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What motivates students to act consistently pro-environmentally?

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Abstract

Research into the reasons why individuals act in a consistent manner has a long history. In this thesis, the focus is in a novel way on factors that motivate individuals to adopt consistent environmentally friendly behavior. In recent years, the attention on the protection of nature and the reduction of greenhouse gas emissions has basically grown thanks to scientific studies, commitment of environmental organizations, firms and states. Individuals´ also have great potential to contribute to global climate targets and to reduce environmental pollution by (consistent) pro-environmental behavior. One milestone in global governance of climate protection can be dated back to the year 2015 when the Paris Climate Agreement was negotiated and agreed upon. In this context, the thesis investigates whether the Paris Climate Agreement spreads over to individuals and lead via personal and social norms to a higher likelihood of consistent greenhouse gas avoiding pro-environmental behavior. Moreover, the focus of this thesis is on investigations on the nexus between moral licensing and behavioral consistency. The consumption of “green products” may motivate further commitment to climate protection through environmental values or moral identity. Additionally, varying ethical mindsets (rule- or outcome-based mindsets) may also influence the decision-making process regarding environmentally friendly behaviors. Therefore, it is investigated whether environmental values, moral identity, and ethical mindsets are cross-situational motivators for consistent pro-environmental behavior. Among other factors, environmental self-identity and personal norms can be crucial factors in consistently opting for sustainable investment opportunities rather than environmentally harmful investment opportunities by foregoing higher returns and lower risks. Therefore, the thesis examines in a novel way which of these factors motivate to invest in sustainable investment fields (wind energy, organic farming) rather than in environmentally harmful investment fields (mineral oil / natural gas).

Zusammenfassung

Die Erforschung der Gründe, warum Individuen in einer konsistenten Weise handeln, hat eine lange Geschichte. Diese Dissertation konzentriert sich in neuartiger Weise auf Faktoren, die Individuen zu konsistenten, umweltfreundlichen Verhalten motivieren. In den letzten Jahren ist die Aufmerksamkeit für den Schutz der Natur und die Reduktion von Treibhausgasemissionen dank wissenschaftlicher Studien, dem Engagement von Umweltorganisationen, Firmen und Staaten grundsätzlich gewachsen. Individuen haben ebenfalls Potenzial, durch (konstantes) umweltfreundliches Verhalten zu globalen Klimazielen beizutragen und die Umweltbelastung zu reduzieren. Ein Meilenstein in der globalen Steuerung des Klimaschutzes kann auf das Jahr 2015 zurückgeführt werden, als das Pariser Klimaabkommen ausgehandelt und abgeschlossen wurde. In diesem Zusammenhang wird untersucht, ob das Pariser Klimaabkommen auf Individuen übergreift und über persönliche und soziale Normen zu einer höheren Wahrscheinlichkeit führt, dass Treibhausgasemissionen durch konstantes umweltbewusstes Verhalten vermieden werden. Darüber hinaus liegt der Fokus dieser Dissertation auf Untersuchungen bezüglich des Zusammenhangs zwischen moralischer Lizenzierung und Verhaltenskonsistenz. Der Konsum „grüner Produkte“ kann über Umweltwerte, oder über eine moralische Identität zu weiterem Engagement für den Klimaschutz motivieren. Zudem können auch unterschiedliche ethische Denkweisen (regel- oder ergebnisbasierte Denkweisen) den Entscheidungsprozess bei umweltfreundlichem Verhalten beeinflussen. Daher wird untersucht, ob Umweltwerte, moralische Identität und ethische Denkweisen situationsübergreifende Motivatoren für konsistentes, umweltfreundliches Verhalten sind. Neben anderen Faktoren können eine ökologische Selbstidentität und persönliche Normen entscheidende Faktoren dafür sein, sich durch den Verzicht auf höhere Erträge und geringere Risiken konsequent für nachhaltige, statt für umweltschädliche Investitionsmöglichkeiten zu entscheiden. Daher wird in dieser Arbeit auf eine neuartige Weise untersucht, welche dieser Faktoren dazu motivieren, in nachhaltige Investitionsfelder (Windenergie, ökologische Landwirtschaft) statt in umweltschädliche Investitionsfelder (Mineralöl/Erdgas) zu investieren.

Contents

LIST OF ABBREVIATIONS

PEB	Pro-environmental behavior
GHG-avoiding PEB	Greenhouse gas avoiding pro-environmental behavior
Paris Agreement	Paris Climate Agreement
Personal norms (Paris Agreement)	Personal norms concerning individual contributions to the global climate targets of the Paris Climate Agreement
Social norms (Paris Agreement)	Social norms concerning individual contributions to the global climate targets of the Paris Climate Agreement

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1. Introduction

The purpose of this thesis is primarily to enhance the knowledge on the reasons why individuals behave consistently in a pro-environmental way. In everyday life there are numerous decisions to be made and some of them have direct effects on the natural environment. The review of the literature shows that there are different theoretical approaches that analyze consistent pro-environmental behavior. Theories that have been applied for analyzing consistent pro-environmental behavior are, among others, the concept of environmental values (e.g., Schwartz, 1992; Stern, 2000), the concept of environmental self-identity (e.g., van der Werff et al., 2013; Whitmarsh & O'Neill, 2010) and the concept of moral licensing (e.g., Mazar & Zhong, 2010). Mainly based on these theoretical frameworks, the thesis investigates pro-environmental behavioral consistency with three different approaches (Bauer & Menrad, 2019, 2020a, 2020b).

1.1 Research topics

1.1.1 Global political events and consistent pro-environmental behavior

The impact of global climate targets which have been adapted to individuals' behavior based on global political events is examined in the first paper (Bauer & Menrad, 2019). As the global climate targets of the Paris Agreement (United Nations Framework Convention on Climate Change, 2015) are supported by parts of German society (Brüggemann et al., 2017), the potential of these targets to lead to personal and social norms concerning individual contributions to the Paris Agreement´s global climate targets (hereinafter: personal and social norms (Paris Agreement)) is investigated. Specifically, the thesis examines the influence of these personal and social norms (Paris Agreement) on greenhouse gas avoiding pro-environmental behavior (hereinafter: GHG-avoiding PEB). This novel approach, which considers the findings of latest studies (e.g., Brüggemann et al., 2017) can help to understand whether global governance of climate change mitigation can be an additional guideline for decision-making for individuals.

1.1.2 Priming by organic consumption and donations for climate and society

Organic consumption and the commitment to climate protection through carbon offsetting are inter alia important for the protection of global natural resources. This work therefore analyzes whether organic consumption triggers subsequent altruistic donations to the environment and society and examines factors that explain the behavioral consistency over these behavioral fields. Based on previous research (e.g., Mazar & Zhong, 2010), the thesis addresses the research question of whether priming by "organic offer" influences subsequent donations via carbon offsetting. Thereby, the interaction between priming by an “organic offer”, ethical mindsets (rule- or outcome-based mindsets), environmental values and moral identity is investigated for the first time (Bauer & Menrad 2020a).

1.1.3 Self-identity and sustainable investments in funds

For the sustainable development of the energy and agricultural sectors, it is necessary to have financial investments inter alia carried out by private households. Thus, the thesis examines investment intentions in funds ranging from environmentally friendly (wind energy, organic farming) to environmentally harmful (mineral oil/natural gas). Thereby, the intention to invest in environmentally friendly or harmful investment fields is analyzed according to economic- and environmental self-identity (Whitmarsh & O´Neill, 2010), personal norms (Paris Agreement) and to the returns, risks and term of duration of the specific investment products (Bauer & Menrad, 2020b).

1.2 Outline of the work

The thesis starts with the theoretical framework. Afterwards, the design of the study (laboratory study, n = 226) is summarized and the statistical methods for analyzing the hypotheses are introduced. In the next chapter, the results will be presented. In the discussion, the limitations of the study will be outlined, and practical implications as well as future research topics will be presented.

2. Theoretical considerations

2.1 Consistent pro-environmental behavior

In recent decades, there have been major investigations in order to understand behavior, consistent behavior and consistent pro-environmental behavior. Thereby, the first question arises: In which way can pro-environmental behavior be defined? Pro-environmental behavior can be grouped in several ways. According to the work by Stern (2000), pro-environmental behavior can be investigated from an impact- or an intend-oriented perspective. The impact-oriented perspective highlights the "[…] extent to which it changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere itself." (Stern, 2000: 408). Otherwise, the intend-oriented definition does not rely on whether a behavior has actually an impact on nature, but rather on the fact that humans intend to protect the environment through their behavior. The advantage of the impact-oriented definition is that it opens up the possibility of grouping into behaviors with negative or positive effects on nature according to scientific knowledge. However, some behaviors can have an influence on different spheres of nature. For example, on the one hand, organic consumption has positive impacts on nature by reducing the loss of biodiversity, pollution from fertilizers and pesticides, and risks to human health (deLonge et al., 2016; Muller et al., 2017). On the other hand, organic food consumption can have positive effects on greenhouse gas emissions, but scientists have not consistently demonstrated these positive effects so far (see Bauer & Menrad, 2020b, for a summary of research results). Therefore, it may be in some cases necessary to make an overall assessment of whether a behavior has a positive or negative impact on nature. In summary, the work applies the impact-oriented definition of pro-environmental behavior (hereinafter: PEB), since I focuse in particular on the benefits of behaviors for nature, including the avoidance of greenhouse gas emissions (e.g., reducing air travel, local consumption, financial investment in renewable energy). In addition, decision-making can be relevant to the natural environment and additionally to the social living conditions. The benefit of a behavior for society can be considered as an additional aspect of environmentally friendly behavior or vice versa. Therefore, the work focuses on donations that

lead to a reduction in greenhouse gas emissions and to an improvement in the social living conditions of the local population (Bauer & Menrad, 2019, 2020a). Lastly, since there are numerous pro-environmental behaviors which could be investigated in a scientific work, the investigations are mainly limited to behaviors with impact on greenhouse gas emissions (Bauer & Menrad, 2019), to environmentally friendly and pro-social donations (Bauer & Menrad, 2019, 2020a) and to investment intentions in sustainable funds (Bauer & Menrad, 2020b).

2.2 Motivation for consistent pro-environmental behavior

In environmental psychology and sociology, there exists a large literature on factors which influence pro-environmental behavior. In this work, the particular focus is on environmental values (Schwartz, 1992), environmental self-identity (van der Werff et al., 2013; Whitmarsh & O'Neill, 2010), moral identity (Aquino & Read, 2002) as well as on personal and social norms (Cialdini et al., 1991; Thøgersen, 2006), as these concepts were significant predictors of environmentally responsible behavior in previous studies. A brief summary of the theoretical framework of this thesis is given by figure 1.

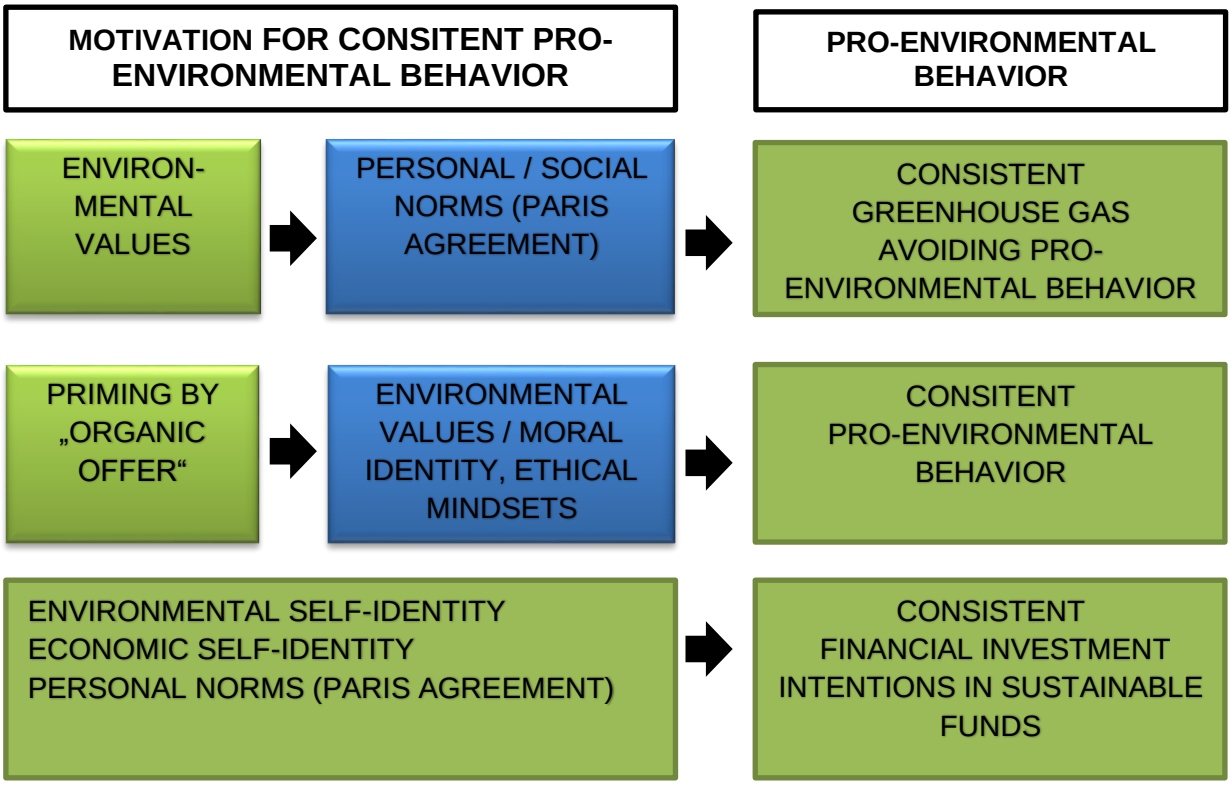

Figure 1. Summary of theoretical framework

2.2.1 Environmental values

Research on values has a long history. Schwartz and Bilsky (1990: 878) define values as "concepts or beliefs, [about] desirable end states or behaviors, [which] transcend specific situations, [and] guide selection or evaluation of behavior and events, and are ordered by relative importance". On the basis of the elementary works by Schwartz (1992) and by Stern (2000), we know that there are specifically three values, which underlie environmental concern, namely egoism, altruism and biospherism. In particular, environmental values (biospherism) tell us if individuals are concerned with the natural environment (Schwartz, 1992; van der Werff et al., 2013). Previous research has inter alia shown that environmental values are related to various pro-environmental behaviors (Gatersleben et al., 2014), sustainable consumption (Thøgersen & Ölander, 2002), organic food consumption (Thøgersen et al., 2016) and intentions to donate for environmental organizations (deGroot & Steg, 2007).

On the other hand, studies argue that, instead of the direct effect of environmental values on pro-environmental behaviors, there might more likely occur an indirect effect of environmental values on pro-environmental behavior. For instance, scholars (Gatersleben et al., 2014; van der Werff et al., 2013) found that environmental values lead to self-reported pro-environmental behavior via environmental self-identity. Moreover, previous studies showed, that personal norms mediate the influence of environmental values on pro-environmental behaviors (Lind et al., 2015; Nordlund & Garvill, 2013; van der Werff & Steg, 2016). These studies argue that environmental self-identity as well as personal norms are based on one´s environmental values. However, environmental values are considered to be too abstractly defined, and therefore there may not occur a direct relationship between environmental values and pro-environmental behavior.

In summary, there are on the one hand insights that environmental values directly influence pro-environmental behavior. On the other hand, researcher showed that the abstract concept of environmental values might has only influence on pro-environmental behavior via more specific concepts like environmental self-identity or personal norms. Thus, this topic will be further explored by investigating the influence of environmental values and personal norms (Paris Agreement) on PEB. Moreover, the thesis examines for the first time whether social

norms (Paris Agreement) mediate the relationship between environmental values and pro-environmental behavior (Bauer & Menrad, 2019).

2.2.2 Self-identity

Self-identity is one of the most-studied concepts in social science (Vignoles et al., 2011) and can be understood as a frame which is "[…] used to describe oneself" (Whitmarsh & O'Neill, 2010: 306). More specifically, self-identity can be defined as "[…] a self-structure – an internal, self-constructed, dynamic organization of drives, abilities, beliefs, and individual history." (Marcia, 1980: 159). In other words, self-identity "[…] refers to how an individual sees him / herself and can encompass all aspects of the self - such as physical attributes, preferences, values, personal goals, habitual behaviour, personality traits and personal narratives." (Gatersleben et al., 2014: 376). According to basic literature, it is assumed that individuals tend to behave according to their self-identity, which in turn consists of different dimensions (Tajfel & Turner, 2004). For some individuals, there are some dimensions of self-identity (e.g., environmental self-identity) meaningful guidelines for life as well as for behavior, whereas the same dimensions are less important for others (Smith, 2007; Stets & Burke, 2000; Stets & Biga, 2003).

a) Environmental self-identity

According to the work by van der Werff et al. (2013: 56), environmental self-identity is regarded as the degree to which individuals see themselves acting in a manner that is environmentally friendly. Studies have shown that environmental self-identity is inter alia positively related to pro-environmental behaviors (van der Werff et al., 2013, Whitmarsh & O`Neill, 2010) and can be considered as a cross-situational motivator for pro-environmental behavior. This is, because whenever an individual sees her- or himself as an environmentally friendly person, it is on the one hand expected that this dimension of self-identity leads to appropriate environmentally friendly decision-making in everyday life. However, Kashima et al. (2014) showed that environmental identity did not explain pro-environmental behavior with significant impact on nature as environmental identity was only associated with the intention towards green talk and green shopping, but not with the intention of driving less by car. Furthermore,

the study by van der Werff et al. (2019) did not show that environmental self-identity is related to promoting energy savings in the Netherlands. Thus, the thesis further contributes to this research topic by investigating the influence of environmental self-identity on sustainable investment intentions.

b) Moral identity

Scientists found that under certain circumstances moral identity is positively associated with different types of environmentally friendly behavior (Wu & Yang, 2018) and therefore moral identity is considered to be a cross-situational motivator for PEB. Moral traits can be, for example, being an honest or a generous person (Aquino & Read, 2002). However, studies also showed that moral self-image or moral self-worth did not explain a positive relationship between environmentally friendly behaviors (Carrico et al., 2017; Truelove et al., 2014, 2016). Moreover, there are also research results that speak for moral licensing effects (e.g., Mazar & Zhong, 2010). To deepen the role of moral identity in explaining environmentally friendly behavior, the thesis focuses on the influence of moral identity on environmentally friendly as well as on pro-social behavior (see also chapter 2.2.5).

c) Economic self-identity

The thesis is also interested in the effects of economic self-identity on consistent pro-environmental behavior. According to previous research (Cook et al., 2002; Whitmarsh & O'Neill, 2010), economic self-identity is for the first time defined as the extent to which someone sees himself or herself as an economically interested and oriented person or consumer (Bauer & Menrad, 2020b). Moreover, economic self-identity is considered an important factor in explaining investment intentions in funds ranging from environmentally harmful to environmentally friendly, as financial decisions are likely to be primarily related to economic issues.

In summary, environmental- and economic self-identity as well as moral identity can be considered as factors which explain cross-situational behavioral consistency. However, research findings (e.g., Kashima et al., 2014) indicate that the impact of self-identity may be

restricted to a subset of specific pro-environmental behaviors. Therefore, the thesis contributes to enhance the knowledge on the influence of self-identity on pro-environmental decision-making (Bauer & Menrad, 2020a, 2020b).

2.2.3 Personal and social norms

Personal norms are according to previous studies (Schwartz, 1977, 1992; Steg, 2016; Thøgersen, 2006) defined as "[…] one´s self-expectation that can lead to a feeling of moral obligation to act in a specific way." (Bauer & Menrad, 2019: 73). Prior studies found that personal norms predicted the intentions to behave pro-environmentally (Bamberg et al. 2007; deGroot et al., 2013; Nigbur et al., 2010) and pro-environmental behavior (Lind et al., 2015; van der Werff & Steg, 2016). Social norms are based on previous studies (Cialdini et al., 1991; Farrow et al., 2017; Kormos et al., 2014; Thøgersen, 2006; Young, 2015) understood as "[…] individually perceived informal obligations originating from an individual´s social environment, which can produce social pressure to behave in a specific way in order to avoid punishment" (Bauer & Menrad, 2019: 73). Previous research showed that social norms are positively associated with pro-environmental behaviors (Horne & Kennedy, 2017; Kormos et al., 2014; Vesley & Klöckner, 2017; Wan et al., 2017).

Scholars usually conceptualize personal and social norms with regard to a specific pro-environmental behavior (e.g., personal norms for recycling). However, norms were so far also related to the issue of global warming (van der Linden, 2015). Accordingly, personal and social norms are in this work set in relation to global political events on global climate targets. The thesis refers specifically to the United Nations Framework Convention on Climate Change (2015), which adopted the Paris Climate Agreement in December 2015. The signatory states to the United Nations Framework Convention on Climate Change agreed on the goal of "[…] holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels" (United Nations Framework Convention on Climate Change, 2015: 22). The work focuses on the Paris Agreement, as this agreement is widely supported inter alia by European citizens (Brüggemann et al., 2017; Steentjes et al., 2017) and the objectives are roughly

concrete in scope. Thereby, the thesis is particularly interested in the middle-term effects of the Paris Agreement on consistent GHG-avoiding PEB.

2.2.4 Influencing factors on investment decisions

According to classical financial theory, the decision-making process with regard to financial products (here: investment funds) is significantly influenced by the annual return and the associated risks (Bauer & Smeets, 2015; Berry & Yeung, 2013; Markowitz, 1952). Under this approach, a sustainable investment option will only be chosen if this option is at least as profitable and at most as risky as conventional investment options.

In recent years, however, scientists argued that non-financial motivators are also important when individuals decide on financial products. Studies showed that social identification and positive attitudes positively influence sustainable or environmentally responsible investments (Bauer & Smeets, 2015; Borgers & Pownall, 2014; Statman, 2004). Moreover, Gutsche and Ziegler (2019) showed that, among other factors, warm glow in the direction of sustainable investments and environmental awareness lead to a higher average willingness to forego returns by opting for sustainable funds. The study by Riedl and Smeets (2017) indicated that socially responsible fund investors put up with lower returns, compared to conventional investors. To summarize, in contrast to classical financial theory, the above-mentioned studies show that non-financial factors lead to a higher probability of sustainable and socially responsible investments and to a reduction in the pursuit of profit. Thus, the study by Curtin et al. (2019) based in Ireland showed via a choice experiment about renewable investments that the relative average importance of the attribute renewable technology (wind onshore, solar photovoltaic, biomass) is not negligible at 16.8% of 100% (further attributes of higher importance are: returns on investment: 26.1% of 100%, risk of losing investments: 20.8% of 100%, minimum holding period: 19.4% of 100%).

Building on these literature findings, the thesis investigates in a novel way the relative importance of varying investment fields (wind energy, organic farming, mineral oil / natural gas and residential real estate) in the decision-making process regarding funds, compared to annual returns, risks and term of validity of these funds (= key attributes of funds).

Previous studies showed that especially investments in renewable energy might be considered in the first place by private investors. For instance, Curtin et al. (2019) showed that 78% of the participants of the study had at least some interest in investing in various renewable energies (i.e. wind onshore). Wind energy as a renewable energy source is largely supported by European society. For instance, wind as a source of energy is on average the second most preferred in European countries and in Russia. A survey with cross-sectional samples (n = 381,351) showed in 2016 that 72% of the participants were of the opinion that a large or very large amount of electricity should be generated from wind (e.g., for Germany: 76%, UK: 72%). By comparison, the average preference for gas as an energy source was only 31% (e.g., for Germany: 27%, UK: 27%) (Pohjolainen et al., 2018).

In summary, the thesis addresses the role of classical financial factors in explaining investment decisions, while considering the influence of non-financial attributes (varying investment fields) and explanatory variables (environmental-, economic self-identity, personal norms (Paris Agreement)).

2.2.5 Priming by exposure, ethical mindsets, environmental values, and moral identity

In recent years, there have been investigations in order to understand how priming by exposure triggers subsequent decision-making (Aarts & Dijksterhuis, 2003; Verplanken & Holland, 2002). As environmental values and moral identity can be activated by a specific situation or context (Aquino & Reed, 2002; Verplanken & Holland, 2002; Wu & Yang, 2018), the thesis considers that the consideration to purchase an organic product is likely to lead to an activation of environmental values and moral identity.

One line of argumentation proposes that priming by exposure aims to get a specific concept (e.g., environmental values, or moral identity) in the foreground of an individual´s memory, so that the activated concepts positively influence subsequent decision-making (Biel et al., 2005; Papies, 2016). Referring to this, the experimental study by Evans et al. (2013) found that priming of self-transcendence values (i.e. environmental or altruistic values) by environmental information about car-sharing resulted in a higher likelihood of recycling. The study by Verplanken and Holland (2002) indicated that priming of environmental values by word tasks

lead to hypothetical environmentally friendly consumer choices, whenever the cognitively activated environmental values were central for the participants. Furthermore, Biel et al. (2005) showed that priming of environmental values by a discrete picture of a cow in the landscape in a simulated grocery-store resulted in a higher probability of the purchase of eco-labelled products.

However, another strand of research expects negative effects of priming by exposure on subsequent behaviors via moral licensing effects (e.g., Cornelissen et al., 2013). Based on the work by Sachdeva et al. (2009), moral licensing is understood to be the negative effect of a moral behavior on subsequent social or pro-environmental behavior. Individuals, who have once engaged in a moral behavior, are in this line of argumentation likely to perceive a license for subsequent selfish behavior (e.g., selfish or environmentally harmful behavior).

Hence, in the moral domain, Mazar and Zhong (2010) pointed out that priming by exposure to a “green online store” (nine green products and three conventional products) with the task to decide for products up to 25 USD resulted inter alia to less altruistic behavior compared to participants who were exposed to a “conventional online-store” (three green products and nine conventional products). However, this laboratory study was regarded as a study with lack of external validity by Thøgersen and Noblet (2012). Furthermore, Urban et al. (2019) replicated the study by Mazar and Zhong (2010) and did not find licensing effects of green consumption on subsequent dishonesty.

In the environmental domain, the field-experimental study by Tiefenbeck et al. (2013) showed that individuals who received weekly information on their water usage afterwards reduced their water consumption (6% on average). The experimental group simultaneously increased their electricity consumption by 5.6% which was indicated as a moral licensing effect. However, another strand of research pointed out that individual´s moral self-worth neither had negative nor positive influence on the relationship between recycling and support of a green fund (Truelove et al., 2016), which does not substantiate moral licensing effects.

In summary, there is a lack of knowledge, in which cases priming by exposure leads via environmental values or moral identity to lower or higher likelihood of subsequent PEB. Thus,

the thesis additionally considers the influence of varying ethical mindsets on subsequent decision-making. In moral philosophy, studies have argued that ethical mindsets influence behavioral consistency and moral licensing (Foot, 1967). Ethical mindsets can be grouped in the categories of rule-based or outcome-based mindsets (e.g., Ostermaier & Uhl, 2017). Rule-based individuals are considered to solve value conflicts in decision situations in the same way based upon their prior rules or values (Albarracín & Wyer, 2000; Cornelissen et al., 2013). By contrast, outcome-based individuals are expected to reflect the consequences of each of the possible decision options (Cornelissen et al., 2013; Ostermaier & Uhl, 2017). This situational evaluation of rules or values is expected to lead to differences in decision-making (Mazar & Ariely, 2006). The study by Cornelissen et al. (2013) showed that priming by an ethical behavior increased the likelihood of engaging in a subsequent ethical behavior when individuals had a rule-based mindset. However, this study did not show that moral self-image (Jordan et al., 2011) explained this positive relationship. The same study has also indicated that priming by an ethical behavior reduces the likelihood of a subsequent ethical behavior when individuals have an outcome-based mindset and this moral licensing effect was explained by moral self-image. Therefore, it is considered that ethical mindsets interact with environmental values and moral identity after priming by exposure, which is thought to influence subsequent environmentally friendly and at the same time pro-social behavior.

3. Research questions and hypotheses

3.1 Personal and social norms (Paris Agreement)

As already mentioned, the Paris Agreement (United Nations Convention on Climate Change, 2015) is considered to have an impact on individual´s behavior. Personal and social norms are seen as decision-making guidelines which have the potential to reduce greenhouse gas emissions. Therefore, the thesis assumes that in particular personal and social norms (Paris Agreement) are related to behaviors that have an impact on greenhouse gas emissions (see Table 1, Hypothesis 1). Moreover, it is also expected that environmental values (Schwartz, 1992) as general guidelines for life have a positive influence on GHG-avoiding PEB, but only

via the more specific concepts of personal and social norms (Paris Agreement) (see Table 1, Hypothesis 2).

3.2 Priming by exposure

3.2.1 Ethical mindsets and environmental values

Priming by an "organic offer" is considered to be related to subsequent environmentally friendly behavior via environmental values, moral identity and varying ethical mindsets. According to recent research results (Carrico et al., 2017; Tate et al., 2014; Truelove et al., 2016), the hypothesis is put forward that priming by an "organic offer" does not lead to a further commitment to climate protection through activated environmental values if ethical mindsets are not taken into account (see Table 1, Hypothesis 3).

However, it can be argued that environmental values are likely to lead to environmentally friendly behavior later on if individuals have a rule-based mindset. As described above, rule-based individuals are less influenced by a situation and therefore more inclined to consistently strive for the achievement of central values in life. Therefore, the work assumes that priming by exposure is likely to lead to subsequent value-congruent PEB, whenever individuals have environmental values and perceive the goal of behaving along rules across situations (see Table 1, Hypothesis 4).

In contrast, individuals with an outcome-oriented mindset are not expected to have an increased probability of PEB after priming via exposure, even if they have environmental values (see Table 1, Hypothesis 5). This hypothesis is based on the assumption that individuals with an outcome-based mindset are more likely to be influenced by situational factors (Mazar & Ariely, 2006), which may result in environmental values being overlaid by divergent goals and values.

3.2.2 Ethical mindsets and moral identity

According to recent empirical findings (Carrico et al., 2017; Truelove et al., 2014, 2016), the present study puts forward the hypothesis that priming via an "organic offer" does not interact with moral identity and therefore has no influence on subsequent decision-making (see Table 1, Hypothesis 6), if ethical ways of thinking are not taken into account. However, in order to

investigate this question in more depth, the thesis investigates the hypothesis that ethical mindsets are decisive factors that influence the effect of moral identity on the relationship between priming and subsequent environmentally friendly behavior. In the moral domain, research showed that moral self-esteem explains the negative relationship between ethical behavior of individuals with an outcome-oriented mindset (Cornelissen et al., 2013). The thesis therefore assumes that for outcome-oriented individuals priming by an " organic offer" is likely to lead to a balanced moral identity, so that engagement in subsequent PEB is no longer considered necessary. As described above, the decision-making of outcome-oriented individuals is more strongly influenced by situational factors, so that for these individuals a tendency towards moral licensing is more likely to be expected. Therefore, the hypothesis for outcome-oriented individuals is based on the assumption that moral identity negatively influences the relationship between priming and subsequent environmentally friendly behavior (see Table 1, Hypothesis 7). In contrast, moral identity is assumed to be a cross-situational guideline for decision-making, whenever individuals have a rule-based mindset. Thus, it is therefore expected that rule-based mindsets counteract moral licensing effects. Finally, the interaction between moral identity and rule-based mindsets is expected to have a positive impact on behavioral consistency (see Table 1, Hypothesis 8).

3.3 Self-identity and personal norms (Paris Agreement)

A key research question is, whether sustainable investments are influenced by environmental self-identity as well as by personal norms (Paris Agreement). Hence, the thesis assumes that the intention to invest in sustainable fields (wind energy, organic farming) is outside the range of behaviors in which an environmentally friendly person normally operates. Therefore, it is hypothesized that environmental self-identity has no influence on sustainable investments intentions. This is expected, because environmental self-identity was even not able to predict energy savings (van der Werff et al., 2019) and sustainable investments are expected to be more difficult and further removed from the kinds of behavior an environmentally friendly person normally pursues (= Hypothesis 9).

Otherwise, the intention to invest in funds may be motivated by economic self-identity. Economic self-identity is expected to be primarily linked to the goals of maximizing the annual return and minimizing the risks of an investment. Thus, economic self-identity is not expected to be primarily linked to specific investment fields (e.g., environmentally friendly or harmful investment fields). However, one can also argue that the interest in economic issues may be linked to the interest in being an environmentally friendly investor. Individuals may expect that sustainable investments could constitute business opportunities with higher returns in the future, as climate change mitigation is obligatory for the states through federal laws or the Paris Agreement (United Nations Framework Convention on Climate Change, 2015). However, as economic self-identity is expected to be linked to the goal of making economically oriented decisions, it is not expected that the field of investment would prevent someone from playing out economic self-identity. Consequently, economic self-identity is expected to positively influence the intention to invest profitable in environmentally harmful, neutral or friendly fields, in order to achieve economic goals (Hypothesis 10).

Finally, personal norms are also considered to have an influence on sustainable investments. Since the work is interested in investments in fields that are associated with low or high greenhouse gas emissions, personal norms that take into account the moral obligation to behave in terms of greenhouse gas avoidance are considered as a factor influencing greenhouse gas avoiding investments. Therefore, it is assumed that personal norms (Paris Agreement) have a positive effect on the intention to invest in wind energy and organic farming (Smith et al., 2019). In contrast, it is assumed that personal norms (Paris Agreement) have a negative impact on investment intentions in the mineral oil / natural sector (Hypothesis 11).

Table 1. Summary of hypotheses

Hypothesis	Abbreviated content of the main hypothesis
1	Personal and social norms (Paris Agreement) positively influence GHG-avoiding PEB.
2	Personal and social norms (Paris Agreement) mediate the influence of environmental values on GHG-avoiding PEB.
3	Priming by an “organic offer” has via environmental values no influence on carbon offsetting.
4	Priming by an “organic offer” has via environmental values and rule-based mindsets a positive influence on carbon offsetting.
5	Priming by an “organic offer” has via environmental values and outcome-based mindsets no influence on carbon offsetting.
6	Priming by an “organic offer” has via moral identity no influence on carbon offsetting.
7	Priming by an “organic offer” has via moral identity and outcome-based mindsets a negative influence on carbon offsetting.
8	Priming by an “organic offer” has via moral identity and rule-based mindsets a positive influence on carbon offsetting.
9	Environmental self-identity has no influence on the intention to invest in environmentally-friendly investment fields (wind energy, organic farming).
10	Economic self-identity has a positive influence on the intention to invest in profitable environmentally harmful, neutral and friendly investment fields.
11	Personal norms (Paris Agreement) have a positive influence on the investment intention in environmentally friendly fields (wind energy, organic farming) and a negative influence on the investment intention in environmentally harmful fields (mineral oil / natural gas).

4. Methods

4.1 Data collection

In order to test the hypotheses 1-11, the data were collected via a study with students taking place in a laboratory for research in economics (experimenTUM, laboratory of the Technical University of Munich (School of Management)). The laboratory study was conducted on December 8 and 12, 2017 in Munich (Bavaria, Germany).

The investigations are mainly focused on self-reported GHG-avoiding PEB. However, a laboratory study was chosen, because it offered the possibility of measuring actual PEB.

The start for the development of the questionnaire was in July 2017. The subjects were randomly recruited via an Online Recruitment System for Economic Experiments (Greiner, 2015) on the basis of a subject pool primarily involving (business) students. The study consists of 226 participating students. Furthermore, data were collected for 11 subjects who were not studying. It was decided to limit the sample to students (n = 226), because the number of non-students was too low to make statements about this subgroup of the sample. Before the study

started, the subjects gave their written consent to follow the rules of the laboratory and were informed that the data would be treated anonymously and only used for scientific purposes. The subjects came in person to the lab and received a payment of 12 EUR for participation in the study. Before the beginning of the experiment, the subjects were asked to answer the questions of the questionnaire on the monitor and were informed that they would subsequently receive payment for participating in the study. The duration of the study was given as approximately 30 minutes. The subjects were not informed about the topic of this study.

4.2 Sample

The sample consist of 36.3% female and 63.7% male participants. 35.8% of the students had already a degree from a university or a university of applied sciences. The average age was 22.4 years (SD 4.4). 117 of the students were studying business at TUM School of Management. The other three most common departments in which the subjects were studying were: TUM Department of Electrical and Computer Engineering (n = 17), TUM Department of Civil, Geo and Environmental Engineering (n = 15) and TUM Department of Informatics (n = 13). 32 of the subjects were students of universities other than Technical University of Munich. As the sample consists entirely of students, the results of the study cannot be generalized for the whole population of Germany. However, it was decided to choose a sample of students, because students are potential future opinion leaders and (business) leaders and therefore it is interesting to analyze their perceptions, opinions and (actual) decision-making.

4.3 Study design

The study started by measuring the dependent variables. Afterwards, participants were questioned about the explanatory and the socio-demographic factors. The origin study was conducted in German.

In order to test hypothesis 1 and 2 (see also Bauer and Menrad, 2019, 2020a), subjects were firstly offered the opportunity to purchase a carbon emission certificate (carbon offsetting) for 1, 2 or 3 EUR (see details in chapter 4.4.1). The payment for participation in the study (= 12

EUR) was reduced by the amount donated. In order to provide reassurance that the money would indeed be donated, subjects had the opportunity to receive a certificate for carbon offsetting upon request. Moreover, participants were asked about their amount of inter-continental flights, consumption of green energy as well as about their consumption of local fruits and vegetables. Furthermore, and in line with a survey conducted by the German Environment Agency (2017a), the participants were informed about the global climate targets of the Paris Agreement and that these targets are internationally binding under international law. After subjects received this information, there were asked about their personal and social norms (Paris Agreement).

Moreover, in order to test the hypotheses 3-8 (see also Bauer & Menrad, 2020a), participants were randomly assigned to the treatment group (n = 110) or to the control group (n = 116). Only the treatment group (n = 110) was primed by being given the opportunity to purchase an organic apple, a conventional apple or to purchase nothing. The apples were sold at half of the market prices so that the price for an organic apple was 0.30 EUR and the price for a conventional apple was 0.20 EUR. The payment for participation in the study (12 EUR) was reduced accordingly in case a purchase decision was made. In order to hold the influence of the region of origin of the apples and the variety of the apple constant, participants were informed that the organic and conventional apples were grown in Germany and that they were of the same variety (Elstar). The control group was not primed by an "organic offer". Afterwards, the treatment group as well as the control group (n = 226) were given the opportunity to purchase a carbon emission certificate (carbon offsetting) for 1, 2 or 3 EUR (see chapter 4.4.1).

Finally, the subjects were asked to imagine a situation of an appointment with a bank for advice on a financial investment, as follows (see also Bauer & Menrad, 2020b): *"We would like to ask you to put yourself in a situation of an appointment with a bank for advice on a financial investment. Please also imagine that you have an investment sum of EUR 5,000 which you would like to invest in funds. You will be offered four different funds in each of the following seven consecutive rounds. We ask you to choose the fund that you prefer. There are funds to choose from that invest either in residential real estate, mineral oil / natural gas, wind energy*

or organic farming. The annual return (0.5%, 4% or 8%), the risk (low, medium, high) and the duration of the investment (2, 5 or 10 years) vary. Afterwards, we will ask you to indicate whether you would intend to invest in the previously selected fund if you had the investment sum of EUR 5,000 at your disposal."

The subjects were firstly asked to choose between four different funds with randomly assigned attribute levels in seven successive random rounds (see Bauer & Menrad, 2020b). Secondly, the subjects were asked after each of the rounds to decide whether they would make the previously chosen investment ("Dual-Response None-Option") (Orme, 2010). By this simplified research design, complex decision-making around the funds on offer can be avoided, which can lead to biased choices, as participants (here: students) may decide to simplify complex choice tasks into easier ones (Green & Srinivasan, 1990; Wright, 1975).

4.4 Measures

4.4.1 Dependent variables

a) Carbon offsetting

The study investigates carbon offsetting (Anderson & Bernauer, 2016; Huber et al., 2018; Whitmarsh & O'Neill, 2010) as an omitted GHG-avoiding PEB. Participants were offered to donate parts of their payment for participating in the study via purchasing of carbon emissions certificates (carbon offsetting) for 1, 2 or 3 EUR for projects in respect of "The Gold Standard" (Wolters et al., 2015). "The Gold Standard" states that the donations are invested in projects which lead to a reduction in carbon emissions and are simultaneously beneficial for the local environment and the social living conditions of the local population (Bauer & Menrad, 2019, 2020a). Participants received information about "The Gold Standard" and about the amount in kilograms of carbon equivalent emissions that could be compensated using their donations (1 EUR = 66 kg CO_2 compensation, 2 EUR = 132 kg CO_2 compensation, 3 EUR = 198 kg CO_2 compensation) (Wolters et al., 2015).

b) Self-reported GHG-avoiding PEB

The subjects were also asked to answer questions on self-reported GHG-avoiding PEB. As the major influence of air travel on greenhouse gas emissions is well documented (e.g., Sims

et al., 2014), participants were asked about their air travel activities within one year before the study. Specifically, the thesis was interested in the amount of inter-continental flights (long-distance) with a significant influence on greenhouse gas emissions. A round-trip was counted as one voyage. In order to reduce the influence of outliers, the number of flights was grouped for the purpose of statistical analysis (inter-continental flights (round-trips): 0 = “zero”, 1 = “one”, 2 = “two”, 3 = “three”, 4 = “four”, 5 = “five or more”). Additionally, the study highlights the consumption of green electricity (Clark et al., 2003). The adoption of renewable energy avoided a total amount of 118.2 Mio. ton CO_2 equivalent emissions in Germany in 2016 (German Environment Agency, 2017b). Therefore, the study collected data on participants’ current situation of use of green electricity at home (0 = “No”, 1 = “Yes”). Moreover, previous studies have shown that greenhouse gas emissions can be avoided via the consumption of locally produced food (e.g., Paxton, 1994). According to previous studies (e.g., Whitmarsh & O´Neill, 2010), subjects responded to the statements “How often do you buy locally produced fruits and vegetables” within a 5-point scale ranging from “never” (=1) to “always” (=5).

c) Financial investment intentions

The study examines the intention to invest either in environmentally friendly, -harmful or -neutral investment products (funds) offered in the laboratory study. Wind energy is seen as a sustainable investment opportunity, as this energy source has great potential for avoiding greenhouse gas emissions. For instance, the avoidance of greenhouse gas emissions in Germany is mainly based on onshore wind energy sources (2017: 59.6 million metric tons of CO_2 equivalents), but also on offshore wind-energy sources (2017: 11.9 million metric tons of CO_2 equivalents) (German Environment Agency, 2018).

Furthermore, organic farming is also regarded as a sustainable investment. Applying methods of conventional agriculture has negative impacts like e.g. loss of biodiversity, pollution from fertilizers and pesticides, and risks for human health (deLonge et al., 2016). Organic agriculture is an alternative to conventional agriculture, which is partially able to overcome the negative effects of conventional agriculture (e.g., pollution through pesticides) (Muller et al., 2017). A

review of the literature on whether organic farming leads to the reduction of greenhouse gas emissions can be found in Bauer & Menrad (2020b).

Funds that invest in mineral oil / natural gas are considered to be environmentally harmful as the oil and gas industry significantly contributes to greenhouse gas emissions (Grasso, 2019; Hanif et al., 2019). Finally, funds that invest in residential real estate were also offered in order to expand the asset classes to a sufficient number and to offer a financial product that might be considered rather neutral in terms of its climatic impact.

In order to analyze the intentions to invest, the data on the decision-making on the four optional funds in seven successive rounds were used (see for details: Bauer & Menrad, 2020b: 5).

4.4.2 Explanatory variables

a) Environmental values

Environmental values were measured with a short version of the value scale by deGroot & Steg (2007), which is based on the work by Schwartz (1992). The scale had already been used in various studies (deGroot & Steg, 2007; Steg et al., 2012). Individual items within the scale are listed in Table 1 in Bauer and Menrad (2019). Participants were asked to qualify environmental values based on the study by deGroot and Steg (2007: 336) as a "guiding principle" of life. The 9-point scale ranges from "opposed to my principles" (= −1) to "not important" (=0) to "extremely important" (=7). The internal consistency measured by Cronbachs´ alpha (Cronbach, 1951) is 0.82. In the following statistical analysis (see Bauer & Menrad, 2019, 2020a), the mean of the environmental value items is used.

b) Personal and social norms (Paris Agreement)

Personal norms (Paris Agreement) were measured by the item "I feel guilty when I do not contribute to the achievement of the climate goals of the Paris Agreement". The item was measured on a five-point agreement scale (Likert-scale), ranging from "I do not agree at all" (=1) to "I agree entirely" (=5).

On the basis of the study by van der Linden (2015) on social norms concerning individual contributions to slow-down climate change, the item for social norms (Paris Agreement) was developed (see also personal norms (Paris Agreement)). These norms were measured by the

item “People whose opinion I value, think that I should contribute to the achievement of the climate goals of the Paris Agreement”. Again, the item was measured on a five-point agreement scale (Likert-scale), ranging from “I do not agree at all” (=1) to “I agree entirely” (=5).

c) Environmental- and economic self-identity

Environmental self-identity is measured on a five-point agreement scale (Likert-scale) ranging from “I do not agree at all” (=1) to “I agree entirely” (=5) using the scale by van der Werff et al. (2013) (see Bauer & Menrad, 2020b, Table 2 for the individual items). For measuring economic self-identity, a scale that considers rational consumption patterns and concerns about economic issues (Bauer & Menrad, 2020b) was developed based on previous research findings (e.g., Whitmarsh & O´Neill, 2010). Economic self-identity is also measured using a five-point agreement scale (Likert-scale) ranging from “I do not agree at all” (1) to “I agree entirely” (=5).

d) Moral identity

Moral identity was measured by a scale based on the work by Aquino and Reed (2002). The original scale of 13 items was reduced to a scale of four items (see Bauer & Menrad, 2020a, Table 2), which reflects the internalization of moral traits. This items have been carried out because earlier studies have shown that moral traits as a central part of self-concept were especially related to donations and volunteering (Aquino & Reed, 2002). Following to Aquino and Reed (2002: 1427), participants of this study received the following initial information before they were asked to answer the items of the moral identity scale: “Listed below are some characteristics that may describe a person. The person with these characteristics could be you or it could be someone else. For a moment, visualize in your mind the kind of person who has these characteristics. Imagine how that person would think, feel, and act. When you have a clear image of what this person would be like, answer the following questions.” The traits were inter alia “caring, compassionate, fair, friendly, generous, helpful, hardworking, honest, and kind” (Aquino & Reed, 2002: 1426). Items were measured on a five-point agreement scale (Likert-scale), ranging from “I do not agree at all” (=1) to “I agree entirely” (=5).

e) Ethical mindsets

According to the work by Foot (1967), ethical mindsets were measured by the item: “A trolley is out of control and threatens to run over five people. By hitting a switch, the trolley can be diverted to another track. Unfortunately, there is another person on that track. Is it permissible (by hitting the switch) to take the loss of a person’s life to save the life of five people?” (Ostermaier & Uhl, 2017: 5). Participants had the opportunity to answer the question with “No, it is not permissible (by hitting the switch) to take the loss of a person’s life to save the life of five people” (= rule-based mindset) or with “Yes, it is permissible (by hitting the switch) to take the loss of a person’s life to save the life of five people.” (= outcome-based mindset).

4.5 Statistical methods

Next to analysis via descriptive statistics, the hypotheses were tested by applying multiple regression models (e.g., Hennevogl et al., 2013; McCullagh & Nelder, 1972), multi-mediator analysis (e.g., Preacher & Hayes, 2004, 2008), mixed logit models (e.g., Hole, 2007) as well as hierarchical Bayesian models (Sawtooth Software, 2017). In the following, the applied statistical methods are briefly highlighted. More details on the specific statistical models can be found in Bauer and Menrad (2019, 2020a, 2020b).

4.5.1 General linear models

The work contains hypothesis, which highlight the influence of explanatory variables on dependent variables (see Table 1, Hypothesis 1, 3-8). Thus, it is a suitable method to analyze the data via multivariate linear regression models. In particular, it was applied a general linear model (GLM), which is an extension of the linear regression model. By more flexibilization of the assumptions of the linear regression model, it is possible to „[…] fit models to a wide range of data“ (Nelder & Wedderburn, 1972: 383). By using GLM, the distribution of the dependent variable is not only limited to a normal distribution but can also be determined by further distributions from the exponential family. The distributions of the dependent variables were chosen according to the scale of the data and the best possible goodness of fit of the models. By the broad scope of GLM, it is possible to test the influence of personal and social norms (Paris Agreement) on different GHG-avoiding PEB as well as the influence of priming by

exposure, ethical mindsets, environmental values and moral identity and of interaction effects on carbon offsetting.

4.5.2 Multi-mediator analysis

By hypothesis 2 (see Table 1), it is investigated the influence of an independent variable (environmental values) on mediating variables (personal and social norms (Paris Agreement)) as well as the influence of these mediating variables on the dependent variables (carbon offsetting, amount of inter-continental flights, consumption of green energy and consumption of local fruits and vegetables). For data analysis, the thesis applied a single-step multi-mediator analysis (Hayes, 2018; Preacher & Hayes, 2004, 2008; Zhao et al., 2010). This method enables to perform a significance test for the mediation effects. Once a mediator explains the relationship between the independent and the dependent variable (= indirect effect), it is obtained a mediation effect. The data analysis is run by Model 4 of the SPSS-PROCESS macro by Hayes (2018). The algorithm uses bootstrap sample in order to estimate the indirect effects and the confidence interval for the indirect effect. Thereby, it is necessary to use bootstrap sample, because the sample size (n= 226) is relatively small.

4.5.3 Hierarchical Bayesian model

In order to analyze the (relative) importance of the attributes and the attribute levels for the hypothetical decision-making among the funds on offer, the study applied a hierarchical Bayesian model (Huber, 2005; Orme, 2010; Sawtooth Software, 2017, 2019). This model uses a Monte-Carlo-Marcov-Chain method to estimate the utility of the attribute levels. The average utilities of the attribute levels are calculated on the basis of 20,000 iterations, which are generated by the Metropolis Hastings algorithm. Finally, on the basis of theses utilities, the software calculates the relative average importance of the attributes. The attributes are investment field (attribute levels: wind energy, mineral oil/ natural gas, organic farming, residential real estate), annual return (attribute levels: 0.5% annual return, 4% annual return, 8% annual return), risk (attribute levels: low risk, medium risk, high risk) and term of validity (attribute levels: 2 years, 5 years, 10 years). The utility which results from an attribute level is also called preference.

4.5.4 Mixed logit models

Lastly, hypothesis 8-11 (see Table 1) concerning the influence of environmental- and economic self-identity and personal norms (Paris Agreement) on the intention to invest in wind energy, organic farming, mineral oil / natural gas and residential real estate is analyzed by mixed logit models (Gutsche & Ziegler, 2019; Kastner & Matthies, 2016; McFadden & Train, 2000; Train, 2009). The intention for financial investments in funds is calculated by the selection of a fund from a variety of offered funds and the additional statement that one would actually invest in this particular fund (see also Bauer & Menrad, 2020b: 5). The mixed logit model takes into account the decision-making in random choice sets and is able to calculate normally distributed individual-specific utilities (Hensher & Green, 2003; Hess, 2010). The parameters are simulated on the basis of the maximum simulated likelihood based on Halton draws (Hole, 2007). Data analysis was performed with STATA 16 using the mixlogit command (Hole, 2007).

5. Results and scientific contribution

In this chapter, the results are summarized (see also Table 2) and the scientific contribution is outlined. Descriptive statistics on the explanatory and dependent variables are reported in Bauer & Menrad (2019, 2020a, 2020b). The contribution of the author of this thesis was to develop the design and questionnaire for the laboratory study based on a literature review and to consider the advanced statistical methods. Furthermore, I wrote the above-mentioned articles based on an extensive literature research. Finally, the articles were linguistically proofread by the proofreading service of the Technical University Munich (School of Management). Finally, I improved the papers according to the peer reviews in the process of publication. Prof. Dr. Klaus Menrad was involved in the development of the survey and provided feedback and helped with the design of the conjoint experiment by giving advice and support due to his great experience in conducting conjoint analyses. Furthermore, the articles could be further developed according to the advice of Klaus Menrad.

5.1 Bauer, A., Menrad, K. (2019): Standing up for the Paris Agreement: Do global climate targets influence individuals‘ greenhouse gas emissions? Environmental Science and Policy 99, 72-79.

One of the main aims of this thesis was to examine the influence of the Paris Agreement (United Nations Framework Convention on Climate Change, 2015) on GHG-avoiding PEB by a laboratory study. This study was published in the international peer-reviewed journal Environmental Science and Policy (Elsevier, Impact Factor 2019: 4.767, DOI: https://doi.org/10.1016/j.envsci.2019.05.015). The scientific contribution of this study can be highlighted as follows:

Personal and social norms (Paris Agreement) partly influence GHG-avoiding PEB. In particular, personal and social norms (Paris Agreement) positively influence the consumption of green energy, the consumption of local fruits and vegetables and the actual compensation of greenhouse gas emissions via carbon offsetting. Since this work was the first to conceptualize personal and social norms linked to individual contributions to global climate targets, this result is important for scientific progress and corresponds to hypothesis 1. In abstract terms, previous research findings which found that personal and social norms have positive influence on pro-environmental behavior could be partly confirmed for personal and social norms (Paris Agreement) (Horne & Kennedy, 2017; Kormos et al., 2014; Lind et al. 2015; van der Werff & Steg, 2016; Vesley & Klöckner, 2017; Wan et al., 2017). Moreover, the results of the study by Brüggemann et al. (2017), which showed that the intentions of the German participants to behave pro-environmentally before, during and after the negotiations on the Paris Agreement have not changed, were comprehensively supplemented by investigations by environmental psychological constructs. This is, because the thesis found out that social norms (Paris Agreement) are related to consumption of green energy, and personal norms (Paris Agreement) are related to carbon offsetting and consumption of local fruits and vegetables. As the decision to consume green energy in a household may be influenced by group-specific processes leading to corresponding social norms, the result is in line with the assumptions of the author of this thesis. However, the findings show, that the amount of inter-continental flights is not influenced by personal and social norms (Paris Agreement). This result

is in line with previous findings, which found that the number of flights were not influenced neither by environmental values nor by environmental self-identity (Whitmarsh & O´Neill, 2010).

Furthermore, the important role of environmental values as well as of personal and social norms (Paris Agreement) in explaining pro-environmental behavior is approved according to hypothesis 2. Thereby, previous research findings were confirmed (Lind et al., 2015; Nordlund & Garvill, 2013; van der Werff & Steg, 2016). More specifically, personal and social norms (Paris Agreement) partially mediate the influence of environmental values on consumption of green energy, consumption of local fruits and vegetables as well as on carbon offsetting. This finding is important and novel because it places personal and social norms (Paris Agreement) in the context of approved constructs of environmental psychology.

5.2 Bauer, A., Menrad, K. (2020a): The nexus between moral licensing and behavioral consistency: Is organic consumption a door-opener for commitment to climate protection? Social Science Journal.

The second part of the thesis was about the examination of consistent PEB by an experimental study. This study was published in the international peer-reviewed Social Science Journal (Tayler & Francis, Impact Factor 2019: 1.033, DOI: https://doi.org/10.1080/03623319.2020.1757350). The main scientific contribution of this work can be summarized as follows:

Priming by an “organic offer” has partially influence on subsequent pro-environmental decision-making. Ethical mindsets, environmental values and moral identity are differently interacting with priming by an “organic offer”. This is a novel finding in the environmental domain and can support understanding consistent pro-environmental behavior in a more comprehensive way.

Focusing on the hypothesis concerning the two-way-interaction terms, the results show that environmental values do not interact with priming by an organic offer. This interaction term has no significant influence on subsequent carbon offsetting (according to Hypothesis 3). This is in line with previous research findings which also found that activated environmental values did not influence subsequent pro-environmental behavior (Carrico et al., 2017; Tate et al., 2014;

Truelove et al., 2016). Furthermore, the results indicate that there is a negative interaction effect between moral identity and priming by an “organic offer”. This finding is against hypothesis 6 because it was assumed according to previous research findings (Carrico et al., 2017; Truelove et al., 2014, 2016), that there is not a significant relationship between these variables. However, the data show that priming by an “organic offer” interacts with moral identity and leads to a reduced likelihood of further commitment for nature via carbon offsetting. This result slightly speaks for moral licensing effects (Mazar & Zhong, 2010).

Investigations towards the interaction between ethical mindsets (Foot, 1967), environmental values, moral identity and priming by exposure are novel in the environmental domain. After including the three-way interaction term in the statistical models, the data show that there is a positive and significant influence of the interaction term between rule-based mindsets, priming by an “organic offer” and environmental values on carbon offsetting (as assumed in Hypothesis 4). Additionally, the results show in line with hypothesis 5, that the interaction between priming by exposure, environmental values and outcome-based mindset has no significant influence on subsequent carbon offsetting. Finally, the results do not support the hypotheses 7 and 8, because there is no statistically significant interaction between an ethical mindset (=outcome-based or rule-based mindsets), priming by exposure and moral identity.

5.3 Bauer, A., Menrad, K. (2020b): Beyond risk and return: What motivates environmentally friendly or harmful student fund investments in Germany? Energy Research and Social Science, 67.

Lastly, preferences towards investments in environmentally friendly, -neutral or -harmful funds and the intentions to invest in these funds were examined by a conjoint experiment. This study was published in the international peer-reviewed journal Energy Research and Social Science (Elsevier, Impact Factor 2019: 4.771, DOI: https://doi.org/10.1016/j.erss.2020.101509). The scientific contribution of this study can by outlined as follows:

One key part of the paper was to investigate the preferences for the funds on offer. There were not formulated specific hypotheses on that topic in advance. In particular, the findings show that the annual return (37.74% of 100%) and the risk (34.15% of 100%) are the most important

attributes when participants were deciding on the offered funds. The relative average importance for the attribute investment field (19.48% of 100%) was lower compared to the attributes annual return and risk but was a much more important attribute than the investment term of validity (8.63% of 100%). Therefore, in accordance with classical financial theory (e.g., Markowitz, 1952), it can be determined that annual return and risks are, in relative terms, the most important factors influencing decision-making about funds. Thus, the work highlighted previous research findings, which found that annual returns and risk are the most important attributes for investments in renewable technology (Curtin et al., 2019). Moreover, subjects preferred high annual returns (= 8%) within the attribute annual return, low risk within the attribute risk, and a short term of validity (= 2 years) within the attribute term of validity. Moreover, subjects have by far the lowest preference towards mineral oil / natural gas investments within the attribute of investment field.

Furthermore, environmental- and economic self-identity were for the first time linked to environmentally friendly and -harmful investments in funds. The results show, that neither environmental- nor economic self-identity have a statistically significant influence on the intentions to invest in wind energy, organic farming or mineral oil / natural gas. These findings are in line with hypothesis 9, but against hypothesis 10. Previous research has shown, that environmental self-identity is related to e.g. sustainable consumption (van der Werff et al., 2013). However, as an investment is not a behavior of everyday life which can be easily executed, the thesis expected according to the work by Kashima et al. (2014), that environmental self-identity has no influence on sustainable investments in wind energy and organic farming. Additionally, a novel finding is, that economic self-identity had no influence on decision-making on funds. This result may be due to the fact that economic aspects are simultaneously taken into account by the attributes of the funds of risk and return.

For the first time, the study shows that personal norms (Paris Agreement) statistically significantly reduce the intention to invest when students think about mineral oil / natural gas investments. Moreover, personal norms (Paris Agreement) increase the investment intention (in accordance with hypothesis 11) in a statistically significant way when students think about

investments in organic farming. Finally, personal norms (Paris Agreement) are not linked to investment intentions in wind energy, which contradicts hypothesis 11.

Table 2. Summary of results

Hypothesis	Abbreviated content of the main hypothesis	Hypothesis confirmed?
1	Personal and social norms (Paris Agreement) positively influence on GHG-avoiding PEB.	Yes (**except** for inter-continental flights)
2	Personal and social norms (Paris Agreement) mediate the influence of environmental values on GHG-avoiding PEB.	Yes (**except** for inter-continental flights)
3	Priming by an organic offer has via environmental values no influence on carbon offsetting.	Yes
4	Priming by an organic offer has via environmental values and rule-based mindsets a positive influence on carbon offsetting.	Yes
5	Priming by an organic offer has via environmental values and outcome-based mindsets no influence on carbon offsetting.	Yes
6	Priming by an organic offer has via moral identity no influence on carbon offsetting.	No
7	Priming by an organic offer has via moral identity and outcome-based mindsets a negative influence on carbon offsetting.	No
8	Priming by an organic offer has via moral identity and rule-based mindsets a positive influence on carbon offsetting.	No
9	Environmental self-identity has no influence on the intention to invest in environmentally-friendly investment fields (wind energy, organic farming).	Yes
10	Economic self-identity has a positive influence on the intention to invest in environmentally harmful, neutral and friendly investment fields.	No
11	Personal norms (Paris Agreement) have a positive influence on the investment intention in environmentally friendly fields (wind energy, organic farming) and a negative influence on the investment intentions in environmentally harmful fields (mineral oil / natural gas).	Yes (**except** for investment intentions in wind energy)

6. Discussion and conclusions

In this chapter, only general conclusions will be made since the results of the three publications and their discussion was already integrated into chapter 5.

Consistent behavior in favor of the environment can be motivated by a variety of influencing factors. The main topic of the thesis was to investigate consistent environmentally friendly behavior for a sample of students by means of a laboratory experiment. Apart from some

limitations of the study (see following paragraph), the applied method was appropriate for the analysis of the research questions. In particular, the scientific knowledge about the general motivation to behave in a greenhouse gas-avoiding manner in different fields could be extended by analyzing personal and social norms (Paris Agreement). First, it can be concluded that personal and social norms (Paris Agreement) can be a cross-situational motivator for environmentally friendly behavior under certain circumstances. However, the extent of inter-continental flights or the investment intentions in wind energy cannot be explained by these norms.

Furthermore, a main purpose of this work was to study environmentally and socially friendly behavior in a continuous sequence. The results suggest that organic consumption can be a door-opener for further environmentally and socially friendly behavior if the environmental values of individuals with rule-based mindsets have been activated by priming by exposure. In contrast, moral identity can be after priming by exposure negative for further environmental and social engagement, which slightly suggests moral licensing effects.

Moreover, the thesis was able to gain insights into decision-making on sustainable financial investments in funds when these funds are in direct competition to environmentally-harmful or -neutral financial products. Financial investments by private households are inter alia necessary in order to further expand sustainable sectors of the economy. Specifically, a higher number of investors in wind energy can further reduce the financing costs of certain wind energy projects and thus help to achieve the ambitious targets for reducing greenhouse gas emissions by switching to renewable energy sources. In summary, the study points out that the analyzed target group of students is not very interested in investing in organic farming. This investment field is probably not (yet) a common investment opportunity, although the market for organic products has grown rapidly in recent decades (FIBL & IFOAM, 2019). Furthermore, it can be concluded that environmental- as well as economic self-identity are not crucial factors in explaining investment intentions. However, the study showed for the first time that personal norms (Paris Agreement) increase the probability of hypothetical investments in funds committed to organic farming.

6.1 Limitations

The thesis has limitations, as the sample of the study consists solely of students, so the results are not valid for the general population of Germany. In addition, it should be noted that students with an average age of about 22 years may be largely unfamiliar with actual financial investment decisions. However, the sample is mainly composed of business students and during the experiment only financial products (funds) were offered that were reduced to their basic characteristics (investment field, annual return, risk, term of validity). Therefore, it can be expected that the students surveyed in this study could hypothetically choose between the funds on offer, even if they were not already experienced investors. Finally, it is concluded that students are an interesting sample worth of investigation, because the future perspectives of environmentally friendly financing may be influenced by students (among others) in their potential future roles as opinion leaders and/or company managers.

Moreover, a limitation of this study is that the results cannot be used to state whether the influence of personal and social norms (Paris Agreement) is causally determined because the study had neither a control and treatment group nor has collected panel data. Further, the results of the study could be influenced by measurement errors stemming from self-reported behavior.

The thesis investigated only a subset of pro-environmental behaviors. The special focus was on GHG-avoiding PEB, environmentally-friendly donations as well as on intentions to invest in sustainable fields and did not consider further important behavioral fields like e.g. water conservation. Furthermore, the work investigated actual behavior in one case (carbon offsetting). The other PEB (reduced inter-continental flights, consumption of green energy, consumption of local fruits and vegetables) were measured as self-reported pro-environmental behaviors. In addition, the choice-experiment deals with preferences and intentions concerning environmentally-friendly and environmentally-harmful investment opportunities. By investigating data with actual behaviors, the insights of the study would have been more powerful.

6.2 Suggestions for future research

Future research can - in addition to personal and social norms regarding individual contributions to global climate goals - also highlight personal and social norms regarding individual contributions to city- or neighbourhood-specific measures to reduce greenhouse gas emissions. It is expected that these norms can also have an impact on the greenhouse gas avoiding PEB as these norms are more closely linked to the spatial environment of the individual. In particular, the interaction effects between these norms and local social capital (Keuschnigg & Wolbring, 2015) may have an impact on GHG-avoiding PEB and therefore may be an important research topic for the future.

Future research may also consider further explanatory variables such as warm glow towards a wind energy or organic farming investment (Gutsche & Ziegler, 2019). Investments in sustainable fields may also be influenced by the bank which offers financial products. Therefore, future research may consider specific the role of e.g. sustainability banks in the process of decision-making regarding financial products (Gutsche & Ziegler, 2019).

Moreover, future research can focus further parts of the population in Germany. Investigations could be concentrated on further target groups (e.g., single person households, multi-person households, business managers) or on specific regions of Germany (e.g., cities, rural regions). Beyond that, it might also be interesting to examine the influence of other social and cultural contexts (e.g., in Europe, the United States or China) on the perception of a moral obligation to contribute to the global climate goals of the Paris Agreement.

6.3 Policy and business-related implications

Global governance on climate change mitigation is important in order to reduce negative impacts of climate change. The thesis suggests that policymakers' emphasis on the importance of contributions by society to global climate targets can act as a non-monetary incentive for GHG-avoiding PEB.

Practical implications can be inter alia formulated for triggering PEB by organic consumption. The thesis aimed to simulate an ordinary consumption situation leading to a usability of the

results in practice. The investigated consumption patterns (organic consumption, donations) are also likely to occur in everyday life (e.g., in a grocery store). This may be the case, when grocery stores offer to donate when people decide to purchase organic products which were produced under fair conditions. Such offers can be relevant for people with strong environmental values and rule-based mindsets. The research results can also be relevant for companies, e.g., if organic dishes are offered in a canteen, which can lead to a further commitment to nature and cost saving, e.g., through later energy saving.

In addition, insights into the influence of explanatory variables on the decision-making process of funds are crucial for renewable energy providers, organic farmers and bank managers. The study provides additional information on the potential group of private investors in funds investing in environmentally friendly economic sectors.

References

Aarts, H., Dijksterhuis, A. (2003): The silence of the library: Environment, situational norm, and social behavior. Journal of Personality and Social Psychology 84 (1), 18–28.

Albarracín, D., Wyer, R. S. (2000): The cognitive impact of past behavior: influences on beliefs, attitudes, and future behavioral decisions. Journal of Personality and Social Psychology 79(1), 5–22.

Anderson, B., Bernauer, T. (2016): How much carbon offsetting and where?: implications of efficiency, effectiveness, and ethicality considerations for public opinion formation. Energy Policy 94, 387–395.

Aquino, K., Reed, A. (2002): The self-importance of moral identity. Journal of Personality and Social Psychology 83(6), 1423–1440.

Bamberg, S., Hunecke, M., Blöbaum, A. (2007): Social context, personal norms and the use of public transportation: two field studies. Journal of Environmental Psychology 27(3), 190–203.

Bauer, A., Menrad, K. (2019): Standing up for the Paris Agreement: Do global climate targets influence individuals' greenhouse gas emissions? Environmental Science and Policy 99, 72–79,

Bauer, A., Menrad, K. (2020a): The nexus between moral licensing and behavioral consistency: Is organic consumption a door-opener for commitment to climate protection? Social Science Journal.

Bauer, A., Menrad, K. (2020b): Beyond risk and return: What motivates environmentally friendly or harmful student fund investments in Germany? Energy Research and Social Science, 67.

Bauer, R., Smeets, P. (2015): Social identification and investment decisions. Journal of Economic Behavior &. Organization 117, 121–134.

Berry, R.H., Yeung, F. (2013): Are investors willing to sacrifice cash for morality? Journal of Business Ethics 117(3), 477–492.

Biel, A., Dahlstrand, U., Grankvist, G. (2005): Habitual and value-guided purchase behavior. AMBIO: A Journal of the Human Environment 34(4), 360–365.

Borgers, A.C.T., Pownall, R.A.J. (2014): Attitudes towards socially and environmentally responsible investment. Journal of Behavioral and Experimental Finance 1, 27–44.

Brüggemann, M., de Silva-Schmidt, F., Hoppe, I., Arlt, D., Schmitt, J.B. (2017): The appeasement effect of a United Nations climate summit on the German public. Nature Climate Change 7 (11), 783–787.

Carrico, A. R., Raimi, K. T., Truelove, H. B., Eby, B. (2017): Putting your money where your mouth is: an experimental test of pro-environmental spillover from reducing meat consumption to monetary donations. Environment and Behavior, 50(7), 723–748.

Cialdini, R.B., Kallgren, C.A., Reno, R.R. (1991): A focus theory of normative conduct: a theoretical refinement and revaluation of the role of norms in human behavior. In: Zanna, M.P. (Ed.), Advances in Experimental Social Psychology, Vol. 24. Academic Press, pp. 201–234.

Clark, C.F., Kotchen, M.J., Moore, M.R. (2003): Internal and external influences on proenvironmental behavior: participation in a green electricity program. Journal of Environmental Psychology 23(3), 237–246.

Cook, A.J., Kerr, G.N., Moore K. (2002): Attitudes and intentions towards purchasing GM food. Journal of Economic Psychology 23(5), 557-572.

Cornelissen, G., Bashshur, M. R., Rode, J., Le Menestrel, M. (2013): Rules or consequences? The role of ethical mind-sets in moral dynamics. Psychological Science 24(4), 482–488.

Cronbach, L.J. (1951): Coefficient alpha and the internal structure of tests. Psychometrika 16(3), 297–334.

Curtin, J., McInerney, C.; Gallachóir, B., Salm, S. (2019): Energizing local communities - What motivates Irish citizens to invest in distributed renewables? Energy Research and Social Science 48, 177–188.

deGroot, J.I.M., Abrahamse, W., Jones, K. (2013): Persuasive normative messages: the influence of injunctive and personal norms on using free plastic bags. Sustainability 5 (12), 1829–1844.
deGroot, J.I.M., Steg, L. (2007): Value orientations to explain beliefs related to environmental significant behavior. Environment and Behavior 40(3), 330–354.
deLonge, M.S., Miles, A., Carlisle, L. (2016): Investing in the transition to sustainable agriculture, Environmental Science and Policy 55, 266–273.
Evans, L., Maio, G. R., Corner, A., Hodgetts, C. J., Ahmed, S., Hahn, U. (2013): Self-interest and pro-environmental behaviour. Nature Climate Change 3(2), 122–125.
Farrow, K., Grolleau, G., Ibanez, L. (2017): Social norms and pro-environmental behavior: a review of the evidence. Ecological Economics 140, 1–13.
FiBL & IFOAM (2019): Organics International, The World of Organic Agriculture. Statistics and Emerging Trends 2019, Available online at: https://shop.fibl.org/CHde/mwdownloads/download/link/id/1202/?ref=1 checked on 2020-1-4.
Foot, P. (1967): The problem of abortion and the doctrine of the double effect. Oxford Review, 5, 5–15.
Gatersleben, B., Murtagh, N., Abrahamse, W. (2014): Values, identity and pro-environmental behaviour. Contemporary Social Science 9(4), 374–392.
Gutsche, G., Ziegler, A. (2019): Which private investors are willing to pay for sustainable investments? Empirical evidence from stated choice experiments. Journal of Banking Finance 102, 193–214.
German Environment Agency (2017a): Environmental Awareness in Germany 2016: Results of a Representative Survey. Available online at: https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/umweltbewusstsein_deutschland_2016_bf.pdf., checked on 2018-09-13.
German Environment Agency (2017b): Renewable Energies in Germany: Data on the Development in the Year 2016. Available online at: https://www.umweltbundesamt.de/publikationen, checked on 2018-09-13.
German Environment Agency (2018): Emission balance of renewable energy sources. Determination of avoided emissions in 2017, in: Thomas Lauf (Ed.), Climate Change, 23/2018, Available online at https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2018-10-22_climate-change_232018_emissionsbilanz_erneuerbarer_energien_2017_fin.pdf, checked on 2019-5-8.
Grasso, M. (2019): Oily politics: A critical assessment of the oil and gas industry's contribution to climate change. Energy Research and Social Science 50, 106–115.
Green, P.E., Srinivasan, V. (1990): Conjoint analysis in marketing: new developments with implications for research and practice. Journal of Marketing 54(4), 3–19.
Hanif, I., Raza, S. M. F, Gago-de-Santos, P., Abbas, Q. (2019): Fossil fuels, foreign direct investment, and economic growth have triggered CO_2 emissions in emerging Asian economies: Some empirical evidence. Energy 171, 493–501.
Hayes, A.F. (2018): Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. Methodology in the Social Sciences, Second edition. The Guilford Press, New York, London, pp. 692.
Hennevogl, W., Fahrmeir, L., Tutz, G. (2013): Multivariate Statistical Modelling Based on Generalized Linear Models. Springer Series in Statistics. Springer, New York.
Hensher, D.A., Green, W.H. (2003): The Mixed Logit model: the state of practice. Transportation 30, 133–176.
Hess, S. (2010): Conditional parameter estimates from mixed logit models: distributional assumptions and a free software tool. Journal of Choice Modelling 3(2), 134–152.
Hole, A.R. (2007): Fitting mixed logit models by using maximum simulated likelihood. Stata Journal 7(3), 388–401.
Horne, C., Kennedy, E.H. (2017): The power of social norms for reducing and shifting electricity use. Energy Policy 107, 43–52.

Huber, J. (2005): Conjoint Analysis: How We Got Here and Where We Are (An Update), Sawtooth Software, Inc. Research Paper Series, Available online at http://www.sawtoothsoftware.com/download/techpap/howwegot2.pdf, checked on 2019-08-07.
Huber, R.A., Anderson, B., Bernauer, T. (2018): Can social norm interventions promote voluntary pro environmental action? Environmental Science and Policy 89, 231–246.
Jordan, J., Mullen, E., & Murnighan, J. K. (2011): Striving for the moral self: The effects of recalling past moral actions on future moral behavior. Personality & Social Psychology Bulletin 37(5), 701–713.
Kashima, Y., Paladino, A., Margetts, E.A. (2014): Environmentalist identity and environmental striving. Journal of Environmental Psychology 38, 64–75.
Kastner, I., Matthies, E. (2016): Investments in renewable energies by German households: a matter of economics, social influences and ecological concern? Energy Research and Social Science 17, 1–9.
Keuschnigg, M., Wolbring, T. (2015): Disorder, Social Capital, and Norm Violation: Three Field Experiments on the Broken Windows Thesis. Rationality and Society 27, 96-126.
Kormos, C., Gifford, R., Brown, E. (2014): The influence of descriptive social norm information on sustainable transportation behavior: a field experiment. Environment and Behavior 47(5), 479–501.
Lind, H.B., Nordfjærn, T., Jørgensen, S.H., Rundmo, T. (2015): The value-belief-norm theory, personal norms and sustainable travel mode choice in urban areas. Journal of Environmental Psychology 44, 119–125.
Marcia, J. E. (1980): Identity in adolescence. J. Adelson (Ed.), Handbook of adolescent psychology. Wiley, New York, pp. 159 – 187.
Markowitz, H. (1952): Portfolio Selection. Journal of Finance 7, 77–91.
Mazar, N., Ariely, D. (2006): Dishonesty in everyday life and its policy implications. Journal of Public Policy & Marketing 25(1), 117–126.
Mazar, N., Zhong, C.-B. (2010): Do green products make us better people? Psychological Science 21(4), 494–498.
McCullagh, P., Nelder, J.A. (1999): Generalized Linear Models, 2.th ed. Monographs on Statistics and Applied Probability 37. Chapman & Hall, London, pp. 511.
McFadden, D., Train K. (2000): Mixed MNL models for discrete response. Journal of Applied Economics 5, 447–470.
Mullen, E., Monin, B. (2016): Consistency versus licensing effects of past moral behavior. Annual Review of Psychology 67(1), 363–385.
Muller, A., Schader, C., El-Hage Scialabba, N. et al. (2017): Strategies for feeding the world more sustainably with organic agriculture. Nature Communications 8, 1290.
Nelder, J.A., Wedderburn, R.W.M. (1972): Generalized linear models. Journal of the Royal Statistical Society, Ser. A (Gen.) 135(3), 370–384.
Nigbur, D., Lyons, E., Uzzell, D. (2010): Attitudes, norms, identity and environmental behaviour: using an expanded theory of planned behaviour to predict participation in a kerbside recycling programme. British Journal of Social Psychology 49(2), 259–284.
Nordlund, A.M., Garvill, J. (2003): Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. Journal of Environmental Psychology 23(4), 339–347.
Orme, B.K. (2010): Getting Started with Conjoint Analysis. Strategies for Product Design and Pricing Research, 2nd ed., Research Publishers, LLC, Madison, WI.
Ostermaier, A., Uhl, M. (2017): Spot on for liars! How public scrutiny influences ethical behavior. PloS One, 12(7),e0181682.
Papies, E.K. (2016): Goal priming as a situated intervention tool. Current Opinion in Psychology 12, 12–16.
Paxton, A. (1994): The Food Miles Report: The Dangers of Long Distance Food Transport. Safe Alliance, London.
Pohjolainen, P., Kukkonen, I., Jokinen, P., Poortinga, W, Umit, R. (2018): Public Perceptions on Climate Change and Energy in Europe and Russia 2018. European Social Survey. Available online at,

https://www.europeansocialsurvey.org/docs/findings/ESS8_pawcer_climate_change.pdf, checked on 2020-1-10.
Preacher, K.J., Hayes, A.F. (2004): SPSS and SAS procedures for estimating indirect effects in simple mediation models. Behavior Research Methods, Instruments, & Computers 36(4), 717–731.
Preacher, K.J., Hayes, A.F. (2008): Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behavior Research Methods 40(3), 879–891.
Riedl, A., Smeets, P. (2017): Why do investors hold socially responsible mutual funds? Journal of Finance 72(6), 2505–2550.
Sachdeva, S., Iliev, R., Medin, D. L. (2009): Sinning saints and saintly sinners: The paradox of moral self-regulation. Psychological Science 20(4), 523–528.
Sawtooth Software, Inc (2017): The CBC System for Choice-Based Conjoint Analysis. Sawtooth Software Technical Paper Series, Version 9, Available online at https://www.sawtoothsoftware.com/download/techpap/cbctech.pdf, checked on 2019/8/7.
Sawtooth Software, Inc (2019): The CBC/HB System for the CBC/HB System for Hierarchical Bayes Estimation, Sawtooth Software Technical Paper Series, 2009 Version 5. Available online at https://www.sawtoothsoftware.com/products/conjoint-choice-analysis/cbc/128-cbc-hb-technical-paper-2009, checked on 08-23-2019.
Schwartz, S.H. (1977): Normative influences on altruism. In: Berkowitz, L. (Ed.), Advances in Experimental Social Psychology, Vol. 10. Academic Press, pp. 221–279.
Schwartz, S.H., Bilsky, W. (1990): Toward a theory of the universal content and structure of values: extensions and cross-cultural replications, Journal of Personality and Social Psychology 58, 878–891.
Schwartz, S.H. (1992): Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries. In: Zanna, Mark P. (Ed.), Advances in Experimental Social Psychology Vol. 25. Academic Press, pp. 1–65.
Sims, R., Schaeffer, R., Creutzig, F., Cruz-N..ez, X., D'Agosto, M., Dimitriu, D., Figueroa Meza, M.J., Fulton, M., Kobayashi, S., Lah, O., McKinnon, A., Newman, P., Ouyang, M., Schauer, J.J., Sperling, D., Tiwari, G. (2014): Transport. In: Edenhofer, O., Pichs-Madruga, R., Sokona, Y., Farahani, E., Kadner, S., Seyboth, K., Adler, A. (Eds.), Climate Change 2014. Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
Smith, L.G., Kirk, G.J.D., Jones, P.J. et al. (2019): The greenhouse gas impacts of converting food production in England and Wales to organic methods. Nature Communications 10, 4641.
Smith, T.W. (2007): Social identity and socio-demographic structure. International Journal of Public Opinion Research 19(3), 380–390.
Statman, M. (2004): What do investors want? Journal of Portfolio Management 30 (5), 153–161.
Steentjes, K., Pidgeon, N., Poortinga, W., Corner, A., Arnold, A., Böhm, C., Mays, C., Poumadére, M., Ruddat, M., Scheer, D., Sonnberger, M., Tvinnereim, E. (2017): European Perceptions of Climate Change: Topline Findings of a Survey Conducted in Four European Countries in 2016. Cardiff University, Cardiff.
Steg, L., Perlaviciute, G., van der Werff, E., Lurvink, J. (2012): The significance of hedonic values for environmentally relevant attitudes, preferences, and actions. Environment and Behavior 46(2), 163–192.
Steg, L. (2016): Values, norms, and intrinsic motivation to act pro-environmentally. Annual Review of Environment and Resources 41(1), 277–292.
Stets, J.E., Biga, C.F. (2003): Bringing identity theory into environmental sociology. Sociological Theory 21(4), 398–423.
Stets, J.E., Burke, P.J. (2000): Identity theory and social identity theory. Social Psychology Quarterly 63(3), 224.

Stern, P.C. (2000): New Environmental Theories: Toward a coherent theory of environmentally significant behaviour. Journal of Social Issues 56(3), 407–424.
Tajfel, H., Turner, J.C. (2004): The Social Identity Theory of Intergroup Behavior, in: John T. Jost, Jim Sidanius (Eds.), Political Psychology, Psychology Press, pp. 276–293.
Tate, K., Stewart, A. J., Daly, M. (2014): Influencing green behaviour through environmental goal priming: The mediating role of automatic evaluation. Journal of Environmental Psychology 38, 225–232.
Thøgersen, J. (2006): Norms for environmentally responsible behaviour: an extended taxonomy. Journal of Environmental Psychology 26(4), 247–261.
Thøgersen, J., Ölander, F. (2002): Human values and the emergence of a sustainable consumption pattern: a panel study. Journal of Economic Psychology 23(5), 605–630.
Thøgersen, J., Noblet, C. (2012). Does green consumerism increase the acceptance of wind power? Clean Cooking Fuels and Technologies in Developing Economies 51, 854–862.
Thøgersen, J., Zhou, Y., Huang, G (2016): How stable is the value basis for organic food consumption in China? Journal of Cleaner Production 134, 214–224.
Tiefenbeck, V., Staake, T., Roth, K., Sachs, O. (2013): For better or for worse? Empirical evidence of moral licensing in a behavioral energy conservation campaign. Energy Policy 57, 160–171.
Train, K. (2009): Discrete Choice Methods with Simulation, 2nd ed., Cambridge University Press.
Truelove, H.B., Carrico, A.R., Weber, E.U., Raimi, K.T., Vandenbergh, M.P. (2014): Positive and negative spillover of pro-environmental behavior: An integrative review and theoretical framework. Global Environmental Change 29, 127–138.
Truelove, H.B., Yeung, K.L., Carrico, A.R., Gillis, A.J., Raimi, K.T. (2016): From plastic bottle recycling to policy support: An experimental test of pro-environmental spillover. Journal of Environmental Psychology 46, 55–66.
United Nations Framework Convention on Climate Change (2015): Adoption of the Paris Agreement: FCCC/CP/2015/L.9/Rev.1. Available online at: http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf, checked on 2018-03-29.
Urban, J., Bahník, Š., Kohlová, M.B. (2019): Green consumption does not make people cheat: Three attempts to replicate moral licensing effect due to pro-environmental behavior. Journal of Environmental Psychology 63, 139–147.
van der Linden, S. (2015): The social-psychological determinants of climate change risk perceptions: towards a comprehensive model. Journal of Environmental Psychology 41, 112–124.
van der Werff, E., Steg, L., Keizer, K. (2013): The value of environmental self-identity: The relationship between biospheric values, environmental self-identity and environmental preferences, intentions and behaviour. Journal of Environmental Psychology 34, 55–63.
van der Werff, E., Steg, L. (2016): The psychology of participation and interest in smart energy systems: Comparing the value-belief-norm theory and the value-identity-personal norm model. Energy Research and Social Science 22, 107–114.
van der Werff, E., Taufik, D., Venhoeven, L. (2019): Pull the plug: How private commitment strategies can strengthen personal norms and promote energy-saving in the Netherlands. Energy Research and Social Science 54, 26–33.
Verplanken, B., Holland, R. W. (2002): Motivated decision making: Effects of activation and self-centrality of values on choices and behavior. Journal of Personality and Social Psychology 82(3), 434–447.
Vesely, S., Klöckner, C.A. (2017): Global social norms and environmental behavior. Environment and Behavior 50(3), 247–272.
Vignoles, Vivian, L.; Schwartz, Seth, J., Luyckx, Koen (2011): Introduction: Toward an integrative view of identity. In: Schwartz et al. (Eds): Handbook of Identity Theory and Research (pp. 1-27). Springer Science+Business Media.

Wan, C., Shen, G.Q., Choi, S. (2017): Experiential and instrumental attitudes: interaction effect of attitude and subjective norm on recycling intention. Journal of Environmental Psychology 50, 69–79.

Whitmarsh, L., O'Neill, S. (2010): Green identity, green living? The role of proenvironmental self-identity in determining consistency across diverse pro-environmental behaviours. Journal of Environmental Psychology 30(3), 305–314.

Wolters, S., Nett, K., Tänzler, D., Wilkening, K., G.tz, M., Krebs, J., Vogel, D. (2015): Updated Analysis of the German Market for Voluntary Compensation of Greenhouse Gas Emissions. German Environment Agency. Available online at: https://www.umweltbundesamt.de/publikationen/aktualisierte-analyse-des-deutschenmarktes-zur, checked on 2018-03-29.

Wright, P. (1975): Consumer choice strategies: simplifying vs. optimizing. Journal of Marketing Research 12(1), 60–67.

Wu, B., Yang, Z. (2018): The impact of moral identity on consumers' green consumption tendency: The role of perceived responsibility for environmental damage. Journal of Environmental Psychology 59, 74–84.

Young, H.P. (2015): The evolution of social norms. Annual Review of Economics 7(1), 359–387.

Zhao, X., Lynch, J.G., Chen, Q. (2010): Reconsidering baron and Kenny: myths and truths about mediation analysis. Journal of Consumer Research 37(2), 197–206.