focus on the sparsely researched topic of climate risk perception in particular, as general risk research is an already broad field in economic psychology. In the theory section, I will elaborate on the psychological perspectives of taxation

and state, using the slippery-slope framework as a starting point. Further, various research on the perception of taxation in regard to climate change and trust will be laid out, also bringing in willingness-to-pay as a possible take on taxation rates and framing. I will introduce the current research around climate emotions and risk perceptions and use those psychological constructs as a rhetorical point of origin for my hypotheses, highlighting the influence of climate risk perception in contrast to the trust in authorities in the acceptance of climate change taxation measures. The departure point for this thesis can be formulated in the form of a simple question: Is the "sacrifice" for the cause greater than the trust in government and state?

2. Theory

2.1 Models of Taxation: The slippery-slope framework and GHG taxation models

The general trust in authorities stands out as a common predictor associated with tax compliance and tax acceptance (Batrancea et al., 2019). More nuanced findings, like the trust in certain institutions and the perception of corruption come to similar conclusions (Rafaty, 2018). This holds also true for taxes related to GHG emissions (Hammar & Jagers, 2006). The slippery-slope framework introduces two driving forces—synergetic and antagonistic—to put power exertion by the authorities and trust into a consecutive model. Acceptance of measures can therefore be seen as a synergetic force that emerges out of trust and tax compliance. On the contrary, an antagonistic tax compliance would need to be enforced by tax audits and fines, as low acceptance of a measures drives tax avoidance. Although this model makes good predictions on a cross-sectional time scale combining economic models with psychological aspects, overarching long-term developments in culture and politics are left out. In democratic societies, prolonged dissatisfaction with policies and state will eventually lead to a change in leadership, and a cultural shift or heightened sensibility for certain issues may change the general acceptance of disadvantageous measures, making them being detached from classical economic models. Arguably, global warming and the fight against it can be regarded as such a cultural shift, as the most recent Eurobarometer regarding climate change suggests (European Commission, 2021). An overwhelming average of 96% of people surveyed in the European Union took at least one significant climate action in the recent years. Austria and Germany both have the highest percentage reported in the reduction of disposable plastics, which falls in line with the recently introduced ban on single-use plastics in the EU (European Commission, 2021). Taxation of carbon intensive consumer goods is one of the necessary and valid methods to lower emissions in a relatively short time frame, making it an almost inevitable measure (Köppl & Schratzenstaller, 2021). Although similar kinds of taxations have been installed in the past (e.g. mineral oil taxes), this tax has wider socio-economic and political consequences. On one hand, the perception of climate change in the general public still is an abstract concept (Saari & Mullen, 2021), and on the other, there are various goods of daily need highly affected by such taxes that hit the lowest income households disproportionally high—i.e. making them regressive—as heating for example. From a purely economic perspective, those aspects make it hard for lawmakers to argue GHG emission taxes to the general public, and con-

sequently those taxes are experiencing some of the strongest opposition from the public (Rhodes et al., 2017).

Emission taxes are Pigouvian taxes, namely a taxation measure to price externalities of the market that create costs but are not directly linked to the produced good, and therefore are used to level out a skewed pricing scheme. While the tax may be difficult to comprehend at first and encounter low acceptance from the public (Kitt et al., 2021), the presentation and communication of taxation measures, education about their effects and transparency regarding redistribution procedures heighten their acceptability (Kallbekken, Kroll & Cherry, 2011). Carattini et al. (2017) examined the attitudes of Swiss voters, a particularly fitting population because of the Swiss voting system of direct democracy. During a 2015 vote, the plan to substitute the value added tax with energy taxation was rejected, with the main motives for the rejection being distributional concerns, competitiveness of the economy and ineffectiveness of the tax. The authors were able to identify a tendency towards the new tax law, if those concerns were leveled out by explaining taxation concepts and their projected positive results for the society and climate.

In regard to emission taxes, there are several key concepts to make taxation effective, i.e tax or internalize the intended externality, and prohibit a disproportionate disadvantage of low-income households, battling the concerns mentioned in the prior studies. Taxing consumers at the purchase of an emission intensive good and redistribute the collected tax with uniform lump-sum transfers to all citizens on a regular basis seems to be the tool of the trade, providing the most benefits, easiest implementation and requiring the lowest intervention by the state (Klenert et al., 2018). Additionally, social cushioning strategies as well as investments in emission neutral transports or consumption alternatives may be examined for each individual economy to relieve low-income households and support the popularity of the tax measure (e.g. Austria in Ökobüro, 2020). Different taxation methods may also be of use under specific circumstances, as Kleenert et al. (2018) laid out, e.g. labour tax cuts, corporate tax cuts or green spending, if the Pigouvian taxation is not being accepted by the public.

In regards to political trust and emission taxation, a relation between the trust in governmental institutions and the acceptance of GHG emission taxes or climate mitigation policies in general is apparent (Fairbrother et al., 2019). Sweden is being widely referenced as a role model in

this matter (Hammar & Jaegers, 2006). Having introduced carbon taxation in as early as 1991 and having raised it steadily since, most of the revenues from the taxation go back into Sweden's general budget. The relocation of the additional tax revenue into the state budget is an unpopular option, as it may lack transparency regarding the use of additional revenue in comparison to earmarking of revenue for climate related projects, disrupting the intention of a climate mitigation policy. Measures of high political trust and low corruption in Sweden make this taxation method possible, as well as habituation effects that take place after an imposed measure has deemed effective and generally accepted, as seen in the introduction of congestion charges in Stockholm for example (Schuitema et al., 2010).

When trust in the government is being deconstructed into substituting parts, it becomes apparent that there are differences in trusting regional and national structures of the state, as well as political parties, individual politicians, industry stakeholders, as well as science, NGOs and the like (Huijts et al., 2007; Rhodes et al., 2017). Political beliefs as well as socio-demographic variables also play a role in the support of GHG emission taxes, as left leaning persons, as well as younger, higher educated and female individuals tend to be in higher support of such measures (Elliott et al. 1997).

To summarize, emission taxation seems to generally follow the slippery-slope framework mechanics of trust in the political system and systematic fairness (see also Harring & Jaegers, 2013; Rhodes et al., 2014), although when analyzed on a more differentiated level, there seem to be differences of socio-demographic, regional and political nature. Besides those sociological considerations for GHG emission taxation support, personal values, climate belief and climate risk perception seem to play a pivotal role in individual support (Drews & van der Bergh, 2015). In the next chapter, I will introduce those psychological aspects of climate change and integrate those into the debate about GHG taxation.

2.2 Psychological Perception of Climate Change

Why would we support something we do not believe in and vice versa? As the earth's temperature rises and the effects of human made climate change becomes more and more visible in the form of extreme weather events, public support for action beneficial to the earth's climate is in the vast majority. Still, climate change remains a spatially and timely diffuse phenomenon

(Saari & Mullen, 2020), having effects that vary greatly in prevalence and scale around the globe. Countries of the global south feel the consequences the hardest—countries that have a proportionally smaller stake in global decisions as well as the scientific and cultural discourse.

First, I want to focus on the socio-psychological constructs that are relevant for pro-climate action, as we already mentioned leftist political views and socio-demographic aspects in the prior section. From the perspective of value orientations, the so-called *New Environmental Paradigm* tries to integrate different motives and perspectives on the relationship between humans and nature, and has shown a positive relationship with the acceptance for climate policies. Based on Schwartz's Value Theory (1992), de Groot & Steg (2007) found a distinction between three core values, namely egoistic, altruistic and biospheric, to be the drivers for pro-environmental behavior. Egoistic values would decrease the support of policies if individuals are not directly affected, or do not think they are, by climate change effects, while altruistic and biospheric values arise from the care about humans and nature respectively. Because climate change is regarded as human made, as the scientific and public consensus arguably state (IPCC, 2021), environmental concern plays an especially strong impact in climate change adaptation behavior. More recently, Valkengoed & Steg (2019) conducted a meta-analysis of 106 studies examining the motivation for climate change adaptation behavior extracting 13 cognitive and affective factors. Efficacy of actions, being self-efficacy or directed to outcomes, negative affect regarding climate change and therefore the desire to reduce it, as well as descriptive norms, i.e. social norms and social comparison mechanisms that are at play, showed the highest effects. Interestingly, climate change belief, responsibility and risk perception only showed moderate effect sizes, although those could possibly be explained with the low direct action-oriented character of these motivations.

A wide range of discrete negative and positive affects have been associated with risk perception, and consequently the risk perception of climate (Sjöberg, 2007). In specific regard to climate change, interest, disgust, worry, hope, helplessness, anger, sadness, fear, depression and guilt have been reported as being strongly to moderately experienced (Smith & Leiserowitz, 2014). Although the reported emotions are mixed between negative and positive, it is apparent that negative emotions are in the majority. It should be noted, that emotional research tends to have a small reliability and is depending on contextual variables and methods. Induced sadness through a film clip can have an impact on donations as well as amusement and awe do (Ibanez,

Moreau & Roussel, 2017). Brosch (2021) emphasizes two pathways that are influenced by emotional responses to climate change, namely associative and reasoning-based appraisal, influencing perception and judgement on one hand, like the support of mitigation policies when showing compassion for flood victims, and empowering motivational tendencies on the other, like donating to animal welfare and nature conservation. Furthermore, the mere anticipation of emotion may play an important role in motivation. Often depicted as the "warm glow", the knowledge about probable positive emotions after doing an environmentally friendly action, like donating money for environmental causes, can act as a motivating component. Once caught in the virtuous cycle, the threshold for repeating sustainable actions decreases and pro environmental behavior can become the norm.

In accordance with the dominance of negative emotions expressed in relation to climate change and the motivation to reduce negative affect, worry stands out as a particularly well researched emotion in the context of climate action. Worry is characterized as a recurring experience of anxiety about potential negative events (Ricci et al, 2010). Bouman et al. (2020) argue that in accordance with Stern's (2000) value-belief-norm theory, personal responsibility, in combination with negative affect about abstract goals can drive a person's general behavior, i.e. making the behavior overlap with the values one holds. Worry being associated with a personal stake in a matter (van der Linden, 2017), is especially potent to be a driving motivation for concrete climate mitigation behavior and choices.

In behavioral economics, human decision making is famously described with the prospect theory, which uses a set of heuristics to map out possible outcomes of decisions under risk (Kahnemann & Tversky, 1979). Beside its underlying assumptions and heuristics, namely endowment or anchoring effects, newer risk behavior research also focuses on additional and especially real-life factors affecting decision making under risk situations. The role of impressions, experience, values, emotion and knowledge has been widely disregarded in the classical approach of the prospect theory, but is gaining traction as a major contributor to risk decisions in real life environments (Gilovich, Griffin & Kahneman, 2002). More recently, Slovic and Peters (2006) defined two pathways that come in to play in risk perception and action, risk-as-analysis and risk-as-feeling. A similar distinction has been made by Brosch (2021) when differentiating between the elicitation of positive and negative emotions. While risk-as-analysis appeals to our rational and

logic thinking, risk-as-feelings uses affect and heuristics to process risk. In accordance with the risk-as-feelings pathway, the affect heuristic is believed to drive the perception of risk substantially, therefore including affects as worry into a broader risk perception theory of climate change (Smith & Leiserowitz, 2014).

While only reporting moderate effects as a climate mitigation behavior motivation (Valkengoed & Steg, 2019), the perception of risks connected with climate change has very relevant features that are of importance in relation to GHG emission taxation. As extreme weather events connected to climate change are rising from year to year, the abstraction of climate change, that may still be a prevailing view in industrialized countries, will transform into a concrete reality. A heightened perception of risk is directly associated with immediate climate-related hazards like floods or hurricanes, less so with diffuse and long term events like heatwaves. Risk seems to be a strong driving force in the adaption of behavior, mainly linked with preparedness to more threats as well as the evading of the threat, insurance and policy support. Being a very regular extreme weather event in the DACH-Region, floods and flood risk management could give us a different perspective on the relation between the reliance on government intervention and risk perception (Prettenthaler et al. 2015). Babcicky & Seebauer (2019) examined flood mitigation behavior on the basis of the protection motivation theory framework (PMT) (Rogers, 1975). Similarly to the afore mentioned models of risk perception, the PMT formalizes two appraisal strategies. *Threat appraisal* includes negative affective responses like fear and affective risk perception, namely worry, while the *coping appraisal* includes rational aspects like the efficacy of the response to flood catastrophes, the associated costs, preventive measures and the like. In their 2019 study, Babcicky and Seebauer found close links to non-protective behavior in the threat appraisal and protective behavior in the coping appraisal conditions respectively, with mediating effects between the two condition/behavior pairs being negligibly small. In turn, this can be interpreted as a reliance in government and civil interventions in cases of emotional distress and actual motivation for action in the case of coping and self efficacy. Interestingly, the negative affects seem to cancel out the tendency to engage in mitigation behaviors. As shown before, self efficacy is a major motivator for climate policy mitigation behavior. So, the climate action taken should be seen as effective and efficient, otherwise the responsibility may be shifted away from the self. In terms of an emission tax, a low and insignificant tax may be seen as unnecessary, lowering its acceptability

and in turn affect the trust in the government, at least regarding this matter.

Huber (2007) introduced the Risk Defusing Operator (RDO) theory and conceptualized RDO categories that include event preventions and compensations, pre- and post-event applications of RDOs and event interventions, where a risk event is being decoupled from its negative outcomes. If the opportunity to reduce an impending risk is given, a rational agent would make use of RDOs and deploy actions to prevent or reduce the approaching risk event. RDOs are based on the Risk-Management-Decision Theory (RDMT) that primarily focuses on immediate consequences of risk events based on actions of the acting agents, that are in turn able to perform a RDO search, i.e. find the least risky outcome of a preferred action pathway (Huber, 2014). How could the RDO concept help us to think about GHG emission taxation acceptance? Given a certain degree of agency in the matter of influence on global warming, the payment of an emission tax could be seen as an intervention RDO. According to Huber, the tax payment could result in decoupling the negative outcomes of GHG from the own actions, because the paid tax is seen as a complete compensation. In other terms, negative rebound effects would be the consequence. The economical incentives for green alternatives would therefore need to be very significant, if not at all mandatory/restrictive, as for example the phase-out of fossile fuel engines/vehicles as a decarbonization measure by 2040 in Austria (Smith et al., 2022). Those restrictions pose the most negative perspective on the tax and are prone to result in a lowered acceptance of the mitigation measure. At best, the GHG emission tax can be regarded as an compensating RDO and—given agency and self-efficacy—be seen as a way to reduce the toll of GHG emissions on the planet to a significant degree, but, it still being only compensating, stressing the need for additional measures besides taxation. When viewed through the lens of the RDO theory considering the agency of the risk takers, GHG emission taxation could be decoupled from trust in government, making it only the executive force of collecting and redistributing the tax to citizens or climate initiatives.

Besides a general measure of acceptance, willingness-to-pay (WTP) may be a more nuanced approach in to assess the individual view on GHG emission taxation, as for example, preoccupations associated with intervention RDOs could be weighted in by supporting high taxation amounts and reject low taxations. Traditionally, WTP is a method used in experimental settings to asses things a monetary value, i.e. their subjective worth. The amount of WTP is being associated with various demographic characteristics of the participants as well as factors like risk and trust,

depending on the objects evaluated. Oh & Hong (2012) examined the relation between citizen's trust in the government and their WTP for government projects, with trust being the significant determinant of a high value WTP. The research in regard to WTP and climate policies ist vast. Most interesting for this research are Kotchen, Boyle and Leiserowitz's (2013) results, that indicate the demographic factors education and age and the knowledge about climate change to be correlates of a higher WTP. Gupta (2016) found similar results in an Indian population, specifically asking about the taxation of transportation. This result is especially interesting, as fiscal measures and externality pricing are rarely discussed in the context of developing countries. Rotaris & Danielis (2019) stressed the importance of earmarking additional tax income from GHG taxes for environmental causes using an Italian sample. Ma et al. (2021) surveyed Chinese students about their WTP to offset plane traveling emissions with voluntary payments, finding demographic differences in gender, income, environmental concern and trust in government initiatives, additionally finding a lowering effect if the taxation was compulsory. WTP research seems to be in line, if not almost interchangeable, with the acceptance measure of GHG emission taxes.

In conclusion, it can be pointed out that research on GHG emission taxation, climate action/mitigation in general and climate emotion has been conducted previously and in various forms, although with trust in the government being the main indicator for GHG emission tax acceptance (most notably Fairbrother et al., 2019). To my knowledge, there is currently no research taking the construct of climate risk perception that respects both—affective and rational factors—as a point of origin for tax acceptance and WTP and giving trust in the government a subordinate position.

2.3 Research Question and Hypotheses

Based on the mentioned research and the gap in the existing literature, this thesis deals with the question, if the perceived risk of climate change, which includes factual occurrences as well as emotional factors, has a significant influence on the acceptance of GHG taxes and if this acceptance can be in some degree decoupled from trust in the government. Therefore, I formulate the hypotheses as follows:

H1a	Higher climate risk perception leads to a higher acceptance of GHG emission taxes and a higher willingness-to-pay for emission taxation.
H1b	Trust in the Government acts as a mediator between climate risk perception and tax acceptance/WTP. The mediation is supposed to be only partial.
H2a	Demographics (gender, education, income) and political (leftist) views result in a higher acceptance of GHG emission taxes and a higher willingness-to-pay for emission taxation.
H2b	Leftist political views result in a higher decoupling of trust in the government in the climate risk perception and tax/WTP relation.

3 Methodology

3.1 Data

The data was collected using an online survey in February 2022 with a total number of *N=656* respondents. The respondents were pooled from Mturk, surveycircle, relevant interest groups such as research communities (e.g. Netzwerk für Psychologie und Umwelt) or various employees from Vienna, surrounding districts and lower Austria in particular and lastly my own family, friends and acquaintances as well as the University of Vienna and die University of Applied Arts Vienna. According to the models of MacKinnon et al. (2007), depending on the statistical method, the lower sample size threshold required for a power of .80 lies between *N*=462 and *N*= 562. In my case, the indirect effect *a* of the independent variable on the mediator was estimated as being in the lowest possible tier, as research regarding the relation between climate risk perception and trust in the government is sparse (the mediation scheme is displayed in Fig. 1). The effect *b* of the mediator variable on the dependent variable can be estimated quite precisely, as various studies have conducted such an analysis (Fairbrother, 2019; Davidovic & Harring, 2020), with an significant effect lying between *b* =.15 and *b*=.17 respectively. Therefore, the lowest tier for the *b* effect has to be assumed, making it necessary to include a valid sample of at least *N*=562 for a sufficient power. In my case, this requirement was achieved. Demographic data like gender, place of residence, age, education and income was collected at the end of the survey.

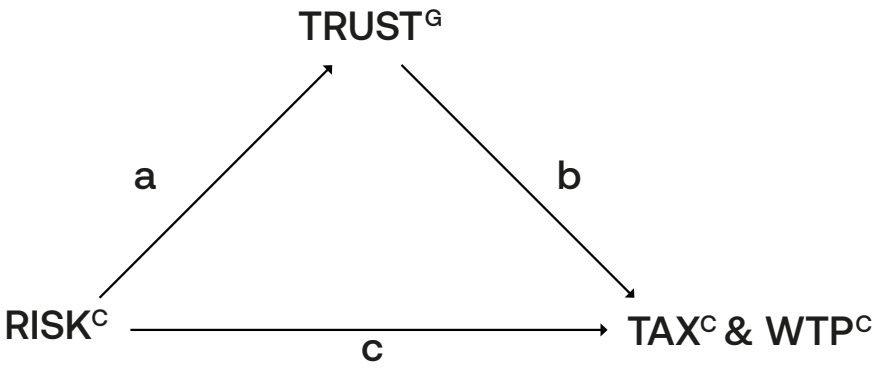

*Figure 1. M*ediation scheme between RISK^{C} (holistic climate risk perception), TRUST^{G} (general trust in the government) and TAX^{C}(acceptance of climate taxation measures)/WTP^{C} (willingness-to-pay for climate taxation measures)

3.2 Measurements

Climate Risk Perception Index

In my analysis, the climate risk perception index by van der Linden (2015) builds the foundation for the independent variables. Climate risk perception is measured with eight items on a Likert scale from 1 to 7 (1 = no perceived risk, 7 = very high perceived risk). Van der Linden has additionally split the construct *holistic climate risk perception* into two dimensions: *Personal* and *global/societal climate risk perception*. For this survey, the questionnaire was translated into German and validated using a confirmatory factor analysis in a structural equation modeling process. A total number of $N = 104$ participants from Austria, Germany and Switzerland were asked to answer the eight items in the survey. Examples for the survey questions are *'How concerned are you about climate change?'* for a question on the personal risk dimension, and *'How serious would you estimate the impacts of climate change for the DACH-Countries (Germany/Austria/Switzerland)?'* for the global dimension. First, the holistic risk dimension was found using an explorative factor analysis, with the holistic dimension explaining 57.76% of the total variance. As the two subdimensions are very similar, structural equation modeling using SPSS AMOS had to be conducted to perform a confirmatory factor analysis. Factor loadings were assessed for each item (for detailed results, see Fig. 2). The resulting model-fit measures $CMIN/df = 1.21$ and $RMSEA = .04$ (Root Mean Square Error of Approximation) indicate a good model fit (Ullmann, 2006; Hu and Bentler, 1998) for the assumed dimensions. An insignificant *chi-squared* $= 22.94$, $df = 16$, $p = .24$ for the overall model fit (Bagozzi and Yi, 1988), a *CFI* (Comparative Fit Index) value of .99 and a *TLI* (Tucker Lewis Index) value of .99 are further strengthening the predicted dimensions and indicating an excellent model fit. Those results are comparable to those provided by van der Linden (2015) in his model calculations. Therefore, global/societal as well as personal climate risk perception indices can be assumed in the German translation of van der Linden's (2015) climate risk perception index.

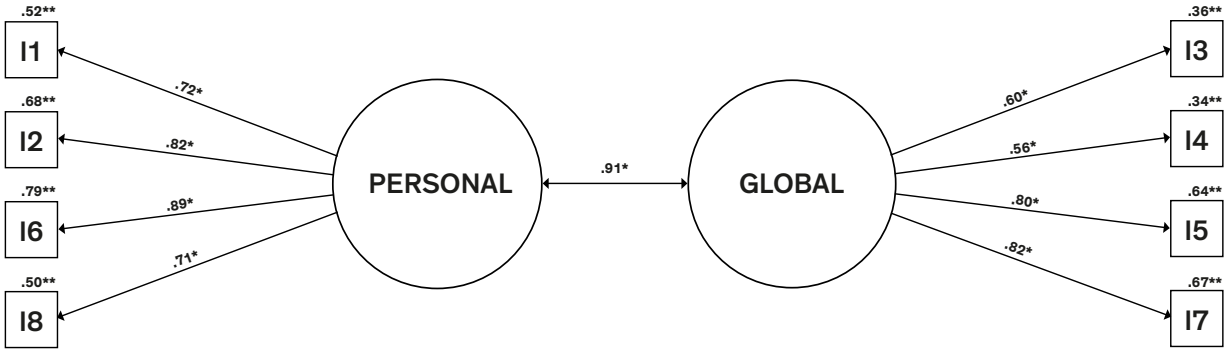

Figure 2. structural equation model for personal and global climate risk perception .* standardised path coefficients, ** determination coefficient.

Trust in Government and Political Affiliation

The measures for trust in the government were collected using items from the European Social Survey (2018) asking about trust in national and international government institutions on an eleven point Likert scale (1= *no trust*, 11= *very high trust*). Questions are for example: *‚How high is your trust in: The parliament/The police/The health system/The United Nations (UN) …'*. The questions are linked into three different groups: National state institutions based on legislative, executive and judiciary, specific questions regarding media and science, as well as international institutions. For the analysis, a trust index for national institutions will be calculated, named *general trust in state*. The political affiliation was asked on an eleven point Likert scale, a low score indicating a leftist political view and a high score indicating a rightist political view. Although in debate, the classification along the known left-right ideological spectrum is found to be a stable indicator of core ideological values (Jankowski et al., 2022). It was left open to the participants to omit the question, although only four participants chose to do so.

Acceptance of GHG emission taxation

The questions about the acceptance of GHG emission taxation were pretexted with informations about the intended taxation policies in the DACH-region as well as about the Pigouvian taxation design complemented with subsidies for disadvantaged households, which are intended by the governments (Klenert et al., 2019; Köppl et al., 2021). Furthermore, the emission of one ton of CO2 emissions is put into perspective using vivid and practical examples, like the mileage of flights per person or the production of beef (Écoconso, 2018; Rahmann et al., 2008).

For the detailed wording and layout, see Appendix A.

For the general acceptance of GHG emission taxation, a cost-effective rate of 150€/tCO2e was assumed (Kirchengast et al., 2019). Although this amount is debatable, as the costs for one ton of green house gas emissions depend strongly on the inclusion of relevant measures and calculation methods (Ökobüro, 2021; Wilke, 2013), 150€/tCO2e emerged as a good anchor value for a cost effective carbon tax (Tölgyes, 2021; Lechinger & Six, 2021). Example prices for products before and after the implementation were presented using calculations derived from Säll & Grenn (2015) for beef production and Tölgyes (2021) for fossil fuels and Schlatzer & Lindenthal (2020) for the price of milk and tomatoes. This range of products was deliberately chosen, as they function as a stand-in for many products of daily use on one hand and show the range of taxation on the other, with beef being the most and tomatoes the least taxed. For the detailed wording and layout, see Appendix A.

The acceptance of the described taxation was asked using an eleven point Likert scale, using three conditions to further specify the answers. The conditions dealt with the imposed dedication of the collected tax, if it was to be included into the state budged, being dedicated for GHG emission reduction projects or being redistributed back to the public.

Willingness-to-pay for GHG emission taxation

Willingness-to-pay was used to specify the acceptance of GHG emission taxation under the conditions described in previous paragraph. Here, five scenarios were presented: No tax, 30€/tCO2e, 75€/tCO2e, 150€/tCO2e and 300€/tCO2e. Participants were asked about their preferred scenario under the three tax dedication conditions described before. The additional pricing options pose an opportunity to get detailed and even contrary answers to the general tax acceptance questions, as people may accept a lowered emission task with its first introduction, as it is the case with Austria and Germany now, and accept higher cost after the successful implementation. Also, in more extreme cases low taxation may be disregarded as well, as it may be seen as ineffective (Büchs et al., 2021) and even regarded as a greenwashing attempt. Those participants would show acceptance in the highest taxation scenarios. The possibility to pose a more detailed and nuanced answer can therefore elicit a higher and differentiated acceptance value in the sample.

Emission intensive consumption behavior

Consumer behavior habits are important control variables, as the GHG emission tax is primarily a consumption tax that hits households differently based on their energy and transportation use as well as their diet. Four items were asked in this category, derived from consumption categories based on Duarte et al. (2016). Two questions asked about the frequent use of a car for transportation and the consumption of meat, providing five answering choices from *daily* to *never*. One question specifically asked about the method of heating used, as oil and gas heating is being hit disproportionally high by GHG emission taxation. The last question uses an eleven point Likert scale to assess the subjective burden a GHG emission tax would have on the household of the participants. The question is deliberately asked from a psychological perspective, as the recent or upcoming introduction of the tax should not pose a significant economic impact on household budgets, but may be perceived as being burdensome, possibly being confounded with other economical phenomena like inflation.

4 Results

4.1 Descriptive Results

In total, *N*=656 participants, 358 male and 281 female, finished the survey and were included in the study. Two participants were excluded in analyses regarding age, as the provided age value was faulty. Four participants omitted the item asking about political affiliation. Inter-correlations of independent, dependent and mediating variables used in the analysis are displayed in Table 1.1. The comprehensive listing of sociodemographic characteristics can be found in Table 1.2 and a summary of descriptive statistics can be found in Table 1.3.

Table 1.1

Inter-correlation matrix of dependent. independent and mediating variables

	1	2	3	4	5	6	7	8	9
1. Acceptance of GHG taxes if: Included in state budget[1]	–	.30**	.31**	.66**	.24**	.25**	-.04	.18**	.24**
2. Acceptance of GHG taxes if: Earmarked for climate projects[1]	.30**	–	.40**	.28**	.74**	.33**	-.35**	.54**	.20**
3. Acceptance of GHG taxes if: Redistributed (Pigouvian tax)[1]	.31**	.40**	–	.25**	.28**	.69**	-.20**	.38**	.15**
4. Willingness-to-pay if: Included in state budget[2]	.66**	.28**	.25**	–	.45**	.43**	-.11**	.23**	.15**
5. Willingness-to-pay if: Earmarked for climate projects[2]	.24**	.74**	.28**	.45**	–	.49**	-.39**	.49**	.13**
6. Willingness-to-pay if: Redistributed (Pigouvian tax)[2]	.25**	.33**	.69**	.43**	.49**	–	-.26**	.37**	.10*
7. Political Affiliation[3]	-.04	-.35**	-.20**	-.11**	-.39**	-.26**	–	-.44**	.14**
8. Holistic Climate Risk Perception[4]	.18**	.54**	.38**	.23**	.49**	.37**	-.44**	–	.04
9. General Trust in State[5]	.24**	.20**	.15**	.15**	.13**	.10*	.14**	.04	–

Note. * p<.05. **p<.01, significance two-tailed. N=656 (Variable 7 N=652). [1] Measured on an 11 point Likert scale (1=No acceptance; 11=Full acceptance). [2] Frequencies measured on a 5 point scale (1=No WTP, 2=30€/tCO2e. 2=75€/tCO2e, 3=150€/tCO2e, 5=300€/tCO2e). [3] Measured on an 11 point Likert scale (1=Far-Left political affiliation, 11=Far-Right political affiliation).
[4] Climate risk perception Items measured on a 7 point Likert scale. [5] Trust in state institutions measured on an 11 point Likert scale.

Table 1.2

Sociodemographic Characteristics

Characteristics	M	SD	N	%
Included cases			656	100
Gender	1.61	.60	645	98.3
Male			358	54.6
Female			281	42.8
Diverse			6	.9
No data			11	1.7
Location				
Austria			183	27.9
Germany			457	69.7
Switzerland			11	1.7
Other			5	.8
Age	41.65	19.26		
18 – 30			161	
31 – 49			314	
50 – 65			155	
66 –99			24	
excluded			2	
Highest completed education	4.58	.76	656	100
Mandatory education			3	.5
Apprenticeship			20	3
Vocational school/diploma			31	4.7
Matura/Abitur			141	21.5
University			461	70.3
Annual net income	4.16	1.72		
0 – 10.000 €			70	10.7
10.001 – 18.000 €			63	9.6
18.001 – 25.000 €			88	13.4
25.001 – 31.000 €			90	13.7
31.001 – 60.000 €			207	31.6
60.001 – 90.000€			94	14.3
more than 90.000€			44	6.7

Table 1.3

descriptive statistics

Items	M	SD	N valid	Skewness (std. error = .65)
Climate Risk Perception[1]			656	
Holistic risk perception	5.61	1.03	.	-1.51
Personal Risk Perception	5.30	1.19	.	-1.14
Global Risk Perception	5.93	.98	.	-1.94
Trust in …[2]			.	
General Trust in State	6.23	1.96	.	-.32
Parliament	6.66	2.37	.	-.50
Government	5.91	2.46	.	-.29
Judicative		2.28	.	-.81
Police	5.81	2.55	.	-.13
Military	5.21	2.58	.	.11
Public Service Broadcasting	7.51	2.55	.	-.85
Health system	7.87	2.08	.	-.89
Public Science and Research	9.17	1.77	.	-1.49
European Parliament	6.53	2.44	.	-.51
United Nations	6.40	2.32	.	-.39
Political Affiliation[2]	3.52	1.63	652	.93
Acceptance of GHG taxes if …[2]			656	
Included in state budget	5.56	2.97	.	.07
Earmarked for climate projects	9.49	2.31	.	-2.17
Redistributed/Pigouvian tax	8.44	2.62	.	-1.08
Willingness-To-Pay if …[3]				
Included in state budget	2.62	1.30	.	.41
Earmarked for climate projects	4.04	1.08	.	-1.16
Redistributed/Pigouvian tax	3,80	1.20	.	-.79
Consumation Behavior				
Car use[3]	2.72	1.14	.	.31
Meat consumption[3]	2.74	1.15	.	-.08
Energy use/Heating[4]			656	
Oil/Gas			403	
District heating			140	
Heat pump			63	
Wood/-pellets			58	
Electric/infrared			34	
Perceived impact of GHG tax on household[2]	6.39	2.17	656	-.30

Note. [1] Measured on a 7 point Likert scale. [2] Measured on a 11 point Likert scale. [3] Frequencies measured on a 5 point Likert scale. [4] Multiple answers possible.

Scores for the sub dimensions of Climate Risk Perception were calculated using the mean score of the respective construct items, Item 1, 2 6 and 8 for the personal climate risk perception sub scale (M=5.30, SD=1.19) and Items 3, 4, 5 and 7 for the global risk perception sub scale (M=5.93, SD=.98). Holistic risk perception was calculated using all items (M=5.61, SD= 1.03). Cronbach's alpha of .92 was reported for climate risk perception survey items. Additionally to the trust sub scales, a general trust in state score was calculated using items assessing the trust in national institutions, namely items 1 to 6. The general trust in state resulted in M=6.23, SD= 1.96 with Cronbach's alpha=.88.

4.2 Empirical Results

To test the influence of holistic climate risk perception on tax acceptance mediated by the general trust in the state, a mediation analysis using SPSS PROCESS 4.0 by Andrew F. Hayes (Hayes, 2022) was performed. Holistic risk perception was used for the independent variable, changing tax and willingness-to-pay conditions—i.e. three options varying in the way the additional tax revenue was intended to be invested respectively—were used as dependent variables, general trust in the state as the mediator and education as well als the subjectively perceived burden of the GHG emission tax on the household als covariates. Those covariates were selected due to the distribution of the sample data and in respect to the socio-economical backgrounds of the participants. The resulting standardized path coefficients can be viewed in Table 3. Significant effects were found under all tax conditions, with the acceptance of taxes earmarked for climate related projects resulting in the strongest effect of *b*=.52, a medium effect for the distributive tax condition of *b*=.37 and a small effect for the integration into the state budget tax condition of *b*=.17. Covariates showed significance for education under the state budget and earmarking tax

Table 3

Simple mediation analysis with X(IV)=holistic risk perception and M=General trust in state

					covariates for total effect model	
Y (DV)	a	b	c'	c	education	perceived burden on household
Acceptance if tax integrated in state budget	.04^{ns}	.22**	.17**	.17**	.14*	-.03ns
Acceptance if tax earmarked for climate projects	.	.17*	.52**	.53**	.07*	-.07*
Acceptance if tax redistributed	.	.13*	.37**	.37**	.04ns	-.02ns
WTP if tax integrated in state budget	.	.13**	.21**	.22**	.17*	-.10*
WTP if tax earmarked for climate projects	.	.10*	.47**	.47**	.14**	-.17**
WTP if tax redistributed	.	.08*	.36**	.36**	.09*	-.12*

Note. * p<.05, **p<.01.

conditions with a small effects of b=.14 and b=.07 respectively. Perceived burden showed a small significant covariance of b=-.07 under the earmarking tax condition. Willingness-to-pay (WTP) was also analyzed in the three mentioned conditions, of which all yielded in significant results. WTP under the earmarking tax condition yielded the strongest effect with a direct effect between holistic climate risk perception of b=.47, followed by the distributed tax condition with b=.36 and the state budget tax condition with b=.21. In contrast to the tax acceptance conditions, WTP showed a stronger influence of covariates. The perceived burden on the household through the implementation of GHG emission taxes was significant in all conditions, showing an effect of b=-.17 in the earmarking tax condition, b=-.12 in the distributed tax condition and b=-.10 in the state budget tax condition. The covariate education produced a different significance pattern, showing significant results in the state budget b=-.17 and earmarked conditions b=-.12.

The relation between holistic risk perception and the general trust in the government variables was not significant (b=.04; p=.34) and therefore a mediation of the general trust variable can not be assumed. Trust sub scales will be analyzed in the exploratory analysis section for a more differentiated view on this hypothesis.

Next, differences between demographic and political views will be examined to account for the second hypothesis. First, differences in the climate risk perception variables as well as GHG emission tax acceptance and WTP were examined. The underlying factors of risk perception as well as acceptance and WTP conditions were tested for normality using Chi-Square and Kolmogorov-Smirnov tests. All tests proven significant and a normal distribution of the data cannot be assumed, therefore non-parametric tests were applied for the statistical analysis.

Male (M_{RANK}=345.21) and female (M_{RANK}=283.29) samples were tested, as the sample size of the diverse gender category was not sufficiently high. Differences in holistic risk perception (U=44770.5, Z=-2.39, r^2=.01, p=.02), personal risk perception (U=445970.5, Z=-2.47, r^2=.01, p=.01) and global risk perception (U=45769, Z=-1.97, r^2=.00, p=.05) all proven to be significant, although with very small effect sizes. Political affiliation also showed significant results with a small effect size (U=39977, Z=-4.34, r^2=.01, p=<.00). All other comparisons remained insignificant. For detailed results, see Table 4.

Table 4

non-parametric tests for Gender (N=639; 1= Male (MRANK = 345.21). 2=Female (MRANK=283.29))

Items	Mann-Whitney U	Wilcoxon W	Z	r	r^2	sig.
Climate Risk Perception						
Holistic risk perception	44770.50	109031.50	-2.39	-.10	.01	.02
Personal Risk Perception	44597.50	108858.50	-2.47	-.10	.01	.01
Global Risk Perception	45769	110030	-1.97	-.04	.00	.05
GHG tax acceptance if tax …						
… gets included in state budget	46268	85889	-1.75	-.07	.00	.08
… is earmarked for green project	48031.50	112292.50	-1.05	-.04	.00	.30
… is redistributed to citizens	48344.50	112605.50	-.86	-.03	.00	.40
Willingness to Pay if tax …						
… gets included in state budget	45930	85551	-1.94	-.08	.01	.05
… is earmarked for green project	49600	113861	-.32	-.01	.00	.75
… is redistributed to citizens	49471.50	89092.50	-.37	-.02	.00	.71
Trust in …						
General Trust in State	47634.50	87255.50	-1.15	-.05	.00	.25
Political Affiliation	39977	79037	-4.34	-.17	.03	.00

Education in relation to GHG tax acceptance and WTP was also tested for normality, resulting in significant Kolmogorov-Smirnov tests highlighting the need for non-parametric testing. The group *mandatory education* was excluded due to the small sample size of N=3. The Kruskal-Wallis test showed significance under three conditions: Tax acceptance if taxes get included in the state's budget (H=17.37, df=3, p<.00), WTP if taxes get included in the state's budget (H=28.89, df=3, p<.00) and WTP if the taxes are earmarked for climate related projects (H=16.33, df=3, p<.00). All other combinations remained insignificant. For detailed results, see Table 5.

Table 5

non-parametric tests for Education (N=653)

Items	Kruskal-Wallis H	df	sig.
GHG tax acceptance if tax …			
… gets included in state budget	17.37	3	<.00
… is earmarked for green project	3.65	3	.31
… is redistributed to citizens	2.36	3	.53
Willingness to Pay if tax …			
… gets included in state budget	28.89	3	<.00
… is earmarked for green project	16.33	3	<.00
… is redistributed to citizens	7.47	3	.10

To examine, where the significant differences between educational levels are showing, pairwise comparisons for the three significant conditions were conducted. In the GHG tax acceptance condition if taxes are included in the state budget condition, the comparisons between apprenticeship and university (Z=-2.85, r=-.13, r^2=.02, p=.04) and between vocational school and university (Z=-2.83, r=-.13, r^2=.02, p=.04) were significant. For the WTP state tax comparison, also apprenticeship and university (Z=-3.57, r=-.16, r^2=.03, p=<.00) and vocational school and university (Z=-3.89, r=-.18, r^2=.03, p=<.00) showed significant results. Although significant results were found in the Kruskal-Wallis test for WTP under the climate project earmark condition, no significant pairwise comparison could be found. Only the comparison between vocational school and university showed an almost significant result (Z=-2.77, r=-.12, r^2=.01, p=.06). Detailed results for pairwise comparisons can be found in Appendix B.

Next, difference in income levels in regard to GHG tax emission acceptance and WTP were tested. Significant Kolmogorov-Smirnov tests for normality made use of the Kruskal-Wallis test necessary. No significant difference between income levels could be found under the tested conditions. For detailed results, see Appendix C.

To test for the relation between political view and tax acceptance/WTP, a bootstrapped linear regression analysis with 10.000 samples was performed, using the reported position on the

political scale as the independent variable and the tax/WTP conditions as the dependent variable. All conditions were proven to be significant, with the exception of political view and the acceptance of taxes if included in the state budget (*B 95%CI* [-.22, .08], *B*=-.07, *SE*=.08, b=-.04, r^2=.04, *p*=.28). Small effects were found in the WTP state condition (*B 95%CI* [-.15, -.03], *B*=-.09, *SE*=.03, *b*=-.11, r^2=.02, *p*=<.00) and the acceptance distribution condition (*B 95%CI* [-.46, -.18], *B*=-.32, *SE*=.07, b=-.20, r^2=.04, *p*=<.00), medium to strong effects in the WTP distribution condition (*B 95%CI* [-.25, -.13], *B*=-.19, *SE*=.03, *b*=-.26, r^2=.07, *p*=<.00), and the tax acceptance earmark condition (*B 95%CI* [-.63, -.35], *B*=-.49, *SE*=.07, *b*=-.35, r^2=.12, *p*=<.00), and the WTP earmark condition (*B 95%CI* [-.31, -.20], *B*=-.26, *SE*=.07, *b*=-.39, r^2=.15, *p*=<.00). For more detailed results, see Table 7.

Table 7

Regression analysis with political view as independent variable (Bootstrapped with 10000 Samples)

Items	B 95% CI [LL, UL]	B	SE	b	r^2	sig.
GHG tax acceptance if tax …						
… gets included in state budget	-.22, .08	-.07	.08	-.04		.32
… is earmarked for green projects	-.63, -.35	-.49	.07	-.35	.12	<.00
… is redistributed to citizens	-.46, -.18	-.32	.07	-.20	.04	<.00
Willingness to Pay if tax …						
… gets included in state budget	-.15, -.03	-.09	.03	-.11	.01	<.00
… is earmarked for green projects	-.31, -.20	-.26	.03	-.39	.15	<.00
… is redistributed to citizens	-.25, -.13	-.19	.03	-.26	.07	<.00

Lastly, age was examined using a bootstrapped linear regression analysis with 10.000 samples and age being the independent and acceptance/WTP being the dependent variables. Under both, the GHG emission tax acceptance and WTP conditions where the tax is being earmarked for climate projects the relation between age and acceptance/WTP has proven to be sig-

nificant with small effects in the acceptance (*B 95% CI* [.01, .04], *B*=.01, *SE*=.01, *b*=.11, r^2=.01, *p*=.04) and WTP (*B 95%CI* [.00, .02], *B*=.01, *SE*=.00, *b*=.12, r^2=.01, *p*=.03) conditions. All other cases showed in insignificant results. For specific results, Table 8.

Table 8

Regression analysis with age as independent variable (Bootstrapped with 10000 Samples)

Items	B 95% CI [LL. UL]	B	SE	b	r^2	sig.
GHG tax acceptance if tax …						
… gets included in state budget	-.03, -.00	-.00	.00	-.05		.28
… is earmarked for green project	.01, .04	.01	.01	.11	.01	.04
… is redistributed to citizens	-.03, .01	.00	.00	-.01		.79
Willingness to Pay if tax …						
… gets included in state budget	-.01, .01	.00	.02	.02		.75
… is earmarked for green project	.00, .02	.01	.00	.12	.01	.03
… is redistributed to citizens	-.01, .00	.00	.00	.01		.80

To test wether leftist political views result in higher decoupling from the general trust in the government, a mediation analysis using political view as the independent, tax acceptance and WTP conditions as the dependent and general trust in the government as the mediating variables was conducted. The resulting path coefficients can be examined in Table 9. All mediations proven to be significant, with the GHG emission tax under the integration into the state budget condition being the only one that showed a full mediation. The direct effect between political view and the tax/WTP conditions showed a negative correlation in all partially mediating cases, and therefore supporting the hypothesis.

Table 9

Simple mediation analysis with X(IV)=political view and M=General trust in state

					covariates for total effect model	
Y (DV)	a	b	c'	c	education	perceived burden on household
Acceptance if tax integrated in state budget	.14*	.23**	-.07ns	-.03ns	.14**	-.04ns
Acceptance if tax earmarked for climate projects	.	.25*	-.37**	-.34**	.08*	-.07*
Acceptance if tax redistributed	.	.17*	-.22**	-.20**	.06ns	-.03ns
WTP if tax integrated in state budget	.	.16**	-.12*	-.10*	.18**	-.10*
WTP if tax earmarked for climate projects	.	.17*	-.39**	-.37**	.15**	-.16**
WTP if tax redistributed	.	.13*	-.26**	-.24**	.10*	-.12*

Note. * p<.05, **p<.01.

4.3 Explorative Analysis

In the explorative analysis, I want to first differentiate on the mediation analysis with the trust sub scores, as those show strong deviations in the subscales *trust in police* and *trust in military*. Second, I want to elaborate on possible differences between personal and global risk perception between GHG tax acceptance and WTP. Those scales, although seemingly highly correlated as shown evident in the structural equation model of the validation analysis, could have a different effect on the two approaches of the tax conformity measurements. I hypothesize WTP to be a more personal assessment of tax acceptance. The subjective burden of the GHG emission tax on the own household showed a significant covariance in all WTP conditions during the mediation analysis and could therefore show higher scores with personal climate risk perception.

For the first approach, a principle component analysis was conducted using all ten trust items. The PCA resulted in the extraction of two factors with Eigenvalues of 5.32 (39.98% of variance explained) and 1.26 (25.88% of variance explained) and a cumulative 65.86% of variance explained. The varimax rotated components showed that all items loaded on the same factor,

expect the trust in police and military, therefore indicating a second component (see Appendix D for details). Two new trust items were calculated out of the resulting component analysis: trust in soft and hard state, based on the definitions formulated for soft and hard power by Joseph Nye (1990). The measure for trust in soft state excluded trust scores for the European Parliament and the United Nations to be coherent with the prior analysis. Mediations analyses were performed with holistic risk perception as the independent, soft/hard trust as mediating and tax/WTP conditions as dependent variables. Splitting trust into two factors showed a significant mediation under the trust soft state (b=.23, p<.00) and trust hard state (b=-.11, p<.00) conditions. Hard state trust has a small significant effect on the acceptance of GHG emission taxes under the earmark and distribution conditions, and remains not significant under all other conditions. For detailed results with trust in hard state as the mediator, see Table 10.1.

Table 10.1

Simple mediation analysis with X(IV)=holistic risk perception and M=Trust in hard state

Y (DV)	a	b	c'	c
Acceptance if tax integrated in state budget	-.11*	.06ns	.38**	.39**
Acceptance if tax earmarked for climate projects	.	.11*	.19**	.18**
Acceptance if tax redistributed	.	.10*	.55**	.54**
WTP if tax integrated in state budget	.	.04ns	.24**	.23**
WTP if tax earmarked for climate projects	.	.05ns	.50**	.49**
WTP if tax redistributed	.	.00ns	.37**	.37**

Note. * p<.05, **p<.01.

Trust in soft power in turn shows small to medium significant effects under all tax and WTP conditions. For detailed results with trust in soft state as the mediator, see Table 10.2.

Table 10.2

Simple mediation analysis with X(IV)=holistic risk perception and M=Trust in soft state

Y (DV)	a	b	c'	c
Acceptance if tax integrated in state budget	.23**	.29**	.11**	.18**
Acceptance if tax earmarked for climate projects	.	.26**	.48**	.49**
Acceptance if tax redistributed	.	.18**	.33**	.38**
WTP if tax integrated in state budget	.	.18**	.22**	.23**
WTP if tax earmarked for climate projects	.	.20**	.45**	.49**
WTP if tax redistributed	.	.17**	.33**	.37**

Note. * p<.05, **p<.01.

To test the differences in global and personal climate risk perception on tax acceptance and WTP, a simple mediation analysis with those two conditions changing as the independent variable was conducted using the general trust in the state as the mediator. Neither the mediation with personal nor with global risk perception was significant (see Appendix E). Also, direct and total effects between risk perceptions and tax/WTP conditions did not differ on a noteworthy scale. A noticeable difference occurred in the acceptance of GHG taxes if the tax gets earmarked for climate related projects, with a direct effect with global risk perception of b=.55, p=<.05 and b=.47, p=<.05 with personal risk. Detailed results are displayed in Appendix E.

5. Discussion

My aim was to show the importance that emotional factors play in the acceptance of and the willingness-to-pay for GHG emission taxes. The results show that, with some considerations for the specific arrangement of tax designs, climate risk perception is the driving force for the acceptance and the willingness-to-pay for GHG emission taxes. Generally speaking, taxes may be viewed by some as a burden, tax evasion as a minor offense and tax offenders as having positively associated traits (Kasper et al., 2018). Therefore, it is a non-trivial task for the government, to make people accept and pay taxes. Prior studies (Fairbrother, 2019; Hammer & Jeagers, 2008) mostly focused on the belief in climate change and more specific taxations like fossil fuel taxes, which may be oversimplifying the GHG emission taxation concepts that are introduced nowadays. An oversimplification of climate mitigation measures through taxation may be finding evidence for trust in the government being the strongest predictor for tax acceptance and disregarding the dynamic emotional relations that are evolving with the growing impact of climate change. As climate change with all of it's systematic dependencies is gaining traction as the defining challenge of the 21st century, reaching out into almost every scientific discipline and stressing the need for interdisciplinary solutions, oversimplification and disregard for possibly influential factors is not a valid option. There is no easy solution for climate mitigation.

The first hypothesis stated the influence of risk perception on acceptance and WTP. This assumption could be found with strong effects in all of the three tax and WTP conditions, namely the use of additional tax revenue in the state budget, earmarking it for climate related project and redistributing it as a Pigouvian tax. The condition, under which the GHG emission tax was being incorporated into the state budget showed the weakest link to climate risk perception. This finding goes in hand with the insignificant moderation effect of the general trust in the state. The state seems to merely play the role of a covariate in this regard, although still positively correlated and therefore positively influencing acceptance and WTP. We see, that the effects of the general trust in the state on tax acceptance and WTP get smaller as the role of the state diminishes in the proposed tax condition, being the smallest in the redistribution condition. The influence of covariates seems to have a bigger impact on the willingness-to-pay conditions than on tax acceptance conditions. Especially the perceived burden on the household has an inverse effect on the willingness to

dedicate greater sums towards climate taxes. A possible explanation for this difference could be deducted from the survey design, as it was possible to dedicate less money than in the cost effective tax acceptance conditions with 150€/tCO2e. Less well-off, rural and households with a higher use of fossil fuel dependent transportation and heating could be therefore less likely to show a high WTP, as those variables most likely influence the perceived burden. Nevertheless, the covariation ranged from *b*=-.10 in the state to *b*=-.17 in the earmark conditions, showing a small effect on WTP and supporting the relatively high overall WTP in the sample.

Regarding hypothesis 1b, a significant mediating effect of trust in the state on climate risk perception and GHG emission tax acceptance/WTP could not be found. A closer look on the measured trust variables showed a pattern of relatively low trust scores in the so called "hard" state institutions, in this case the police and military. This observation was pursued in the exploratory analysis eventually showing two prevalent constructs in the trust data: Trust in the "soft", i.e. non executive state mostly concerned with legislature, judicature and academia, and trust in the „hard", i.e. executive state mostly concerned with policing and military duties. The hypothesized mediation effects could be found when using the trust in soft state variable as the mediator with small to medium indirect effects on tax acceptance and WTP, with the highest values in the project earmarking tax acceptance and WTP conditions. Those findings are more in line with former tax psychological research and climate change mitigation measure acceptance literature (Carattini et al., 2017). Trust in the hard state seems to have a contradictory effect indicated by the negative relation between climate risk perception and trust. Plenty of possible explanations for this effect could come into play, like the general ideology of left leaning participants (Roché & Oberwittler, 2017) or the negative public image that those institutions have to battle with due to political scandals and aggressive actions towards green protestors (Kurier, 2020), to name a few.

The second hypothesis is concerned with demographic differences, as those are considered to be highly influential on the perception of climate change and the acceptance of taxes. The effects between genders remained small and, contrary to the literature (Sundblad et al., 2017), leaning towards a stronger holistic climate risk perception with males. Male participants were also leaning towards a right wing political affiliation which is in line with prior findings in the literature (Roché & Oberwittler, 2017). Accordingly, we can observe a small significant effect for a higher willingness-to-pay if the tax gets included in the state budget with the male sample. Testing

for education is not only essential due to findings connecting higher education with higher concerns and therefore higher acceptance of climate mitigation policies in previous studies (van der Linden, 2015), but also due to the skewed sample for higher education that underlies this study. Significant differences occur in both state budget conditions as well as the WTP earmarking conditions. Concluding from those findings, the involvement of the state seems to be a defining characteristic in the difference between education levels. When we take a look at the pairwise comparisons between the educational levels under each condition, significant results occur between the educational levels that are furthest away from each other, namely apprenticeship, vocational school and university education. Those effects, although small, could indicate to an educational or knowledge divide, in this case mostly concerned with the effect taxes could have on climate mitigation and the agency citizens have in political decisions (Carattini et al., 2018). When we consider differing income levels, that in turn are closely tied to the achieved educational level (Statistik Austria, 2020), significant differences could not be observed. This result strikes as especially interesting, as a closer look at the acceptance means in income classes reveals, showing low acceptance on the extreme ends of the income distribution. Two forces could be hypothesized to be at play. For one, a negative relation between the acceptance of taxes and income is found in the literature (Hofmann et al., 2017) that may play an effect, and for the other, the afore mentioned educational gap that may also find an resemblance in the income may influence the acceptance and WTP in income categories. Income is one of the most strikingly debated demographic variables when it comes to details in the design of GHG emission taxation, especially taken as an argument for a generally lower taxation sum in tons per CO2 equivalent. It is possible that the discourse is misled, as a properly introduced tax would relieve low income households, which in turn could even improve acceptance ratings (Domon et al., 2022). The argument for a low GHG emission tax to protect low income households can be therefore considered as invalid and politically unwise.

When talking about politics, we have to observe the political spectrum as another important influence on climate mitigation policies. Except for the tax acceptance under the inclusion in the state budget condition, all conditions showed significant effects between the individual position on the political spectrum and tax acceptance or WTP. A more leftist position on the political spectrum was associated with a higher acceptance of GHG emission taxes and WTP with strongest effects in the project earmark conditions. Interestingly, those effects are in line with the gener-

al acceptance of climate mitigation policy findings, where green projects get the highest acceptance scores due to their immediate and visible effects (Klenert et al., 2018). People answering in favor of the importance or impact of climate change may be inclined to view themself as being leftist or at least not view themselves on the right political spectrum. It is to be noted, that this relation does not hold true under every condition, as it was stated before that there is a significantly higher WTP for GHG emission taxes for males under the state budget condition. I will continue the discussion on the political spectrum later in this section.

Due to the importance of the climate issue to the younger generations, age was also considered in the analysis. Contrary to the belief, that a lower age would yield in higher support for tax acceptance or at least the WTP, the regression analyses remained insignificant except for the earmarked conditions in both tax acceptance and WTP. The small effect remained positive, showing higher support for this condition with rising age. The explanation for this small albeit significant effect may for one lie in the fact that young people are more likely to be less involved in the taxation system and have less financial means than older cohorts. Furthermore, older generations may view the tax as a donation to green development, not having the need for redistribution and disregarding the societal effect of a Pigouvian tax. Those ideas, although seemingly logical, are also highly speculative and need further research, as there is a clear and strong ideological tendency towards the fight against climate change with young generations, at least in the western hemisphere (Lewis et al., 2021).

The last hypothesis considered the relation between trust and political views in regard to tax acceptance and WTP. Under most conditions, a clear negative correlation and therefore a tendency towards the left political spectrum was found with higher tax acceptance and WTP. Also, trust remained a mediating variable with a higher value resulting from a position further right on the political spectrum. Here, we can also see two forces weighting in on tax acceptance and WTP. First, leftist views that are traditionally pro-environmental, reinforce climate mitigation, and second, more right-winged views reinforce trust in the state that in turn reinforces tax acceptance, although with smaller effects. There seem to be two motives at play, that both result in GHG emission tax acceptance to some degree. As previously stated, leftist views influence the general trust in the state negatively due to the differing effects of hard and soft state, lowering further potential for taxation acceptance from a higher trust score. Increasing trust in the hard state in left

leaning cohorts may be considered as an achievable and effective way to rise acceptance and WTP, possibly not exclusively of GHG emission taxes.

This study presented a differentiated perspective on the effect of climate risk perception on GHG tax acceptance and WTP with further reaching specifications on demographic and political views affecting tax related climate mitigation policies. There is a clear positive relation between climate risk perception and tax acceptance/WTP, although no mediating effect could be found when calculating a combined variable for trust in the state. The state itself is a complex and abstract structure, that manifests itself in the form of various institutions and therefore politicians and personalities. It may be hard to consider the state as a whole, unified structure when regarding the issue of climate mitigation policies, as different roles are assigned to executive, judicial and legislative forces, putting them in positive and negative light. The explorative analysis found two constructs behind the trust survey items. The resulting mediations using trust in the soft and hard state variable showed that trust in the hard state caused an inverse mediating effect, if the mediation was proven to be significant, and therefore reducing the effect soft trust has on tax acceptance. The mediation effect that was originally hypothesized with the combined general trust in state was found using the soft state variable, showing medium size mediating effects on tax acceptance, although smaller than the direct effect climate risk perception has on GHG emission tax acceptance and WTP. While climate risk perception is the main influence on emission tax acceptance and WTP, trust in the (soft) state also plays a significant role and needs to be regarded and maintained by authorities.

The climate risk perception survey hypothesized two distinct climate risk dimensions, personal and global risk perceptions. Those constructs were validated in the German translation of the survey. In the explorative analysis, the two constructs were tested for the afore mentioned mediations with GHG emission tax acceptance and WTP. WTP being a more individual construct, as seen on the influence of the burden on household covariable, was believed to show slightly distinct results in those conditions. Those assumptions could not be found, as the path coefficients remain almost identical under both conditions. Although two constructs are prevalent in the survey in theoretical terms, their standardized coefficient, which showed b=.91 in the structural equation model, is too high to produce any noteworthy statistical differences. It is more likely, that the climate risk perception survey produces a useable measure for holistic risk, but is too ambi-

tious in describing differentiated risk facets that may just not be thoroughly developed in the sample. It would be interesting to examine samples that are more narrowed down to specific cohorts that experienced strong climatic weather events to some degree and compare their differentiated view on the matter.

5.4 Limitations

There are some limitations to the sample that need to be considered when interpreting the results of this thesis. Regarding the educational level, the sample is skewed towards a university education with $N=461$ which stands in stark contrast to the sample size of mandatory or apprenticeship education respectively. Skewness towards high values occurs in all climate risk perception indices, although this might only reflect the societal importance of the issue. A high right sided skewness is also to be noted in trust values regarding public science and research, which occurs in parallel to the high degree of university education in the sample.

6. Conclusion

The presented results show a strong relation between the psychological factors of climate risk perception and the acceptance/WTP of GHG emission taxes. It is also apparent that trust in the state does plays a role in the mediation between individual and tax acceptance, although in a more complex way that needs to be considered in future research. Still, it can be argued that at least in the matter of greenhouse emissions, there is a tendency to differentiate between a tax that is used by the government as revenue, and being dedicated for a cause or to steer capitalist market imbalances. On a more detailed level, demographic differences need to be considered and a growing educational gap to be taken into consideration when implementing climate mitigation policies. Climate change being a mostly invisible, slowly progressing threat that in most parts makes itself visible through data, it is prone to be disregarded by lower educated demographics. People who share ideological values with the climate movement, i.e. with leftist political views, tend to lean toward the acceptance of GHG emission taxes regardless, or in spite of, the government.

Which future prospects can be consequently formulated from the presented results? First, let's take direct and immediate psychological effects into consideration. The introduction of a price for carbon will cause rebound effects, as the impression that the carbon price already justifies carbon intensive consumption may arise (Duarte et al., 2016). A prominent example for this rebound effect is currently present in the form of voluntary carbon offsetting of plane travel emissions, where a certain amount can be paid to be invested in green projects or the purchase of biofuel. Higher income travelers and companies may "greenwash" or more precisely "carbonwash" their consciousness and not change their travel behavior (In & Schumacher, 2021). GHG emission taxation could be prone to similar effects. With the introduction of a distributional tax scheme, lower income households will have a higher budget that will eventually be used for consumption of potentially carbon intensive goods. Those mechanisms may therefore diminish the effect of GHG emission taxation and even produce inverse effects. As those effects need to be factored into an effective climate mitigation measure, the carbon tax needs to be appropriately taxed to unfold its intended effect. Acceptance is influenced by the effectiveness of a measure, and a low and ineffective tax may lose its effect not due to the taxed amount but due to an inconsequent implementation. We have seen that climate risk perception is generally high and leads to high acceptance and WTP scores, therefore allowing for a higher and faster taxation than it is currently im-

plemented by Austria and Germany. Although left leaning voters are more likely to support GHG emission taxation, governments in general could improve acceptance ratings by introducing an effective taxation. It would be therefore in their best interest, even if not apparent in their strategy papers, so impose sharp GHG emission taxation policies.

Governments need to consider public concerns about fairness when implementing new policies. Fairness in the context of carbon pricing has been studied thoroughly (Maester-Andrés et al., 2019), stressing the importance of perceived fairness on the acceptance and ultimately the success of implemented policies. The presented results show that investments in green projects as well as the proposed distributional taxation concepts show the highest acceptance. From a communicative perspective, governments need to inform and educate about the workings of GHG emission taxes as well as present successfully accomplished green projects financed by the increased budget from GHG emission tax revenues. Additionally, it is important to stress the risk that climate change poses not only to the environment but also directly to the population. A heightened climate risk perception will drive acceptance and the willingness-to-pay in the population, building an important cornerstone for successful implementation of climate mitigation policies. As those are within the scope of various international agreements and contracts (e.g. COP26, Paris Agreements, EU), it is in the governments best interest to avert harm from the state and reduce the emission of greenhouse gas.

Climate mitigation policies are not only about the aversion of negative consequences, but also pose an opportunity for growth. As various calculation models show (Parry, 2020; Borissov et al., 2019), higher emission taxes and a clean and green economy may provide an impulse for economic growth, promote skilled and therefore higher quality labour and eventually a stronger international knowledge exchange. Those aspects are important, as small countries like Austria may perceive a high climate risk, but refuse to act due to the size and the small direct impact on the global emission budget. In this argumentation, chain effects and spillovers from the own actions are disregarded or diminished. Especially Austria, being a wealthy and diplomatically well connected country, has a variety of possibilities to exchange knowledge, resources and best practices to less fortunate countries in the global south. Climate risk perception can stress the importance of those issues. Additionally, more focus needs to be put on studying climate risk perception and climate mitigation policy acceptance outside of WEIRD samples (western, educated, industri-

alized, rich, democratic; Henrich et al., 2010). Appeals to more inclusion and recognition of lesser-industrialized countries in the discussion have been elaborately formulated in the past (Kandlikar & Sagar, 1999). Studies like Thaker et al. (2020) in India or Sattler et al.'s (2021) Mongolian expeditions show differences to western cultures in the perception and coping mechanisms in regard to climate change, stressing the need for more research in countries that get to experience the consequences of anthropogenic climate change the first and possibly the hardest. Adaptation and recognition is deeply embedded in cultural structures and norms, that need to be respected when implementing climate mitigation policies (Asiyanbi, 2015).

Lastly, climate change is a predominantly global issue. We need more than just GHG emission taxation and national climate projects to battle the biggest challenge of the 21st century. As climate risk perception allows for a high willingness-to-pay for emissions, high emitting and wealthy countries could significantly contribute to a global climate fund, help developing countries in developing their own green infrastructures and reduce the free-riding of less climate concerned countries (Kornek & Edenhofer, 2020). Such global initiatives are key to the achievement of global emission goals, but they start small and on national grounds. It can therefore not be stressed enough to push for countries of the global north like Austria and Germany to strive to be global climate leaders. As both countries are highly affected by climate change, strong measures are expected to be accepted and carried by the population, putting us in the privileged position to pioneer in the installment of climate mitigation policies.

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Appendix

Appendix A *Survey Page 1 – Introduction*

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Sehr geehrte Teilnehmer:innen,

Vielen Dank, dass Sie sich für diese Erhebung im Rahmen meiner Masterarbeit an der Universität Wien Zeit nehmen. Der Fragebogen wird in etwa 10 Minuten in Anspruch nehmen. Es werden politische Einstellungen, Konsumverhalten und Einstellungen zum Klimawandel abgefragt.

Die Antworten sind anonym und werden ausschließlich für wissenschaftliche Zwecke ihm Rahmen dieser Masterarbeit am Institut für Arbeits-, Wirtschafts-, und Sozialpsychologie der Universität Wien verwendet. Ein Rückschluss auf Ihre Person ist ausgeschlossen.

Sollten Sie weitere Fragen oder Anliegen haben, können Sie mich gerne unter *a1168922@unet.univie.ac.at* erreichen.

Weiter

B.Sc. Patryk Senwicki, Universität Wien – 2022

0% ausgefüllt

Appendix A *Survey Page 2 – Climate Risk Perception*

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Fragen zur klimabezogenen Risikowahrnehmung

1. Wie besorgt sind Sie über die Folgen des Klimawandels?

nicht besorgt — sehr besorgt

2. Wie wahrscheinlich empfinden Sie den Fall, dass der Klimawandel im Laufe Ihres Lebens eine ernsthafte Bedrohung für Ihre Gesundheit und Ihr Wohlbefinden darstellen wird?

sehr unwahrscheinlich — sehr wahrscheinlich

3. Wie wahrscheinlich ist es Ihrer Meinung nach, dass der Klimawandel unserer Gesellschaft nachhaltig schadet?

sehr unwahrscheinlich — sehr wahrscheinlich

4. Stellt der Klimawandel Ihrer Meinung nach eine schwerwiegende Bedrohung für das natürliche Ökosystem dar?

keine Bedrohung — sehr schwerwiegende Bedrohung

5. Wie bedenklich finden Sie die derzeit weltweit sichtbaren Auswirkungen des Klimawandels?

nicht bedenklich — sehr bedenklich

6. In welchem Ausmaß fühlen Sie sich persönlich vom Klimawandel bedroht?

nicht bedroht — sehr bedroht

7. Wie schwerwiegend schätzen Sie die Folgen des Klimawandels für die DACH-Länder (Deutschland/ Österreich/Schweiz) ein?

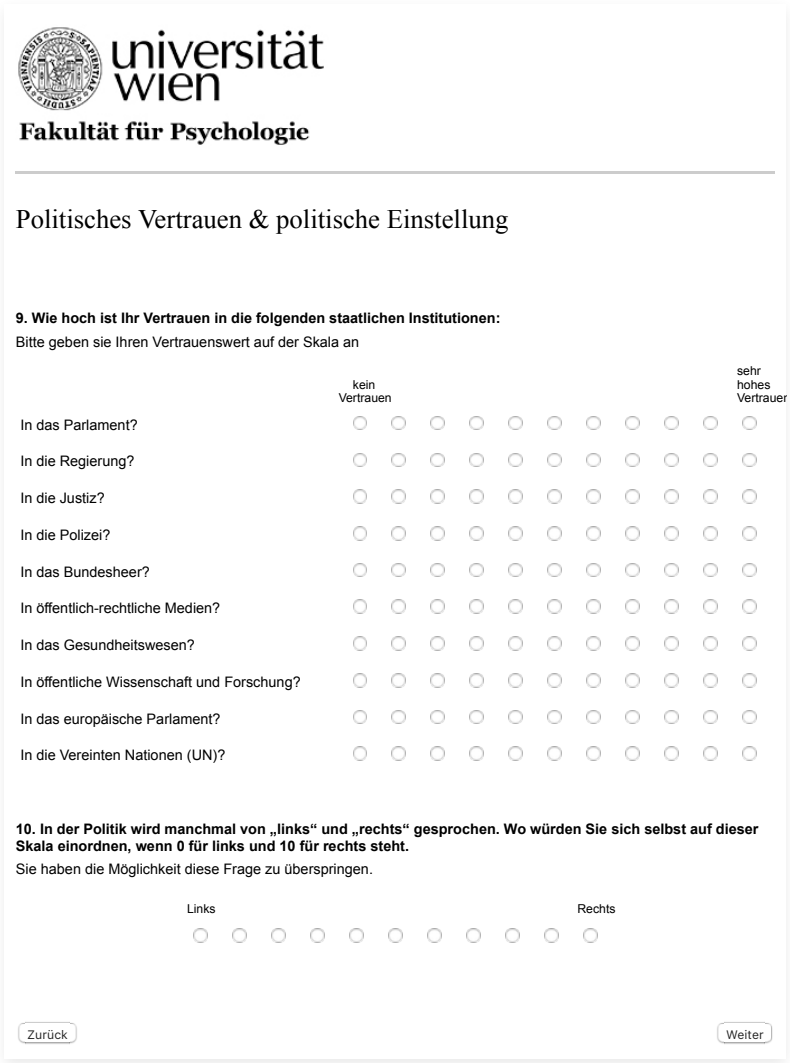
keine Folgen — sehr schwerwiegende Folgen

8. Wie oft sorgen Sie sich über mögliche negative Folgen des Klimawandels?

nie — sehr oft

Zurück — Weiter

Appendix A *Survey Page 3 – Trust in the Governmental Institutions & Political Affiliation*



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Politisches Vertrauen & politische Einstellung

9. Wie hoch ist Ihr Vertrauen in die folgenden staatlichen Institutionen:

Bitte geben sie Ihren Vertrauenswert auf der Skala an

	kein Vertrauen										sehr hohes Vertrauen
In das Parlament?	○	○	○	○	○	○	○	○	○	○	○
In die Regierung?	○	○	○	○	○	○	○	○	○	○	○
In die Justiz?	○	○	○	○	○	○	○	○	○	○	○
In die Polizei?	○	○	○	○	○	○	○	○	○	○	○
In das Bundesheer?	○	○	○	○	○	○	○	○	○	○	○
In öffentlich-rechtliche Medien?	○	○	○	○	○	○	○	○	○	○	○
In das Gesundheitswesen?	○	○	○	○	○	○	○	○	○	○	○
In öffentliche Wissenschaft und Forschung?	○	○	○	○	○	○	○	○	○	○	○
In das europäische Parlament?	○	○	○	○	○	○	○	○	○	○	○
In die Vereinten Nationen (UN)?	○	○	○	○	○	○	○	○	○	○	○

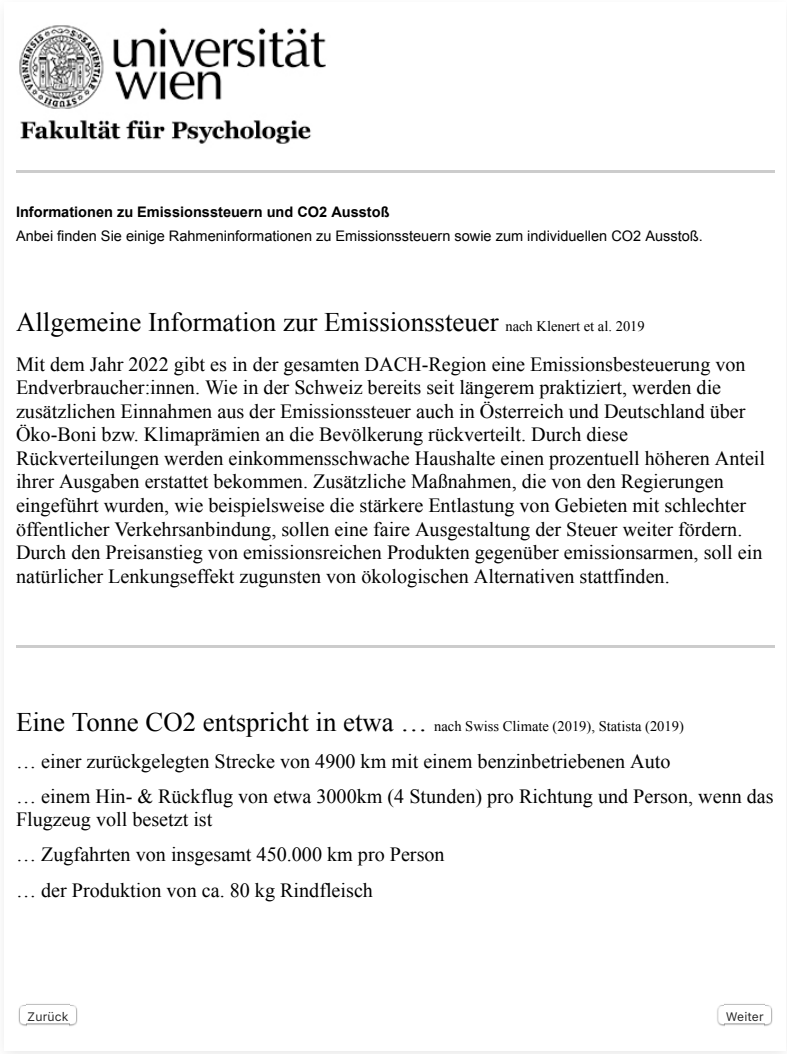
10. In der Politik wird manchmal von „links“ und „rechts“ gesprochen. Wo würden Sie sich selbst auf dieser Skala einordnen, wenn 0 für links und 10 für rechts steht.

Sie haben die Möglichkeit diese Frage zu überspringen.

Links										Rechts
○	○	○	○	○	○	○	○	○	○	○

Zurück Weiter

Appendix A *Survey Page 4 – Information about GHG Emission*



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Informationen zu Emissionssteuern und CO2 Ausstoß

Anbei finden Sie einige Rahmeninformationen zu Emissionssteuern sowie zum individuellen CO2 Ausstoß.

Allgemeine Information zur Emissionssteuer nach Klenert et al. 2019

Mit dem Jahr 2022 gibt es in der gesamten DACH-Region eine Emissionsbesteuerung von Endverbraucher:innen. Wie in der Schweiz bereits seit längerem praktiziert, werden die zusätzlichen Einnahmen aus der Emissionssteuer auch in Österreich und Deutschland über Öko-Boni bzw. Klimaprämien an die Bevölkerung rückverteilt. Durch diese Rückverteilungen werden einkommensschwache Haushalte einen prozentuell höheren Anteil ihrer Ausgaben erstattet bekommen. Zusätzliche Maßnahmen, die von den Regierungen eingeführt wurden, wie beispielsweise die stärkere Entlastung von Gebieten mit schlechter öffentlicher Verkehrsanbindung, sollen eine faire Ausgestaltung der Steuer weiter fördern. Durch den Preisanstieg von emissionsreichen Produkten gegenüber emissionsarmen, soll ein natürlicher Lenkungseffekt zugunsten von ökologischen Alternativen stattfinden.

Eine Tonne CO2 entspricht in etwa … nach Swiss Climate (2019), Statista (2019)

… einer zurückgelegten Strecke von 4900 km mit einem benzinbetriebenen Auto

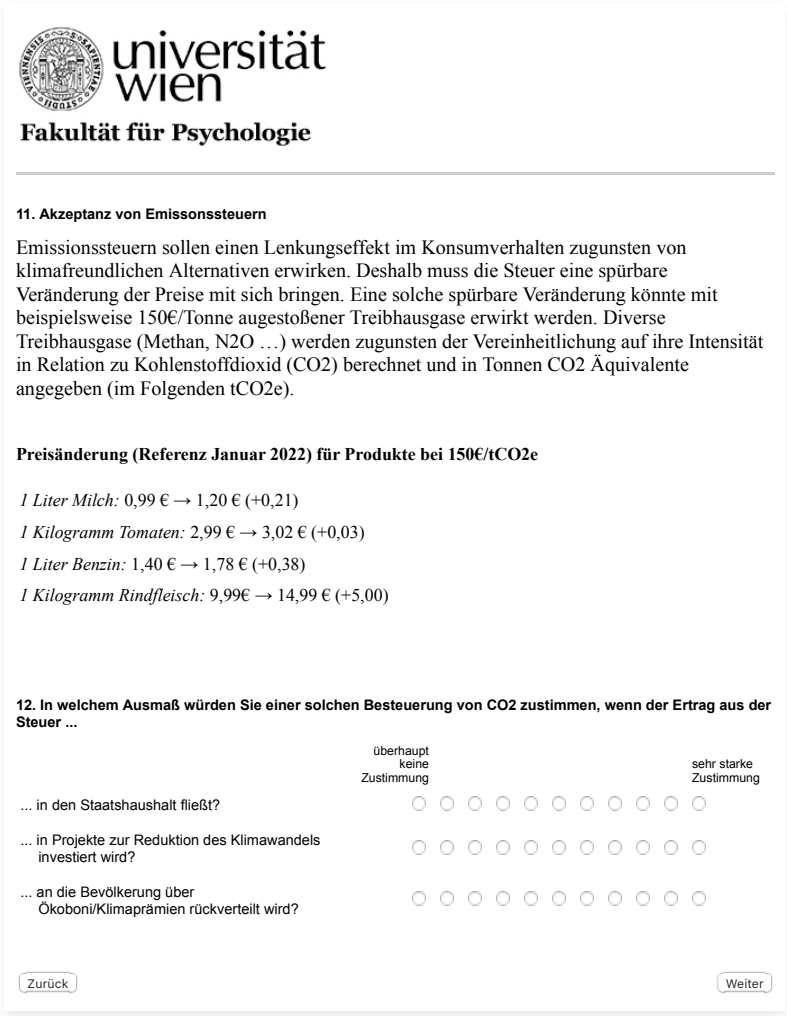
… einem Hin- & Rückflug von etwa 3000km (4 Stunden) pro Richtung und Person, wenn das Flugzeug voll besetzt ist

… Zugfahrten von insgesamt 450.000 km pro Person

… der Produktion von ca. 80 kg Rindfleisch

Zurück Weiter

Appendix A *Survey Page 5 – Acceptance of GHG Emission Taxes*



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11. Akzeptanz von Emissonssteuern

Emissionssteuern sollen einen Lenkungseffekt im Konsumverhalten zugunsten von klimafreundlichen Alternativen erwirken. Deshalb muss die Steuer eine spürbare Veränderung der Preise mit sich bringen. Eine solche spürbare Veränderung könnte mit beispielsweise 150€/Tonne augestoßener Treibhausgase erwirkt werden. Diverse Treibhausgase (Methan, N2O …) werden zugunsten der Vereinheitlichung auf ihre Intensität in Relation zu Kohlenstoffdioxid (CO2) berechnet und in Tonnen CO2 Äquivalente angegeben (im Folgenden tCO2e).

Preisänderung (Referenz Januar 2022) für Produkte bei 150€/tCO2e

1 Liter Milch: 0,99 € → 1,20 € (+0,21)

1 Kilogramm Tomaten: 2,99 € → 3,02 € (+0,03)

1 Liter Benzin: 1,40 € → 1,78 € (+0,38)

1 Kilogramm Rindfleisch: 9,99€ → 14,99 € (+5,00)

12. In welchem Ausmaß würden Sie einer solchen Besteuerung von CO2 zustimmen, wenn der Ertrag aus der Steuer ...

	überhaupt keine Zustimmung										sehr starke Zustimmung
... in den Staatshaushalt fließt?	○	○	○	○	○	○	○	○	○	○	○
... in Projekte zur Reduktion des Klimawandels investiert wird?	○	○	○	○	○	○	○	○	○	○	○
... an die Bevölkerung über Ökoboni/Klimaprämien rückverteilt wird?	○	○	○	○	○	○	○	○	○	○	○

Zurück Weiter

Appendix A *Survey Page 6 – Willingness-to-pay*

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Zahlungsbereitschaft im Bezug auf Emissionsbesteuerung

Bitte betrachten Sie zuerst die folgenden Szenarien und beantworten die darauf folgenden Fragen

Preisänderung (Referenz Januar 2022) für Produkte bei **30€**/tCO2e

1 Liter Milch: 0,99 € → 1,03€ (+0,04)

1 Kilogramm Tomaten: 2,99 € → 2,99€ (+0,00)

1 Liter Benzin: 1,40 € → 1,48€ (+0,08)

1 Kilogramm Rindfleisch: 9,99€ → 10,99€ (+1,00)

Preisänderung (Referenz Januar 2022) für Produkte bei **75€**/tCO2e

1 Liter Milch: 0,99 € → 1,10€ (+0,11)

1 Kilogramm Tomaten: 2,99 € → 3,01€ (+0,02)

1 Liter Benzin: 1,40 € → 1,54€ (+0,14)

1 Kilogramm Rindfleisch: 9,99€ → 12,49€ (+2,50)

Preisänderung (Referenz Januar 2022) für Produkte bei **150€**/tCO2e

1 Liter Milch: 0,99 € → 1,20 € (+0,21)

1 Kilogramm Tomaten: 2,99 € → 3,02 € (+0,03)

1 Liter Benzin: 1,40 € → 1,78 € (+0,38)

1 Kilogramm Rindfleisch: 9,99€ → 14,99 € (+5,00)

Preisänderung (Referenz Januar 2022) für Produkte bei **300€**/tCO2e

1 Liter Milch: 0,99 € → 1,41€ (+0,42)

1 Kilogramm Tomaten: 2,99 € → 3,05€ (+0,06)

1 Liter Benzin: 1,40 € → 2,16€ (+0,76)

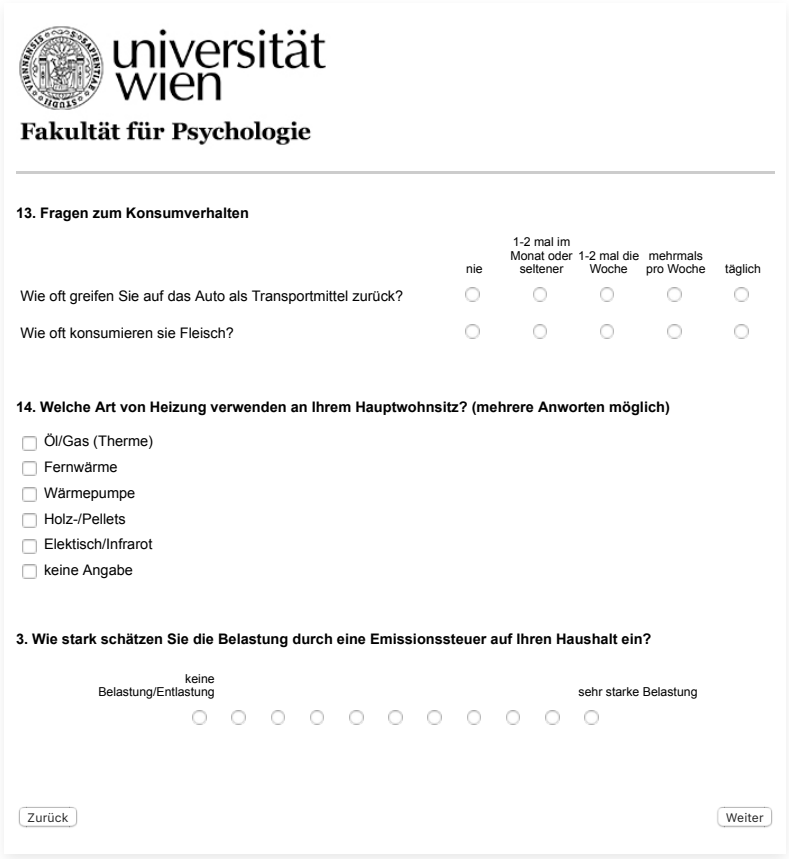
1 Kilogramm Rindfleisch: 9,99€ → 19,99€ (+10,00)

Welches Steuerszenario wären Sie am ehesten bereit zu akzeptieren, wenn die eingenommene Steuer ...

	keine Steuer	**30€** /tCO2e	**75€** /tCO2e	**150€** /tCO2e	**300€** /tCO2e
... in den Staatshaushalt fließt?	○	○	○	○	○
... in Projekte zur Reduktion des Klimawandels investiert wird?	○	○	○	○	○
... an die Bevölkerung über Ökoboni/Klimaprämien rückverteilt wird?	○	○	○	○	○

Zurück Weiter

Appendix A *Survey Page 7 – Emission intensive consumption behavior*



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13. Fragen zum Konsumverhalten

	nie	1-2 mal im Monat oder seltener	1-2 mal die Woche	mehrmals pro Woche	täglich
Wie oft greifen Sie auf das Auto als Transportmittel zurück?	○	○	○	○	○
Wie oft konsumieren sie Fleisch?	○	○	○	○	○

14. Welche Art von Heizung verwenden an Ihrem Hauptwohnsitz? (mehrere Anworten möglich)

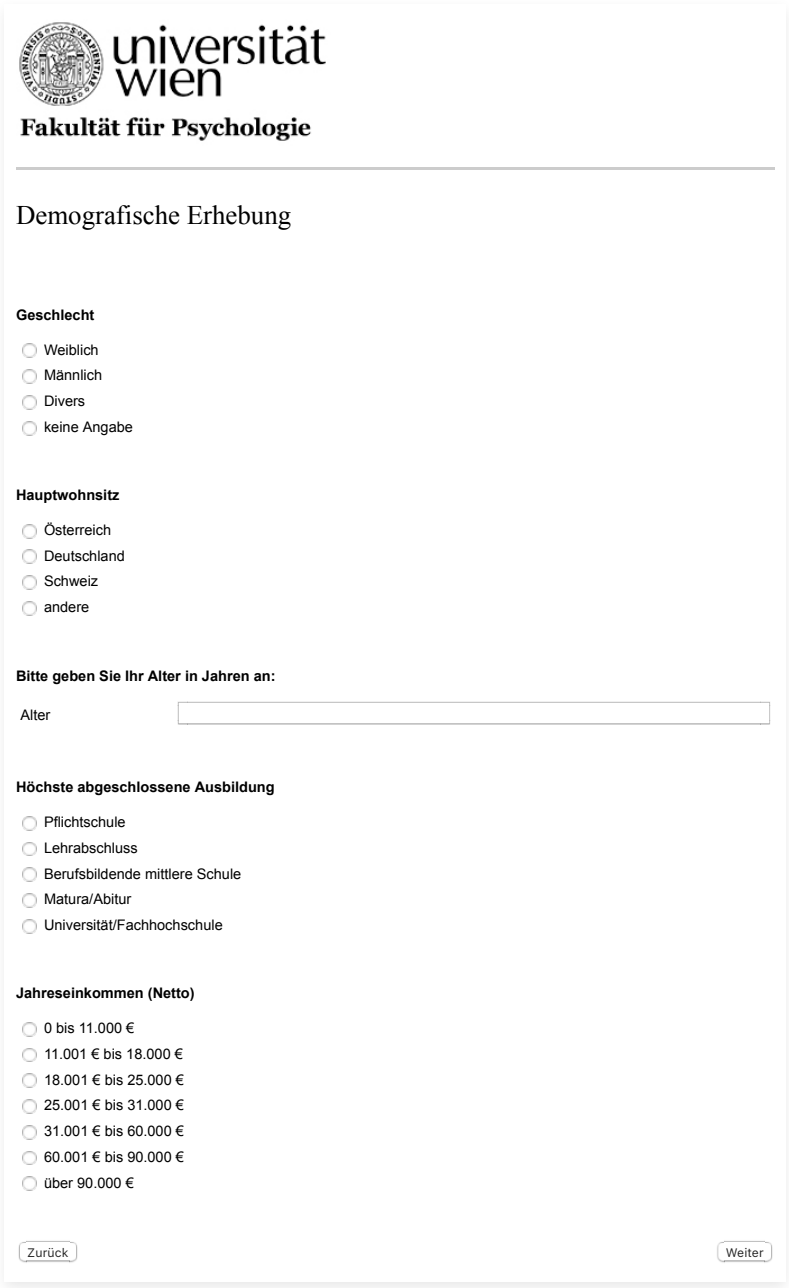
- ☐ Öl/Gas (Therme)
- ☐ Fernwärme
- ☐ Wärmepumpe
- ☐ Holz-/Pellets
- ☐ Elektisch/Infrarot
- ☐ keine Angabe

3. Wie stark schätzen Sie die Belastung durch eine Emissionssteuer auf Ihren Haushalt ein?

keine Belastung/Entlastung ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ sehr starke Belastung

Zurück Weiter

Appendix A *Survey Page 8 – Demographics*



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Demografische Erhebung

Geschlecht

- Weiblich
- Männlich
- Divers
- keine Angabe

Hauptwohnsitz

- Österreich
- Deutschland
- Schweiz
- andere

Bitte geben Sie Ihr Alter in Jahren an:

Alter

Höchste abgeschlossene Ausbildung

- Pflichtschule
- Lehrabschluss
- Berufsbildende mittlere Schule
- Matura/Abitur
- Universität/Fachhochschule

Jahreseinkommen (Netto)

- 0 bis 11.000 €
- 11.001 € bis 18.000 €
- 18.001 € bis 25.000 €
- 25.001 € bis 31.000 €
- 31.001 € bis 60.000 €
- 60.001 € bis 90.000 €
- über 90.000 €

Zurück Weiter

Appendix B.1 *Pairwise Comparisons between education levels*

Table Appendix B.1

pairwise comparisons for Education under WTP condition 1 excluding mandatory education (N=653)

Sample 1 – Sample 2	Z	r	r2	p
Lehrabschluss-Berufsbildende mittlere Schule	-.33			1.00
Lehrabschluss-Matura/Abitur	-2.49			.13
Lehrabschluss-Universität/Fachhochschule	-3.57	-.16	.03	.00
Lehrabschluss-Pflichtschule	2.25			.25
Berufsbildende mittlere Schule-Matura/Abitur	-2.53			.12
Berufsbildende mittlere Schule-Universität/ Fachhochschule	-3.89	-.18	.03	.00
Berufsbildende mittlere Schule-Pflichtschule	2.15			.32
Matura/Abitur-Universität/Fachhochschule	-2.29			.22
Matura/Abitur-Pflichtschule	1.37			1.00
Universität/Fachhochschule-Pflichtschule	.99			1.00

Appendix B.2 *Pairwise Comparisons between education levels*

Table Appendix B.2

pairwise comparisons for Education under WTP condition 2 excluding mandatory education (N=653)

Sample 1 – Sample 2	Z	r	r2	p
Lehrabschluss-Berufsbildende mittlere Schule	-.25			1.00
Lehrabschluss-Pflichtschule	-54			1.00
Lehrabschluss-Matura/Abitur	-1.56			1.00
Lehrabschluss-Universität/Fachhochschule	-2.56			.10
Berufsbildende mittlere Schule-Pflichtschule	-.44			1.00
Berufsbildende mittlere Schule-Matura/Abitur	-1.52			1.00
Berufsbildende mittlere Schule-Universität/ Fachhochschule	-2.77	-.12	.01	.05
Pflichtschule-Matura/Abitur	-.06			1.00
Pflichtschule-Universität/Fachhochschule	-.43			1.00
Matura/Abitur-Universität/Fachhochschule	-2.21			.27

Appendix C *Non-Parametric Tests for income levels*

Table Appendix C

non-parametric tests for Income (N=653)

Items	Kruskal-Wallis H	df	p
GHG tax acceptance if tax …			
… gets included in state budget	6.96	6	.33
… is earmarked for green project	5.68	6	.46
… is redistributed to citizens	10.98	6	.09
Willingness to Pay if tax …			
… gets included in state budget	6.39	6	.38
… is earmarked for green project	10.91	6	.09
… is redistributed to citizens	8.19	6	.23

Appendix D *Factor Analysis Trust in Government Items*

Table Appendix D.1

KMO and Bartlett's Test for Trust Items

Test		X2	df	p
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.86			
Bartlett's Test of Sphericity		3874.71	45	<.00

Table Appendix D.2

Explained variance after principal component analysis

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.32	53.23	53.23	4.00	39.98	39.98
2	1.26	12.64	65.86	2.59	25.88	65.86

Appendix D *Factor Analysis Trust in Government Items*

Table Appendix D.3

Rotated component matrix[1]

Item	Component 1	Component 2
Trust in state institutions: The parliament?	**.72**	.42
Trust in state institutions: The government?	**.59**	.51
Trust in state institutions: The justice system?	**.59**	.53
Trust in state institutions: The police?	.18	**.91**
Trust in state institutions: The military?	.14	**.89**
Trust in state institutions: The public service media?	**.78**	.16
Trust in state institutions: The health system?	**.73**	.18
Trust in state institutions: Public research and science?	**.76**	-.01
Trust in state institutions: The European parliament?	**.74**	.31
Trust in state institutions: The United Nations?	**.66**	.33

Note.[1] Rotation Method: Varimax with Kaiser Normalization.

Appendix E *Mediation Analysis with Personal/Global Risk Perception*

Table Appendix E.1

Simple mediation analysis with X(IV)=personal risk perception and M=General trust in state

Y (DV)	a	b	c'	c
Acceptance if tax integrated in state budget	.02ns	.24*	.17*	.18*
Acceptance if tax earmarked for climate projects	.	.19*	.47**	.47**
Acceptance if tax redistributed	.	.14*	.34**	.34**
WTP if tax integrated in state budget	.	.14*	.21**	.21**
WTP if tax earmarked for climate projects	.	.12*	.45**	.45**
WTP if tax redistributed	.	.09ns	.35**	.35**

Note. * p<.05, **p<.01.

Table Appendix E.2

Simple mediation analysis with X(IV)=global risk perception and M=General trust in state

Y (DV)	a	b	c'	c
Acceptance if tax integrated in state budget	.06ns	.15*	.23**	.17**
Acceptance if tax earmarked for climate projects	.	.16*	.55**	.56**
Acceptance if tax redistributed	.	.12*	.36**	.37**
WTP if tax integrated in state budget	.	.14*	.22**	.23**
WTP if tax earmarked for climate projects	.	.10*	.48**	.49**
WTP if tax redistributed	.	.08ns	.35**	.36**

Note. * p<.05, **p<.01.