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Why Do We (Not) Reduce Our Meat Consumption? An Extended Theory of Planned Behavior

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Abstract

Purpose: The objective of this study is to provide insights into the reduction of meat consumption as a pro-environmental behavior. As individuals are unaware of the environmental impact of their diet, we began by examining what an environmentally responsible diet entails. To understand the underlying psychological constructs of diet modification and in particular meat reduction, we analyzed the influence of norms and values on the respective behavior. Previous research and the resulting insights were utilized to develop well-founded recommendations for the promotion of meat reduction.

Methodology: Based on existing pro-environmental research we developed an extended Theory of Planned Behavior model including Schwartz's (2012) self-transcendence and self-enhancement values and distinct norms, i.e. personal, descriptive, and injunctive norm. To examine the psychological aspects influencing meat reduction, we applied a cross-sectional research design. The data was collected using a self-completed online-questionnaire. We conducted Structural Equation Modeling with SPSS and AMOS to test the developed model and the derived hypotheses.

Main Findings: When examining environmentally responsible eating behavior, we found that the reduction of animal-based products was an integral component. Meat reduction was found to be the most effective strategy to limit the environmental impact of diet. We further found that personal norms and injunctive norms drive meat reduction. This suggests that a feeling of moral obligation and other's approval increase individuals' meat reduction. In addition, self-transcendence values revealed a significant positive influence on several constructs in the context of meat consumption reduction. This implies that individuals with altruistic values, who care strongly about the welfare of others and the environment, are more positive towards and more likely to engage in meat reduction. Finally, we found that initiatives to promote meat reduction should comprise a variety of measures. To address the examined norms and values, we primarily suggest message framing.

Relevance: This study makes a theoretical and practical contribution to the topic of meat reduction. The suggested actions can benefit initiatives to more effectively promote individually determined diet choices which lead to reductions in meat consumption. The developed model and our findings provide a foundation for future research in this context.

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List of Abbreviations

AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CR	Construct Reliability
C.R.	Critical Ratio
EPI	Environmental Performance Index
FAO	Food and Agriculture Organization
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
MI	Modification Index
MLE	Maximum Likelihood Estimation
NAM	Norm Activation Model
NAT	Norm Activation Theory
NFI	Normed Fit Index
PBC	Perceived Behavioral Control
PNFI	Parsimony Normed Fit Index
RMSEA	Root Mean Square Error of Approximation
SE	Standard Error
SEM	Structural Equation Modeling
TLI	Tucker Lewis Index
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
VBN	Value-Belief-Norm

1. Introduction

1.1 Context

Human behavior is ultimately responsible for current global environmental issues like climate change. The excessive production and consumption of goods, services, and natural resources lead to higher emissions and more waste products (Terlau & Hirsch, 2015). Consequently, natural disasters, significant changes in weather patterns, and melting glaciers are more frequent on a global level than ever (IPCC, 2014a). Immediate mitigation actions are thus crucial (Spence, Poortinga, & Pidgeon, 2011). Even though it is challenging for individuals to fully grasp the environmental impact of their daily behavior (Roy & Pal, 2009; Chan & Bishop, 2013), it is argued that accountability needs to be set on the individual level to facilitate a reduction in environmental impacts (Milfont, 2010).

Correspondingly, the current high consumptive lifestyle of individuals needs to change to achieve sustainability in the future (Bandura, 2007). A good starting point to mitigate the detrimental effects on the climate is thereby everyday consumption behavior (Moser, 2015). In this context, the consumption of food is considered to be environmentally significant (Tobler, Visschers, & Siegrist, 2011). Animal based foods in particular are considered harmful to the environment and meat in particular is associated with high energy consumption and environmental damage (Dagevos & Voordouw, 2013). Both meat production and consumption greatly affect the environment and contribute to the changes in the current climate (Graham & Abrahamse, 2017).

Already today, consumers are devoting more and more attention to sustainable consumption (De Boer, Helms, & Aiking, 2006), which is discussed globally (Zhu, Li, Geng, & Qi, 2013). Accordingly, an increasing number of consumers are reducing their meat consumption (Dagevos & Voordouw, 2013). These so-called ‘meat reducers’ or ‘flexitarians’ play a pivotal part in changing the current consumption patterns to become more sustainable (De Bakker & Dagevos, 2012). In this study, we define meat reducers as consumers who do generally eat meat but consciously intend to reduce their meat consumption (e.g. Baker, Thompson, & Palmer-Barnes, 2002).

It is evident that there are significant reasons to reduce the consumption of meat, yet this issue still has to receive considerable attention (Laestadius, Neff, Barry, & Frattaroli, 2013; Westhoek, Rood, Van den Berg, Janse, Nijdam, Reudink, & Stehfest, 2011). Therefore, this study

enhances existing research on the novel topic of meat reduction as a pro-environmental behavior. An examination of meat reduction in particular is interesting as there is a significant amount of literature on the topic of meat substitution (e.g. Apostolidis & McLeay, 2016a-b; Hoek et al., 2011) as well as veganism and vegetarianism (Dagevos & Voordouw, 2013). Yet, there is still relatively little academic research on *meat reducers* (De Bakker & Dagevos, 2012). Current research examines meat consumption rather from a health perspective instead of taking a pro-environmental view (Çoker & Van der Linden, 2020). In addition, there is a lack of research on the corresponding initiatives to stimulate a reduction in meat consumption (Dagevos & Voordouw, 2013; Laestadius, Neff, Barry, & Frattaroli, 2014). Here, the focus is mostly on technological and economic approaches to mitigate the environmental effects instead of adjusting human actions (Spence & Pidgeon, 2010). Accordingly, it is argued that the environmental effects of individual meat consumption should receive more attention both from a theoretical as well as from a practical perspective (Lea & Worsley, 2008).

1.2 Problem Identification

As indicated, human actions are both responsible for environmental issues and pivotal in diminishing the detrimental effects of those actions on the environment (Van der Werff, Steg, & Keizer, 2014). However, individuals are often not aware how their daily behavior affects the environment (Roy & Pal, 2009; Chan & Bishop, 2013). The connection between environmental issues and food might not always be clear and individuals might not be aware of the environmental impact of their food consumption (Macdiarmid, Douglas, & Campbell, 2016). Along these lines, it is not clear to individuals as to what an environmentally responsible diet includes (Hoek, Pearson, James, Lawrence, & Friel, 2017). Even though a reduced consumption of animal-based products, in particular meat, is often discussed (De Bakker & Dagevos, 2010), the majority of individuals is unaware that animal-based products are among the main drivers of climate change (Bailey, Froggatt, & Wellesley, 2014). Furthermore, academic literature has found no consensus on the types of foods or food behaviors included in an environmentally responsible diet (Hoek et al., 2017). It is therefore of interest to research how to increase individuals' awareness of the impact of their specific food choices on the environment (Dagevos & Voordouw, 2013; Laestadius et al., 2014).

It is thus essential to further examine consumer food choices with regard to meat reduction and determine which specific factors influence such behavior (Van der Werff et al.,

2014). Research points out that psychological motivations are essential for consumers in the context of pro-environmental behavior (Onel, 2017). In a similar vein, Nordlund and Garvill (2002) state that psychological factors, such as value orientation and norms, are of importance and influence a variety of pro-environmental behaviors (Nordlund & Garvill, 2002). In addition, food behavior is likewise found to be related to social psychological factors, like attitudes, norms, and values (e.g. Maio et al., 2007). Accordingly, research on pro-environmental behavior should rather focus on underlying motivations instead of broad factors like demographics (Onel, 2017).

An approach to understanding consumers' choice of foods in a pro-environmental context and in particular meat reduction, is the examination of the role norms and values with regard to the respective behavior (Antimova, Nawijn, & Peeter, 2012). Underlying values relevant to an action are suggested to construct the norms for the specific situation. In addition, norms and values have proven to have high explanatory power with regard to behavior (Turaga, Howarth, & Borsuk, 2010). Thus, this study is focused on the norms and values related to meat reduction. By incorporating norms and values, our research examines additional aspects of and provides new perspectives on meat reduction.

In addition, there is insufficient research on initiatives that promote a reduced consumption of meat (Dagevos & Voordouw, 2013; Laestadius at al., 2014) whereas managers and policy makers with a pro-environmental intent should recognize meat reduction to a greater extent (De Bakker & Dagevos, 2012; Dagevos & Voordouw, 2013). As De Boer and Aiking (2017) outline, policy makers in various fields such as the government, NGOs and other businesses seem reluctant to provide adequate information regarding meat reduction to consumers (De Boer & Aiking, 2017). Also, policies in favour of meat reduction usually do not turn into the practice of an actual reduction (Dibb & Fitzpatrick, 2014 in Stoll-Kleemann & Schmidt, 2017). It is argued that it is essential to implement effective multi level procedures that focus on healthy *and* environmentally friendly food behaviors (Hoek et al., 2017). In order to develop plans that mitigate environmental impact, individuals' perception of environmental issues have to be taken into consideration (Jansson & Dorrepaal, 2015). Accordingly, these insights will support the development of effective strategies (Apostolidis & McLeay, 2016a), for instance with regard to message framing (Graham & Abrahamse, 2017).

1.3 Research Questions

To shed more light on meat reduction in a pro-environmental context, particularly concerning norms and values, our research question of this study is stated as follows:

How do internal processes influence meat reduction as a pro-environmentally responsible behavior?

In order to adequately answer this question, four sub-questions are addressed in the following sections of this study:

1. *What is environmentally responsible eating behavior?*
2. *Which norms drive meat reduction?*
3. *Which values drive meat reduction?*
4. *Which measures can be taken to encourage meat reduction?*

1.4 Research Context

Consumption is the core concern in this study. We therefore examine the field of consumer behavior as it involves the what, how, and amount individuals consume. As consumption directly impacts the environment and future generations, it is inherently connected to sustainability. Therefore, we focus on the field of sustainable and pro-environmental consumer behavior (Trudel, 2018). A pro-environmental perspective on meat reduction is applied. As this research addresses *reduction,* it is not focused on an actual product but on a type of behavior or intention. Accordingly, individuals must have the ability to engage in meat reduction, hence vegetarians and vegans are not considered. In addition, this study is conducted in the context of university students in the Netherlands, Denmark and Germany. This context is relevant as young adults are considered to be the future and have an acceptable amount of knowledge on sustainability (Vermeir & Verbeke, 2008). Moreover, all respective countries are rather similar in their environmental performance (EPI, 2018) and have comparable dietary patterns (De Boer et al., 2006).

1.5 Aim

As discussed, the aim of this study is to supplement existing research on the novel topic of meat reduction as a pro-environmental behavior. Therefore, we examine consumers on an individual level. Specifically, we address social psychological factors, i.e. norms and values, to examine this subject matter. As the objective of this research is to both confirm as well as to uncover specific relationships, the outcomes aim at giving a more holistic understanding of individuals' underlying factors regarding meat reduction. In accordance with these findings, this study yields at providing effective recommendations which can be implemented at different levels.

1.6 Outline

First of all, the *Introduction* discussed the relevance of the topic of meat reduction and introduced the research questions. Second, a *Theoretical Foundation* is provided. Here, we examine environmentally responsible eating behavior and, in this context, the environmental effects of meat consumption. In addition, the role of norms and values in a pro-environmental context is discussed. Third, we provide our *Main Findings and Research Direction* in accordance with the examined literature and address the first research question. Fourth, we discuss the *Theory and Conceptual Model*. The relevant theory for the development of our model particularly concerns the Theory of Planned Behavior (TPB) as well as norms and values (Ajzen, 1991). Accordingly, hypotheses are proposed based on the empirical findings in previous literature. On the basis of these hypotheses, we develop the conceptual model as an extended version of the TPB. Fifth, we discuss the *Methodology* of this study. This chapter provides the method, sample and measurements. Sixth, the *Data Analysis and Results* are presented. Seventh, we conduct a *Discussion* of the results of our study. Conjointly, research questions 2 and 3 are discussed. In addition, implications are derived to provide insights for research question 4 and limitations and future research are presented. Eighth, we make a final *Conclusion*.

2. Theoretical Foundation

2.1 What is Environmentally Responsible Eating Behavior?

2.1.1 Defining Sustainability

The term sustainability became popular in the end of the 20th century (McElwee, 2012; Montiel & Delgado-Ceballos, 2014). Literally, sustainability translates to endurance (Young & Dhanda, 2013). The main targets usually addressed by sustainability efforts are climate change, the protection of water systems and supply, preparation for environmental changes, and avoiding disposal of damaging materials in the underground and water (Portney, 2015). While there are various definitions of sustainability, there is no such thing as a standard definition of sustainability as a construct, and various meanings can be found (e.g. McElwee, 2012; Portney, 2015). Nevertheless, basic common concepts can be identified. These comprise environmental boundaries, humans' responsibility for pollution, and the interconnectedness and interdependence of the environment, society, and sustainability (Young & Dhanda, 2013).

Generally, sustainability is built on three main pillars, which comprise economic, social, and environmental sustainability (Kuhlman & Farrington, 2010). These pillars can also be referred to as the three E's of sustainability: economy, equity, and environment. It is argued that sustainability is only possible if all three pillars are developed and protected, hence when economic development is preserved, equity is promoted and the environment is protected (Portney, 2015).

First, the *economic* component is profit-related and concerns fair prices for both consumers and stakeholders in agriculture (Vermeir & Verbeke, 2008). Second, the social or *equity* aspect relates to social acceptability, hence the match between the needs and priorities of society and production processes. Also, it concerns the treatment of the production sector by both society and governments including sustainable government policies (Vermeir & Verbeke, 2008). Third, the *ecological* aspect concerns the environment and its protection. This includes life quality and living environment as well as animal and plant production factors (Vermeir & Verbeke, 2008). Ecological sustainability is furthermore focused on keeping the balance of environmental systems while consuming in a way that resources can replenish themselves (Kuhlman & Farrington, 2010) and damage to the environment is minimized (Liobikienė & Bernatonienė, 2017; Tripathi & Singh, 2016). Accordingly, the preservation of both natural resources as well as environmental quality is of importance (McElwee, 2012). McElwee (2012)

further points out that sustainability is one of the main influences on global resource preservation (McElwee, 2012).

In 1987, the Brundtland Commission published a definition of sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987: 39). Chambers and Conway (1992) further introduced the sustainable livelihoods approach as another sustainability research stream. This approach not only relates to natural capital but also to human capital. The latter not only concerns the actual human capital such as skills but economic capital, hence household assets, and social capital, e.g. relationships, as well (Chambers & Conway, 1992). Kates et al. (2001) introduced a new stream of literature on sustainability science, shifting emphasis to environmental systems again. This more synergetic and holistic approach is characterized by more complexity and laying focus on the role of global processes in sustainability. Here, long-term trends are modeled and monitored. The main concepts include such as social learning and vulnerability (McElwee, 2012). An overview of these sustainability research streams can be found in Table 1.

Research Stream	**Definition**	**Authors**
Sustainable Development	"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"	Brundtland Commission (WCED, 1987: 39)
Sustainable Livelihoods	Protection and preservation of natural and human capital	Chambers & Conway (1992)
Sustainability Science	More holistic approach shifting back to environmental systems	Kates et al. (2001)

Table 1: Sustainability Research Streams

Saiia (2018) describes sustainability as an evolving concept concerning the integration of ecology, economy, and society. He further highlighted the understanding of the connection between human actions and all systems human-made and occurring naturally (Saiia, 2018). McElwee (2012) concludes that the meaning of sustainability has changed. People have different perceptions and definitions of sustainability. Still, value is found in understanding the

interconnectedness of social, ecological, and economic aspects in one holistic concept (McElwee, 2012).

In this study, we deem all previous sustainability streams relevant as they build on one another and complement each other. The definition of sustainable development as introduced by the Brundtland Commission (1987) paved the way for various purposes, such as academic context or business and governmental policies. This definition thus forms the basis for subsequent discourses on sustainable development (Redclift, 2005). In this context, Chambers and Conway (1992) took the direction of human (over)population (Chambers & Conway, 1992). Kates et al. (2001) rather focused on the joint consideration of the environment and development and the corresponding practical issues related to the interactions between natural and social systems (Kates, 2017). The focus of recent research such as Saiia (2018) and McElwee (2012) is on the basis that sustainable development is always evolving and changing.

As the focus of this study relates to the environmental aspect of sustainability and meat consumption can be regarded as a long-term trend, the sustainability science stream by Kates et al. (2001) in particular is relevant. The transdisciplinary nature is applicable as it integrates research from various fields such as natural, biological, and social sciences, all of which should be considered in the context of both pro-environmental behavior and meat reduction. This sustainability stream is particularly relevant because it considers the practical relevance of changing behavior in order to address sustainability-related issues (Kates, 2017).

We focus on one critical aspect of sustainability: sustainable consumption. The usual view of consumption as resource throughput has to be extended with the understanding of its importance within politics, society, and culture (Cohen & Murphy, 2001). This is especially the case as the impact of individuals' consumption is accumulating over time (Trudel, 2018). As outlined, sustainable behavior can be defined as a way of living, which respects the scarceness of resources (Kuhlman & Farrington, 2010). To achieve sustainability and sustainable consumption, the sustainable purchase, use, and disposal of products is integral (Liobikienė & Bernatonienė, 2017; Tripathi & Singh, 2016). Importantly, it has to be noted that researchers also differ in their opinions about sustainable consumption (Portney, 2015). Useful sustainability efforts include the usage of goods and services with a high sustainability standard as well as purchasing from sustainability-oriented companies (Liobikienė & Bernatonienė, 2017; Peattie, 2010). Further measures may be purchasing recycled or used products at second-hand stores as well as avoiding

specific products considered to be *not sustainable* (Moraes, Carriga, & Szmigin, 2012; Nordlund & Garvill, 2002).

It is important to notice that considering sustainability issues when consuming can lead to sustainable consumption behaviour (Onel, 2017). Sustainable consumption goes hand in hand with a reduction in consumption. In this matter, some researchers propose a general decrease of consumption while others refer to the type of consumption, such as the choice of products (Portney, 2015). Here, consumers are expected to regulate their consumption purposefully (Connolly & Prothero, 2008). This specifically relates to materials requiring non-renewable resources (Portney, 2015). When aiming at sustainable consumption, individual consumers as well as public policies and governments have to be addressed in concert. While it might be feasible to increase demand for renewable energies, both private and public institutions need to be responsive to the demand increase. In the case of efforts solely directed at one group, the change of consumption patterns is often limited (Portney, 2015).

2.1.2 Environmental Impact of Food

Food production for human consumption is constantly increasing (Graham & Abrahamse, 2017). This puts a high pressure on the global climate system (IPCC, 2014a in Graham & Abrahamse, 2017) as the consumption of food is considered to be environmentally significant (Tobler et al., 2011) and accounts for approximately 20-30% of the total environmental impact in the Western world (Tukker & Jansen, 2006). Both food *consumption* and *production* including transport and processing are related to environmental impact (Aleksandrowicz, Green, Joy, Smith, & Haines, 2016; Partidario, Lambert, & Evans, 2007). Hereby, food consumption issues are mostly related to storage, cooking, and dishwashing. Less significant, but nonetheless important factors are going to the supermarket by car and food waste and disposal (Reisch, Eberle, & Lorek, 2013). Importantly, food production, for instance raising livestock, has the greatest influence on the environment. While diets focusing on seasonality and local origin do have some advantages, environmental efforts should be directed at the choice of food types (e.g. Aleksandrowicz et al., 2016). Accordingly, specific diets and food types are highly relevant and the focus in our study (Reisch et al., 2013).

Major factors of food production are greenhouse gas (GHG) emissions and human water use. Globally, food production is accountable for approximately 30% of GHG emissions and 70% of human water usage (Hoek et al., 2017). Furthermore, food choices influence biodiversity, land

degradation and the use of oil (Dagevos & Voordouw, 2013). Without a change in current food production and consumption, GHG emissions caused by food products might increase 80% by 2050 (Tilman & Clark, 2014). Accordingly, devoted measures to mitigate the negative effects of the food system are necessary in order to not exceed the planetary limits (Springmann et al., 2018).

Because of the severe impacts on the environment, consumers are encouraged to eat more environmentally sustainable. A sustainable diet is defined as the following: "*those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources*" (FAO, 2010: 10 in Hoek et al., 2017). Changing food patterns to become more sustainable is regarded as a difficult undertaking (Spaargaren & Mol, 2008). Food products are considered to be low-involvement products due to existing purchase patterns and the relatively low prices. Terlau and Hirsch (2015) propose that according to the model of Daniel Kahneman (2003), this falls into human mental system 1 in which decisions are made fast, in automatic fashion, and subconsciously. However, system 2 is relevant in order to make the switch to become more sustainable. Within the human mental system 2 decisions are rather slow, logic, based on rationality, deliberate, and difficult. This means that consumers need to make a conscious decision to engage in a more sustainable diet (Terlau & Hirsch, 2015). Furthermore, there is no consensus on all the types of foods or food behaviors included in a sustainable diet (Hoek et al., 2017). One possible description of green foods is that they are produced considering animal welfare and with sustainable development in mind, but also deliver quality, nutritional value, and are safe to use (Saleki & Seyedsaleki, 2012). In this study, we define organic foods as sustainable (De Bakker & Dagevos, 2010), and hence environmentally friendly (Lea & Worsley, 2008).

Furthermore, this new paradigm in food consumption including sustainability (Schacht, Filho, Koppe, Struksnaes, & Busch-Stockfisch, 2010) often includes a reduced consumption of meat (e.g. Dagevos & Voordouw, 2013). Animal based foods in particular are considered harmful to the environment (Dagevos & Voordouw, 2013), with meat and dairy as the two main categories (e.g. Zur & Klöckner, 2014; Dagevos & Voordouw, 2013; Hertwich et al., 2010; Bailey et al., 2014). This is due to the fact that these products necessitate higher levels of resources and emissions compared to plant-based products (Hertwich et al., 2010). According to

Zur and Klöckner (2014), the four main aspects regarding the environmental impact of animal-based food are land use, climate change and atmospheric emissions, water depletion and pollution, and biodiversity loss. With regard to land use, the main processes that are affected are grazing and the allocation of cropland in order to cultivate feed crops, which can result in the exploitation of tropical forests or soil erosion (Zur & Klöckner, 2014). In addition, meat and dairy products account for 14,5% of total GHG emissions (Gerber et al., 2013 in Stoll-Kleemann & Schmidt (2017), which is extraordinarily high considering a lower percentage of all road vehicles, trains, ships, and airplanes combined globally (Bailey et al., 2014). In addition, the livestock sector is responsible for approximately 40% of global anthropogenic emissions which is causing major damage to the ecosystem. Furthermore, meat and dairy production demands large quantities of water which amongst others contributes to the degradation of coral reefs. Meat and dairy production further contributes to all fundamental threats with regards to biodiversity such as changes in habitat and distribution of invasive species and diseases (Zur & Klöckner, 2014).

In accordance with the combined impact of meat and dairy, the most significant direct impacts of meat production are climate change, deforestation of rainforests and shortages in food and water (Šedová, Slovák, & Ježková, 2016). Other direct impacts are the pollution of soil and water (Martinez, Dabert, Barrington, & Burton, 2009), and the high energy-intensiveness especially in respect to industrial farming (De Haan et al., 2001). Moreover, as mentioned in Graham and Abrahamse (2017) meat production is relatively carbon intensive as compared to crop production for the purpose of food energy. It is also resource intensive as the transformation from plant protein into animal protein is inefficient (Graham & Abrahamse, 2017). This inefficiency refers to the fact that animal metabolism needs 6kg plant protein to produce only 1kg of meat protein, hence approximately 85% of protein is wasted (De Boer & Aiking, 2011; Pimentel & Pimentel, 2003).

The environmental damage caused by meat consumption is not equal across all types of meat. While the consumption of all types of meat is harmful to the environment, especially the consumption of red meat has detrimental effects. Poultry, pork or fish, on the other hand, has a lower negative effect on the environment (Mekonnen & Hoekstra, 2012). For a healthy diet taking into account both the environment as well as nutritional factors, it is advised to considerably limit the intake of red meat. The intake of poultry should be limited as well. A focus on consuming fish rather than meat can be beneficial to both one's health and the environment (Willett et al., 2019).

Both demand-side and supply-side measures are necessary to mitigate the impact of meat on the environment, yet demand-side measures offer a greater potential (Smith et al., 2013). To decrease the environmental impact of diets, the Intergovernmental Panel on Climate Change recognized changing eating patterns as a key area requiring action (IPCC, 2014b in Stoll-Kleemann & Schmidt, 2017). This is in accordance with De Bakker and Dagevos (2010) who propose eight possible strategies for a protein transition, hence a more sustainable diet regarding protein consumption that is less reliant on animals and more on plants. These strategies include the consumption of hybrid meat products, meat types with relatively low environmental impact, meal concepts with no or a decreased amount of meat, plant-based substitutes, fish that is farmed sustainable, organic meat, meat from insects, and reduced meat consumption (De Bakker & Dagevos, 2010).

In most countries, a complete cutting of meat and animal-based products from diets in general is rather unrealistic (Aleksandrowicz et al., 2016). A diet including meat *reduction* will thus not only positively influence the environment (e.g. Çoker & Van der Linden, 2020), it is also one of the most influential and realistic methods for consumers to reduce their environmental impact (Lea & Worsley, 2008). Accordingly, reducing meat consumption is essential for more sustainable diets and in decreasing the ecological footprint of food systems (Lang & Barling, 2013). More specifically, diets including meat reduction could result in 2.5 times less GHG emissions (Çoker & Van der Linden, 2020) and overall emissions could be reduced up to 50% by 2050 (Tilman & Clark 2014; Stehfest et al., 2009).

In this study, a reduction in consumption as part of a sustainable diet is in focus. Meat is especially of importance in this case as it greatly impacts the environmental footprint of food systems (e.g. Lang & Barling, 2013), and as such contributes to climate change (Graham & Abrahamse, 2017). A reduced consumption of meat is thus appropriate (Portney, 2015). However, meat reduction is a complex topic as eating meat is embedded in culture, economy, and politics. This makes it difficult to promptly change behavior (Rust et al., 2020). Individuals might oppose the idea of meat reduction, do not feel like their individuals actions make a difference on a global level, or are simply not aware of the detrimental effects of meat on the environment (Macdiarmid et al., 2016). It is therefore of interest to research meat reduction on an individual level, which is further discussed in the next section.

2.1.3 Meat Consumption and Reduction

We identified a dichotomous split regarding meat consumption as to whether you eat it or not, yet there is a third type which is the focus in this study, namely the notion of meat reduction. Hence, consumers can typically be grouped in three groups, namely meat consumers, meat avoiders (such as vegetarian or vegan), or meat reducers. Among meat avoiders and meat reducers, the latter make up the majority (Rosenfeld, Rothgerber, & Tomiyama, 2019). The terms *meat reducers* and *flexitarians* are often used interchangeably in literature (Derbyshire, 2017). Other synonyms include semi vegetarians (Rothgerber, 2014), partial vegetarians (Fox & Ward, 2008), or pseudo-vegetarians (Janda & Trocchia, 2001). Consumers reducing their meat consumption play a pivotal part in changing the current consumption habits to become more sustainable (De Bakker & Dagevos, 2012).

There are various ways to distinguish meat reducers. In line with Rosenfeld et al. (2019) a general distinction can be made between vegetarians, meat eaters and meat reducers that deliberately try to eat less meat (Baker et al., 2002). Meat reducers can be presented as consumers that make their decisions consciously and do not regard meat as fundamental (De Bakker & Dagevos, 2010). Meat reducers can also be described as consumers who are reducing meat consumption but are unready for complete avoidance of meat in their diet (Sanchez-Sabate & Sabaté, 2019). De Backer and Hudders (2014) thereby note that meat reducers can be distinguished as semi-vegetarians (that significantly reduce their meat consumption), and light semi-vegetarians (that only mildly reduce their meat consumption) (De Backer & Hudders, 2014). In accordance with earlier research, our study defines meat reducers as consumers who do generally eat meat but consciously intend to reduce their meat consumption (e.g. Baker et al., 2002). We recognize that this description is rather broad, therefore various motivations and ways to achieve meat reduction are discussed in the following.

There are several motivations for reducing the amount of meat consumption. Among these, cost and health are main drivers (Neff et al., 2018). First, health issues related to meat consumption are for example cancer, heart disease, and diabetes (e.g. Aston, Smith, & Powles, 2012). Accordingly, healthiness was found as an overall important reason (Latvala et al., 2012). Second, motivations can be based on animal welfare or environmental concerns (Neff et al., 2018). It was found that for consumers who already intend to reduce their meat consumption, environmental concern and animal welfare are essential motivators (Latvala et al., 2012). Accordingly, Dagevos and Voordouw (2013) state that an increasing number of consumers

already reduce their meat consumption due to the detrimental effects on the environment (Dagevos & Voordouw, 2013). Third, it has to be noted that *motivations for meat reduction* vary for different consumer groups. Similar to the previously mentioned research, Lentz, Connelly, Mirosa, and Jowett (2018) found health and cost significant motivators for meat reducers and standard consumers, i.e. meat eaters. It was also found that for meat reducers environmental friendliness and animal welfare are relatively more important than for meat eaters. However, environmental friendliness and animal welfare were found most apparent amongst abstainers, i.e. someone who does not consume meat (Lentz et al., 2018).

The group of meat reducers is relatively heterogeneous due to the fact that the *way* and the *extent* of reducing meat consumption differ (De Bakker & Dagevos, 2010). The least preferred possibility to alter one's meat intake is the complete elimination, more preferred is thus a reduction of one's meat consumption (Verain, Dagevos, & Antonides, 2015). The ways to achieve a reduction of meat consumption differ. First, meat reduction can be achieved by substitution (Verain et al., 2015), which can be implemented by replacing meat with plant-based meat substitutes. These substitutes are not only healthy and high in protein but also offer numerous social and environmental advantages (Apostolidis & McLeay, 2016b). Similar to plant-based substitutes are hybrid meat products that taste and look like actual meat but are in fact a combination of meat and plant-based ingredients (De Bakker & Dagevos, 2012). A future opportunity could be to substitute meat with in-vitro meat (Pluhar, 2010), which is artificial meat from genetically modified organisms (Bonny, Gardner, Pethick, & Hocquette, 2015), yet this is still being researched (Pluhar, 2010). Second, it is possible to engage in meat reduction without an increased consumption of meat substitute products. This approach is the focus of this study (Verain et al., 2015). In this view, possibilities to reduce meat consumption generally fall into two categories namely meatless days in a diet or decreasing the portions of meat in a meal (De Boer, Schösler, & Aiking, 2014; De Bakker & Dagevos, 2012; Schösler, De Boer, & Boersema, 2012). This is in accordance with one of the proposed strategies of De Bakker and Dagevos (2010), namely less meat consumption. Furthermore, Schösler et al. (2012) also found that meatless days in a diet or decreasing the portions of meat in a meal to decrease meat consumption often go together (Schösler et al., 2012).

Meat reduction as a strategy is considered to be confronting and thus subject to criticism (De Bakker & Dagevos, 2010). One factor is the significant impact on the meat sector and retailers (Dagevos & Voordouw, 2013). Meat reduction is further subject to criticism as eating

meat continues to be the norm (Sanchez-Sabate & Sabaté, 2019) and is generally accepted due to various reasons. First of all, it is argued that some consumers believe that a healthy diet must include meat and that a meal without meat is incomplete (Neff et al., 2018). Possible health issues related to abstaining from meat consumption are, for instance, a lack of protein, B vitamins, and iron (Pereira & Vicente, 2013). Yet, other (protein-rich) foods can be consumed instead of meat to counteract these health issues (Verain et al., 2015). Moreover, there is rather a case of overconsumption, hence it is possible to lower meat intake and still receive sufficient protein (De Bakker & Dagevos, 2010). Second, it was found that not wanting to miss the taste of meat and a lack of cooking skills, as cooking without meat is considered more difficult (Neff et al., 2018), are important barriers of meat reduction (Hoek et al., 2017). Other research also states comparable reasons as significant factors regarding the preference for meat consumption. These preferences comprise, amongst others, meal structure, nutrition, cooking tradition (Lentz et al., 2018), meal formats, and cooking skills (Schösler et al., 2012).

Moreover, meat consumption goes further than solely being a food-related decision and is also a significant part of culture, and even social status, and identity (Çoker & Van der Linden, 2020). Meat reduction addresses issues of consumption culture and society (De Bakker & Dagevos, 2010). Accordingly, a barrier to reducing one's meat consumption is the consideration of meat as a consumption-cultural icon (De Bakker & Dagevos, 2010). Various values are associated with meat consumption, namely strength, masculinity, indulgence (De Bakker & Dagevos, 2010), power (e.g. Gaard, 2002), and wealth (e.g. Cronin, McCarthy, & Collins, 2014). Moreover, societal factors such as economic growth, changes in the food industry, and urbanization are pivotal to the increased consumption of meat. Meat plays a central role in the menu of Western countries and has developed into a symbol of food itself. Yet, nowadays this view is increasingly questioned due to environmental concerns (Graça, Calheiros, & Oliveira, 2015). However, an issue towards meat reduction is that some consumers are highly skeptical towards the scientific evidence related to the environmental impact of meat (Çoker & Van der Linden, 2020). Accordingly, meat consumption addresses normative behavior, historical human behavior, and socially constructed food pyramids (Piazza et al., 2015). Along the same lines, meat consumption is connected to feelings of tradition and familiarity. It was also found that social norms in terms of preferences of the other household members further complicated matters of changing eating patterns to a less meat-based diet (Hoek et al., 2011).

2.2 Which Norms Drive Meat Reduction?

2.2.1 Defining Norms

Previous research has shown the importance of norms on pro-environmental behavior (e.g. Trudel, 2018; Fang, Ng, Wang, & Hsu, 2017) and food-related choices (e.g. Sanchez-Sabate & Sabaté, 2019). In the following sections, we thus discuss the role of norms more detailed in the context of pro-environmental behavior, food behavior, and meat consumption respectively.

The subject of norms emerged in the field of sociology. However, currently, various disciplines such as business ethics take norms into account (Farrow, Grolleau, & Ibanez, 2017). Norms can be referred to as culturally influenced and sanctioned prohibitions or prescriptions regarding actions, feelings or beliefs (Morris, 1956; Van Liere & Dunlap, 1978). Norms are social standards which direct one's behavior (Schroeder, 2010) and are the so-called everyday rules individuals comply with (Hall, 2005). Besides entailing the right and wrong of behavior, norms are also regarded as rules concerning the when, where, and with whom of one's actions (Alloy, Jacobson, & Acocella, 1999). The notion of morality can evolve with time on an individual level, but also on macro level i.e. the society. In addition, a change in morals can have great effects both socially and interpersonally. The term morality is often discussed in social psychology. One of the main frameworks was developed by Dewey (1902), which enables research on how moral goals and norms influence moralization. Despite its relevance, academic research on this topic is novel and divided (Rhee, Schein, & Bastian, 2019).

In this study, we set our focus, amongst others, on social norms as social norms impact sustainable behaviors (Trudel, 2018). Social norms can be defined as "the unwritten codes and informal understandings that define what we expect of others and what others expect of us" (Young, 2015: 360). As such, social norms are externally influenced (Fang et al., 2017). Social norms are not unconditionally pursued. Individuals are thus more likely to comply with social norms when the social norm is easily observable and/or certain normative expectations exist (Farrow et al., 2017). Individuals follow social norms as a consequence of social pressure, be it objective or subjective (Ajzen & Fishbein, 2005; Thøgersen, 2006).

Social theory proposed three broad approaches for why people adhere to social norms. These comprise rational choice theory and the Homo Economicus, evolutionary theory using biological and/or cultural evolution theories, and social or cultural rationality explained by the Homo Sociologicus (Anderson, 2000). Social norms are pivotal in making decisions in daily life (e.g. Cialdini & Goldstein, 2004; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007).

Social norms can be distinguished in *prescriptive* or *proscriptive* social norms. The former involves a positive point-of-view and includes descriptions of appropriate behavior and its approval. Proscriptive social norms take a negative perspective, are prohibitive (Farrow et al., 2017) and relate to what is disapproved by others (Bergquist & Nilsson, 2019). Yet, both norms can stimulate the same action. Another distinction of social norms can be made between *explicit* and *implicit* norms. Social norms are implicit, as they are unwritten social rules rather than laws which are considered to be explicit norms (Farrow et al., 2017). In the context of this study implicit social norms are in focus.

Social norms can further be subdivided into subjective (Fang et al., 2017) and local norms (e.g. Fornara, Carrus, Passafaro, & Bonnes, 2011). The subjective norm entails the belief that an individual, or a group of significant others approve of a behavior. Hence, the approval of significant others is the source of motivation to adhere to their views and engage in a certain behavior. Significant others could for example be family, friends, and colleagues (Ham, Jeger, & Ivković, 2015). Subjective norms are thus the magnitude of which significant others want an individual to act in a certain way, multiplied by how far the individual wants to satisfy these views (Rivis & Sheeran, 2003).

Subjective norms should not be regarded as a single concept but as two, namely *what one should do,* i.e. the injunctive norm, and *what others actually do ,*i.e. the descriptive norm (Cialdini, Kallgren, & Reno, 1991) (See Table 2). Hence, the fact has to be recognized that social norms refer to both the actual common behavior and approval beliefs about these behaviors (Farrow et al., 2017). This distinction is due to the fact that individual behavior is influenced differently by and motivations differ for each type of norm (Cialdini et al., 1991). This is in accordance with Rivis and Sheeran (2003) who also distinguish subjective norms based on their source of motivation. A further differentiation between injunctive and descriptive norms is inspired by the view of normative social influence and informational social influence by Deutsch and Gerard (1955). The research of Deutsch and Gerard (1955) showed that one's psychological processes and individual judgement are influenced by these two types of influences. Here, normative social influence involves the conformity with expectations of 'the group', while informational social influence is linked to evidential knowledge about reality, i.e. what is actually done (Schultz, Khazian, & Zaleski, 2008).

Norms	Types of Norms	Norm Level	Definition
Subjective	Injunctive Norms	External	"with reference to a given social group … norms that characterize the perception of what most people approve or disapprove" (Cialdini et al., 1991: 203)
	Descriptive Norms	External	"with reference to a given social group … norms that characterize the perception of what most people do" (Cialdini et al., 1991: 203)

Table 2: Overview of Subjective Norms (Inspired by Fang et al., 2017)

The injunctive norm comprises the level of approval or disapproval. Thus, the injunctive norm drives behavior as individuals' aspiration is to acquire social approval rather than social blame (Cialdini et al., 1991). Accordingly, the injunctive norm is based on the opinion of significant others (Rivis & Sheeran, 2003). Contrarily, the descriptive norm refers to the actual behavior of others. Hence, it relates to appropriate behavior in a specific situation based on the ability to show the appropriate behavioral alternative by significant others (Cialdini et al., 1991). Consequently, the descriptive norm is based on the perception of attitudes and behavior (Rivis & Sheeran, 2003). This perspective is in accordance with the theory of social learning (Bandura, 1986), which proposes that observing the behaviors of others is utilized to determine one's appropriate behavior in a situation (Fornara et al., 2011).

Despite the differences between the injunctive and descriptive norms, and importance to include both types of norms (e.g. Cialdini et al., 1991), previous studies failed to do this and rather solely built on injunctive norms (Ham et al., 2015). These two types of norms are likely to be positively correlated (Thøgersen, 2008). Meta-analyses in various fields have drawn similar conclusions (e.g. Rivis & Sheeran, 2003). In addition, supporting evidence was also found for environmentally responsible behaviors (Cialdini, 2003). While these two types of subjective norms often overlap, they are distinct constructs and can also differ. An example for the overlap of the descriptive and injunctive norm is the notion of wearing business suits for executives, or wearing jeans for teenagers. However, the two norms can be dissimilar as well. Such an example is healthy eating, which can be referred to as an injunctive norm, yet less of a descriptive norm. Hence, others approve of healthy eating but might not engage in it themselves. Also, regarding the psychological processes, Deutsch and Gerard (1955) consider the injunctive norm a process of normative social influence whereas descriptive norms are a process of informational social influence. Furthermore, descriptive norms impact behavior with regards to a specific situation or

group of people, while injunctive norms reach further and have consequences for behavior across populations or situations (Prentice, 2007).

A less prominent social norm is the local norm which comprehends place-specific normative influence. Originally, this idea was shown by Asch (1955) by means of his experiments on small group conformism. Unlike subjective norms, the importance of local norms is not related to conformity of relevant others, but rather of people in the same spatial-physical setting. Local norms are thus dissimilar to subjective norms, as subjective norms entail the normative influence of people important to an individual (Fornara et al., 2011).

When researching norms, another commonly discussed concept are personal norms. Whereas social norms are externally influenced, the personal norm is internalized (Fang et al., 2017) and includes an individual's perspective on right and wrong (Zur & Klöckner, 2014). In contrast to social norms, the personal norm is completely attached to one's self-concept instead of the perceived social concept (Arvola et al., 2008). Personal norms are complied with due to internal reasons that are related to internal values (Thøgersen, 2006). Personal norms are considered to be someone's perceived moral obligation. This is in line with Schwartz's (1977) concept of personal norm, which is often used interchangeably with moral obligation and moral norm (Arvola et al., 2008). Correspondingly, personal norms are less subject to specific conditions, i.e. observability and normative expectations, compared to the social norm (Farrow et al., 2017). For an overview of subjective norms, local norm, and personal norm see Table 3.

Norms	Types of Norms	Norm Level	Definition
Social	Subjective norms	External	"behaviors expected or supported by people around you, such as family, peers, and colleagues" (Fang et al., 2017: 17)
	Local norms	External	"the kind of social influence deriving from the association between a specific behavior and the specific spatial-physical setting in which such behavior occurs" (Fornara et al., 2011: 625)
Personal	Personal Norms	Internalized	"the self-expectations for specific action in particular situations that are constructed by the individual" (Schwartz, 1977: 227)

Table 3: Overview of Norms (Inspired by Fang et al., 2017)

Within the field of pro-environmental behavior, primarily personal norms (e.g. Steg, Dreijerink, & Abrahamse, 2005) and social norms (e.g. White & Simpson, 2013) consisting of subjective norms (e.g. Biel & Thøgersen, 2007) have been researched. In specific cases of pro-environmental behavior, local norms are also found relevant (Fornara et al., 2011). In the following section, norms are discussed further, respectively in a pro-environmental context and meat reduction specifically.

2.2.2 The Role of Norms in Environmentally Responsible Behavior

The TPB has been utilized to examine the role of norms in various pro-environmental contexts (Fang et al., 2017). Despite being a general model to explain behavior, the TPB has proven its relevance in specific fields, such as sustainability research (Bauer, Arnold, & Kremer, 2018). The TPB framework is relevant in the field of sustainable consumption due to its ability to examine substantial variance in intentions (Armitage & Conner, 2001), causal relationships between motivational factors and intentions (Patterson, 2001), and the strength of those relationships (Jackson, 2005).

As indicated, social norms impact sustainable (Trudel, 2018) and pro-environmental behavior (Fang et al., 2017). Inherently, a shift in social norms is a possible option for a change towards more sustainable behavior (Barnett, Clarke, Cloke, & Malpass, 2005; Jackson, 2005). This shift is necessary as certain situations, e.g. travelling, are not only subject to an influence of social norms but are also regarded as a personal right. This can thus be considered a barrier in changing behavior (Valle, Rebelo, Reis, & Menezes, 2005). Bamberg, Hunecke, and Blöbaum (2007) examined the use of public transportation as a pro-environmental behavior and suggested that the impact of social norms mostly depends on the easy accessibility of information rather than fearing social sanctions (Bamberg et al., 2007). Additionally, Biel and Thøgersen (2007) found support for the notion of Bicchieri (2002) that norms serve as the standard social rules in social dilemmas in a pro-environmental context (Biel & Thøgersen, 2007). Fang et al. (2017) proposed that individuals felt pressured by normative social influence to behave environmentally friendly with regards to the usage of reusable tableware. Moreover, social norms are considered to be relevant in behaviors such as composting (White & Simpson, 2013), reusing hotel towels (Goldstein, Cialdini, & Griskevicius, 2008), recycling (Meng & Trudel, 2017), car use (Bamberg & Schmidt, 2003) and the efficient consumption of energy (Allcott & Mullainathan, 2010).

More specifically, subjective norms, as part of the social norm construct, can impact pro-environmental behaviors (e.g. Valle et al., 2005) such as environmentally friendly product purchases (Robinson & Smith, 2002). Robinson and Smith (2002) even found that subjective norms are more relevant in explaining environmentally friendly product purchase behavior than demographic variables (Robinson & Smith, 2002). In addition, it was found that both the injunctive subjective norm and the descriptive subjective norm are of importance for explaining household waste recycling. Especially the descriptive subjective norm was found to have a strong influence, which is in line with research findings by Cialdini et al. (1991) and Goldstein et al. (2008) (Fornara et al., 2011). In accordance, it is proposed that acting in consistency with injunctive norms satisfies interpersonal objectives like belonging to an in-group and meeting social responsibility. Whereas descriptive norms enable group-level objectives related to the collective mindset (White & Simpson, 2013).

Additionally, it is proposed that ‘certain consumers’, hence those having great confidence in the food product's sustainability, are directed more by social norms than ‘unconfident consumers’, hence those not trusting the food product's sustainability (Vermeir & Verbeke, 2008). Research identified the importance of subjective norms in the context of organic foods (Dean, Raats, & Shepherd, 2008). Moreover, it is suggested that subjective influence and attitudinal influence impact one another regarding organic food purchasing (Tarkiainen & Sundqvist, 2005). In a similar vein, Ham et al. (2015) found that subjective norms are relevant to the purchase of green foods. It is proposed that consumers from individualistic countries are assumed to feel a stronger external pressure than consumers from collectivistic countries. Additionally, they state the relevance of including descriptive norms when researching regarding the purchase behavior of green foods was found relevant (Ham et al., 2015).

One of the basic assumptions of place-theory is that the spatial-physical environment impacts social relationships and the development of norms (e.g. Bonnes & Carrus, 2004), also known as local norms (Fornara et al., 2011). According to Fornara et al. (2011), local norms impact certain types of pro-environmental behavior, which are place-specific and influenced by the behavior of people that share a specific place without an affective bond, such as recycling. More specifically, both injunctive and descriptive local norms influence recycling behavior. Along these lines, Fornara et al. (2011) proposed that individuals feel more motivated to reduce their water consumption when neighbours are doing the same (descriptive local norm) due to the fact that they feel it is well worth the effort (Fornara et al., 2011).

In addition, personal norms are important in the context of pro-environmental behavior (e.g. Stern, 2000). As proposed by Steg et al. (2005) pro-environmental behavior follows from personal norms as individuals feel morally obliged to behave in a way not harmful to the environment. Personal norms are in turn influenced by the belief that environmental situations impact one's values and the fact that an individual can decrease environmental threats. They moreover argue that less costly behavior (e.g. recycling) is more strongly related to personal norms than costly behavior (e.g. decreasing car use) (Steg et al., 2005). Personal norms are furthermore important to consider as they mediate the influence of values on pro-environmental behavior (Nordlund & Garvill, 2002).

There is various research in the field of pro-environmental behavior and personal norms. Onel (2017) argues that the stronger the influence of pro-environmental norms is, the higher is the intention to behave eco-friendly (Onel, 2017). Furthermore, personal norm conditions, such as one's environmental involvement and perceived consumer effectiveness, encourage green behavior (Gupta & Ogden, 2009). In addition, personal norm was found important in various fields such as green mobility (Jansson, Marell, & Nordlund, 2010), energy-efficient products (Ha & Janda, 2012), willingness to decrease personal car use (Nordlund & Garvill, 2003) and recycling behavior (Thøgersen, 2003).

Personal norms were also found relevant to food behaviors in the pro-environmental context, such as the purchase of organic food and wine (Thøgersen, 2002). Dean et al. (2008) found the personal norm as an important variable in the context of organic food purchases, even more than subjective norms (Dean et al., 2008). Furthermore, moral attitude, i.e. positive self-rewarding perceptions of appropriate behavior, impact the purchase intentions of organic foods (Arvola et al., 2008).

2.2.3 The Role of Norms in Meat Reduction

As with pro-environmental behavior in general, norms influence meat reduction (De Bakker & Dagevos, 2012). This is in line with the previously outlined notion that meat consumption addresses normative behavior (Piazza et al., 2015) and the consumption culture (De Bakker & Dagevos, 2010). Developing a better understanding of meat reduction, and the corresponding norms, aids in improving the normalisation of meat reduction (De Bakker & Dagevos, 2012). To recall, meat reduction can be distinguished from meat substitution as meat reduction can be achieved by simply eating less meat *without any meat substitutes, hence replacements,* for

example by decreased portions (De Boer et al., 2014; De Bakker & Dagevos, 2012; Schösler et al., 2012). Generally, reduction of meat is based on three motivational factors, namely prosocial, personal, and moral (Rosenfeld et al., 2019).

The impact of norms on meat consumption is also highly relevant as eating meat remains the norm for most countries globally (Piazza et al., 2015; Ruby & Heine, 2012). Consuming meat is considered normal, i.e. what most people do and what is expected behavior (Joy, 2010), and as such high levels of and a frequent meat consumption continues to be the social norm (Sparkman & Walton, 2017). Consequently, the conscious reduction of meat consumption involves the violation of the norm (De Backer & Hudders, 2015). Meat consumption is considered normal, i.e. what most people do and what is expected behavior due to the socialization processes (Joy, 2010). For example, meat consumption is associated with masculinity (De Bakker & Dagevos, 2010). Accordingly, as men consider how other men think and behave, men often overestimate the positive (manly) effects instead of focusing on the experienced discomfort of consuming meat (Rothgerber, 2013). Furthermore, as meat consumption is so ingrained in ethical matters, a strong relationship between social and moral norms and meat consumption is expected (e.g. Rees, Bamberg, Jäger, Victor, Bergmeyer, & Friese, 2018). In that regard, meat consumption is amongst others predicted by subjective norms (e.g. Berndsen & Van Der Pligt, 2004).

Accordingly, breaking with social norms, thus reducing one's meat consumption, can induce social identity formation and intergroup phenomena, for instance disregarding deviant in-group members and demonstrating opposition to similar out-groups (e.g. Rosenfeld & Burrow, 2017a). Additionally, as explained, motivations and symbolic meanings for reducing meat consumption differ, yet all of them arouse individuals to counteract the omnivorous social norms (Rosenfeld & Burrow, 2017a, 2017b, 2018).

Furthermore, social norms can spur a change in behavior. The chances of sustaining a behavior, in this case meat reduction, are much higher if at least one relevant individual is supporting the behavior. As such, how other people behave, i.e. the descriptive norm, and what other people say, i.e. the injunctive norm, are found relevant (Zur & Klöckner, 2014). However, social support is found more important for vegans. It can thus be assumed that more social support is needed when the behavior is more extreme (Povey, Wellens, & Conner, 2001). In a similar vein, it is suggested that subjective norms with regards to meat reduction are less important due to the fact that external pressure related to meat reduction is low (Çoker & Van der Linden, 2020). Similar results were found for meat substitution (Graça et al., 2015).

Moreover, Hoek et al. (2017) investigated healthy and environmentally friendly food behaviors by means of four target behaviors. These comprised reducing overconsumption, the reduction of low-nutrient but energy-intensive food consumption, food waste reduction, and a decreased consumption of animal-based foods while shifting to a more plant-based diet. Social norms were found to be important for all four types of behavior but were most apparent for the reduction of animal-based foods, which is in accordance with other research, e.g. Graça et al. (2015) and Berndsen and Van der Pligt (2004) (Hoek et al., 2017).

In addition to social norms, Dagevos and Voordouw (2013) found that personal norms impact food decisions of meat reducers. As indicated, such consumers feel morally obliged to reduce their meat intake due to various reasons such as ethical and health concerns. Furthermore, the importance of personal norms differed between consumer groups. As for the so-called 'disengaged meat-eaters', i.e. individuals who eat meat regularly but also substitute meat regularly, personal norms were not found as relevant (Dagevos & Voordouw, 2013). In general, abstaining from meat is considered to be the morally *right* thing to do. This notion does not only apply to individuals quitting meat consumption but even to meat eaters. Meat eaters are thus morally inconsistent as their behavior is harmful, for example for animals and the environment, yet they continue and enjoy eating meat (Piazza et al., 2015). This inconsistency is called the 'meat paradox' (e.g. Joy, 2010). Consistent with the cognitive dissonance theory, this issue can be addressed in two ways (i.e. minimizing cognitive dissonance), namely changing meat consumption behavior and thus aligning behavior and norms, or by adapting beliefs and attitudes to fit with the behavior (Piazza et al., 2015).

2.3 Which Values Drive Meat Reduction?

2.3.1 Defining Values

In addition to norms, values were considered relevant in the context of this study. Values comprise a person's individual interests against collective interests, such as the environment (Van Doorn & Verhoef, 2015). Furthermore, values provide more thorough insights and, together with norms, allow for a more comprehensive view of eating behavior (De Boer, Hoogland, & Boersema, 2007), in this study meat reduction. Values guide the justification of actions (Steg, Bolderdijk, Keizer, & Perlaviciute, 2014), yet in general actions only relate indirectly to values (Strack & Deutsch, 2004). Values are considered similar to the social psychological variables as

depicted in the TPB framework, like norms (Dietz, Fitzgerald, & Shwom, 2005) and attitudes (Thøgersen & Grunert-Beckmann, 1997 in Vermeir & Verbeke, 2008). Attitudes, in comparison, are less fundamental and abstract and apply to specific objects. The importance of attitudes depends on the underlying values (Cieciuch, Schwartz, & Davidov, 2015). Also, a differentiation has to be made between character or personality traits and values. While traits also impact behavior, traits are, unlike values, not due to reflection and do not necessarily refer to the desirable. Examples of character traits are risk aversion or authoritarianism (Dietz et al., 2005). Furthermore, values have an influence on the importance of certain norm types. This means that individuals' holding certain values might respond distinctly to specific norms. For instance, individuals high in self-enhancement values might not concern oneself with social norms (Vermeir & Verbeke, 2008).

Values are motivational constructs of individuals, or in other words the guiding principles in life, which evolve into behavior (Piscicelli, Cooper & Fisher, 2015). Values comprise a person's individual interests against collective interests, such as the environment (Van Doorn & Verhoef, 2015), hence representing the desirable (Dietz et al., 2005). As most people are surrounded by a quite stable environment, their values are relatively stable as well (Vermeir & Verbeke, 2008).

The psychology of values has been influenced by three main theories (See Table 4). First, the earliest one, a psychology of personality, is Allport's motivational theory of values. Allport and Vernon (1931) characterize values as integral for a holistic description of personalities. Allport and Vernon (1931) further define *values as interests and evaluative attitudes*. They introduced six types of evaluations, which correspond to six types of personalities and are characterized by and dependent on the main values. Personalities are thus perceived as a synthesis of dominant and subordinate values and accordingly also correspond to the different types of evaluations. Such evaluations range from aesthetic to economic. They propose that values do not only affect personality but may also influence perceptions (Cieciuch et al., 2015).

Second, Rokeach's theory of values (1973) characterizes values as integral to personality and effective for the analysis of discrepancies in behavior and attitude across individuals and groups. Therefore, Rokeach's (1973) approach also relates to the personality theory by Allport (1931) (Rokeach, 1973). Unlike Allport, a cognitive approach is in focus here. Rokeach (1973) further describes personality as enduring beliefs and implicit or explicit notions of the desirable, which can be adopted by individuals or groups. Those beliefs thus concern the personal or social

desirability of specific states of existence or modes of conducts, conceptualized in a hierarchical system. He further characterizes values as stable constructs, which can evolve through experience and maturation processes of beliefs. In consequence, Rokeach's theory of values incorporates both change and stability. The author proposes 36 values consisting of 18 terminal values, such as justice, and 18 means or modes of conduct values, such as honest. Therefore, Rokeach (1973) defines beliefs as integral for the description of values and values as essential for the description of personalities (Rokeach, 1973).

Third, the most recent and currently predominant theory is Schwartz's theory of basic individual values, which integrates previous approaches. Schwartz's (1992) approach is the basis for the refined basic individual values (Schwartz, 2012) used in this study, which will be explained in more detail subsequently. Schwartz's (1992) theory of basic individual values enables values research in various psychology areas, such as cross-cultural or personality psychology, along with the fields of education, economics, sociology, and law (Cieciuch et al., 2015). Values are predominantly characterized as transsituational objectives, which vary in importance (Cieciuch et al., 2015). Hence, values refer to what humans evaluate as important in their lives. The importance of specific values may thus differ among individuals (Schwartz, 2012). Accordingly, Schwartz (1992) defines values as guiding life principles for individuals or on the group-level. The difference between values further relates to the motivational content (Cieciuch et al., 2015). Schwartz (1992) integrated the view introduced by Allport (1931) of values as evaluative attitudes and interest as well as the cognitive approach of Rokeach (1973) of values as goals (Cieciuch et al., 2015). The Schwartz values (1992) are preferred as they integrate previous theories such as Allport (1931) and Rokeach (1973). In this notion, Schwartz's approach is a contemporary theory which is widely utilized to study individual values and forms the basis for the refined basic values that are utilized in this study (Schwartz, 2012).

Theory	Definition of Values	Main Author(s)
Allport's Theory of Values	Value as interest Value as evaluative attitude	Allport & Vernon, 1931
Rokeach's Theory of Values	Values as implicit or explicit notions of the desirable Values as enduring beliefs	Rokeach, 1973
Schwartz's Theory of Values	Values as guiding life principles Values as beliefs connected to emotions Values as transsituational objectives	Schwartz, 1992

Table 4: Main Value Theories in Psychology (Adapted from Cieciuch et al., 2015)

Schwartz (1992, 2006) introduced five value characteristics shared by most psychology approaches. First, values can be defined as beliefs connected to emotions; second, values are related to the desirable and thus motivate actions; third, values encompass more than specific situations and actions; fourth, values provide guidance for the evaluation of actions, people, policies, and events; and fifth, values constitute a hierarchical system according to the importance of the respective values. These characteristics are furthermore extended by the unconscious influence of values on everyday decisions. Moreover, the relative importance of various competing values with regards to attitudes or actions are reflected upon (Cieciuch et al., 2015). This is in line with the fact that the influence of specific values is dependent on the context and on how important they are to the actor (Schwartz, 2012).

In accordance with these characteristics, Schwartz (1992) introduced 10 basic individual values. These are considered universal as each of them is based on at least one of the three universal requirements of human existence to whose attainment they contribute. These universal requirements relate to individuals' needs, social interaction, and the welfare and survival of groups. As such, individuals are not able to successfully meet these demands of human existence on their own. Therefore, humans have to formulate goals, communicate those goals to others, and gain support for their pursuit (Schwartz, 2012).

In Schwartz's (1992) theory, the circular continuum of values organizes values along two dimensions, which are bipolar and thus show the polarity of competing values. The dimensions' *poles* are referred to as higher order values (Cieciuch et al., 2015). One of the two dimensions

places *conservation* values and *openness to change* values opposite. The openness to change dimension relates to independence of feelings, action, and thought as well as to readiness for change (Cieciuch et al., 2015). This goes hand in hand with the willingness for accepting new ideas as well as trying and looking for new things (Graham & Abrahamse, 2017). Conservation values, on the other hand, are linked to change resistance, preservation of the traditional and the past, and to self-restriction and order (Cieciuch et al., 2015; Graham & Abrahamse, 2017). The second dimension places *self-enhancement* and *self-transcendence* opposite. Self-enhancement values are rather egoistic values, which are related to own interests, power over others, and relative success. On the contrary, self-transcendence values are rather altruistic values related to the interests and welfare of others (Cieciuch et al., 2015; Graham & Abrahamse, 2017). Commonly, researchers relate the self-transcendence values introduced by Schwartz (1992) to altruism (e.g. Graham & Abrahamse, 2017). Stern, Dietz, and Kalof (1993) introduce altruism as laying importance on the welfare of and preventing harm for others (Graham & Abrahamse, 2017).

More recently, the basic individual values theory of Schwartz (1992) was refined. The refined version was introduced by Schwartz et al. in 2012 and comprises 19 instead of 10 values, offering greater explanatory and heuristic power (See Figure 1). As outlined, the original theory of refined values assumed that values are arranged in a circular motivational continuum. The new refined theory does even more justice to this assumption. The continuum is split into 19 values that are conceptually distinct. The more refined value definitions allow for less correlation of one item with another. In addition, the refined theory provides more accurate understanding of the relationship between values and beliefs (Schwartz et al., 2012).

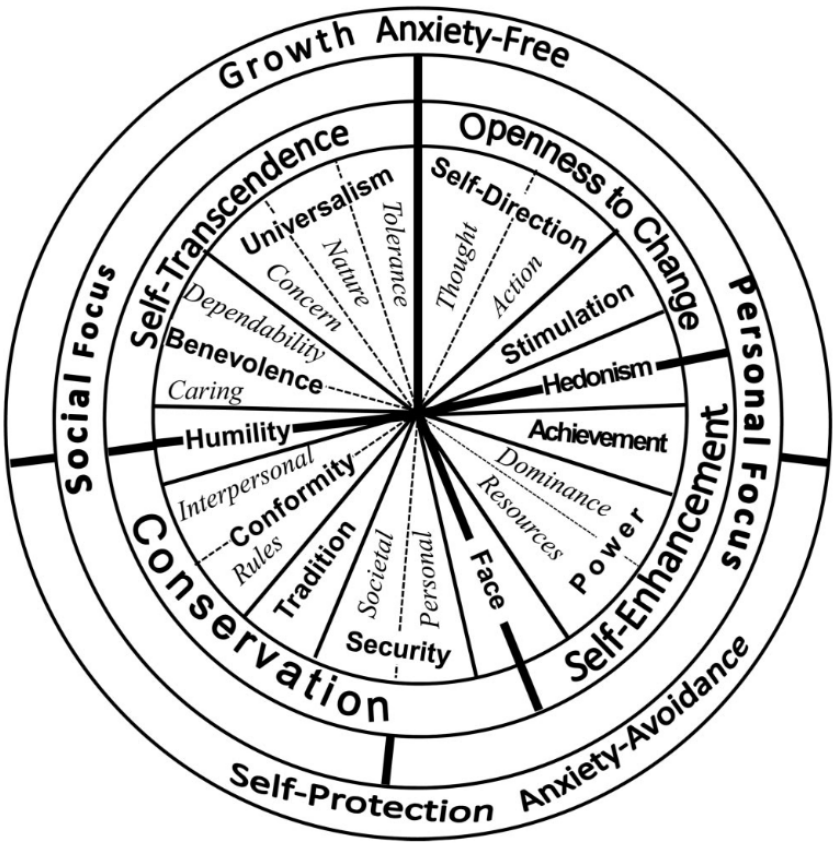


Figure 1: Circular value continuum by Schwartz et al. (2012)

In this study the refined values of Schwartz are preferred above the original basic values developed in 1992. A more detailed argumentation for this choice is as follows. The new refined values of Schwartz account for a more distinct understanding of individuals' motivational goals. In detail, the refined values allow for a more comprehensive examination of universalism by splitting up one item into three (Schwartz et al., 2012). The original item is focused on the welfare of every human being and of nature (Schwartz, 2012). The new refined values enable a differentiation between the importance of the welfare and protection of all people, individuals' dissimilar to oneself, and the natural environment. Furthermore, benevolence is split up into two items. Thus, a distinct analysis of the importance of being a reliable ingroup member and the commitment to the welfare of members of the ingroup can be conducted (Schwartz et al., 2012).

In addition, two more items related to the self-transcendence and self-enhancement dimension were added. Schwartz et al. (2012) proposed humility as linked to both conservation and self-transcendence. Humility is defined as the awareness of the insignificance of oneself in the greater picture. Furthermore, face was introduced as a new value with both conservation and

self-enhancement motivations. This value is connected to the protection of one's public image, which is related to avoiding shame and gaining power (Schwartz et al., 2012).

Moreover, when further proceeding along the self-enhancement pole, the new refined values enable a distinction between power over people and power over social resources and material instead of combining both aspects. The values achievement and hedonism have not been updated in the refined version. Achievement is linked to success in accordance with social standards. Hedonism is characterized by sensuous gratification and pleasure for oneself and relates to both self-enhancement as well as to openness to change (Schwartz et al., 2012).

2.3.2 The Role of Values in Environmentally Responsible Behavior

When values are activated in the pre-decision phase, they may shape behavior in a way that individuals' actions are value-congruent. Accordingly, values can have a major impact on consumption decisions of consumers such as brand or sustainable product choice (Vermeir & Verbeke, 2008). Although the definition of values explicitly states that they direct individuals' behaviour, the nature of values as abstract constructs indicates that actual consumer behavior is only indirectly linked to values (Brunsø, Scholderer, & Grunert, 2004 in Aertsens, Verbeke, Mondelaers, & Van Huylenbroeck, 2009). On the other hand, over longer time periods, values can function as better predictors of behavior due to their stability (Krystallis,Vassallo, Chryssohoidis, & Perrea, 2008). Dietz et al. (2005) state that values are assumed to have an impact on both collective and individual decisions. Therefore, if consumers inherited the 'right' values, more sustainable decisions would be made. However, such assumptions about the influence of values are often not specific enough and not built on explicit scientific results and foundation (Dietz et al., 2005).

Researchers have found that both moral attitudes as well as values influence pro-environmental behavior (Clayton & Myers, 2009). Various value theories categorize the values concerning pro-environmental behavior similarly. Those comprise, for instance, egocentric, ecocentric, and homocentric values (Nordlund & Garvill, 2002) or egoistic, biospheric or social altruistic values (Steg et al., 2005).

Egoistic values are related to maximizing one's own personal outcome. Therefore, own interests are placed above the collective interest. Individuals with strong egoistic values were found to be *less* likely to behave sustainably (Steg et al., 2005). *Biospheric* values relate to the welfare of the natural environment and the concern with the biosphere (Stern et al., 1993). Strong

biospheric values are linked to recognizing the worth of the environment and animal welfare. Consumers with these values are thus found to be *more* likely to engage in sustainable behavior (Van Doorn & Verhoef, 2015). When researching the underlying values of pro-environmental behavior, many researchers made use of *altruism* (e.g. Stern et al., 1993). Altruistic values are connected to the concern for and the valuation of other people's welfare. An individual with strong altruistic values may thus assign more importance to the welfare of others than oneself (Van Doorn & Verhoef, 2015). Accordingly, altruistic values and sustainable behavior and attitudes should theoretically be positively connected (Steg et al., 2005). Often though, empirical evidence does not show a positive significant relationship (Nordlund & Garvill, 2002; Schultz, 2001 in Van Doorn & Verhoef, 2015). Altruistic behavior is particularly interesting when analyzing pro-environmental behavior as despite the support of moral behavior and norm, many fail to behave accordingly. This leads to the conclusion that individuals do not need persuasion of the positive aspects of pro-environmental behavior but rather need to be persuaded to act in accordance (Hopper & Nielsen, 1991).

Both empirical and theoretical literature has acknowledged that non-egoistic motivations influence consumers' pro-environmental behavior. Here, researchers utilized differences in attitudes and values in order to analyze heterogeneity among consumers and therewith predict environmental behavior (Turaga et al., 2010). Generally, consumers engaging in pro-environmental consumption behaviors tend to have stronger pro-environmental values, are more altruistic and open to change (Stern, Dietz, & Guagnano, 1995 in Park & Ha, 2012).

There are various studies that have connected personal values and *sustainable behavior*. Vermeir and Verbeke (2008) found that traditional values such as being humble, devout or the respect for traditions are likely to be connected to sustainable purchase behavior. This can be explained by a rather moderated way of living and going for the 'middle course'. On the other hand, power seekers, hence values connected to power over and respect of others, are less likely to buy sustainably. An explanation here can be that sustainable behavior is not connected to gaining power and thus not expedient (Vermeir & Verbeke, 2008).

Various researchers have pointed out that especially Schwartz's (1992) self-transcendence and self-enhancement dimension of values is highly relevant for *sustainable* or *pro-environmental* behavior (e.g. Nordlund & Garvill, 2002; Thøgersen & Ölander, 2002). While the tradition and openness to change dimension also has an influence on the likelihood of an individual engaging in pro-environmental behavior, this relationship is usually weaker than the

one of pro-environmental behavior and the self-transcendence and self-enhancement dimension (Graham & Abrahamse, 2017). Individuals with strong values related to traditionalism have been found to be less inclined to perform environmentally friendly behaviors (e.g. Stern et al., 1995) while values related to openness to change are believed to have a small impact only (Dietz et al., 2005).

As individuals only consider some values in the process of decision-making, De Groot and Steg (2008) advise to focus on self-enhancement and self-transcendence values when studying environmental intentions and behavior (De Groot & Steg, 2008). In accordance with this notion, research focused on the relationship between pro-environmental behavior and values has primarily examined the self-enhancement and self-transcendence dimension (Schultz et al., 2005). When analyzing previous literature, Thøgersen and Ölander (2002) even found that only values along the self-transcendence and self-enhancement dimension impact the propensity to pro-environmental behavior. They thus state that, for pro-environmental research, it is reasonable to focus on the self-transcendence and self-enhancement values while excluding values along the conservation and openness to change dimension (Thøgersen & Ölander, 2002).

In accordance with other researchers, Stern, Dietz and Guagnano (1998) found that pro-environmental behavior is only significantly related to values along the self-transcendence and self-enhancement dimension (Thøgersen & Ölander, 2002). Often, the engagement in environmental behaviors involves some kind of trade-off between long-term collective welfare, or gains, and individual payoffs. Individuals with a high concern for egoistic payoffs may be less inclined to engage in pro-environmental behavior (De Groot & Steg, 2007). Accordingly, an individual with strong self-transcendence compared to self-enhancement values is more likely to engage in environmentally friendly behavior (Thøgersen & Ölander, 2002). Also, Nordlund and Garvill (2002) only made use of the self-enhancement versus self-transcendence dimension in their study on pro-environmental behavior (Nordlund & Garvill, 2002). In accordance with other studies, they found that the self-transcendence and self-enhancement dimension are connected to pro-environmental behavior and attitudes (e.g. De Groot & Steg, 2007; Nordlund & Garvill, 2002; Schultz et al., 2005).

In addition, studies have found that individuals with stronger self-transcendence values tend to be more environmentally concerned than individuals with lower self-transcendence values (Schultz et al., 2005; Stern, Dietz, Abel, Guagnano, & Kalof, 1999). Moreover, it was found that self-transcendence values are positively linked to self-reported pro-environmental behavior (e.g.

Nordlund & Garvill, 2002). In accordance, self-enhancement values are found to be connected to behaving less environmentally friendly (Nordlund & Garvill, 2002). Thøgersen and Ölander (2002) found that, when past behavior is included, only universalism significantly influences pro-environmental behavior. The fact that universalism has the greatest influence is also in line with previous studies and is consistent with the motivational content of universalism (Thøgersen & Ölander, 2002). Additionally, other studies found that self-enhancement and self-transcendence values are not only related to pro-environmental attitudes and behaviors but also to norms and intentions (Steg et al., 2014).

Furthermore, research has shown that food choices and food consumption are impacted by shared conventions, meanings, and values (Beardsworth & Keil, 2002 in Graça et al., 2015). Accordingly, the personal value system of individuals influences food choice (Lindeman & Sirelius, 2001). Along the same lines, values are likely to have an important impact on diet changes (Graham & Abrahamse, 2017). As for the general relationship between values and behavior (Schwartz, 2012), values are only relevant to food choice when the respective food characteristics or products as such are meaningful to attain one's personal desired values (Hoek et al., 2011). Regarding food choices, the indirect influence of values on actions via related concepts may be of specific importance. Here, preferences and habits may influence the preferred products, ingredients, meals, and situations (De Boer et al., 2007 in Aertsens et al., 2009). Furthermore, it was found that strong universalism values are related with the choice of *environmentally sustainable* foods (De Boer et al., 2007). Some research on the relationship of values and *organic* food consumption can be identified. In accordance with previous research, Van Doorn and Verhoef (2015) found that the main drivers of organic purchases are biospheric values. On the other hand, they did not find a significant influence of altruism on organic purchase behavior (Van Doorn & Verhoef, 2015).

This study primarily relies on the new refined version of values (Schwartz et al., 2012). As outlined, the theory of basic individual values introduced by Schwartz (1992) is commonly used to examine the connection between values and the behavior of consumers (Aertsens et al., 2009). Gifford and Nilsson (2014) criticize the original basic individual values for not distinguishing between values concerning the environment, hence biospheric, and other self-transcendence values, including altruistic (Gifford & Nilsson, 2014). The new refined version of Schwartz's (2012) values accounts for this distinction and enables a more detailed understanding of consumers' motivational goals. As the new refined values of Schwartz (2012) include more

aspects of the underlying motivations of behavior, a more detailed analysis of the values underlying pro-environmental behavior seems possible. In accordance, the analysis of the refined values can offer more specific insights (Schwartz et al., 2012). Particularly the refinement of universalism offers the possibility to examine whether individuals value the welfare of all people, of individuals dissimilar to oneself, or of the natural environment (Schwartz et al., 2012). This distinction is of high interest for environmental research as consumers may have different values motivating one's pro-environmental behavior (e.g. Steg et al., 2005).

2.3.3 The Role of Values in Meat Reduction

Compared to norms, values have a more indirect influence on behavior (e.g. Strack & Deutsch, 2004). Furthermore, values refer to what one finds important, whereas norms refer to what one 'ought to do' (Dietz et al., 2005). Generally, value theories propose that values both structure and influence norms (e.g. Rokeach, 1973). This structure was confirmed by various studies concerning pro-environmental behavior (e.g. Nordlund & Garvill, 2003; Steg et al., 2005). It is expected that these notions also hold true for meat reduction behavior. In the following, values are further examined in relation to meat consumption and meat reduction respectively.

Research has found that values are associated with meat consumption (Graham & Abrahamse, 2017). As outlined, values with an orientation towards oneself and towards others are critical with regards to pro-environmental behavior (Stoll-Kleemann & Schmidt, 2017). To recall, individuals with strong self-transcendence values have been found to be more likely to engage in pro-environmental behavior while the opposite holds true for self-enhancement values (e.g. Thøgersen & Ölander, 2002). In line with this, research has shown the influence of values related to self-transcendence, i.e. altruistic values, and self-enhancement, i.e. egoistic values, on meat consumption. In detail, previous research suggests that strong self-enhancement values result in the consumption of more meat while strong self-transcendence values are related to less meat consumption (Graham & Abrahamse, 2017). In addition, Allen and Ng (2003) showed that strong self-enhancement values are linked to positive attitudes towards red meat consumption (Allen & Ng, 2003). A similar influence of self-transcendence and self-enhancement values on pro-environmental behavior and meat reduction seems reasonable as a high meat consumption harms animals and the environment (Stoll-Kleemann & Schmidt, 2017).

Apostolidis and McLeay (2016a) state that several studies have found motives related to the environment, health, and animal welfare to be the main drivers of a *consumption of less meat*

and vegetarianism in the Western world (Apostolidis & McLeay, 2016a). Health-related motives are related to the view that a reduced consumption of meat benefits one's personal fitness and can prevent illnesses (Radnitz, Beezhold, & DiMatteo, 2015; Rothgerber, 2013 in Apostolidis & McLeay, 2016a) while ethical concerns are related to animal welfare (Radnitz et al., 2015 in Apostolidis & McLeay, 2016a). Therefore, health-related motives are stronger related to individual self-interests while environmental and ethical motives are stronger related to moral or altruistic values (Janssen, Busch, Rödiger, Hamm, 2016 in Apostolidis & McLeay, 2016a).

Along the same lines, De Backer and Hudders (2015) found that *meat reducers* are mainly influenced by motives related to health rather than human or animal welfare (De Backer & Hudders, 2015). Accordingly, other studies have also found that *meat reducers* are more concerned about the health than the ethical aspect of meat consumption (e.g. Forestell, Spaeth & Kane, 2012). While health-related motives seem to be of higher importance, a higher concern for animal welfare still increases the likelihood of meat reduction in one's diet (De Backer & Hudders, 2015). In addition, reviewing previous studies on reduced meat consumption, Stoll-Kleemann and Schmidt (2017) state that concerns regarding animal welfare may result in a voluntary restraint from all or some animal products (Stoll-Kleemann & Schmidt, 2017). Similarly, lower meat consumption and vegetarianism have also been found to correlate with universalistic values, which relate to animal welfare and environmental concern (De Boer, Schösler, & Boersema, 2013). Along the same lines, De Boer et al. (2007) identified that certain values are connected to the extent of meat consumption. In detail, they found that a high importance of universalism values results in a preference for free range meat or even less meat consumption.

3. Main Findings and Research Direction

3.1 Main Findings

To respond to our first research question, we researched different aspects of environmentally responsible diets. As for sustainable consumption, sustainable diets are also environmentally, economically, and socially sustainable. It is thus concluded that sustainable eating behavior is environmentally friendly (FAO, 2010). As there is no standard definition of foods included in a *sustainable diet* (Hoek et al., 2017), the same principles as of sustainable consumption are applied. Sustainable eating behavior can therefore be achieved by the purchase of foods with a high sustainability standard (Liobikienė & Bernatonienė, 2017; Peattie, 2010) while avoiding non-sustainable foods (Moraes et al., 2012; Nordlund & Garvill, 2002).

In accordance with the sustainability science stream as introduced by Kates et al. (2001), we focus on shifting to *environmentally friendly diets*. As outlined, environmentally responsible diets should focus on the type of foods rather than other factors such as the origin (e.g. Aleksandrowicz et al., 2016). In order to achieve an environmentally responsible diet, a reduced consumption of specific foods is considered purposeful (Portney, 2015). Especially critical are foods requiring many resources and related to high emissions (Hertwich et al., 2010). This is especially the case for animal-based foods, in particular dairy and meat (Dagevos & Voordouw, 2013). An environmentally responsible diet should thus include a reduction of these foods. Especially meat reduction is among the most impactful measures to reduce consumers' environmental impact (Lea & Worsley, 2008). Here, a focus should be set on strongly avoiding red meat. When eating meat, the consumption of poultry or pork is recommended. It is furthermore advised to substitute meat by fish for both environmental as well as for health reasons (Mekonnen & Hoekstra, 2012; Willett et al., 2019).

Based on previous literature, we therefore propose that it is pivotal to reduce the intake of animal-based products in an environmentally responsible diet in order to stay within the planetary limits (e.g. Springmann et al., 2018). To further examine meat reduction as part of a pro-environmental behavior, influencing factors including norms and values will be researched in more detail.

3.2 Research Direction

The impact of norms on meat reduction has not been researched thoroughly to the best of our knowledge, even though norms are considered to be relevant regarding meat consumption and reduction (e.g. Sparkman & Walton, 2017) and norms are being researched in various fields of pro-environmental behavior (e.g. Fornara et al., 2011). Generally, meat reduction is based on prosocial and moral normative factors (Rosenfeld et al., 2019). Following previous research (e.g. Çoker & Van der Linden, 2020; Rosenfeld et al., 2019; Sanchez-Sabate & Sabaté, 2019; Thøgersen, 2002), we therefore identify the subjective norm, hence the injunctive subjective norm and the descriptive subjective norm, and the personal norm to be most relevant in the case of meat reduction. In the context of our study we always refer to the descriptive/injunctive subjective norm when mentioning the descriptive or injunctive norm.

Local norms are not further taken into consideration as local norms refer to a physical rather than an emotional connection. Local norms are rather applicable to pro-environmental activities visible to e.g. neighbours, who one may not be potentially emotionally connected with (Fornara et al., 2011) while conformity in the case of meat reduction is rather related to one's social network or community (Rosenfeld et al., 2019). As outlined, social norms related to socially proximal individuals have a high influence on food choice. It is thus concluded that meat consumption is rather a social issue and not necessarily normatively influenced by specific people within the same spatial-physical environment, i.e. the local norm (Fornara et al., 2011).

Besides norms, values are of high interest in the context of meat reduction. Often, values concerned with pro-environmental behavior revolve around egoistic, biospheric or altruistic values (e.g. Steg et al., 2005). Along these lines it is generally found that biospheric values positively influence pro-environmental behavior (Van Doorn & Verhoef, 2015), whereas egoistic values have a negative effect on pro-environmental behavior (Steg et al., 2005). Theoretically, altruistic values should positively impact pro-environmental behavior, yet this is not always empirically supported (e.g. Nordlund & Garvill, 2002). Furthermore, the values introduced by Schwartz (1992) and Schwartz et al. (2012) are often researched in relation to pro-environmental or sustainable behavior. As individuals only take into account certain values in the decision making process, it is proposed to focus solely on one dimension, namely self-enhancement and self-transcendence (De Groot & Steg, 2008). This dimension is often found to be more relevant to pro-environmental research than the conservation and openness to change dimension (e.g. Nordlund & Garvill, 2002). Some research even found that only values along the self-

transcendence and self-enhancement dimension influence pro-environmental behavior (Thøgersen & Ölander, 2002). Along these lines, self-enhancement values, which can be linked back to egoistic values, usually result in decreased likelihood of pro-environmental behavior. To the contrary, self-transcendence values are linked to a higher probability of engaging in a pro-environmental behavior (Graham & Abrahamse, 2017). More specifically, universalism was found to be positively related to sustainable foods and less meat consumption (De Boer et al., 2007). The new refined basic values of Schwartz's (2012) are thereby in particular interesting to research meat reduction as the universalism values allow for a distinction between concern, nature and tolerance. By utilizing Schwartz's (2012) values, biospheric and altruistic aspects of values were also covered. Furthermore, the refined basic values allow for a more detailed comprehension of the behavioral motivations behind meat reduction (Schwartz, 2012).

In accordance with previous research, the further proceedings of this study build on the injunctive subjective norm, the descriptive subjective norm, personal norm and values along the dimension of self-transcendence and self-enhancement. The combined analysis of these factors thus allow for insights into how these concepts are related to the pro-environmental behavior of meat reduction. All taken together, these factors are examined by means of the TPB (Ajzen, 1991), which is further discussed in the next section.

4. Theory and Conceptual Model

4.1 Theory of Planned Behavior

4.1.1 Relevance of the Theory of Planned Behavior

In order to examine these norms and values with regards to the pro-environmental behavior of meat reduction, an extended version of the theory of planned behavior (Ajzen, 1991; Ajzen, 1985; Ajzen & Fishbein, 1980) is highly useful (Kaiser, Hübner, & Bogner, 2005). Other theories that consider norms and/or values are the norm-activation theory (NAT, NAM) (Schwartz, 1977), and the value-belief-norm (VBN) theory (Stern et al., 1999). The NAT explicitly addresses moral aspects of behavior (Schwartz, 1977). The VBN theory builds on the notion of the NAT by extending the causal chain with personal values (Oreg & Katz-Gerro, 2006). Various studies (e.g. Manstead, 2000) have suggested to incorporate these two frameworks in relation to the TPB (Bamberg & Möser, 2007). On this basis, it is argued that an extended TPB surpasses the VBN (Kaiser et al., 2005) and NAM (Bamberg & Möser, 2007) (Aertsens et al., 2009).

The TPB adequately presents the relationships between its concepts. Respectively, attitude, perceived behavioral control, and subjective norms influence behavioral intention and ultimately behavior (Ajzen, 1991). Furthermore, the challenge of the intention-behavior gap can be addressed by the TPB, as the framework adequately represents the notion of intention formation, and the comprehension of the underlying internal factors predicting behavior (Bauer et al., 2018). Correspondingly, understanding subjective beliefs and attitudes towards an intention or actual behavior is pivotal in achieving behavioral change (Fang et al., 2017). In addition, it is considered the most widely utilized model amongst rational choice models (Han, 2015).

Stemming from the notion of the expectancy-value approach of attitude-behavior research, this model can provide great insights (Eagly & Chaiken, 1993). The predictive power of the TPB model is confirmed by various meta-analyses (e.g. Godin, Conner, & Sheeran, 2005) for a range of behaviors and contexts (e.g. Armitage & Conner, 2001). In accordance, the TPB is utilized in many forms of pro-environmental behaviors (Çoker & Van der Linden, 2020), and food consumption behaviors (Tuu, Olsen, Thao, & Anh, 2008).

The TPB is furthermore regularly applied when researching ethical consumers and the corresponding process of decision-making (Carrington, Neville, & Whitwell, 2010). As stated by Hsu, Chang, and Yansritakul (2017), the TPB has been adopted with great success in the area of

ecological behavior, with regards to both the acceptance of and engaging in this type of behavior (e.g. Moser, 2016; Nguyen, Lobo, & Greenland, 2016; Paul, Modi, & Patel, 2016). The TPB framework is also utilized to research environmentally responsible behaviors, like water conservation (Fielding, McDonald & Louis, 2008), travel mode choice (Bamberg & Schmidt, 2003), reduction in the use of electricity and water (De Leeuw, Valois, Ajzen, & Schmidt, 2015; Maki & Rothman 2017), and recycling (Ramayah, Lee, & Lim 2012; Chan & Bishop 2013). Moreover, a substantial amount of research on the purchase of environmentally friendly goods and services has adopted the TPB (Onel, 2017). This comprises, with respect to green purchasing behavior, amongst others the purchase intention of green skincare products (Hsu et al., 2017), the intention to visit green hotels (e.g. Han, Hsu, & Sheu, 2010; Chen & Tung, 2014), and pro-environmental behaviors in a hotel context (Han & Kim, 2010).

Moreover, the TPB is widely applied and empirically supported when researching food consumption and eating behaviors (Tuu et al., 2008). Food choice behavior is furthermore studied with the use of the TPB (Godin et al., 2005). There is a substantial body of research on organic food utilizing the TPB (e.g. Arvola et al., 2008), and the TPB is found a relevant framework in order to understand the choice for organic food (Aertsens et al., 2009). Likewise, the model is utilized the in research of sustainable dairy consumption (Vermeir & Verbeke, 2008), the consumption of novel food products containing insect flour (Menozzi, Sogari, Veneziani, Simoni, & Mora, 2017), and nutrition-related behaviors (e.g., Bogers, Brug, Van Assema, & Dagnelie, 2004; Kim, Reicks, & Sjoberg, 2003).

The TPB is also the predominant model in social psychology to examine meat consumption (Graça, 2016). However, compared to the environmentally significant behaviors previously mentioned, meat consumption and its *reduction* has received relatively little attention. This is due to the fact that, when the TPB is applied to meat consumption, it is often health related, rather than adopting a pro-environmental behavior perspective (Çoker & Van der Linden, 2020). There are a few cases in which reasoned action models, such as the TPB, are applied to meat consumption as a pro-environmental behavior, for example sustainable meat consumption (Bauer et al., 2018). In addition, meat consumption and its reduction were examined with an extended TPB including habit strength (Rees et al., 2018). Zur and Klöckner (2014) developed an integrated model consisting of the TPB, NAT (Schwartz, 1977), and the protection motivation theory (Rogers, 1983) to examine meat reduction (Zur & Klöckner, 2014). Çoker and Van Der Linden (2020) furthermore found that the TPB model is effective in examining one's intention to

reduce meat consumption (Çoker & Van Der Linden, 2020). Examining meat reduction as a pro-environmental behavior by means of the TPB might yield distinct findings and enhance existing research. Furthermore, applying the TPB in the context of meat reduction allows for an examination of factors beyond demographic trends and motivations, which are more frequently researched in this context (Lentz et al., 2018).

4.1.2 Discussion of the Theory of Planned Behavior

The field of social psychology has established different models to understand and predict one's behavior (Beedell & Rehman, 2000). A great amount of these models are built on an expectancy value approach, hence the probability of pursuing a behavior indexed by the subjective value or utility related to the corresponding outcomes (Feather, 1982). One of the most utilized models is the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) (Beedell & Rehman, 2000) (See Figure 2), which is the predecessor of the TPB (Conner & Armitage, 1998). Both the TPB and the TRA try to predict individuals' behavioral intentions and actual behavior by means of motivational constructs (Conner & Armitage, 1998). While this prediction is the main purpose of the TRA, the TPB extends this framework by also including control perceptions regarding behavior. Furthermore, aside from the level of control, the TPB demonstrates a higher explanatory power of intentions on average (Madden, Scholder, & Ajzen, 1992).

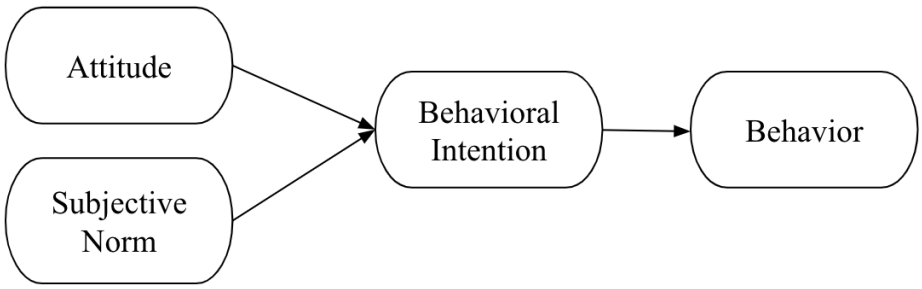


Figure 2: Theory of Reasoned Action (Fishbein & Ajzen, 1975)

The TPB is a theoretical framework in the field of social psychology (Turaga et al., 2010) that is largely implemented to explain both behavior and behavioral change (Abrahamse & Steg, 2011) (See Figure 3). The TPB views individuals as rational and thus making planned decisions, while being generally driven by self-interest (Abrahamse & Steg, 2011). Structural variables, like socio-demographics, are believed to indirectly affect intentions and the corresponding behavior

(Ajzen & Fishbein, 1980). Thus, psychological variables are thought to be mediators regarding the relationship of these structural variables, e.g. gender, and actual behavior (Abrahamse & Steg, 2011). This approach can be subject to criticism, as the structural variables such as demographics are not explicitly taken into account, yet they are implicitly included via attitudes and intentions (Beedell & Rehman, 2000). Theoretical behavior models can furthermore be grouped according to three levels, namely individual, interpersonal, and community of which the TPB belongs to the first (Anable, Lane, & Kelay, 2006 in Antimova et al., 2012).

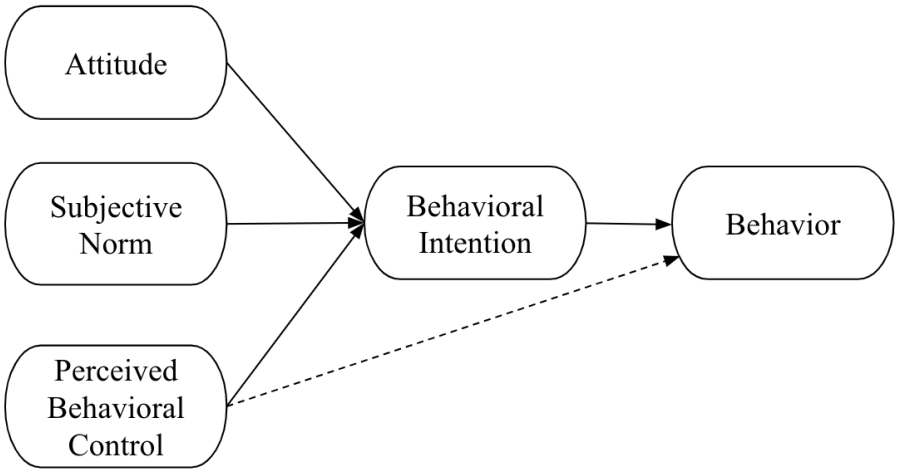


Figure 3: Theory of Planned Behavior (Ajzen, 1991)

According to the TPB framework, intention is the most proximal predictor of a certain behavior. Intention, in turn, is established by three variables namely attitudes, subjective norms, and perceived behavioral control (PBC) (Ajzen, 1991; Ajzen & Driver, 1991; Ajzen & Fishbein, 1980). These three constructs are not independent, but affect each other (Bauer et al., 2018). It is postulated that, together, these variables can accurately estimate behavioral intentions (Ajzen, 1991). All three variables are expected to positively impact the intentions towards an action, hence the higher the favourability of one's attitude, subjective norms, and PBC, the stronger the intention (Turaga et al., 2010). These intentions in turn explain substantial variance in a given behavior (Ajzen, 1991). Intentions and behavior are regarded as causally connected (Graça, 2016).

Regressing attitude, subjective norm, and PBC on behavior allows for an assessment of the amount of variation in behavior that can be explained by these concepts (Beedell & Rehman,

2000). These concepts, i.e. attitude, subjective norm, and PBC, can differ based on the behavioral type and the type of situation, and are thus not uniform (Ajzen, 2002b; Armitage & Conner, 2001). However, generally 50%-70% of the variation in a given behavior can be predicted by means of the TPB (Beedell & Rehman, 2000).

Beliefs form the basis for the TPB constructs (Ajzen, 1991) and are regarded as pivotal in determining one's behavior (Antimova et al., 2012). These beliefs are built on various aspects namely, actual information, hearsay, experience, and implicit knowledge. Hence, they serve as the information individuals hold regarding their world, and thus influence behavior (Beedell & Rehman, 2000). In accordance, Dietz et al. (2005) state that beliefs are insights about the world state, being facts identified by individuals. Consequently, when these beliefs are generalized, they become worldviews. Dietz et al. (2005) furthermore argue that beliefs are distinct from values. For example, an individual can have a belief about the climate change effects on threatened species, *and* assign importance to these circumstances (Dietz et al., 2005).

Attitudes are indicative of the extent to which an individual has a favourable or unfavourable evaluation of a particular behavior (Abrahamse & Steg, 2011; Ajzen, 1991). Attitudes are thus established by one's beliefs with regards to the outcomes of a particular behavior, i.e. the behavioral beliefs, while considering the evaluation. Behavioral beliefs can be described as the subjective expectation that the behavior in question will generate desirable outcomes (Ajzen & Fishbein, 1980). In accordance, attitudes are considered rational-choice-based evaluations of the outcomes of an action along with the likelihood of this happening (Kaiser et al., 2005).

Subjective norms point to individual perceptions of whether relevant others would adopt a particular behavior and individual motives to meet this social pressure (Abrahamse & Steg, 2011; Ajzen, 1991). Relevant others could for example be family, friends, and colleagues (Ham et al., 2015). Subjective norms are thus established by one's belief about the level of (dis)approval to execute a particular behavior by relevant others, i.e. the normative beliefs, while taking into account one's motivation to adhere to these expectations (Conner & Armitage, 1998). In other words, subjective norms are the magnitude of which relevant others want an individual to act in a certain way, multiplied by the extent one wants to satisfy these views (Rivis & Sheeran, 2003). Subjective norms, as included in the original TPB model, are prescriptive in nature as they entail the level of approval or disapproval (Fornara et al., 2011). In the original TPB framework, all of the moral and normative behavioral impacts are accounted for by subjective norms and attitudes

(Ajzen & Fishbein, 1980; Manstead, 2000).

The *PBC* describes the perceived level of easiness or difficulty of conducting a certain behavior (Abrahamse & Steg, 2011; Ajzen, 1991). It is one's own perception about the extent to which they believe it is possible to perform a certain behavior (Aertsens et al., 2009). The PBC furthermore consists of one's belief regarding the presence or absence of external factors that involve or obstruct the conduct of a given behavior, i.e. the control beliefs, while considering the allocated impact of each of the factors (Conner & Armitage, 1998). The PBC exists of two dimensions, namely an individual's perceived ability to perform a given behavior and external conditions to an individual (Valle et al., 2005). This is in accordance with the PBC distinction based on self-efficacy (Bandura &Wessels, 1997) and controllability (Çoker & Van der Linden, 2020). In addition, the PBC might be useful as a proxy for actual control, given that the behavior is sufficiently controlled (Ajzen, 2006). As indicated previously, the PBC was added to the TRA to enhance the explanatory power and to fully explain behavior, particularly behaviors relatively complex to perform (Madden et al., 1992). It is assumed that together with intentions, PBC is also a direct predictor of behavior (Antimova et al., 2012). In line with this, some behaviors are subject to one's volitional control, yet others are limited by the available resources and/or opportunities (Turaga et al., 2010). In accordance, the TRA is rather appropriate to predict a given behavior when this behavior is under volitional control while the TPB is preferred when this is not the case (Madden et al., 1992) or in the case of a combination of the two (Han, 2015).

Intention is a central factor in the TPB and is considered to apprehend motivational aspects that impact behavior, hence being an immediate predictor of actual behavior (Turaga et al., 2010). Behavioral intention is an indicator of the amount to which individuals are inclined to try to carry out a certain behaviour (Abrahamse & Steg, 2011). Intentions rely on one's level of attempt and willingness to conduct a certain behavior (Ajzen, 1991). In accordance, intention includes the extent of the belief and the power to perform a given behavior (Antimova et al., 2012). Moreover, it is regarded that intentions are essential in ensuring long-term objectives (Baumeister & Bargh, 2014; Kuhl & Quirin, 2011).

Another component of the TPB is *behavior,* which can be described as human action (Ajzen, 2011). The TPB makes the assumption that behavior is reasoned and planned, as it is proposed that attitudes, subjective norms and PBC stem reasonably from their beliefs, i.e. behavioral, normative, and control beliefs, which will evolve into intention and finally in behavior (Ajzen, 2011). Behavior is thus regarded as a function combined of intentions and PBC

(Ajzen, 1991). Generally, intention and behavior are positively related. Hence, the stronger the intention, the higher is the probability of carrying out the behavior (Turaga et al., 2010). It is often assumed that intention can serve as a proxy of behavior (Grimmer, Kilburn, & Miles, 2016), which is widely applied in academic research (Chandon, Morwitz, & Reinartz, 2005). Furthermore, the higher the perceived level of control, i.e. PBC, the more likely an intended behavior will be conducted. Accordingly, Ajzen (1985) proposed that intentions would be stronger predictors of behavior in the case of an increase in PBC (Conner & Armitage, 1998).

Along the same lines, literature with its basis in marketing and consumer behavior often applies behavioral intention as a surrogate regarding buying behavior (Shaw & Shiu, 2003). Correspondingly, a great deal of research only examines intention, such as Han (2015) who examined travelers' pro-environmental intentions in green lodging. Accordingly, it is argued that only a few studies *actually* measure behavior due to the fact that often intentions are being researched or behavior is depicted by self-reported behavior instead of actual behavior (Van Doorn & Verhoef, 2015).

4.2 Extended Theory of Planned Behavior

4.2.1 General Pitfalls of the Theory of Planned Behavior

Despite the fact that the TPB is widely used, it is also subject to certain pitfalls (e.g. Manstead, 2000). Various meta-analyses illustrate that, generally speaking, attitude, subjective norm, and PBC together account for 50% of the total variance in intention (e.g., Armitage & Conner, 2001; McEachan, Conner, Taylor, & Lawton, 2011). In turn, the combination of intention and PBC demonstrates as far as 33% of the total variance in behavior (Rees et al., 2018). This limited predictive validity of the model has received much criticism as a great extent of variability of behavior cannot be explained by TPB variables alone (Sniehotta, Presseau & Araújo-Soares, 2014). Furthermore, the TPB received criticism due to its focus on rationality, consequently ignoring unconscious behavioral impacts (Sheeran, Gollwitzer & Bargh, 2013) and emotions (Conner, Gaston, Sheeran, & Germain, 2013). In addition, the TPB is regarded as static in providing explanations of future behavior (McEachan et al., 2011; Sutton, 1994). These general pitfalls of the TPB are also relevant regarding pro-environmental behaviors (e.g. Bamberg & Möser, 2007). Therefore, various extensions of the TPB with supplementary predictors were suggested (Rees et al., 2018). This is consistent with the notion of Ajzen (1991) who stated that

the drawbacks of the TPB can indeed be addressed by adding other variables to the model, further enhancing the predictive potential (Armitage & Conner, 2001). In addition, it is argued that extended and modified versions of the TPB enhance the exploratory power of the model (Armitage & Conner, 2001; Conner & Armitage, 1998).

Besides the more general drawbacks of the TPB, there are also specific issues regarding the model. Consistent with the low predictive validity, another pitfall of the TPB model is the fact that subjective norms were found to be relatively weak in explaining intention or behavior (Ajzen, 1991). This issue is addressed by distinguishing the concept of subjective norms into normative and informational social influence, the former consisting of social, subjective, and injunctive norms, while the latter entails descriptive norms (Armitage & Conner, 2001; Cialdini, Reno, & Kallgren, 1990). Nevertheless, the injunctive subjective norm is in general still more prevalent than the descriptive subjective norm, also in the case of pro-environmental research (Fang et al., 2017).

Moreover, one of the variables often discussed in relation to the TPB is habits (e.g. Moraes et al., 2012), which can be described as the inclination to repeat past behavior given the context is stable (Ouellette & Wood, 1998 in Ajzen, 2002c). This is due to the notion that day-to-day behavior takes place with little cognitive thinking, aiding us to cope with environments full of information. Yet, the TPB model, with its basis in reasoned action and expectancy value models, views cognitive processes as reasons to behave in a certain way (Jackson, 2005). Several studies agree with Jackson (2005) and argue that pro-environmental consumption can be accomplished by adapting practical routines (Clarke, Barnett, Cloke, & Malpass, 2007). Accordingly, it is proposed that the factors that stimulate habitual behavior should be addressed in order to reduce attitude-behavior inconsistencies, rather than trying to change behavior through informational interventions alone (Verplanken & Wood, 2006).

Furthermore, when examining diets focused on health and sustainability, models based solely on rational decision making are questioned and there is a growing importance and interest for a more holistic approach (Garnett, Mathewson, Angelides, & Borthwick, 2015; Köster, 2009 in Hoek et al., 2017). Generally, attention for incorporating less rational concepts in the field of sustainable diets has increased (Garnett et al., 2015 in Hoek et al., 2017). Therefore, Aertsens et al. (2009) extended the TPB model by affective variables, including values (Aertsens et al., 2009). Similarly, there is a need for a more holistic viewpoint regarding the levels of abstraction. When extending the TPB regarding pro-environmental behavior many researchers focus on a

particular level of abstraction, like environmental values, general values, or norms, rather than the inclusion of different concepts and therewith levels of abstraction (Nordlund & Garvill, 2002). In addition, various research proposed to extend the TPB with specific variables regarding pro-environmental behaviors, for instance environmental concern (Paul et al., 2016), environmental knowledge (Yadav & Pathak, 2016) and sustainability knowledge and sustainability values (Bauer et al., 2018).

4.2.2 Inclusion of Norm Types

To elaborate on and overcome these pitfalls, we take additional concepts into consideration (e.g. Manstead, 2000). As such, the conceptual model in this study builds on the TPB and extends the model by certain factors. First, we make a distinction between the injunctive subjective norm and the descriptive subjective norm. This has been found relevant in various pro-environmental behaviors such as household waste recycling (Fornara et al., 2011). In a similar vein, Ham et al. (2015) propose to utilize a dual approach concerning the subjective norm, thus including aspects of the descriptive norm and injunctive norm to study green food purchase behavior (Ham et al., 2015).

Second, the personal norm is included. Initially, the first thoughts of the TPB by Fishbein (1967) were encouraged by the theory of propositional control (Dulany, 1961), which consists of a personal normative component and a social normative component. Yet, in later empirical studies it was found that the personal normative component did not enhance the prediction of intention, and was therefore removed from the TPB model as we know it now. Hence, this resulted in subjective norms and attitude being the sole variables to depict normative matters (Arvola, et al., 2008). However, following this decision, various studies argued for the importance of the inclusion of personal norms (e.g. Harland, Staats, & Wilke, 1999) as this aids in the understanding and explanation of behaviors, particularly environmentally relevant behaviors (Onel, 2017). Likewise, it is proposed that internalized norms and self-expectations should receive more attention with regards to an individual's motivation to comply with a certain behavior (Godin et al., 2005).

The TPB model in this study is thus extended by the personal norm as this distinction is highly relevant to understand behavior (e.g. Fang et al., 2017). Hence, personal norms within the rational framework of the TPB are increasingly accepted in the field of environmental social psychology (Turaga et al., 2010). Similarly, personal norms were found to be a valuable

extension concerning pro-environmental behavior, particularly environmentally food behaviors (Hoek et al., 2017). Research in the field of consumer food choice also proposes to include self-related variables, for instance personal norm (e.g. Robinson & Smith, 2002). These variables can hinder favourable attitudes evolving into behaviors, and it is therefore suggested to incorporate (various levels) of personal factors (Vermeir & Verbeke, 2008). In addition, in the case of inconsistency in attitude and behavior, relating to the social psychology theory of cognitive dissonance (Festinger, 1957), individuals support their behavior with the use of moral norms, i.e. personal norms (Antimova et al., 2012).

4.2.3 Inclusion of Values

In addition to these norms, the refined values by Schwartz (2012) are part of the conceptual model utilized in this study. Norms and values are distinct concepts. While norms refer to what one 'ought to', values refer to what one finds important. Hence, one might be influenced by the norm that 'everyone should recycle' and value efficient resource use (Dietz et al., 2005). As outlined, values influence individuals' decision-making. While values have a strong influence on decisions, and thus on behavior, the consideration of various different aspects is important (Dietz et al., 2005).

Therefore, a joint examination of social norms and values in the context of sustainable consumption is of interest as they are inherited by every individual and are difficult to change. Moreover, both constructs are motivations and ideas deeply rooted in oneself and relatively stable over long time periods (Vermeir & Verbeke, 2006). Generally, value theories propose that values both structure and influence specific norms, beliefs, and attitudes. These constructs, in turn, influence behavior (e.g. Rokeach, 1973). This structure was confirmed by various studies concerning pro-environmental behavior (e.g. Nordlund & Garvill, 2003; Steg et al., 2005). Furthermore, research has found that values do not only influence norms and behavior but also beliefs, attitudes, and intentions. In accordance, the strength of self-transcendence and self-enhancement values was found to influence environmental norms, behavior, belief, attitudes, and intentions (Dietz et al., 2005; Steg & De Groot, 2012 in Steg et al., 2014). Accordingly, the focus of this study is on the internal pre-conditions (Bauer et al., 2018) of meat reduction, while taking into account different levels of abstraction as proposed by Nordlund and Garvill (2002).

4.2.4 Factors Not Included

However, not all factors related to overcoming the previously mentioned pitfalls are included. One of the factors not included in our study is habits. Routinization, rather than habits, are found to be consistent with a reasoned action perspective. Along these lines, routinization is depicted in attitudes and intentions as they are assumed to be activated automatically and thus guide actions without the use of conscious supervision (Ajzen & Fishbein, 2000). In this view, daily routines are regarded as semi-automatic responses involving both controlled and autonomous phases, which both are considered to be controlled by beliefs, attitudes, and intentions as in the TPB (Ajzen, 2002c). Furthermore, Çoker and Van der Linden (2020) found that meat consumption habits did not significantly correlate with meat consumption reductions. This finding differs from previous research (e.g. Saba & Di Natale, 1998), yet it has to be noted that previous research often focused on meat consumption in a health context and that the outcome behavior was actual consumption instead of reduction (Çoker & Van der Linden, 2020).

Other factors not included in the proposed model are environmental concern and knowledge. Research found that environmental concerns do not directly impact intentions and proposed that this finding can be generalized across different pro-environmental behaviors (De Groot & Steg, 2007). In a similar vein, meta-analyses showed that the relationship between environmental concern and behavior is weak (e.g. Hines, Hungerford, & Tomera, 1987). Furthermore, environmental concern is interlinked with other concepts as it refers to values, attitudes, emotions, perceptions, knowledge, and behaviors connected to the environment. It is thus proposed that environmental concern is a component of attitude (Paul et al., 2016). In addition, the notion of being well informed, i.e. having sufficient knowledge, is questioned as an imperative for effective behavior leading to desired results. This holds true for both general behavior and pro-environmental behavior. Along these lines, environmental knowledge did not have a significant impact on energy conservation (Ajzen, Joyce, Sheikh, & Cote, 2011).

4.3 Hypotheses and Conceptual Model

4.3.1 Theory of Planned Behavior

The original TPB model holds true for various pro-environmental behaviors (e.g. Onel, 2017). Along these lines, the three TPB variables (attitude, subjective norm, and PBC) together with intentions can be useful to predict the regularity and amount of meat consumption, with attitudes being the strongest predictor (Lentz et al., 2018). Equivalent results have been found in research regarding meat reduction, namely Çoker and Van der Linden (2020) found that attitudes, subjective norms, and PBC together explain meat reduction intentions (Çoker & Van der Linden, 2020). However, Lentz et al. (2018) found that *only* attitudes predict intentions to meat reduction in an accurate and consistent manner. This is contradicting the notion that all three TPB variables significantly predict meat reduction intentions (Lentz et al., 2018). Likewise, Zur and Klöckner (2014) found that meat reduction intentions were driven by attitudes. As meat *reduction* is not extensively researched with regards to the TPB, empirical results regarding various pro-environmental behaviors have been taken into account.

As outlined, *attitude* is a predictor of intention. If an individual holds a positive attitude towards a given behavior it will strengthen their intention to conduct that behavior (Ajzen, 1991). In other words, a favorable attitude towards a concept, in this case meat reduction, results in intentions that are in line with this attitude (Onel, 2017). This positive relationship between attitude and intention is empirically supported in a pro-environmental context (e.g. De Leeuw et al., 2015). Similar results were found for pro-environmental purchasing behavior (Onel, 2017), conservation behavior (Kaiser et al., 2005), organic food consumption (Aertsens et al., 2009), green food purchasing (Ham et al., 2015), recycling (Park & Ha, 2012), staying in a green hotel (Han et al., 2010), environmental behavior in a private-sphere context (Gkargkavouzi, Halkos, & Matsioria, 2019), organic food purchasing intentions (Arvola et al., 2008) and organic product purchases (Jackson, 2005). While most research on pro-environmental behavior found a significant positive relationship between attitude and intention, it has to be mentioned that some research identified a gap between attitude and intention (e.g. Vermeir & Verbeke, 2006). In line with the majority of findings, we hypothesize that:

> **Hypothesis 1**: Individuals' attitudes toward meat reduction and their intentions to reduce their meat consumption are positively related.

Similar to attitudes, the *subjective norm* is proposed to be a predictor of intention. Thus, if relevant others of an individual would approve of meat reduction, the individual would be more likely to act accordingly. This also entails that when relevant others would disapprove of meat reduction, the individual would be less likely to plan to engage in meat reduction. Correspondingly, it is expected that positive subjective norms induce behavior through intentions (Ajzen, 1991). Empirical findings show the relationship between subjective norm and intentions for various pro-environmental behaviors such as pro-environmental purchasing behavior (Onel, 2017), conservation behavior (Kaiser et al., 2005), recycling (Park & Ha, 2012), staying in a green hotel (Han et al., 2010), environmental behavior in a private-sphere context (Gkargkavouzi et al., 2019), organic food purchasing (Arvola et al., 2008), and organic food consumption (Aertsens et al., 2009).

It is furthermore found relevant to take a dual approach regarding the subjective norm (e.g. Ham et al., 2015; Fornara et al., 2011; Rivis & Sheeran, 2003). In their meta-analysis, Rivis and Sheeran (2003) found that descriptive norms improve the variance explained in intentions (Rivis & Sheeran, 2003). Accordingly, it was found that the inclusion of both subjective norms increased the variance explained in green food purchase intention. This empirical finding thus shows the distinction between the two types of norms (Ham et al., 2015). Furthermore, it was found that descriptive subjective norms and injunctive subjective norms significantly influence intentions in household waste recycling with the descriptive norm demonstrating a stronger direct effect (Fornara et al., 2011). This suggests that the subjective norm should incorporate what an individual *should do* according to relevant others, however this has to be combined with relevant others *actually do* (e.g. Ham et al., 2015). Similar to the relationship discussed by Ajzen (1991), if relevant others act in a certain way, the individual is more likely to act accordingly. In the context of meat reduction this entails that when important others engage in meat reduction, the individual is likely to also plan to engage in meat reduction. On this basis, we hypothesize that:

Hypothesis 2: Individuals' injunctive subjective norms and their intentions to reduce their meat consumption are positively related.

Hypothesis 3: Individuals' descriptive subjective norms and their intentions to reduce their meat consumption are positively related.

Furthermore, *PBC* depicts the perceived easiness or difficulty to perform a given behavior. If the behavior is perceived easy, there should be high intentions (Ajzen, 1991). Obstacles to perform a certain behavior could be contextual factors, such as perceived availability. A high amount of constraints might result in negative intentions to act (Onel, 2017). Empirical findings show this kind of relationship between PBC and intentions for general pro-environmental behavior (e.g. Onel, 2017; De Leeuw et al., 2015; Gkargkavouzi et al., 2019). In addition, a positive relationship between PBC and intention was found for specific behaviors like conservation behavior (Kaiser et al., 2005), staying in a green hotel (Han et al., 2010), organic food consumption (Aertsens et al., 2009), and green food purchasing (Ham et al., 2015). This results in the following hypothesis:

> **Hypothesis 4**: Individuals' PBC and their intentions to reduce their meat consumption are positively related.

4.3.2 Personal Norm

As meat reduction is, amongst others, based on moral normative factors, our conceptual model takes personal norms into account (Rosenfeld et al., 2019). In general, there are three ways to incorporate personal norms in the TPB model, namely as a fourth and independent predictor of intention, as influencing intention indirectly via mediation of attitude, and by the combination of the TPB and VBN in one integrated framework. For all three ways to incorporate personal norms, there are mixed empirical results, however overall it can be concluded that for pro-environmental behaviors, the majority of empirical findings support the general inclusion of personal norm (Turaga et al., 2010). Accordingly, it is found that the combination of subjective norms and the personal norm increases the explanatory power of pro-environmental behaviors (Aertsens et al., 2009). Even though there is mixed empirical evidence for including personal norms as an independent fourth predictor of intention there is also a great extent of research that did find a significant relationship and increased explanatory power for this relationship (e.g. Bamberg & Möser, 2007). These findings will be discussed in more detail below.

The *personal norm* can be described as the moral obligation towards a given behavior (Schwartz, 1977), and therefore impacts intentions. As such, if an individual feels strongly that a certain behavior is the right thing to do, it will increase their intention to engage in this behavior (Aertsens et al., 2009). Empirical findings show support for the notion that personal norms

predict intentions in pro-environmental behaviors (e.g. Gkargkavouzi et al., 2019; Bamberg & Möser, 2007; Harland et al., 1999). In addition, personal norm significantly impacts intentions related to specific behaviors such as the use of public transportation (Bamberg et al., 2007) and recycling (Nigbur, Lyons, and Uzzell, 2010; White, Smith, Terry, Greenslade, & McKimmie, 2009). Chan and Bishop (2013) found that personal norms directly influence recycling intention and thereby even replace attitude. Similar to Armitage and Conner (2001), they furthermore found that personal norms explained 39% of the variance in intention (Chan & Bishop, 2013). In addition, personal norms significantly predict pro-environmental purchase intentions. Correspondingly, including the personal norm increased the explained variance in intention from 65% to 79% (Onel, 2017). Based on these results, we predict that:

> **Hypothesis 5**: Individuals' personal norms and their intentions to reduce their meat consumption are positively related.

4.3.3 Values

In line with suggestions in existing research, this study is focused on values along the self-enhancement and self-transcendence dimension. It is implied that these values indirectly impact intentions (De Groot & Steg, 2008). When examining and summarizing previous research on environmental values, Dietz et al. (2005) state that values are usually associated with social psychological variables such as norms. The plausible and often used assumption that values precede such constructs can only be partially validated though. While values are integral for the understanding of pro-environmental behavior, their importance will most likely be underestimated if mediating constructs such as *norms*, *attitudes*, and *perceived behavioral control* are not included (Thøgersen & Grunert-Beckmann, 1997 in Vermeir & Verbeke, 2008). Furthermore, De Boer et al. (2007) state that the indirect influence of values on actions may operate through certain combinations of related concepts such as *attitudes* (De Boer et al., 2007). We thus hypothesize that:

> **Hypothesis 6**: Individuals' self-transcendence values and their attitude towards meat reduction are positively related.

Hypothesis 7: Individuals' self-enhancement values and their attitude towards meat reduction are negatively related.

Several studies found that individuals with strong self-transcendence values are more likely to inherit pro-environmental *norms* than those with strong self-enhancement values (e.g. Nordlund & Garvill, 2003; Schultz et al., 2005 in Steg et al., 2014). Furthermore, the personal norm is activated when the environmental conditions are perceived to threaten what an individual values, may it be one's own, other humans', or nature's welfare. The personal norm is thus derived from an individual's values relevant to the situation and conceived as a moral responsibility for protection. Therefore, values were found to have a direct influence on personal norm (Nordlund & Garvill, 2002). Based on these studies, we hypothesize that:

Hypothesis 8: Individuals' self-transcendence values and personal norm are positively related.

Hypothesis 9: Individuals' self-enhancement values and personal norm are negatively related.

4.3.4 Behavior

As previously outlined, another variable included in the TPB model is behavior. It should be noted that in the pro-environmental context *actual* behavior is challenging to measure (Geng, Xu, Ye, Zhou, & Zho, 2015). Due to its complexity, it is common to measure intention as a proxy of behavior (Van Doorn & Verhoef, 2015). Correspondingly, a great deal of research *only* examines intention (e.g. Han, 2015). Despite the fact that measuring behavior is challenging, this study aims at incorporating behavior in the basic conceptual model. To recognize the complexity of accounting for behavior, we examine and compare models *with* behavior and *without* behavior in the initial stages of the data analysis. Correspondingly, *potential* hypotheses including behavior are derived. These hypotheses are, unlike the hypotheses previously introduced, only applicable on the condition that the model including behavior is most suitable. When it turns out the model *without* behavior is deemed most adequate, these hypotheses are neglected.

Intention is as such considered an immediate predictor of behavior. Accordingly, the two constructs have a positive relationship as it is expected that a higher intention will lead to a higher

likelihood to engage in a behavior (Ajzen, 1991). Meta-analyses have shown the correlation between intention and behavior in various fields (Armitage & Conner, 2001). Bamberg and Möser (2007) found intention as the variable strongest related to pro-environmental behavior. Correspondingly, empirical findings show intention as an antecedent to general pro-environmental behavior (e.g. De Leeuw et al., 2015), environmental behavior in a private-sphere context (Gkargkavouzi et al., 2019), and more specific types of behavior such as conservation behavior (Kaiser et al., 2005) and recycling behavior (Chan & Bishop, 2013). Furthermore, Aertsens et al. (2009) found intention, together with PBC, a significant predictor of organic food consumption. Also, Rees et al. (2018) found that reduction intentions explained meat consumption (Rees et al., 2018). Thus, we propose this *potential* hypothesis:

> **Hypothesis 10**: Individuals' intentions to reduce their meat consumption and meat reduction behavior are positively related.

It is argued that the influence of moral norm, i.e. personal norm on behavior is underestimated (Godin et al., 2005). As such, personal norms impact the intention *and* behavior directly (e.g. Thøgersen, 2006). Pro-environmental behavior can follow from personal norms as individuals feel morally obliged to behave in a way not harmful to the environment (Steg et al., 2005). Correspondingly, positive relations were found in various environmentally responsible behaviors such as buying organic milk, buying energy saving light bulbs, recycling, and using public transport (Thøgersen, 2006). Furthermore, regarding the consumers' choice behavior of choosing between organic and non-organic wine, personal norm was found important. It has to be noted that this finding was only found for consumers who had bought wine in the past. If so, the strength of personal norms on behavior was equivalent to the influence of attitude on behavior (Thøgersen, 2002). In addition, with their model based on the VBN theory, Nordlund and Garvill (2002) found that personal norm influences pro-environmental behavior directly. Therefore, we propose this *potential* hypothesis:

> **Hypothesis 11**: Individuals' personal norms and their meat reduction behavior are positively related.

Various studies furthermore found that individuals with strong self-transcendence values are more likely to act environmentally friendly than those with strong self-enhancement values (e.g. Nordlund & Garvill, 2003; Schultz et al., 2005 in Steg et al., 2014). In line with previous research, Nordlund and Garvill (2002) found that values directly impact personal norm, in turn personal norm influences pro-environmental behavior. The relationship between values and pro-environmental behavior was thus found to be mediated by personal norm (Nordlund & Garvill, 2002). Hence, we propose these *potential* hypotheses:

> **Hypothesis 12**: The positive relationship between individuals' self-transcendence values and meat reduction behavior is mediated by personal norm.

> **Hypothesis 13**: The negative relationship between individuals' self-enhancement values and meat reduction behavior is mediated by personal norm.

4.3.5 Conceptual Model

Based on the hypotheses outlined above, the following conceptual model is developed (See Figure 4). The basis of this conceptual model lies in the TPB framework. The original TPB model is extended by personal norm and values.

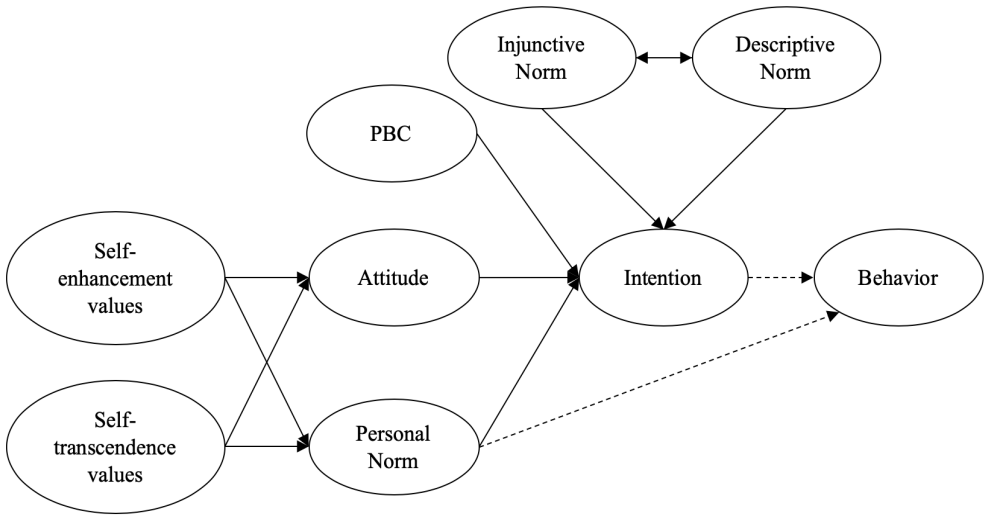


Figure 4: The Conceptual Model

4.3.6 Originality of the Conceptual Model

The novelty of this model lies in the fact that it enhances the original TPB model in the context of the pro-environmental behavior of meat reduction. The extension and modification of the model builds on distinguishing between the injunctive subjective and descriptive subjective norm, the addition of personal norm, and the addition of self-enhancement and self-transcendence values. These internal processes allow for a more comprehensive view on meat reduction. By the incorporation of these additional factors, we are able to better examine the psychological motivations underlying meat reduction.

5. Methodology

5.1 Method

Methodology can be defined as "a combination of techniques used to inquire into a specific situation" (Easterby-Smith, Thorpe, & Jackson, 2015: 47). To explain the various steps taken in this research process, the 'Research Onion' (Saunders, Lewis, & Thornhill, 2009) is applied (See Figure 5). In this framework, the process flows from the outer ring to the inner ring with each stage becoming more detailed, respectively research philosophy, research approach, research strategy, time horizon and data collection method (Saunders et al., 2009). This framework is found useful for various types of research methodology and contexts (Bryman, 2012).

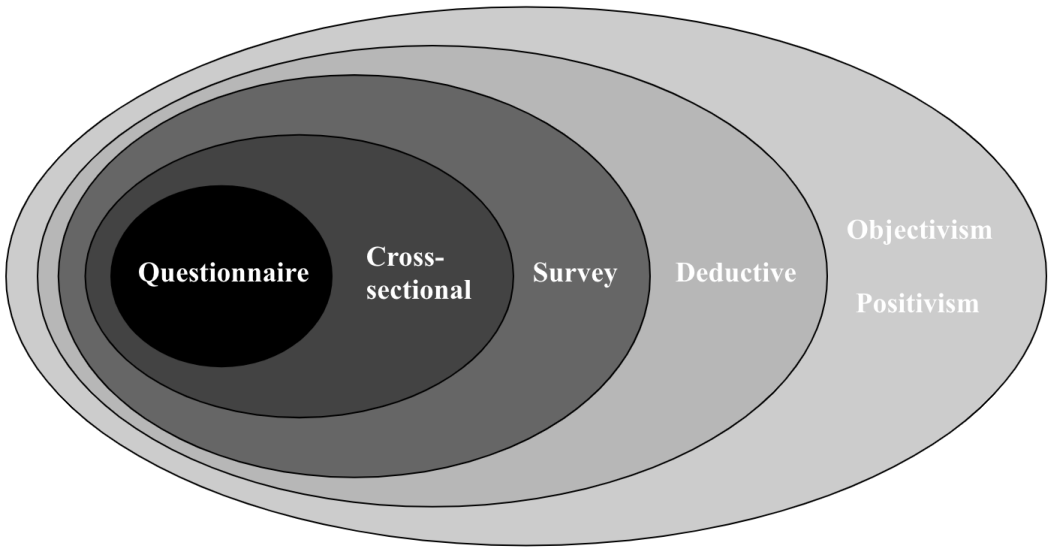


Figure 5: Research Onion (Adapted from Saunders et al., 2009)

5.1.1 Research Philosophy

When conducting a research it is pivotal to understand and be aware of the underlying philosophical assumptions, which can be depicted by the use of 'The Four Rings Model' (See Figure 6). In a research, ontology, epistemology, and methodology are depicted by the inner rings. Together, these philosophical assumptions form the basis for the methods and techniques, like questionnaires, which are illustrated by the outer ring (Easterby-Smith et al., 2015).

Ontology is described as “the philosophical assumptions about the nature of reality” (Easterby-Smith et al., 2015: 47). Aside from the nature of reality, it is also seen as the nature of the ‘knowable’ (Guba, 1990). According to Bryman and Bell (2015), the main distinction is whether social entities can and should be regarded as objective entities, which by their nature have a reality external to social actors, i.e. objectivism, or whether these social entities can and should be regarded as social constructions grounded in the perceptions and actions of social actors, i.e. constructionism. This study was built on objectivism, thus it was asserted that social phenomena exist independent from social actors (Bryman & Bell, 2015).

Epistemology can be depicted as “a general set of assumptions about ways of inquiring into the nature of the world” (Easterby-Smith et al., 2015: 47). Hence, it refers to the basis of knowledge, which can be derived from personal experiences and insights or in a concrete form (Cohen, Manion & Morrison, 2006). Epistemological considerations are focused on the question whether it is possible to study the social world by imitating natural science approaches. The position in favour of this is known as positivism, while the opposite is known as interpretivism. This study makes use of a positivistic approach. Positivism can generally be understood by the principle of phenomenalism, by being value free i.e. objective and by having a deductive approach followed by an inductive strategy which is further illustrated in the next section. Furthermore, there is a clear difference between theory and research, so that the function of research is to test theories (Bryman & Bell, 2015). The notion of positivism points out that reality cannot be accessed directly and should thus be obtained indirectly, for instance via surveys (Easterby-Smith et al., 2015).

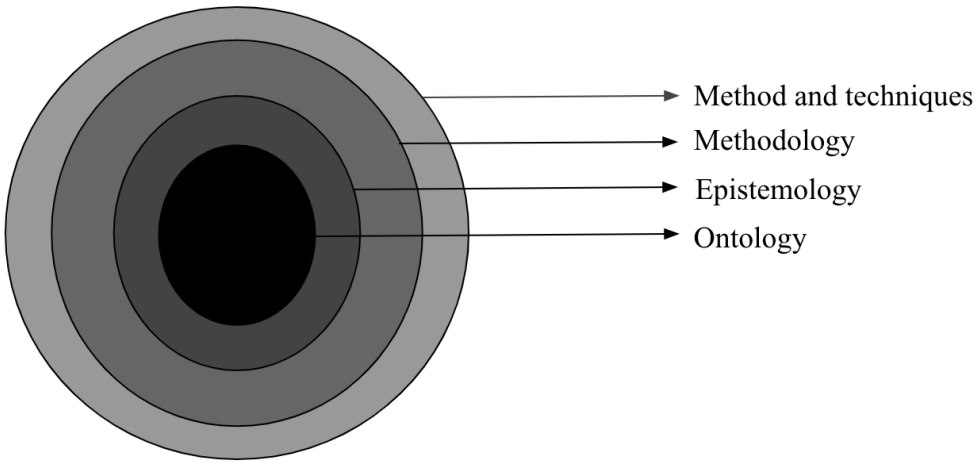


Figure 6: The Four Rings Model (Adapted from Easterby-Smith et al., 2015)

5.1.2 Research Approach

This study applies a quantitative method as the aim is to enhance existing theory and to examine relationships. Qualitative research is found not applicable as it is appropriate for interpreting phenomena instead of systematically examining a relationship (Perumal, 2014). Quantitative research, on the other hand, is useful to support or reject knowledge assumptions (Creswell, 2003). Consequently, this study can be depicted as having a deductive approach. This approach is the prevailing view of the relationship between theory and research. Accordingly, we deduced hypotheses based on a theoretical analysis. In turn, these hypotheses were verified empirically. After the data collection and analysis, our research turned to a contradicting approach namely taking on an inductive strategy. Accordingly, implications based on the research findings were derived, relating the results back to theory. This combination of a deductive approach including a feedback loop is consistent with the positivist view in quantitative studies (Bryman & Bell, 2015).

5.1.3 Research Strategy

Along these lines, the research strategy is a survey research. This type of research is applicable as the aim of this study is the ability to generalize results in Europe, specifically the Netherlands, Germany, and Denmark, hence gaining knowledge about its population (Perumal, 2014). Furthermore, the survey approach has been found useful in various value-attitude-behavior research (e.g. Thøgersen, Zhou, & Huang, 2016) and is regarded as the standard in TPB research (e.g. Oluka, Nie, & Sun, 2014).

5.1.4 Research Design

This study is built on a cross-sectional design, thus encompassing the collection of quantitative data of several cases and more than 2 variables at one point in time in order to analyze patterns of association. In this study, a cross-sectional design is more feasible than a longitudinal design as it is less time-consuming and costly. In addition, our primary unit of measurement and analysis is the individual (Bryman & Bell, 2015).

5.1.5 Data Collection Methods

Methods and techniques depict the individual techniques used in a study (Easterby-Smith et al., 2015). In this study, a self-completed questionnaire is the research instrument to collect the data. Questionnaires are pivotal in studies concerning behavior and behavioral change (Oluka et al., 2014). Self-completed questionnaires are furthermore relatively fast and simple to manage for researchers (Bryman & Bell, 2015), provide for easy analysis and are cost effective (Perumal, 2014). In addition, the interviewer effect and interviewer variability are absent and they are convenient for the respondents. However, it is not possible to prompt or probe, to ask additional questions and there is a higher risk of missing data (Bryman & Bell, 2015).

While online surveys raise confidentiality concerns, are impersonal, and exclude people without access to adequate facilities (Bryman & Bell, 2015), the advantages were considered more valuable. Respectively, online surveys are more time efficient and cost effective compared to other survey formats (Evans & Mathur, 2005; Wright, 2005). In addition, online surveys facilitate rather large sample sizes, are simple to manage for respondents, are continually available, and have a relatively high and fast response rate (Singleton & Straits, 2005). As this study is focused on university students in the Netherlands, Denmark, and Germany, the location-independent availability of online surveys was highly beneficial (Bryman & Bell, 2015). To develop the questionnaire, the survey software Qualtrics was applied. The process of data collection was treated confidentially and anonymous.

5.2 Sample

The population in this study, i.e. “the universe of units from which the sample is to be selected” (Bryman & Bell, 2015: 187) are university students who are consuming meat. This study comprises students form regular universities, for instance Copenhagen Business School. Furthermore, students of ‘practical universities’, for instance Copenhagen Business School Academy and Hanze University Groningen, are included. Strict vegetarians and vegans are excluded as lowering one’s meat intake needed to be possible.

This study made use of non-probability sampling. More specifically, the sampling method was convenience sampling. This type of sampling is characterized by its accessibility to the researcher (Bryman & Bell, 2015). In addition, convenience sampling is common in the business field and is utilized relatively frequently compared to probability sampling (Bryman, 1989 in

Bryman & Bell, 2015). In several fields, like consumer behavior, convenience samples have evolved into being the norm (Bryman & Bell, 2015). As indicated, the questionnaire was distributed online across Europe, primarily among university students in the Netherlands, Germany, and Denmark. As such, the sample of this study, i.e. "the segment of the population that is selected for investigation" (Bryman & Bell, 2015: 187) are university students that are consuming meat, primarily living in the Netherlands, Germany, and Denmark.

The decision for these specific countries was mostly due to their accessibility and feasibility. Furthermore, according to the Environmental Performance Index (EPI, 2018), all three countries are in the top 20 out of 180 countries. Respectively, Denmark ranks 3rd with a score of 81.60 out of 100, followed by Germany ranking 13th scoring 78.37, and finally the Netherlands ranking 18th with a score of 75.46 (EPI, 2018). Moreover, concerning protein consumption and sustainability, De Boer et al. (2006) propose that the most apparent differences in diets nowadays are still reflected by the early Europe's Protestant and Catholic cultural zones and between the Germanic and Celtic cultures. Considering the three countries, all belong to the Protestant cultural zone and Germanic culture and thus hold similar diets (De Boer at al., 2006).

University students were selected as *university* students in particular are viewed as future leaders and act as a reference for other people. With their level of education and guiding role, university students are pivotal in order to effectively make a change in the context of pro-environmental behavior. It should be noted that university students are not the *only* group of people important in making a change. However, in effectively changing behavior they are essential to research (Vicente-Molina, Fernández-Sainz, & Izagirre-Olaizola, 2018). Similarly, young adults are considered the consumers of the future, hence able to make an impact. They will or already hold substantial spending power and are able to impact food choices in their (future) households. In addition, these individuals are in a crucial phase of identity development and forming their belief and value system. This group of consumers is also expected to have an acceptable amount of knowledge on sustainability (Vermeir & Verbeke, 2008). Furthermore, young people are identified as critical stakeholders to reduce the detrimental environmental impact as past and current environmental misconduct impacts their future. Furthermore, younger people seem to have a greater gap between generally positive attitudes towards pro-environmental behavior and the actual behavior compared to older people. It is therefore of importance to develop a better understanding of the motivations of young people to conduct pro-

environmental behaviors (De Leeuw et al., 2015).

5.3 Measurements

5.3.1 Attitude, Subjective Norm, PBC, Behavioral Intention, and Behavior

The survey contained a total of five sections. First of all, two questions were asked to assure that non-students and non-meat eaters were excluded from further questions. Thereafter, the participants were asked to fill out questions regarding their demographics (gender, age, nationality, country of education, educational level, and gross income). Then, multiple statements assessed the individuals' values. In the fourth section, meat reduction and meat reducers were defined. An explanation including examples facilitated the understanding of the study's definition of meat reduction and which specific types of meat were regarded (red meat, poultry, and pork). In the next section, the statements and questions related to the TPB items. Here, also the personal norm and the descriptive and injunctive norm were assessed by different items (See Appendix B).

When selecting and developing the items for the questionnaire, validated scales were adapted from highly rated articles in the context of sustainability and pro-environmental behavior. As such, attitude and PBC were adapted from Kim and Han (2010). Their article used validated scales in previous literature (e.g. Ajzen, 1988; Ajzen, 1991; Ajzen & Fishbein, 1980; Han & Ryu, 2006; Lam & Hsu, 2004; Lam & Hsu, 2006; Lee & Back, 2007) to develop measures to examine green hotel customers' decision-making (Kim & Han, 2010). The injunctive subjective norm and the descriptive subjective norm were adapted from Fornara et al. (2011). This highly rated article concerns the pro-environmental behavior of household waste recycling. The measurements make an explicit distinction between the two different types of subjective norms (Fornara et al., 2011).

Intention and behavior were measured with scales from the same article, namely Latvala et al. (2012). This recognizes both the ambiguity regarding measuring intention and/or behavior, while recognizing the important relationship of the two concepts in the TPB. As our study is focused on meat reduction, we chose measurement scales from an article related to meat consumption behavior (i.e. increase, remain stable, *reduction*) and the interplay with intention. It should be noted that there are various ways to measure pro-environmental behavior and, accordingly, various measurements, which differ in the number of items (Markle, 2013). The majority of research relies on self-reported measures of behavior (Steg & Vlek, 2009). In detail,

around 80% of pro-environmental studies solely rely on self-reported behavior *or* solely focus on its antecedents such as intentions (Lange, Steinke, & Dewitte, 2018). Moreover, Latvala et al. (2012) measured behavior by means of past behavior, which was a requirement for the measurement scale due to the scope of our study. In sum, validated scales of highly-rated research in the pro-environmental context were utilized, however, slight adjustments were made to conform with the context of the current study. This is in line with the notion that there are no standardized TPB questionnaires for every type of behavior (Ajzen, 2009; Ajzen & Fishbein, 1980).

The item of *attitude* was adapted from Kim and Han (2010) and was measured on a 7-point response scale. In total, this item consisted of one statement measured on seven different response scales, namely "For me, reducing meat is:" 1 = extremely bad – 7 = extremely good, 1= extremely undesirable – 7 = extremely desirable, 1 = extremely unpleasant – 7 = extremely pleasant, 1 = extremely foolish – 7 = extremely wise, 1 = extremely unfavorable – 7 = extremely favorable, 1 = extremely unenjoyable – 7 = extremely enjoyable, and 1 = extremely negative – 7 = extremely positive.

The item of *subjective norm* was measured by distinguishing the injunctive subjective norm and the descriptive subjective norm. Fornara et al. (2011) originally proposed two-item scales (Fornara et al., 2011). In order to adhere to the three indicator-rule, a self-developed third item scale was added (Hair, Black, Babin, & Anderson, 2014). The injunctive subjective norm was measured by the statements "Most people who are important to me think that I should reduce my meat consumption" (1 = totally unlikely – 5 = totally likely), "Most people who are important to me would agree that I reduce my meat consumption during the next two weeks" (1 = completely disagree – 5 = completely agree), and "Most people who are important to me would encourage me reducing my meat consumption" (1 = completely disagree – 5 = completely agree). In addition, the descriptive subjective norm was measured by "How many among the people that are important to you reduce their meat consumption?" (1 = few – 5 = many), "Most of the people who are important to me reduce their meat consumption" (1 = completely false – 5 = completely true), and "I expect most people that are important to me to engage in meat reduction on a regular basis" (1 = completely disagree – 5 = completely agree).

The item of *PBC* was also adapted from Kim and Han (2010) and was measured by three statements on a 5-point response scale with 1 = strongly disagree and 5 = strongly agree. The three statements are the following, "Whether or not I reduce meat is completely up to me", "I am

confident that if I want to, I can reduce my meat consumption", and "I have resources, time and opportunities to reduce my meat consumption". This is in line with the notion that PBC is mostly operationalized by generic questions rather than characterizing specific barriers (Moser, 2015).

The item of *intention* was adapted from Latvala et al. (2012). Intention was measured on a 3-point scale, asking the respondents to indicate whether they expect their meat consumption to decrease, remain stable or increase in the next 2-3 years. This measure is consistent with the notion of Ajzen (2002a) that the behavioral intention and actual behavior should be depicted by its target, action, context, and time (TACT). Specifically, the level of meat (target) consumption (action) in the next 2-3 years (time). As can be noted, context is not considered as it is assumed that meat consumption and/or reduction can take place in various contexts. The item of *behavior* was also adapted from Latvala et al. (2012). Similarly, behavior was measured on a 3-point scale asking the respondents to indicate whether their meat consumption had decreased, remained stable or increased in the past 2-3 years.

5.3.2 Values and Personal Norm

Besides the original TPB variables, personal norm and values were included. Similarly, validated scales from highly rated articles were adapted to fit the current study. Personal norm was adapted from Abrahamse and Steg (2011) who researched the reduction of household energy use. The item of *personal norm* was adapted from Abrahamse and Steg (2011). The respondents were asked to respond to three statements, namely "I feel morally obliged to reduce my meat consumption, regardless of what other people do", "I feel guilty when I eat a lot of meat", and "I would consider myself a better person if I reduced my meat consumption" (1 = strongly disagree – 5 = strongly agree).

In addition, the refined basic values by Schwartz et al. (2012) were used to measure the values related to self-transcendence and self-enhancement. The refined version was chosen due to its wide-spread use and applicability in an environmental context. The *value* items were adapted from Schwartz et al. (2012). The respondents were asked to rate their compliance with values across the dimensions of self-transcendence and self-enhancement, thus concerning hedonism, achievement, power-resources, power-dominance, face, humility, benevolence-dependability, benevolence-caring, universalism-concern, universalism-nature, universalism-tolerance. Each value contained three descriptions of a person (e.g. "He strongly believes that he should care for nature"), which the respondents replied to on a 6-point response scale (1 = not like me at all – 6 =

very much like me).

5.3.3 Face Validity

In accordance with the requirements for SEM, we also ensured *face validity*. As face validity, or content validity, relates to the consistency between the constructs' definition and the items of the construct, it was established before conducting the actual survey. As outlined, we only utilized validated scales of highly-rated pro-environmental research. We further facilitated face validity by researching all constructs and carefully selecting and evaluating the measurement items. Here, we also ensured a match between the conceptual definition of the constructs and the wording of the respective items. Also, we ensured that the item content did not overlap across constructs (Hair et al., 2014).

6. Data Analysis and Results

6.1 Data Collection

Before distributing the questionnaire and starting the data collection process, a pilot test (or pre-test) was conducted to test the effectiveness and ensure the quality of the measurement instrument. Generally, pilot testing is utilized to detect errors and ultimately refine the questionnaire. In most cases, the use of a pilot test is advised, the only exception being that the final outcomes might be influenced by conducting a pilot test. It is furthermore recommended that the pilot test sample should resemble the actual sample (Reynolds, Diamantopoulos, & Schlegelmilch, 1993). Hence, the pilot study was administered amongst eight individuals belonging to the target population. Based on the feedback by the pilot test sample, several adjustments were made, primarily concerning language and word choice of the instructions and statements in the questionnaire.

The data was collected between the 19th of March and the 24th of April. In this time frame a total of 615 finalized responses was collected. To ensure a sample of university students consuming meat, two controlling questions were asked. Therefore, we excluded 337 responses due to the fact that the respondents were no university students or meat-eaters, which resulted in 278 remaining responses. In addition, as the sample comprises *university* students, three responses were excluded as they were studying e.g. bricklayer. As this study focused on students in the Netherlands, Germany and Denmark, fourteen responses were excluded as these respondents did not study in these respective countries. All in all, this resulted in a final sample of 261 respondents.

6.2 SPSS and Structural Equation Modeling

The analyses were carried out with SPSS 25 and AMOS 25. This study made use of Structural Equation Modeling (SEM) as it was found a suitable technique for the conceptual model and the purpose of this study, which was the examination of several relationships between latent constructs in the context of meat reduction. SEM can be seen as an extension of multivariate techniques, in particular multiple regression analysis and factor analysis. There are three main characteristics of SEM models, which are in line with the requirements for our study.

First, SEM models are useful to measure relationships between multiple variables and allow for the measurement of both direct and indirect influences (Hair et al., 2014). As research

has shown that some of the constructs included in this analysis might have indirect effects, SEM is particularly useful. In addition, some of the constructs in our study, such as attitude, are both an independent and a dependent variable, depending on the specific relationship under consideration. On the one hand, the construct attitude is dependent when examining the relationship between values and attitude. On the other hand, the construct attitude is viewed as an independent variable when examining the relationship between attitude and intention.

Second, SEM models facilitate the representation of unobserved concepts in such relationships along with accounting for measurement errors (Hair et al., 2014). This is particularly useful for our study as it comprises latent, hence unobserved, constructs. For instance, the construct personal norm cannot be directly observed. It is thus measured indirectly through three indicator variables, which were gathered through the conducted survey.

Third, SEM models can be used to analyze a set of relationships (Hair et al., 2014). As outlined, the proposed conceptual model of this study includes several direct and indirect relationships, representing a set of relationships. Therefore, as the requirements of this study and the capabilities of the SEM correspond to each other, it is concluded that the SEM is an applicable technique for this study.

6.3 Data Examination

6.3.1 Missing Data

The data was assessed with regard to missing values and outliers to meet the requirements of SEM (Hair et al., 2014). Missing data can arise when the respondents of the questionnaire do not answer all of the questions, both by accident or on purpose (Bryman & Bell, 2015). By using the 'force response' option in Qualtrics, respondents in our study could only proceed to the next question when they answered the previous question(s). Only respondents that completed the questionnaire were included in the data exported from Qualtrics. Thereby, it was ensured that every respondent in the final sample answered all questions in the questionnaire and missing data was therefore prevented. Within this final sample, the number of missing data was thus 0.

6.3.2 Outliers

Outliers can be described as “observations with a unique combination of characteristics identifiable as distinctly different from the other observations” (Hair et al., 2014: 62). In order to detect outliers, a multivariate perspective was taken as the study examined several variables and we thus needed to measure the multidimensional position of the individual observations (Hair et al., 2014). Therefore, the Mahalanobis D^2 measure was utilized (Tabachnick & Fidell, 2007). In line with Kline (2011), the conservative threshold value of .001 was utilized (Kline, 2011).

Accordingly, six observations were conspicuous. The issue with outliers is that there is no clear categorization of them as problematic or beneficial. Therefore, the observations were examined separately in order to determine the reason for their uniqueness (Hair et al., 2014). In order to understand the reasoning behind the uniqueness of these observations, a univariate perspective was taken. All responses of the respective observations were analyzed according to their Z score, in particular whether the responses exceeded |3.29| (Tabachnick & Fidell, 2007). All identified observations had a higher Z score than |3.29| on one or more of the items. No pattern of responding or the like was identified. A bivariate perspective is deemed inadequate for this research as it would require a high number of graphs due to the large number of variables (Hair et al., 2014).

The examination of the outliers showed no proof that they were not representative for the population or aberrant. Furthermore, the deletion of outliers just to fit the data and improve multivariate analysis could have led to a lower generalizability of the results (Hair et al., 2014). We therefore decided, based on these findings, to not delete any of the outliers.

6.3.3 Normality

In order to be in line with the assumptions for SEM, both univariate and multivariate normality was examined. Here, it is important to be aware of the impact of sample size. The sample size for this study was 261. Larger sample sizes can decrease the detrimental influence of nonnormality (Hair et al., 2014). According to Kline (2011), a descriptive approach, e.g. using rules of thumb, is useful for the assessment for normality when using such techniques as SEM (Kline, 2011). Both the height and the balance of the distribution was analyzed (Hair et al., 2014) according to the skewness and kurtosis values output by AMOS. No skewness values higher than three

indicating high skewness were identified. Furthermore, no kurtosis values of eight or higher indicating high kurtosis were identified. It is therefore concluded that normality of distributions is guaranteed (Kline, 2011).

6.4 Demographic Analysis

In order to get an overview of the respondents, a frequency analysis was performed in SPSS, as can be seen in Table 5 on the next page. The majority of respondents were female (71.3%). Furthermore, the age of the majority of respondents was in the range between 20 and 24 years (58.6%). As indicated before, the countries of study were the Netherlands, Germany and Denmark, predominantly Denmark (45.2%). The nationalities of the respondents were more widespread, however Dutch (33%) and German (29.9%) were predominant. In addition, the main levels of education were Bachelor (49%) and Master (43.3%). Lastly, the majority of respondents had an income below 20.000 €/year.

Characteristic	Category	% (N = 261)	n (N = 261)
Gender	Male	28.4	74
	Female	71.3	186
	Other	0.4	1
Age	< 20	4.6	12
	20-24	58.6	153
	25-29	34.5	90
	> 29	2.3	6
Study Country	The Netherlands	29.9	78
	Germany	24.9	65
	Denmark	45.2	118
Nationality	Dutch	33	86
	German	29.9	78
	Danish	14.2	37
	Other	23	60
Level of education	AP degree	3.4	9
	Bachelor	49	128
	Master	43.3	113
	PHD	1.1	3
	Other	3.1	8
Gross income/financial support of (€/year)	0 - 10 000	40.6	106
	10 001 - 20 000	39.8	104
	20 001 - 40 000	14.9	39
	40 001 - 60 000	1.9	5
	> 60 000	2.7	7

Table 5: Sample Descriptives

6.5 Modeling Strategy and Estimation Technique

With regard to the estimation technique, the Maximum Likelihood Estimation (MLE) procedure was chosen, which is most common in Structural Equation Modeling. This technique is deemed applicable as MLE is unbiased and efficient in the case of multivariate normality (Hair et al., 2014). Furthermore, a competing models strategy was utilized in this study. As the objective of this research was to both confirm as well as to discover specific relationships, this approach is found the most suitable. Based on research, we built a basic model consisting of nine latent constructs. The different versions of this model, i.e. the different measurement models, were tested, adjusted, and compared to each other. All considered models had hypothesized relationships, which were backed up by literature (Hair et al., 2014).

In the case of this study, two main models were considered. Model 1 (see Appendix 1) consisted of all underlying latent constructs including all values measured in the questionnaire. As outlined, three of the measured values, i.e. hedonism, face, and humility, are not only related to the self-transcendence and self-enhancement dimension but also to the conservation and openness to change dimension (see Figure 1). Therefore, we included only those eight values solely on the self-enhancement and self-transcendence dimension in Model 2 (see Appendix 2). These comprise achievement, power-resources, power-dominance, benevolence-dependability, benevolence-caring, universalism-concern, universalism-nature, and universalism-tolerance.

Furthermore, as outlined, research has often only examined intention instead of behavior as the measurement of actual behavior. Around 80% of pro-environmental studies solely rely on self-reported behavior or solely focus on its antecedents such as intentions (Lange et al., 2018) as it can be assumed to be a rather time-consuming and complex process to measure actual behavior. Therefore, in line with existing research, the measurement of self-reported past behavior was used in this study. In order to account for the discussion, both models were tested *including* behavior and *excluding* behavior.

6.6 Confirmatory Factor Analysis

6.6.1 Relevance and Procedure

As outlined, multivariate techniques are designed to incorporate several variables for analysis. Both the measurability of the model but also the theoretical foundation were in focus along the

whole process, therewith striving for model parsimony. In order to avoid specification error, critical variables to the analysis were not deleted even if the measurements suggested so. In addition, we tried to avoid indiscriminately inserting variables and did not adhere to all conceptual changes suggested by AMOS. While irrelevant variables do not usually bias estimates of the variable relevant to the research, multicollinearity is increased and thus the actual relationships might be altered. Hereby, multicollinearity is characterized as the extent to which variables can predict the influence of another variable. When multicollinearity increases, the ability to identify a variable's actual influence is reduced and the difficulty to interpret the entire set of relationships increases. Furthermore, as with deleting outliers to fit the data, the generalizability of the results is reduced (Hair et al., 2014).

For this study, a Confirmatory Factor Analysis (CFA) was conducted in order to test to what extent the latent constructs are represented by the measured variables. In the first stage of the estimation process, the measurement properties of the initially proposed latent constructs were estimated. After utilizing the modification indices to evaluate and improve the competing measurement models, we compared the model fit of these. Concluding, we then decided for one measurement model to continue the analysis with. Following, we further assessed our chosen measurement model. In order to estimate construct validity, convergent validity, discriminant validity, and nomological validity were assessed (Hair et al., 2014).

6.6.2 Initial Assessment of Validity of Competing Models

6.6.2.1 Cronbach's Alpha

Cronbach's Alpha is a measure of internal consistency reliability ranging from 0 to 1 (Hair et al., 2014). We assessed Cronbach's Alpha for the attitude, injunctive norm, descriptive norm, personal norm, and PBC across all competing models (See Table 6). The Cronbach's Alpha values showed acceptable internal consistency reliability for attitude, injunctive norm, and personal norm. The assessment further suggested that one item of descriptive norm and one item of PBC should be deleted in order to comply with a Cronbach's Alpha of at least 0.6 (Hair et al., 2014), which is further discussed in the following.

Construct	Cronbach's Alpha
Attitude	0.928
Injunctive norm	0.667
Descriptive norm	0.461
Personal norm	0.816
PBC	0.568

Table 6: Cronbach's Alpha Model 1 and 2

Comparing the different value scales across the competing models showed that both the self-enhancement and the self-transcendent construct had a lower Cronbach's Alpha when including all values, i.e. Model 1, than when including values only on the self-enhancement and self-transcendence dimension, i.e. Model 2 (See Table 7). It can thus be concluded that both the scales for both self-enhancement and self-transcendence are reliable as they display a high internal consistency (Hair et al., 2014).

Construct	Model 1	Model 2
Self-enhancement	0.852	0.872
Self-transcendence	0.861	0.868

Table 7: Comparison of Cronbach's Alpha for Values

6.6.2.2 Standardized Factor Loadings

When analyzing the standardized factor loadings for the competing models, it was obvious that the standardized factor loadings for Model 2 with and without behavior were higher than for Model 1 with and without behavior (see Appendix A3). Especially the values in Model 2, hence the values located solely on the self-enhancement and self-transcendent dimension, had higher standardized factor loadings. The standardized factor loadings from the competing models suggested, in accordance with the findings from the analysis of Cronbach's Alpha, that one item of the *descriptive norm* and one item of *PBC* should be deleted. As both constructs were only measured by 3 items, the deletion of these items would have led to two 2-item constructs. On the one hand, deleting the two items would have yielded a better model fit and the reliability of *descriptive norm* and *PBC*. On the other hand, it is good practice to have three items for each

factor as a minimum and 2-item constructs are rather critical due to the risk of the models being underidentified. Furthermore, by keeping all of the three items for the two constructs despite the low factor loadings we ensured the coverage of the theoretical domain of the two constructs. In addition, the validity of the constructs would have most likely been diminished by deleting one of the items (Hair et al., 2014).

6.6.3 Model Diagnostics

In addition, model diagnostics were utilized in the form of standardized residuals and modification indices. As Hair et al. (2014) outline, standardized residuals with a value above |4.0| may indicate errors that require the deletion of the respective item. Comparing the competing models in terms of standardized residuals (See Appendix C) did not lead to further insights than the comparison of the standardized factor loadings. Some of the items identified during the analysis of the standardized residuals showed critical values but were not excluded due the reasons stated before (Hair et al., 2014).

Another diagnostic measure taken was the assessment of the modification indices in AMOS, which were used as a guideline for improving model fit while adhering to the theory. The Modification indices suggested adding several error covariances. Examining those suggested covariances, a cut-off at a Modification Index (M.I.) of at least 20 was set. In addition, only covariances across the same construct were considered. Finally, several covariances among error terms across the same construct were added for both models (Hair et al., 2014). Following the insertion of the covariances in both models, the model fit improved for both models. The analysis of the standardized factor loadings was repeated and, again, showed less standardized factor loadings violating the 0.5 rule in Model 2 with and without behavior (see Appendix A4) (Hair et al., 2014). To complement the analysis of the standardized factor loadings, the squared multiple correlations for all measured variables across the four competing models were examined (see Appendix A5). These values can also be referred to as R-Squared (Hair et al., 2014). The analysis revealed the same results as the examination of the standardized factor loadings.

6.6.4 Model Fit of Competing Models

The results of the CFA revealed different model fit indices for the different measurement models (See Table 8). To recall, measurement models only include correlational and no directed

relationships. It was taken into account that the complexity of the model increased the likelihood of the same fit of alternative models. In accordance, the actual fit relies on the characteristics of each model, including such as model complexity and sample size. While rather simple models are more easily evaluated by existing fit standards, more complex models such as the ones prevalent in this research require different treatment and evaluation. As suggested by Hair et al. (2014), several fit indices were evaluated to facilitate a more holistic perspective on the actual fit of the model. Using multiple indices also accounts for the fact that there are no definitive values which allow for a distinction between good and bad model fit. It is therefore not reasonable to adhere to a specific set of rules that is applicable to all measurement i.e. SEM models (Hair et al., 2014).

Even though it is challenging to determine whether a model fit is good or bad with these indices, they indicate whether a model is better or worse than another one. It therefore seems reasonable to apply different indices to get insight into which model is more suitable for our research (Hair et al., 2014). The comparison of the model fit was conducted between the four considered measurement models, i.e. Model 1 and Model 2, both with and without behavior. To recall, Model 1 hereby included all value items and Model 2 included value items solely on the self-enhancement and self-transcendence dimension.

Index	Model 1 including behavior	Model 1 excluding behavior	Model 2 including behavior	Model 2 excluding behavior
P	0	0	0	0
$\chi 2$	2176.827	2131.204	1556.895	1514.706
df	1315	1270	892	856
Normed $\chi 2$	1.655	1.678	1.745	1.77
NFI	0.737	0.739	0.781	0.783
TLI	0.863	0.862	0.879	0.879
CFI	0.874	0.873	0.891	0.891
PNFI	0.678	0.681	0.703	0.708
RMSEA	0.050	0.051	0.054	0.054

Table 8: Model Fit of Measurement Models

The high $\chi 2$ value and the corresponding low p-value suggest a low model fit as a good model fit in SEM is represented by a low $\chi 2$ and a high corresponding p-value. Noticeably, the $\chi 2$ value shows a tendency to reject models with larger sample sizes and a high number of variables.

The latter is applicable to this study. Furthermore, the degrees of freedom represent how much information is available for the estimation of the model parameters. In our case, the Normed $\chi 2$, hence the $\chi 2$:df ratio, complies with the threshold of maximum 3 across all competing models (Hair et al., 2014).

The Normed Fit Index (NFI) slightly indicates that Model 2 without behavior (0.783) has the best fit. The NFI ranges between 0 and 1 and perfect fit would result in a NFI of 1. Even though the index usually shows higher NFI values for more complex models, the least complex model, i.e. Model 2 without behavior, displays the highest value in this case (Hair et al., 2014).

Model 2 with and without behavior shows the highest value for the Tucker Lewis Index (TLI) (0.879) as well as for the Comparative Fit Index (CFI) (0.891). A good fit for both indices is mostly considered a value higher than 0.9 approaching 1. It is therefore arguable that Model 2 provides acceptable fit both with and without behavior according to these indices (Hair et al., 2014).

Furthermore, the Root Mean Square Error of Approximation (RMSEA) is evaluated as it seeks to overcome the disadvantages of the $\chi 2$ measure regarding the impact of number of variables and sample size. The RMSEA values range between 0.050 for Model 1 including behavior and 0.054 for both versions of Model 2. While most research has set thresholds for a good model fit at maximum 0.05 and 0.08, other researchers argue that no absolute cut-off values is advisable for the RMSEA. In all respects, the values for all four models adhere to the 0.08 threshold (Hair et al., 2014).

To inherit a different perspective, a parsimony fit index was utilized. Parsimony fit indices are particularly designed for comparing competing models, taking into consideration both their complexity and relative fit. A higher parsimony index indicating better fit is thus due to either a simpler model or a higher fit. Parsimony fit indices are therefore comparable to R-Squared. The Parsimony Normed Fit Index (PNFI) reveals the highest value for Model 2 without behavior (0.708). Apart from model fit, this is explainable by the fact that Model 2 without behavior incorporates less items to measure than the three other models (Hair et al., 2014).

In sum, the initial assessment of the reliability of the competing models showed better results for Model 2 incorporating less values. The assessment of the Normed $\chi 2$ showed good model fit for all four considered models. The NFI, TLI, CFI, and PNFI indicated that Model 2 had the highest fit. While the RMSEA indicated that Model 1 without behavior was the model with the best fit, all four measurement models demonstrated values indicating acceptable model

fit. Based on these results, we decided to continue with measurement *Model 2 without behavior*.

6.6.5 Convergent Validity

6.6.5.1 Construct Reliability

In addition to Cronbach's Alpha, the standardized factor loadings, and squared multiple correlations, we assessed the Construct Reliability (CR) of our final model, hence Model 2 without behavior. Reliability estimates higher than 0.7 suggest good reliability. Estimates greater than 0.6 are deemed acceptable in the case of other indicators showing signs of good construct validity and indicate internal consistency and adequate convergence. Hair et al. (2014) provide the following formula for its estimation:

$$\mathrm{CR} = \frac{\left(\sum_{i=1}^{n} L_i\right)^2}{\left(\sum_{i=1}^{n} L_i\right)^2 + \left(\sum_{i=1}^{n} e_i\right)}$$

Figure 7: Construct Reliability Formula (Hair et al., 2014: 619)

All constructs show a CR above 0.6 except for the descriptive norm (0.289) (see Appendix A6). This value is in line with earlier findings of low standardized factor loadings for this construct. PBC and the injunctive norm show a CR between 0.6 and 0.7 while the remaining constructs display a CR above 0.7 .

6.6.5.2 Average Variance Extracted

As suggested by Hair et al. (2014), the Average Variance Extracted (AVE) was calculated accordingly:

$$\mathrm{AVE} = \frac{\sum_{i=1}^{n} L_i^2}{n}$$

Figure 8: AVE formula (Hair et al., 2014: 619)

Adequate convergence is represented by an AVE of 0.5 or higher and was derived for each latent construct. The AVE for PBC, injunctive and descriptive norm, and self-enhancement was between 0.4 and 0.5 (see Appendix A7). Self-transcendence displayed a low AVE of 0.288, which is not in line with the good result of the Cronbach's Alpha analysis and might be due to the high number of items. Finally, attitude and personal norm showed signs of adequate convergence (Hair et al., 2014).

6.6.6 Discriminant Validity

Discriminant validity was assessed in order to ensure that the estimated constructs were distinct from each other and are thus unique. Discriminant validity indicates that individual items only represent one of the latent constructs. In order to assess AVE, the square of the correlation between two factors, e.g. descriptive and injunctive norm, was compared to the AVE estimates for the respective factors (see Appendix A8). Higher AVE estimates indicate discriminant validity. The examination of all constructs except for injunctive and descriptive norms showed good discriminant validity. It is to note that this result is only due to the high correlation (0.773) between the two constructs themselves, i.e. descriptive and injunctive norm, while other correlations are lower. The high correlation makes sense as the two norms are related to the principle of subjective norm and it was postulated that these were correlated in the further analysis as well (Hair et al., 2014).

6.6.7 Face Validity and Nomological Validity

In addition to convergent and discriminant validity, constructs evaluated in SEM need to possess nomological and face validity. As outlined, we established face validity before conducting the actual survey. Nomological validity was assessed by examining the correlations between the constructs and whether they made sense according to theory (Hair et al., 2014). The majority of constructs were significantly correlated. With the TPB in mind, these findings made sense. The exceptions were the relationships between the self-transcendence values and the descriptive as well as the injunctive norm. In addition, the self-enhancement values were not found significantly correlated to the other constructs. While most research postulates a significant relationship between self-transcendence values and pro-environmental behavior, some research did only find a significant relationship when examining self-transcendence values instead of self-enhancement

values (Thøgersen & Ölander, 2002). The nature of the correlations, i.e. positive or negative, was in line with theory. It was therefore concluded that both face and nomological validity were attained.

6.7 Structural Model Fit

Following the CFA, we evaluated the validity of the structural model (See Figure 9). In accordance with the SEM process, our structural model explained the relationships between constructs in a more precise and simple way than the measurement model. Hence, the structural model included directed relationships between constructs unlike the measurement model that solely included correlational relationships (Hair et al., 2014).

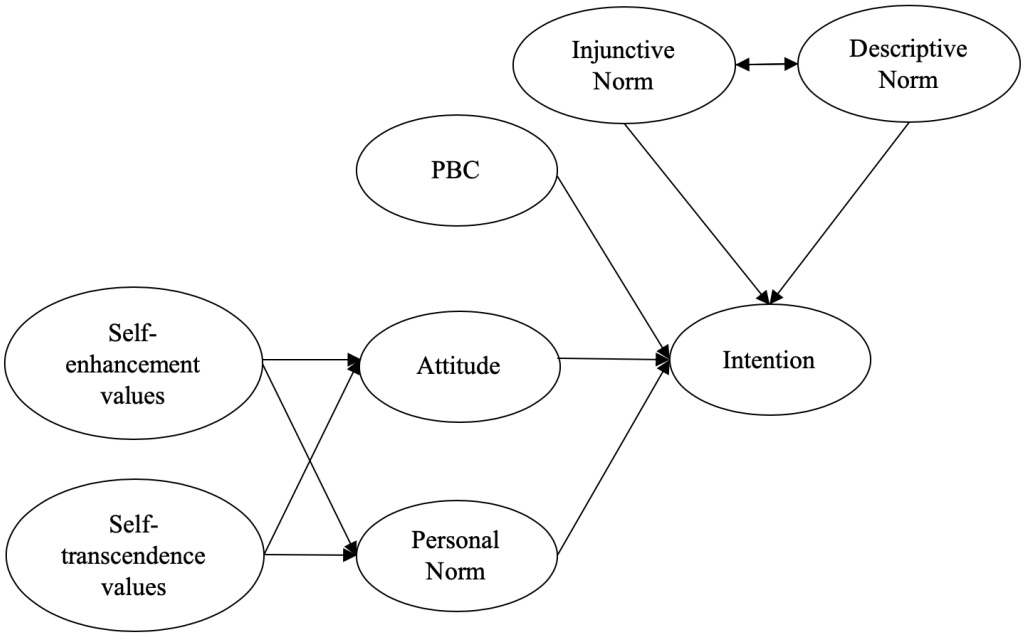


Figure 9: Structural Model

We compared the fit of the structural model with the fit of the final measurement model (See Table 9). In SEM, it is not possible that a recursive structural model has a better fit than the measurement model. The fact that the structural model shows a slightly worse fit than the measurement model is thus reasonable. We further assessed the fit of the structural model as such. The assessment of the fit of the structural model was crucial to determine the fit between the theoretical research and the data. The evaluation of the different indices led to the conclusion

that the model fit was reasonable given the complexity of the model. In addition, we found that the indices supported a fit between the theory and the data (Hair et al., 2014).

Model	$\chi 2$	df	P	Normed $\chi 2$	NFI	TLI	CFI	PNFI	RMSEA
Structural Model	1733.77	874	0	1.984	0.751	0.845	0.857	0.694	0.062
Measurement Model 2 excluding behavior	1514.70	856	0	1.770	0.783	0.879	0.891	0.708	0.054

Table 9: Fit of the Structural and the Measurement Model

Additionally, we compared the standardized loading estimates for the measurement and the structural model (see Appendix A8). While small changes were detected, it can still be argued for the stability of the constructs due to the small size of the respective changes. In addition, the construct reliabilities of the measurement and the structural model (see Appendix A9) only displayed small discrepancies as well (Hair et al., 2014).

Structural Relationship	Unstandardized Estimate	S.E.	z-value	P	Standardized Estimate
Self-enhancement → Attitude	-0.087	0.068	-1.27	0.204	-0.081
Self-enhancement → Personal norm	-0.04	0.055	-0.739	0.46	-0.05
Self-transcendence → Attitude	1.39	0.329	4.228	***	0.382
Self-transcendence → Personal norm	1.208	0.28	4.317	***	0.437
Personal norm → Intention	0.262	0.039	6.678	***	0.877
Attitude → Intention	0.013	0.026	0.5	0.617	0.057
PBC → Intention	0.129	0.052	2.497	0.013**	0.295
Injunctive → Intention	0.216	0.104	2.078	0.038**	0.482
Descriptive → Intention	-0.124	0.061	-2.037	0.042**	-0.466

Table 10: Structural Parameter Estimates

Note: significance levels: ***=p<0.01; **=p<0.05

Table 10 displays the standardized and unstandardized estimates for the structural paths. Three out of nine hypothesized relationships were not found significant at a p-value of 0.05. Even though the three estimates were in the hypothesized direction, the paths were not supported. One hypothesized relationship was found significant but not in the hypothesized direction, i.e. found negative instead of positive. Due to these results, the overall assessment shows that the majority of the results support the model derived from theory, but with a reservation for the four paths that were not fully supported (Hair et al., 2014).

Following, we compared the structural relationships with the correlational relationships from the measurement model (See Appendix A10). While some of the standardized estimates and correlational estimates were comparable, others showed a significant difference. This finding indicated a difference between the measurement and the structural model (Hair et al., 2014).

Finally, we examined the standardized residuals as well as the modification indices. When analyzing and looking for patterns of the standardized residuals, a pattern became obvious (See

Appendix C). Items of three construct combinations showed higher values than |4|. These were attitude and personal norm, attitude and PBC, and personal norm and PBC. This indicated a potential relationship between these constructs. Initially, we did not hypothesize a direct or indirect relationship between these three pairs of constructs. Examining the modification indices, directed influences displayed. In detail, descriptive norm on personal norm with a modification index of 46, attitude on personal norm with a modification index of 58 and personal norm on attitude with a modification index of 53. These findings strongly supported the addition of the respective relationships to the model in the case of conceptual validity. The conducted research did not focus on and in accordance did not reveal such relationships. In order to avoid respecifications of the model without legitimate theoretical research, we did not include the respective relationships in the model.

6.8 Model Results

6.8.1 Hypotheses

Following the assessment of the validity of the model, the strengths of the hypothesized relationships were assessed and whether the empirical findings are in line with the theoretical research. See Table 11 on the next page. In order to estimate the effects within the model, a bootstrap was performed with 500 bootstrap samples and at a 95 percent bias-corrected confidence level. We adopted a conventional 0.05 significance level to evaluate the effects (Hair et al., 2014).

Hypothesis	Hypothesized Relationship	Nature	Coefficient	p-value	Accepted
1	Attitude → Intention	+	0.013	0.617	no
2	Injunctive norm → Intention	+	0.216	0.038**	yes
3	Descriptive norm → Intention	+	-0.124	0.042**	no
4	PBC → Intention	+	0.129	0.013**	yes
5	Personal norm → Intention	+	0.262	***	yes
6	Self-transcendence → Attitude	+	1.39	***	yes
7	Self-enhancement → Attitude	-	-0.087	0.204	no
8	Self-transcendence → Personal norm	+	1.208	***	yes
9	Self-enhancement → Personal norm	-	-0.04	0.46	no

Table 11: Hypotheses Testing

Note: significance levels: ***=p<0.01; **=p<0.05

Hypothesis 1 postulated a positive relationship between individuals' attitudes toward meat reduction and their intentions to reduce their meat consumption. Against the expectation and the postulation of the TPB, the direct effect of attitude on intention was not found significant. *Hypothesis 1* was therefore rejected. Furthermore, we found a significant positive effect of injunctive norm on intention. *Hypothesis 2* was therefore accepted. In addition, *Hypothesis 3* proposed a positive relationship between individuals' descriptive subjective norms and their intentions to reduce their meat consumption. While a direct influence of descriptive norm on intention was found significant, the identified effect was negative. As this finding is not in line with the postulated positive effect, *Hypothesis 3* is rejected. Furthermore, a positive relationship between individuals' PBC and their intentions to reduce their meat consumption was found. We thus accepted *Hypothesis 4*. In line with the TPB, we hypothesized a positive relationship between personal norms and intentions to reduce meat consumption. The study confirmed this proposition and *Hypothesis* 5 was therefore accepted. The relationship between personal norms and intentions was thereby the strongest in the model. In addition, we tested *Hypothesis 6* which postulated a positive relationship between individuals' self-transcendence values and their attitude towards meat reduction. In line with previous research, our findings supported the positive direct relationship. Along the same lines, we expected to find a negative relationship between individuals' self-enhancement values and attitude. However, the relationship was not

found significant and *Hypothesis 7* was rejected. Adding to the influence of self-transcendence values on attitude, a significant positive effect was also found for individuals' self-transcendence values on personal norm. The direct influence was the second strongest in the model and we therefore accepted *Hypothesis 8*. Lastly, *Hypothesis 9* proposed a negative relationship between individuals' self-enhancement values and personal norm. The effect was not found significant and *Hypothesis 9* was thus rejected.

6.8.2 Correlation, Means and Standard Deviations

The proposed correlation between injunctive and descriptive norm was found significant and strong (0.726). In order to give insights into the mindset of the respective sample group, the mean and the standard deviation for each construct are reported in Table 12.

Construct	Mean	Scale	Std. Deviation	Coefficient of Variation
Self-transcendence	4.765	1-6	0.628	0.132
Self-enhancement	3.556	1-6	0.904	0.254
Attitude	5.088	1-7	1.261	0.248
PBC	4.206	1-5	0.714	0.170
Personal norm	3.376	1-5	1.090	0.323
Descriptive norm	3.227	1-5	1.332	0.413
Injunctive norm	3.098	1-5	0.900	0.290
Intention	2.506	1-3	0.538	0.215

Table 12: Means and Standard Deviation

Generally, the sample group seems to have a positive notion of meat reduction. The high mean for attitude (5.088 on a 7-point response scale) indicates a positive attitude towards meat consumption across the sample. In accordance with these findings, the mean for the intention to reduce meat consumption (2.506 on a 3-point scale) indicates that the sample group intends to rather decrease than increase their meat consumption in the next 2-3 years. Furthermore, the high mean of PBC (4.206 on a 5-point scale) indicates that the sample group, on average, feels rather capable of reducing their meat consumption. In addition, most of the respondents scored higher on self-transcendence values than on self-enhancement values.

6.8.3 Additional Analyses

6.8.3.1 Indirect Effects

Complementing the reported direct effects, we also examined indirect effects. In addition to the direct effect of self-transcendence on attitude, we also found a significant positive indirect effect of self-transcendence values on intention (0.405). This effect was mediated by attitude and personal norm.

6.8.3.2 Control Variables

The model was further examined by including different control variables. When including the different potential demographic characteristics as control variables, the model fit did not show a significant improvement. When adding the control variables to the model, no improvement of model fit was recognizable. The respective model fits can be found in Table 13. To make it more clear, the values indicating the best fit are marked green for each index.

Model	$\chi 2$	df	P	Normed $\chi 2$	NFI	TLI	CFI	PNFI	RMSEA
Structural Model	1733.78	874	0.0	1.98	0.751	0.845	0.857	0.694	0.062
Including Control Variables	2029.78	1090	0.0	1.86	0.738	0.838	0.856	0.656	0.058

Table 13: Model Fit with Control Variables

Furthermore, we compared the coefficients and the significance levels for the structural model with and without control variables (See Table 14). As can be seen, adding the control variables did not substantively change the results of the identified relationships. All hypothesized relationships showed the same level of significance and the same nature, i.e. positive or negative. This speaks for the robustness of our model in the context of meat reduction and the stability of our results.

Hypothesis	Hypothesized Relationship	Model excluding control variables		Model including control variables	
		Coefficient	p-value	Coefficient	p-value
1	Attitude → Intention	0.013	0.617	0.063	0.582
2	Injunctive norm → Intention	0.216	0.038**	0.53	0.033**
3	Descriptive norm → Intention	-0.124	0.042**	-0.505	0.043**
4	PBC → Intention	0.129	0.013**	0.274	0.014**
5	Personal norm → Intention	0.262	***	0.853	***
6	Self-transcendence → Attitude	1.39	***	0.406	***
7	Self-enhancement → Attitude	-0.087	0.204	-0.061	0.342
8	Self-transcendence → Personal norm	1.208	***	0.503	***
9	Self-enhancement → Personal norm	-0.04	0.46	-0.015	0.832

Table 14: Coefficients with and without Control Variables

Note: significance levels: ***=p<0.01; **=p<0.05

Only two control variables were found to have a significant influence (p<0.05). In detail, both age and gender revealed significant effects on attitude (See Table 15). In order to further evaluate the influence of these control variables, we conducted Levene's test for Equality of Variances. To examine the influence of gender, we conducted a T-test. We only tested for the influence of 'female' and 'male' as there was only one 'other' response. We found that on average females (M=5.256) had a more positive attitude towards meat reduction than men (M=4.714) (p<0.01).

Structural Relationship	Unstandardized Estimate	S.E.	z-value	P	Standardized Estimate
Gender → Attitude	0.344	0.157	2.190	0.029**	0.132
Age → Attitude	0.072	0.029	2.527	0.011**	0.164

Table 15: Significant Effects of Control Variables

Note: significance levels: **=p<0.05

Furthermore, we examined the influence of age. Therefore, we re-coded the variable age into different age groups (18-21, 22-25, 26-29, 30-34). In order to find significant differences, we conducted a one-way ANOVA (See Table 16). We found some significant differences between groups. These were between the age group 18-21 and 22-25 as well as 18-21 and 26-29. The results indicated that the attitude towards meat reduction among the 18-21 was significantly less positive than the attitude among the 22-29 year old's.

Group	Age range	N	Mean	Std. Deviation
1	18-21	53	4.636	1.113
2	22-25	151	5.186	1.236
4	26-29	51	5.322	1.301
5	30-34	6	4.619	1.927

Table 16: One-Way ANOVA Results

6.8.3.3 Post Hoc Analyses

In addition to the hypothesized relationships, which were based on examined theory, we conducted a post hoc analysis based on the diagnostic information provided by AMOS. As outlined, the examination of the standardized residuals and the modification indices suggested three additional direct effects. In detail, adding a path from descriptive norm to personal norm, from personal norm to attitude, and from attitude to personal norm was suggested.

Model	$\chi 2$	df	P	Normed $\chi 2$	NFI	TLI	CFI	PNFI	RMSEA
Structural Model	1733.77	874	0	1.984	0.751	0.845	0.857	0.694	0.062
Post Hoc Model	1574.76	871	0	1.808	0.774	0.873	0.883	0.713	0.056

Table 17: Model Fit Post Hoc Analysis

Adding the three paths to the model led to an improvement of the model fit (See Table 17). Furthermore, two of the three suggested paths displayed significance (See Table 18). In detail, descriptive norm showed a significant positive effect on personal norm (0.769). While the positive influence of personal norm on attitude (0.839) was found significant, the effect of attitude on personal norm was not significant.

Structural Relationship	Unstandardized Estimate	S.E.	z-value	P	Standardized Estimate
Descriptive norm → Personal norm	0.721	0.14	5.141	***	0.769
Attitude → Personal norm	-0.298	0.184	-1.616	0.106	-0.402
Personal norm → Attitude	1.132	0.167	6.785	***	0.839

Table 18: Estimates Post Hoc Analysis

Note: significance levels: ***=p<0.01

7. Discussion and Implications

7.1 Discussion of Results

The main purpose of this study is to enhance research on meat reduction from a pro-environmental perspective. As such, the objective was to both confirm as well as to discover specific relationships. Accordingly, the TPB model provided the basis for this study, which we extended with additional norms and values.

Our first research question identified sustainable diets as based on three pillars namely the environment, the economy, and people. Therefore, we concluded that sustainable eating behavior is environmentally friendly (FAO, 2010). Both sustainable and environmentally responsible eating is a complex issue since it encompasses various types of foods and there is no exact definition (Dagevos & Voordouw, 2013, Hoek et al., 2017). For environmentally responsible diets, we proposed that the *type* of foods is relevant rather than other factors such as the origin (e.g. Aleksandrowicz et al., 2016). Refraining from or reducing the intake of specific foods that have a negative impact on the environment is thus essential. Animal-based foods are considered to be particularly harmful to the environment (Dagevos & Voordouw, 2013). Consequently, we suggest a reduction of these types of food (Portney, 2015). In this context, individuals' meat reduction is considered to be especially impactful (Lea & Worsley, 2008). We thus conclude that reducing meat consumption is integral to establishing an environmentally friendly diet (Portney, 2015).

Next, we answer our subsequent research questions by means of the hypothesized relationships between studied variables. Mixed support has been found for our hypotheses regarding both the original and extended TPB variables. To understand what these findings actually entail, the various relationships are discussed.

First of all, contradictory to our hypothesis the relationship between attitude and intention was not found significant. This is also contradicting previous research as usually a significant positive relationship is found regarding intentions to reduce meat consumption (Çoker & Van der Linden, 2020; Rees et al., 2018; Lentz et al., 2018; Zur & Klöckner, 2014). One potential reason might be that the relationship between attitude and intention might have been influenced by other factors, causing an attitude-intention gap which entails that individuals hold a positive attitude towards a behavior yet do not plan to act accordingly (Vermeir & Verbeke, 2006; Vermeir & Verbeke, 2008; Arvola et al., 2008). A potential explanation is that purchase decisions are usually based on reasons such as convenience, rather than pro-environmental motives (Vermeir &

Verbeke, 2006). Furthermore, individuals might not feel like their individual actions would make a difference, implying low perceived consumer effectiveness. In addition, uncertainty due to the lack of sufficient or correct information about meat reduction as a sustainable consumer behavior might influence one's intention. Moreover, a low perceived availability of meat-free options might have had an impact (Vermeir & Verbeke, 2006). Another possible explanation for this might be that personal norm replaced attitude. Accordingly, Chan and Bishop (2013) found that personal norms directly influenced recycling intention, even replacing attitude (Chan & Bishop, 2013). Another potential argument could be that personal norm is apparent in one's attitude (Kaiser, 2006). This would be consistent with the results found in the post hoc analyses. Another possible reason could be that only cognition-based attitude was considered in this study. However, research also points out the relevance to include feeling-based attitude (e.g. Burns & Neisner, 2006 in Park & Ha, 2012). Possibly, an inclusion of both types of attitude could have led to a significant effect.

Additionally, as hypothesized, we found a significant relationship between PBC and intention. PBC positively impacts meat reduction intentions. Yet, it should be noted that this is the weakest significant effect found. This finding is in line with other research, as the PBC is found to significantly influence intentions to reduce meat consumption (Çoker & Van der Linden, 2020; Rees et al., 2018). In addition, Çoker and Van der Linden (2020) also identified PBC as the weakest predictor of intention. The positive relationship between PBC and intention leads to the conclusion that individuals who feel capable of performing meat reduction, i.e. when the behavior looks feasible, are more likely to actually conduct meat reduction behavior. The fact that PBC has a relatively weak effect compared to other constructs can be explained by the fact that one's perception of control is a complex construct including various aspects such as availability of alternatives and cost-benefit analysis, but also taking into account the social and cultural context (Çoker & Van der Linden, 2020). Along these lines, some studies did not find a significant effect at all (e.g. Onel, 2017; Lentz et al., 2018).

Moreover, the injunctive subjective norm is found to have a significant effect on meat reduction intentions. This is in line with previous research, as injunctive norms are usually found to have a positive influence on intentions (e.g. Fornara et al., 2011). Noticeable, while the identified influence of injunctive subjective norm on intention is positive, it is weaker than the influence of personal norm on intention. This indicates that individuals also feel social pressure of doing what is approved by important others in the context of meat reduction. Along these

lines, it is not uncommon that the incorporation of personal and descriptive norms weaken the effect of injunctive norm on intention (Niemiec, Champine, Vaske & Mertens, 2020).

Furthermore, the descriptive subjective norm was found to negatively influence meat reduction intention. We therefore rejected our hypothesis that the descriptive norm positively impacts meat reduction intention. This finding contradicts existing pro-environmental research. For instance, Fornara et al. (2011) which found the descriptive subjective norm to positively influence household waste recycling intentions (Fornara et al., 2011). In addition, descriptive norm was also found to positively influence green food purchase intentions (Ham et al., 2015). In accordance with the findings of our study, other studies have also found a positive effect of negative descriptive norm as well as a negative effect of positive descriptive norm.

A potential explanation could be related to the free rider problem. In this case, individuals might profit from the collective benefit, hence a positive impact on the environment but do not take action themselves. Therefore, individuals might not feel like they have to contribute when others around them reduce their meat consumption (e.g. Kinzig et al., 2013). Moreover, a negative descriptive norm can also lead to a positive impact on the respective behavior. Political research found that engagement in a desired action can increase when other individuals do not behave in the desired way. Here, this lack of action of others results in emotional arousal, which then increases the likelihood of taking action (e.g. Schuck & De Vreese 2012; Valentino, Brader, Groenendyk, Gregorowicz, Hutchings, 2011). Along the same lines, it could be conceivable that individuals, who are generally in favor of meat reduction, might get triggered to engage in meat reduction when others around them do not take action. In addition, it could be that the injunctive and descriptive norms are not aligned. It is argued that a conflict between these two norms will result in weaker intentions. Therefore, it is of interest to consider how both norms interact and thereby impact meat reduction (Smith, Louis, Terry, Greenaway, Clarke, & Cheng, 2012).

Moreover, the finding that personal norm positively influences meat reduction intention is in accordance with our outlined hypothesis. This finding is consistent with previous research, such as in the research of Onel (2017) who also found a significant positive relationship between personal norm and pro-environmental purchase behavior (Onel, 2017). Other pro-environmental research that also found a significant positive relationship between these two constructs was conducted in, for instance, the field of public transportation (Bamberg et al., 2007) and recycling (Nigbur et al., 2010; White et al., 2009). Furthermore, Chan and Bishop (2013) found that personal norms directly influence recycling intention, thereby even replacing attitude (Chan &

Bishop, 2013). Overall, these findings show that if individuals feel morally obliged, they are more likely to reduce their meat consumption. Noticeably, the effect of personal norm on intention is considerably higher than the effect of injunctive norm, i.e. the feeling of social pressure.

With regard to our second research question *Which norms drive meat reduction?* we conclude that personal norm and injunctive descriptive norm drive meat reduction. The influence of personal norm is the strongest and, we therefore conclude that the most important norm regarding meat reduction is personal norm. Furthermore, injunctive descriptive norms drive meat reduction but have a weaker influence on individuals' intention. Whereas personal norm and injunctive subjective norm are positively related to meat reduction intention, we found that the descriptive subjective norm is negatively related to meat reduction intention. We therefore conclude that the descriptive subjective norm does not *drive* meat reduction behavior but rather *impedes* this behavior.

Furthermore, in line with our expectations, self-transcendence values were positively related to personal norm and to attitude. In addition, we found a significant indirect effect of self-transcendence values on meat reduction intentions, mediated by attitude. The finding that self-transcendence is positively related to attitude is in accordance with existing research. As such, De Boer et al. (2007) stated that the indirect influence of values on actions may operate through certain combinations of related concepts such as *attitudes* (De Boer et al., 2007). Along the same lines, the finding that self-transcendence is positively related to personal norm is in accordance with previous research. Several studies found that individuals with strong self-transcendence values are more likely to inherit pro-environmental norms and act environmentally friendly (e.g. Nordlund & Garvill, 2003; Schultz et al., 2005 in Steg et al., 2014). This indicates that individuals with strong stronger self-transcendence values are more likely to have a positive attitude and intention towards meat reduction.

Contradicting our hypotheses, self-enhancement was not found to significantly impact either attitude or personal norm. This is not in line with the majority of research on pro-environmental behavior that found both self-transcendence and self-enhancement values relevant to pro-environmental behavior (e.g. Nordlund & Garvill, 2002; Thøgersen & Ölander, 2002). Some studies did not report significant effects of self-enhancement or egoistic values as well. For instance, Bouman, Steg, and Kiers (2018) only found inconsistent effects of self-enhancement values on environmental behaviors and beliefs (Bouman et al., 2018). In a similar vein, previous

research has found a weaker relationship between self-enhancement values and pro-environmental behavior and beliefs compared to self-transcendence values. Research argues that the strengths of the influence of self-enhancement values depends on the costs related to the respective beliefs and behavior. Therefore, if a pro-environmental behavior also offers egoistic benefits, a positive relationship between self-enhancement values and the respective pro-environmental behavior could be found. On the one hand, meat reduction might require effort, e.g. in terms of finding new recipes. On the other hand, meat reduction also results in egoistic benefits related to health and financial savings. In conclusion, the lack of influence of self-enhancement values could be explained by inconsistency of the self-enhancement, hence egoistic, motives related to meat reduction. The perceived personal benefit thus depends on weighing negative sides such as effort against positive sides such as health (Bouman et al., 2018; Steg & De Groot, 2012).

With regard to our third research question *Which values drive meat reduction?* we conclude that self-transcendence values drive meat reduction. Self-transcendence values positively impact attitude and personal norm as well as intention when mediated by attitude. We thus conclude that an individual is more likely to engage in meat reduction the stronger the benevolence and universalism values, hence self-transcendence values, are. Accordingly, if an individual feels concerned with people, society and nature, the higher the probability for meat reduction for the respective individual. Since meat consumption harms the environment it is therefore not surprising that strong self-transcendence values lead to meat reduction.

Furthermore, the post hoc analyses identified additional significant direct effects, which were not included in the model. These comprised an effect of personal norm on attitude and descriptive norm on personal norm. As outlined, the theoretical foundation of this study was not sufficient to include these additional relationships in the structural model. However, the general characteristics of the TPB do not speak against including such a relationship between personal norm and attitude. Generally speaking, the components of the TPB are interrelated and both the components as such, as well as their interaction, influence the respective intention and/or behavior (Ajzen, 1991; Bauer et al., 2018). It is thus not inconceivable that a relationship of this kind exists.

Furthermore, a relationship between descriptive subjective norm and personal norm in the context of meat reduction could be possible as well. Along these lines, it is argued that subjective norms develop into personal norms, thereby becoming internalized (Hopper & Nielsen, 1991;

Schwartz & Howard, 1980 in Valle et al., 2005). This relationship between the subjective and personal norm is also found in the study of Valle et al. (2005) in the context of recycling (Valle et al., 2005). It should however be noted that this is the subjective norm in general, and thus does not focus on the descriptive subjective norm as such.

Based on these findings, we conclude that the TPB is a suitable framework in order to research meat reduction. It is advised to extend the TPB with the additional variables of personal norm and values. The incorporation of these variables is supported as they were found to be strong direct and indirect predictors of intention to reduce one's meat consumption. Furthermore, the model fit showed no significant improvement when adding the demographics as control variables and only two significant relationships were found. This leads to the assumption that the model is robust. It should be noted that by adding additional variables to the TPB model, original relationships can be impacted. In this study, this was most likely the case for the relationship between attitude and intention.

7.2 Implications of the Research

7.2.1 Theoretical Implications

The findings of this study are valuable in the academic field as they give a novel look at the factors influencing meat reduction behavior. This study thus complements and enhances existing literature while also serving as a medium for future research. This study is furthermore relevant for organizations such as NGOs, other businesses, the government and other parties that wish to enforce meat reduction strategies to, for instance, minimize the environmental impact of meat consumption.

As for the theoretical relevance, this study tries to enhance existing research on the novel topic of meat reduction as a pro-environmental behavior. This topic is regarded novel as most research on meat reduction is health-oriented instead of having a pro-environmental orientation (Çoker & Van der Linden, 2020). Moreover, most similar research has been performed on meat substitution rather than meat reduction (De Bakker & Dagevos, 2012). In addition, this study gives a comprehensive overview and additional insights into the factors behind meat reduction. Correspondingly, the focus of this study is on internal pre-conditions, specifically norms and values, of meat reduction.

In accordance, this study incorporates rational choice models i.e. the TPB and social psychology theories, especially moral theories. As such, this study provides transdisciplinary insights by incorporating various considerations such as moral deliberation instead of solely focussing on the Homo Economicus assumption within rational choice models (Anderson, 2000). This is highly relevant as pro-environmental behaviors, such as meat reduction, are a mix between acting out self-interest and pro-social motivations (Bamberg & Möser, 2007). It is therefore of importance to include measures of self-interest *and* motivations based on the interest of others when examining pro-environmental behavior (Kaiser et al., 2005). Along these lines, our model, with its basis in the TPB, provides additional value as personal norm is considered. In addition, most studies do not distinguish injunctive subjective norm and descriptive subjective norm as different constructs. Therefore, this study also enhances existing research on the subjective norm in a pro-environmental context.

Besides the moral considerations, this study examines values related to meat reduction behavior as these have also been found highly relevant in social dilemmas (Van Doorn & Verhoef, 2015). A joint examination of social norms and values is of interest as they are inherited by every individual and are difficult to change. Moreover, both constructs are motivations and ideas deeply rooted in oneself and relatively stable over long time periods (Vermeir & Verbeke, 2006). Thus, by extending the TPB model with self-transcendence and self-enhancement values, this model adds to existing research. All in all, the combination of both norms and values provides new insights and a more comprehensive view of meat reduction behavior, which adds to existing literature on the topic of meat reduction as a pro-environmental behavior.

7.2.2 Managerial Implications

Besides the theoretical implications, this study also provides considerable practical implications. As outlined, self-transcendence values and personal norm were found to have the strongest positive influence on meat reduction. Respectively self-transcendence values on attitude, self-transcendence on personal norm and personal norm on intention. The focus of the practical implications is thus on these two constructs, i.e. self-transcendence values and personal norm. In addition, PBC and the injunctive subjective norm were also found to have a positive, yet less strong, effect on meat reduction intention. Furthermore, the descriptive subjective norm was found to be negatively related to meat reduction intention negatively. Therefore, these three constructs will also be considered.

It should furthermore be noted once more that meat reduction is different from most other research examining meat consumption in a pro-environmental context as the focus in previous research is rather on meat substitution (Apostolidis & McLeay, 2016b). A notable difference is thus that this research is not focused on an actual product with an influence on meat consumption. Hence, it is rather a type of *behavior* for which recommendations are provided.

Moreover, in order to give a comprehensive overview of the entire spectrum of consumers who *do* consume meat, this study does not make a distinction between different consumer groups according to their level of meat consumption (except for the exclusion of strict vegetarians and vegans). As such, the results will provide insights that could be essential for meat reduction efforts concerning the whole society, rather than one specific consumer group (Lentz et al., 2018).

There are various approaches to encourage pro-environmental behavior. As argued by Turaga et al. (2010), policies that aim to change behavior need to involve the combination of economic incentives, education, and information provision in order to attain a change in beliefs and inherently a behavioral change (Turaga et al., 2010). In a similar vein, De Bakker and Dagevos (2010), proposed various sustainable consumption policy recommendations that can be carried out by the government and facilitating groups in the business sector or society. The formation of intervention groups is one of such recommendations. These groups can consist of socio-cultural, marketing and policy experts which together develop change strategies and concrete proposals for policy development. In addition, information provision and promoting meat reduction as a 'normal' eating pattern are suggested (De Bakker & Dagevos, 2010). Accordingly, Apostolidis and McLeay (2016a) suggest the use of interventions and policies including educational campaigns and information provision as adequate ways to achieve a reduced meat consumption (Apostolidis & McLeay, 2016a).

As for economic incentives, it is argued that price based instruments that focus on differences between private and social costs, such as taxes, could be appropriate. It is proposed that a tax on consumption is more adequate than a tax on meat production partially due to its high monitoring costs (Edjabou & Smed, 2013). However, the use of financial and economic incentives, such as taxes, have been contested in academic research (e.g. Säll & Gren, 2015). It is found rather controversial as these measures are often not globally feasible and receive a substantial amount of consumer opposition (Apostolidis & McLeay, 2016b). It is thus argued that a meat tax could only work in combination with other methods such as campaigns and message

framing strategies (Lentz et al., 2018).

In addition, educational measures such as campaigns and information provision that aim at informing individuals can increase awareness, encourage alterations in meat consumption behavior and ultimately aid in the overall acceptance of meat reduction (Dagevos & Voordouw, 2013). It is advised to establish educational programs independent of individual knowledge levels, which increase awareness and understanding of one's responsibility towards the environment (Fang et al., 2017). It should be noted that providing information in itself will lead to increased knowledge and awareness, in this case of the effect of meat consumption on the environment. Yet, it is argued that it does not necessarily lead to a behavioral change (Abrahamse, Steg, Vlek, & Rothengatter, 2005; Nolan, 2010). Inherently, the general provision of information might not lead to a decrease in the intention-behavior gap either (e.g. Sheeran & Webb, 2016). In order to achieve a behavioral change, the communication needs to be more focused on an individuals' impetus for conducting a certain behavior (Barr & Gilg, 2007 in Graham & Abrahamse, 2017), such as norms and values which will be addressed in more detail in the next section.

Concerning interventions, both downstream and upstream interventions are needed. On the one hand, downstream interventions focus on the individual with the aim of altering behavior to *decrease* the negative effects of the behavior. On the other hand, upstream interventions are policy and governmental initiatives that *prevent* a given behavior and thus its detrimental effects (Verplanken & Wood, 2006). A further distinction can be made between antecedent strategies and consequence strategies. The former being focused on adapting aspects that precede behavior, whereas the latter is aimed at adjusting the consequences of these actions. A similar distinction can be made between informational strategies, which focus on changing internal conditions, and structural strategies, which are focused on the external circumstances of the given behavior (Steg & Vlek, 2009).

The positive pro-environmental effects from these policies, economic incentives, educational measures and interventions should be communicated to society in order to increase the effectiveness. This can, for instance, be done by organizing open conferences (Gkargkavouzi et al., 2019). Furthermore, it is advised to utilize the internet and social media to spread the policies to stimulate pro-environmental behavior as social media has a great influence on public opinion (Wang, Wang, Guo, Zhang, & Wang, 2018). Accordingly, organizations that aim at changing lifestyles have to ensure that the environmental impacts of the given behavior are

incorporated in their daily reasoning (Jackson, 2005 in Gordon, Carrigan, & Hastings, 2011). In a similar vein, it is argued to turn behavior into a conscious process to establish behavioral change in the long-term (Gkargkavouzi et al., 2019).

As the focus of this study is on effectively addressing behavioral change and on its motivational factors, i.e. norms and values, antecedent strategies related to information provision are of importance, be it by education or promotion. In a similar vein, as internal conditions to meat reduction are researched rather than changes to the external context related to this behavior, informational strategies are found more relevant. Moreover, this type of strategy works best when the pro-environmental behavior is rather convenient and inexpensive (Steg & Vlek, 2009), which can be assumed to be the case for meat reduction behavior. Accordingly, it is proposed to focus on meatless days, the reduction of portions of meat and encouraging an adjustment in lifestyles (Apostolidis & McLeay, 2016a) rather than economic incentives such as taxes.

As indicated, to achieve a behavioral change it is essential to implement focused communication, i.e. based on the specific norms and values related to a behavior (Barr & Gilg, 2007 in Graham & Abrahamse, 2017). As such, the identification of norms and values related to sustainable consumption yields a deeper understanding of non-sustainable and sustainable behaviors. It can furthermore give insights into which norms and values should be addressed in order to influence such behavior (Vermeir & Verbeke, 2006). These insights are valuable for various organizations, such as the government and businesses (Trudel, 2018).

Message framing, referring to the process of communicating messages in various manners influencing one's interpretation and usage of the message, is a way to focus on motivational factors, such as norms and values (Chong & Druckman, 2007). Generally, it is advised to use positive messaging, i.e. referring to gains rather than losses, as this has a more effective impact which ultimately leads to behavioral change (Spence & Pidgeon, 2010). If targeted messages are focused on the values important to individuals, it aids in awareness-raising and stimulation of these values (Graham & Abrahamse, 2017). Accordingly, when reminding individuals of their values the probability is higher that one will comply with these values (Fazio, 1995 in Graham & Abrahamse, 2017). Correspondingly, "if the right buttons are pushed" (Vermeir & Verbeke, 2008: 550), meat reduction will become more likely (Vermeir & Verbeke, 2008).

In this study, self-transcendence values were found to positively influence one's attitude towards meat reduction and personal norm. Furthermore, a positive indirect effect on meat reduction intention was found. Regarding message framing, it is thus proposed to focus on self-

transcendence values. A targeted message could, for instance, highlight the fact that becoming a meat reducer will have a positive impact on climate change by contributing to keeping the temperature increase below 2 degrees Celsius (Carrington, 2018). This message or comparable messages could be spread in the context of, for instance, governmental campaigns promoting meat reduction. Eventually, by promoting these specific values long-term, sustainable consumption can be achieved (Vermeir & Verbeke, 2008). It is also advised to take emotional or symbolic messaging into account in combination with values (Stoll-Kleemann & Schmidt, 2017). Emotional messages could, for instance, encourage meat reduction in order 'to keep the world a place your grandchildren want to live in'. Such messages could be communicated by, for instance, pro-environmental organizations.

Furthermore, to stimulate values that drive meat reduction, cognitive dissonance needs to be addressed (Stoll-Kleemann & Schmidt, 2017). One way to utilize cognitive dissonance could be to place signs in supermarkets addressing individuals' values and the corresponding behavior at the point of purchase. For instance, the meat section could hold a sign saying 'Care about the future of our world? Try the hybrid meat option!' or the like. Moreover, as individuals aim for harmony between their own actions and values and the one's inherited by their aspirational reference group (Arnould, Price, & Zinkhan, 2004), cognitive dissonance could be reduced by social norms, hence the promotion of meat reduction by this group (Stoll-Kleemann & Schmidt, 2017). This can for instance be achieved by having opinion leaders as role models (O'Riordan & Stoll-Kleemann, 2015). Examples of opinion leaders could be famous individuals, like Johnny Depp, who portray their opinion about meat consumption publicly (Dibb & Fitzpatrick, 2014 in Stoll-Kleemann & Schmidt, 2017). Accordingly, it was found by various studies that the behavior of these role models support pro-environmental behavior (Steg & Vlek, 2009).

In line with Onel (2017), our findings suggested focusing on addressing self-transcendence values as well as various normative aspects to promote pro-environmental behavior (Onel, 2017). As the effect of personal norm on intention was found positive with a comparably high impact in this study, it is argued that messages should focus on the personal norm rather than the subjective norms. In a similar vein, Terlau and Hirsch (2015) also state that increasing one's personal responsibility and hence facilitating a change in behavior can be achieved by promotion, campaigns, and marketing (Terlau & Hirsch, 2015). Moreover, it is found that when providing information about the environmental impacts of meat, individuals' concern and thus one's ascribed responsibility will increase, especially for individuals with high

self-transcendence values (Graham & Abrahamse, 2017).

Onel (2017) argues that various consequences of the behavior of interest need to be conveyed in order to target individuals' personal norm. These consequences can be either positive or negative, however as indicated before, positive messaging is preferred (Spence & Pidgeon, 2010). Therefore, making individuals aware of the effect of meat consumption and meat reduction on the environment in turn activates self-responsibility and one's moral obligation. This is depicted by the personal norm as introduced by Schwartz (1977). An example of a targeted message could, for instance, include that by having one meatless day in the week 3,5 animals are spared per person. In turn, a change of eating patterns of this kind will lower the GHG emissions (Nelson, n.d.). Furthermore, offering free access to or public viewings of popular and highly discussed documentaries educating individuals about the impact of meat consumption on the environment, e.g. 'Cowspiracy' (https://www.cowspiracy.com/) would allow individuals to easily get a grasp of the impact of their own individual actions.

Besides promotion and messaging, personal norms are also important regarding interventions (Zur & Klöckner, 2014). In accordance, practical examples of activating the personal norm are, for instance, informing individuals about environmental consequences of their behavior. This can be done by the publishing of consumer guides and utilizing an online calculator that shows the environmental impacts of a given behavior (Zur & Klöckner, 2014). In addition, it is proposed to use nudging, i.e. "the creation of stimuli to make people act in a certain manner … by definition a rational self-obligation of consumers" (Terlau & Hirsch, 2015; 168). For instance, in Denmark green footprints were utilized to direct individuals to trash bins instead of disposing of their trash somewhere else (Terlau & Hirsch, 2015). This concept could be utilized with regards to meat reduction, for instance using green footprints in university canteens to lead students to meat-free food.

To recall, we found that the injunctive subjective norm positively influences meat reduction intention. In addition, it is thus suggested to target this norm in particular. Accordingly, it is proposed to emphasize the general trend of meat reduction as a pro-environmental behavior, as individuals are prone to follow what others approve of (Ham et al., 2015). Therefore, pro-environmental organizations or initiatives could utilize social media to encourage meat reduction. In terms of the injunctive norm, incentivizing that users post about their meat reduction behavior, can be useful. This would show that individuals, to which one is connected on social media, engage in meat reduction and approve of it. Such posts can be promoted by introducing hashtags

(e.g. #meatreducer). However, it should be noted that communicating what individuals ought to do can also have an opposite effect on behavior. As such, assertive injunctive messages, in this study for instance 'Everyone must engage in meat reduction behavior to save the planet', might lead to resistance (Trudel, 2018). It is therefore of importance to carefully choose the exact messaging.

As outlined, the findings of this paper suggest that the descriptive norm had a negative effect on meat reduction intention. Generally, addressing descriptive norms in a practical context is rather critical and one has to be careful as the 'wrong' message can backfire and increase undesired behavior. Addressing individuals with different levels of engagement in the desired behavior with the same message can lead to issues. These especially concern individuals already engaging in the desired behavior above average adjusting to the lower average level (Kinzig et al., 2013, Schultz et al., 2007). As targeting with a distinction of the different levels of meat reduction or consumption is rather impractical, research advises to combine both injunctive and descriptive elements. The inclusion of injunctive norm can be reconstructive as to its ability to mitigate these undesired effects (Schultz et al., 2007). Furthermore, research has found that messaging including both injunctive and descriptive norms has a higher influence on a given behavior than the inclusion of either type alone (Cialdini, 2003). In accordance, the joint utilization of subjective norms in messaging can be beneficial for organizations and campaigns promoting meat reduction. A potential message including both norms could read 'Most people encourage meat reduction but do not take action. Be the one to act!'

Furthermore, as PBC was also found to significantly predict intention, it is advised to provide information about *how* the respective behavior, i.e. meat reduction, can be carried out (Fang et al., 2017). As such, pointing out the fact that individuals are responsible and able to perform the respective behavior is key to behavioral change. Indeed, only communicating the (detrimental) effects of individuals' behavior does not always lead to an actual behavioral change. However, when explaining *how* to conduct a certain behavior, the behavior seems more feasible and is thus more likely to be performed (Onel, 2017). Accordingly, a practical example of an intervention program that takes up the *how* is "Meatless Monday" (www.meatlessmonday.com), established in the US in 2003 and currently holding a global presence. This program includes recipes, online information, forms the basis for meatless initiatives, provides articles, and gives a sense of community. Thereby, increasing availability and familiarity with foods that do not contain meat and increasing overall awareness of meat

reduction. As such, it aids individuals in reducing their meat consumption by means of practical information (Zur & Klöckner, 2014). Other organizations can take this initiative as an example in their efforts to achieve meat reduction. Furthermore, other measures should be taken to facilitate the easiness of meat reduction behavior. For instance, canteens could introduce, e.g. two days a week on which the majority of the offered food would be meat-free. We advise not to introduce entirely meatless days to avoid resistance. Another specific suggestion concerning supermarket placements is to place the meat and hybrid or non-meat products next to each other with signs saying 'You can use me for cooking the same meals without meat'. This would most likely make the decision on what to cook with, for instance, hybrid meat, considerably easier. Consumers would not have to think about how to eat less meat or even be vegetarian but could easily cook and shop as they are used to while reducing their meat consumption.

It should be noted that it is not only found difficult to initiate a behavioral change, but it is also considered challenging to sustain such a change (Gordon et al., 2011). Sustaining a change is amongst others perceived difficult due to the intention-behavior gap as identified by e.g. Sheeran and Webb (2016) which also holds true for meat reduction (Loy, Wieber, Gollwitzer, & Oettingen, 2016). It is therefore advised to promote forming an implementation intention (Ajzen, 2006). Accordingly, a meta-analytical review shows that the inclusion of implementation intentions increases the probability of actual behavior (Gollwitzer & Sheeran, 2006). An implementation intention is a detailed plan including factors such as the when, where, and how of conducting the given behavior. Formulating such a plan facilitates one's ability to perform the intended behavior (Ajzen, 2006). Similarly, Steg and Vlek (2009) argue that commitment strategies, i.e. strategies including an implementation intention, are lucrative in stimulating pro-environmental behavior (Steg & Vlek, 2009).

As for this study, implementation intention plans could include specific days in the week (*when*) without consuming meat (*how*), such as Meatless Mondays. Another example could be to have the 'rule' to only eat meat on the weekend, special occasions, or in restaurants. Furthermore, apps for planning meals throughout the week could be utilized for this purpose. An example of such an app is MealBoard (http://www.mealboard.com/). Herewith, individuals can easily plan meals beforehand while adhering to one's own rules, for instance only eating meat on the weekend. Such plans make the behavior of meat reduction more feasible, i.e. relating back to the PBC, and thus more likely that the behavior is actually performed (e.g. Steg & Vlek, 2009). Furthermore, when promoting such an app, meat reduction could be included as a selling point.

One slogan for the app could thus be ‘Meat reduction made easy - Finally plan your meals and cook them!’

7.3 Limitations

This study is also subject to certain limitations. First, even though quantitative research is deemed applicable in this study, it should be pointed out that quantitative research also receives critique. Some of the main criticism is related to quantitative research utilizing natural science approaches. Furthermore, the measurement process is considered to be flawed, there is too much reliance on measurement instruments and procedures, and the actual meaning and relation to daily life is ignored by only analyzing relationships (Bryman & Bell, 2015).

Second, this study displays limitations regarding the generalizability of results. It should be noted that this study is focused on students in the Netherlands, Germany and Denmark. The sample consisted of various nationalities, primarily from these three countries. Yet, generalizations to countries other than the Netherlands, Germany and Denmark should be made carefully. Moreover, it should be recognized that for student samples, i.e. young individuals with high-levels of education and cognitive skills, it is rather difficult to generalize findings to other consumer groups (Bodur, Duval, & Grohmann, 2015). In addition, well-educated individuals usually hold more environmental awareness, which might have influenced the outcome of this study (Verbeke, 2015).

This research was furthermore based on a convenience sampling due to time and budget restrictions, yet this might have caused biased responses (Zur & Klöckner, 2014). Moreover, it might have impacted the generalizability of the results due to the fact that certain units have a relatively higher chance to be part of the sample (Bryman & Bell, 2015). It should thus be noted that the findings of this study might be generalized only within the target population, rather than the wider population (De Backer & Hudders, 2015). In a similar vein, sample self-selection bias might influence the results of this study as individuals that are more environmentally concerned might have been more prone to answer our questionnaire when reading its description. This might have resulted in an overrepresentation of environmentally concerned people in our study (Hage, Söderholm, & Berglund, 2009). Furthermore, the model of this study is rather complex. While the sample size of 261 is argued to generally be sufficient, a higher sample size might have yielded a higher generalizability of the results (Hair et al., 2014).

Third, limitations related to the used variables in this study must be taken into

consideration. As with most cross-sectional designs, this study ultimately does not include behavior (Wynveen, Wynveen, & Sutton, 2015). While we initially planned to include behavior, the process of testing the measurement model led to an exclusion of the variable. Therefore, intention was seen as a proxy for behavior. The use of intention as a proxy for behavior is not uncommon and widely applied in academic research (Grimmer et al., 2016; Chandon et al., 2005). However, it should be noted that intention does not always lead to behavior (Sheeran & Webb, 2016). Drawing conclusions from intention as a proxy for actual behavior might thus not always be accurate. Moreover, as this study is built on a cross-sectional design possible changes in meat reduction cannot be seen over time (Doran & Larsen, 2016). While SEM models offer ways to draw causal inferences, they can be drawn with less certainty (Hair et al., 2014). In addition, all variables are based on self-reports. While self-reports are commonly utilized in pro-environmental studies (Lange et al., 2018), some researchers argue that self-reports do not always accurately represent reality. Accordingly, it is argued that individuals over-report in their responses regarding pro-environmental research (Kormos & Gifford, 2014) relating to the socially desirable response bias (Sun & Morwitz, 2010). Relying on self-reports might therefore affect the validity of pro-environmental research findings (Kormos & Gifford, 2014).

Fourth, the method was subject to some limitations. In addition, intention and behavior were only measured by one item each. While the items for both intention and behavior were taken out of a highly rated article and a high number of items is not necessarily more beneficial, some researchers argue against the use of one-item constructs. It is argued that more items might result in a higher generalizability and reliability estimates. On the other hand, a higher number of items also requires a larger sample size and some constructs, especially non-latent constructs, can indeed be measured by one item (Hair et al., 2014).

Lastly, we only focused on one type of meat reducers as consumers who do generally eat meat but consciously intend to reduce their meat consumption. However, there are various ways to define this group of consumers. Similarly, we did not distinguish between the various motivations (e.g. health, economics, environment) underlying meat reduction. The motivations for meat reduction might thus encompass but are not limited to pro-environmental intent (Nordlund & Garvill, 2002).

7.4 Future Research

As outlined, our model, hence the proposed extension of the PBC, revealed significant results. It is therefore advised to utilize this model as a basis for further research in the context of meat reduction. As an extended version of the TPB is also used for various other pro-environmental contexts, it could also be interesting for future research to replicate this study in other pro-environmental domains.

An interesting adjustment in future studies could be the incorporation of both feeling-based and cognitive-based attitude. Additionally, the attitude-intention gap could be addressed. The model developed in this study could be extended with different factors such as perceived consumer effectiveness and perceived availability. This could potentially result in a significant relationship between attitude and intention as proposed by the TPB or yield more insights into the reasoning behind the gap. As outlined, we found a significant negative effect of descriptive norm on intention and a positive influence of injunctive norm. While this can be explained by a potential conflict between the two values, this was not further examined in this study. In accordance, future research should further examine both the impact of the descriptive norm on meat reduction as well as the interaction between the two norms in the meat reduction context. This will lead to further insights into how norms shape individuals' meat reduction. Furthermore, it is of interest for further research to carefully examine the additional direct effects identified in the post hoc analysis. While two of the effects were found significant in the post hoc analyses, the scope of this study prohibited a thorough theoretical research on this issue. Therefore, future research should examine the relationship between attitude and personal norm as well as between descriptive norm and personal norm in the context of meat reduction further.

In addition, taking into account the limitations of quantitative research, future research could combine quantitative and qualitative research in a mixed method research. Such an approach is gaining increasing acceptance in social science studies. Accordingly, qualitative research can aid in the development of the hypotheses or provide in-depth knowledge. As such, qualitative research could serve as the basis for the quantitative research or qualitative and quantitative research could be embedded in one design (Bryman & Bell, 2015).

Moreover, the model utilized for our final research did not include behavior. While this was due to the characteristics of the measurement model, the examination of behavior is still of interest in the context of meat reduction. Therefore, future research should aim at not only examining intention but behavior as well. It is furthermore advised that future research includes

objective measures of behavior such as observations. In addition, future research could employ a study with a longitudinal design in order to take into account changes over time. As indicated, it is difficult to operationalize meat reducers. Future research could address this issue by differentiating this consumer group by the amount or frequency of meat consumption. In a similar vein, the various motivations regarding meat reduction could be examined in order to give a comprehensive view on its diverse motivators.

Furthermore, it could be interesting to include the values on the conservation and openness to change dimension in combination with the values on the self-transcendence and self-enhancement dimension. As the self-transcendence and self-enhancement dimension usually influences pro-environmental behavior the strongest, this dimension was chosen in our study. However, by including the conservation and openness to change dimension the refined basic values of Schwartz (2012) are fully covered and further insights might be gained.

Additionally, it is suggested that future studies address different socio-demographic groups to both examine if similar results are to be found, hence validating the findings of this study and to gain insights into meat reduction behavior of these groups. Accordingly, future research could address non-student samples and/or could focus on other countries. In a similar vein, meat consumption is considered to be part of culture (Çoker & Van der Linden, 2020) and pro-environmental behavior can vary across cultures (Oreg & Katz-Gerro, 2006). In addition, cultures have a distinct "shared pattern of beliefs, attitudes, self-definitions, norms and roles and values" (Triandis, 2002: 16). It is thus interesting to test whether our results are similar in a different cultural context, e.g. collectivism vs. individualism.

Moreover, it might be interesting to research the different motivations underlying meat reduction. This could aid more effective strategies and policies in achieving sustainable diets (Apostolidis & McLeay, 2016a). Future research could thus focus on distinct consumer segments in interventions or policy efforts (Apostolidis & McLeay, 2016b).

Lastly, this study focused on red meat, poultry, and pork as these comprise a complete range of meat options. However, this study did not include seafood (e.g. fish, crab, mussels, squids). It might thus be interesting for future studies to cover all types of meat including seafood as this might provide different results. Furthermore, it could also be of interest to future studies to examine if there are distinct results for each type of meat. This could potentially facilitate more focused targeting.

8. Conclusion

The purpose of this study is to identify effective methods of motivating a reduction in meat consumption as a pro-environmental behavior. First, we examined the environmental impact of food choices and what an environmentally responsible diet entails. Second, we gathered and analyzed data which provides insight into how and which norms and values influence meat reduction. Third, we derived practical recommendations to promote the reduction of meat consumption at different levels.

This topic is relevant for several reasons. First, individuals are often not aware of the environmental impact of their diets and do not know which foods an environmentally responsible diet includes. Second, the topic of meat reduction is insufficiently researched. As pro-environmental behavior is highly influenced by psychological motivations, norms and values were examined. Third, organizations lack efficient efforts to reduce meat consumption. It was thus of interest to suggest well-founded practical implications.

In order to sufficiently address the main research question *How do internal processes influence meat reduction as a pro-environmentally responsible behavior?* several aspects of meat reduction were examined. In accordance with pro-environmental research, we concluded that the *type* of foods is central in environmentally responsible diets. For instance, animal-based products are particularly harmful to the environment. It is therefore essential to reduce the intake of such foods to achieve an environmentally responsible diet. A general meat reduction and in particular red meat was found to be the most impactful measure to achieve an environmentally responsible diet.

Furthermore, we developed and tested an extended version of the TPB including values and different types of norms. We found that personal norm, hence the feeling of moral obligation, is the strongest driver of meat reduction intention. In addition, the approval of others, hence the injunctive norm, also results in a higher intention to reduce meat consumption. The descriptive norm was found to have a negative effect, indicating that a high number of meat reducers among one's social group leads to lower meat reduction intention.

We also found that individuals' self-transcendence values drive meat reduction in different relationships. Self-transcendence values were found to positively influence attitude and personal norm and had a positive indirect effect on intention. Self-enhancement values, on the other hand, did not show any significant effects. Accordingly, individuals are more positive towards meat reduction, in terms of attitude, personal norm, and intention, when inheriting

stronger values connected to altruism and caring about the interests and welfare of others and the environment.

In addition, we found no significant influence of attitude on intention, which can be explained by the attitude-intention gap, prominent in pro-environmental research. PBC was positively related to meat reduction intention. Accordingly, if individuals feel capable of engaging in meat reduction, they demonstrate stronger intention.

The extended TPB revealed acceptable fit and applicability. The extended TPB including values, personal norms and a distinction between injunctive and descriptive norm, was found applicable as a theoretical framework in the context of meat reduction. Ultimately, we utilized our theoretical and empirical findings to derive substantiated and practical recommendations. Previous research suggests to focus on a combination of different initiatives such as intervention groups. Utilizing the empirical findings of our study, we conclude that organizations promoting meat reduction should primarily target self-transcendence values and personal norms. Additionally, PBC, the injunctive norm, and descriptive norm also offer effective ways to target consumers. Hereby, the influencing factors can be primarily stimulated by message framing. Using these conclusions as a foundation, future research can further validate our findings and examine new aspects related to meat reduction and diet modification.

Meat reduction is a powerful action to decrease one's environmental impact. With this study, we do not suggest a total renunciation of meat but we do want to encourage more conscious eating patterns. Then perhaps at some point, we will no longer have to ask ourselves 'Why do we not reduce our meat consumption?'

References

Abrahamse, W., & Steg, L. (2011). Factors Related to Household Energy Use and Intention to Reduce It: The Role of Psychological and Socio-Demographic Variables. *Human Ecology Review*, *18*(1), 30–40. https://www.jstor.org/stable/24707684

Abrahamse, W., Steg, L., Vlek, C., & Rothengatter, T. (2005). A review of intervention studies aimed at household energy conservation. *Journal of Environmental Psychology*, *25*, 273–291. https://doi.org/10.1016/j.jenvp.2005.08.002

Aertsens, J., Verbeke, W., Mondelaers, K., & Van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: A review. *British Food Journal*, *111*(10), 1140–1167. https://doi.org/10.1108/00070700910992961

Ajzen, I. (2011). Behavioral Interventions Design and Evaluation Guided by the Theory of Planned Behavior. In *M. M. Mark, S. I. Donaldson, & B. Campbell (Eds.), Social Psychology and Evaluation* (pp. 74–103). The Guilford Press.

Ajzen, I. (2009). *A Theory of Planned Behavior*. http://people.umass.edu/aizen/tpb.html

Ajzen, I. (2006). *Behavioral interventions based on the theory of planned behavior*. https://people.umass.edu/aizen/pdf/tpb.intervention.pdf

Ajzen, I. (2002a). *Constructing a Theory of Planned Behavior questionnaire.* https://people.umass.edu/aizen/pdf/tpb.measurement.pdf

Ajzen, I. (2002b). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*, *32*(4), 665–683. https://doi.org/10.1111/j.1559-1816.2002.tb00236.x

Ajzen, I. (2002c). Residual Effects of Past on Later Behavior: Habituation and Reasoned Action Perspectives. *Personality and Social Psychology Review, 6*(2), 107-122. https://doi.org/10.1207/S15327957PSPR0602_02

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I. (1988). *Attitude, Personality, and Behavior*. Dorsey Press.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *J. Kuhl and J. Beckmann (Eds.), Action Control: From Cognition to Behavior* (pp. 11–39). Springer.

Ajzen, I., & Driver, B. L. (1991). Prediction of leisure participation from behavioral, normative, and control beliefs: An application of the theory of planned behavior. *Leisure Sciences*, *13*(3), 185–204. https://doi.org/10.1080/01490409109513137

Ajzen, I., & Fishbein, M. (2005). The Influence of Attitudes on Behavior. In *Handbook of Attitudes* (pp. 173–221). Lawrence Erlbaum Associates. https://www.researchgate.net/publication/325114583

Ajzen, I., & Fishbein, M. (2000). Attitudes and the attitude-behavior relation: Reasoned and automatic processes. In *W. Stroebe & M. Hewstone (Eds.), European review of social psychology* (pp. 1–33). Wiley.

Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Prentice Hall.

Ajzen, I., Joyce, N., Sheikh, S., & Cote, N. G. (2011). Knowledge and the Prediction of Behavior: The Role of Information Accuracy in the Theory of Planned Behavior. *Basic and Applied Social Psychology, 33*(2), 101-117. https://doi.org/10.1080/01973533.2011.568834

Aleksandrowicz, L., Green, R., Joy, E. J. M., Smith, P., & Haines, A. (2016). The impacts of dietary change on greenhouse gas emissions, land use, water use, and health: A systematic review. *PLoS ONE*, *11*(11). https://doi.org/10.1371/journal.pone.0165797

Allcott, H., & Mullainathan, S. (2010). Behavior and Energy Policy. *Science*, *327*(5970), 1204–1205. https://doi.org/10.1126/science.1180775

Allen, M. W., & Ng, S. H. (2003). Human values, utilitarian benefits and identification: The case of meat. *European Journal of Social Psychology*, *33*(1), 37–56. https://doi.org/10.1002/ejsp.128

Alloy, L., Jacobson, N., & Acocella, J. (1999). *Abnormal psychology: Current perspectives*. McGraw-Hill. https://psycnet.apa.org/record/1995-98429-000

Allport, G.W., Vernon, P., 1931. A test for personal values. *The Journal of Abnormal and Social Psychology*, *26*(3), 231–248.

Anable, J., Lane, B. and Kelay, T. (2006), *An Evidence Base Review of Public Attitudes to Climate Change and Transport Behaviour,* Department for Transport, London.

Anderson, E. (2000). Beyond Homo Economicus: New Developments in Theories of Social Norms. *Philosophy & Public Affairs*, *29*(2), 170–200. www.jstor.org/stable/2672816

Antimova, R., Nawijn, J., & Peeters, P. (2012). The awareness/attitude-gap in sustainable tourism: A theoretical perspective. *Tourism Review*, *67*(3), 7–16. https://doi.org/10.1108/16605371211259795

Apostolidis, C., & McLeay, F. (2016a). It's not vegetarian, it's meat-free! Meat eaters, meat reducers and vegetarians and the case of Quorn in the UK. *Social Business*, *6*(3), 267–290. https://doi.org/10.1362/204440816x14811339560938

Apostolidis, C., & McLeay, F. (2016b). Should we stop meating like this? Reducing meat consumption through substitution. *Food Policy*, *65*, 74–89. https://doi.org/10.1016/j.foodpol.2016.11.002

Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: A meta-analytic review. *British Journal of Social Psychology*, *40*(4), 471–499. https://doi.org/10.1348/014466601164939

Arnould, E. J., Price, L. L., & Zinkhan, G. M. (2004). *Consumers*. McGraw-Hill/Irwin.

Arvola, A., Vassallo, M., Dean, M., Lampila, P., Saba, A., Lähteenmäki, L., & Shepherd, R. (2008). Predicting intentions to purchase organic food: The role of affective and moral attitudes in the Theory of Planned Behaviour. *Appetite*, *50*(2–3), 443–454. https://doi.org/10.1016/j.appet.2007.09.010

Asch, S. (1955). Opinions and social pressure. *Scientific American*, *193*, 31–35. https://www.jstor.org/stable/24943779

Aston, L. M., Smith, J. N., & Powles, J. W. (2012). Impact of a reduced red and processed meat dietary pattern on disease risks and greenhouse gas emissions in the UK: A modelling study. *BMJ Open*, *2*, 1–9. https://doi.org/10.1136/bmjopen-2012-001072

Bailey, R., Froggatt, A., & Wellesley, L. (2014). *Livestock-Climate Change's Forgotten Sector Global Public Opinion on Meat and Dairy Consumption*. https://gastronomiaycia.republica.com/wp-content/uploads/2014/12/estudio_consumo_carne.pdf

Baker, S., Thompson, K. E., & Palmer-Barnes, D. (2002). Crisis in the meat industry: A values-based approach to communications strategy. *Journal of Marketing Communications*, *8*(1), 19–30. https://doi.org/10.1080/13527260110108319

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. https://doi.org/10.1016/j.jenvp.2007.04.001

Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, *27*(1), 14–25. https://doi.org/10.1016/j.jenvp.2006.12.002

Bamberg, S., & Schmidt, P. (2003). Incentives, Morality, Or Habit? Predicting Students' Car Use for University Routes With the Models of Ajzen, Schwartz, and Triandis. *Environment and Behavior*, *35*(2), 264–285. https://doi.org/10.1177/0013916502250134

Bandura, A. (2007). Impeding ecological sustainability through selective moral disengagement. *International Journal of Innovation and Sustainable Development*, *2*(1), 8–35. https://doi.org/10.1504/IJISD.2007.016056

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A., & Wessels, S. (1997). *Self-efficacy: The exercise of control*. Freeman.

Barnett, C., Clarke, N., Cloke, P., & Malpass, A. (2005). The political ethics of consumerism. *Consumer Policy Review*, *15*(2), 45–51. http://oro.open.ac.uk/7143/

Barr, S. & Gilg, A. (2007). A Conceptual Framework for Understanding and Analyzing Attitudes towards Environmental Behaviour. *Geografiska Annaler. Series B, Human Geography, 89*(4), 361-379. www.jstor.org/stable/4621594

Bauer, D., Arnold, J., & Kremer, K. (2018). Consumption-Intention Formation in Education for Sustainable Development: An Adapted Model Based on the Theory of Planned Behavior. *Sustainability*, *10*(10), 3455. https://doi.org/10.3390/su10103455

Baumeister, R. F., & Bargh, J. A. (2014). Conscious and unconscious: Toward an integrative understanding of human mental life and action. In *J. W. Sherman, B. Gawronski, Y. Trope, J. W. Sherman, B. Gawronski, Y. Trope (Eds.) Dual-process theories of the social mind* (pp. 35–49). Guilford Press.

Beardsworth, A. & Keil, T. (2002). *Sociology on the menu: An invitation to the study of food and society.* Routledge, London.

Beedell, J., & Rehman, T. (2000). Using social-psychology models to understand farmers' conservation behaviour. *Journal of Rural Studies*, *16*(1), 117–127. https://doi.org/10.1016/S0743-0167(99)00043-1

Bergquist, M., & Nilsson, A. (2019). The DOs and DON'Ts in social norms: A descriptive don't-norm increases conformity. *Journal of Theoretical Social Psychology*, *3*(3), 158–166. https://doi.org/10.1002/jts5.43

Berndsen, M., & Van Der Pligt, J. (2004). Ambivalence towards meat. *Appetite*, *42*, 71–78. https://doi.org/10.1016/S0195-6663(03)00119-3

Bicchieri, C. (2002). Covenants without Swords: Group Identity, Norms, and Communication in Social Dilemmas. Rationality and Society, 14(2), 192–228. https://doi.org/10.1177/1043463102014002003

Bicchieri, C., & Muldoon, R. (2014). Social norms. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*.

Biel, A., & Thøgersen, J. (2007). Activation of social norms in social dilemmas: A review of the evidence and reflections on the implications for environmental behaviour. *Journal of Economic Psychology*, *28*(1), 93–112. https://doi.org/10.1016/j.joep.2006.03.003

Bodur, H. O., Duval, K. M., & Grohmann, B. (2015). Will You Purchase Environmentally Friendly Products? Using Prediction Requests to Increase Choice of Sustainable Products. *Journal of Business Ethics*. https://doi.org/10.1007/s10551-014-2143-6

Bogers, R. P., Brug, J., Van Assema, P., & Dagnelie, P. C. (2004). Explaining fruit and vegetable consumption: The theory of planned behaviour and misconception of personal intake levels. *Appetite*, *42*(2), 157–166. https://doi.org/10.1016/j.appet.2003.08.015

Bonnes, M., & Carrus, M. (2004). Environmental psychology, overview. In *C. Spielberger (Ed.), Encyclopedia of Applied Psychology* (Vol. 1, pp. 801–814). New York, NY: Academic Press/Elsevier.

Bonny, S. P. F., Gardner, G. E., Pethick, D. W., & Hocquette, J.-F. (2015). What is artificial meat and what does it mean for the future of the meat industry? *Journal of Integrative Agriculture*, *14*(2), 255–263. https://doi.org/https://doi.org/10.1016/S2095-3119(14)60888-1

Bouman, T., Steg, L., & Kiers, H. A. L. (2018). Measuring Values in Environmental Research: A Test of an Environmental Portrait Value Questionnaire. *Frontiers in Psychology*, *9*(564). https://doi.org/10.3389/fpsyg.2018.00564

Brundtland, G. (1987). *Report of the World Commission on Environment and Development: Our Common Future.* https://doi.org/10.1080/07488008808408783

Brunsø, K., Scholderer, J., & Grunert, K. G. (2004). Closing the gap between values and behavior - A means-end theory of lifestyle. *Journal of Business Research*, *57*(6), 665–670. https://doi.org/10.1016/S0148-2963(02)00310-7

Bryman, A. (2012). *Social research methods* (5th ed.). Oxford University Press.

Bryman, A. (1989). *Research Methods and Organization Studies*. Routledge.

Bryman, A., & Bell, E. (2015). *Business Research Methods* (4th ed.). Oxford University Press.

Burns, D. J., & Neisner, L. (2006). Customer satisfaction in a retail setting: the contribution of emotion. *International Journal of Retail & Distribution Management*, *34*(1), 49-66. https://doi.org/10.1108/09590550610642819

Carrington, D. (2018). *Huge reduction in meat-eating 'essential' to avoid climate breakdown | Environment | The Guardian*. https://www.theguardian.com/environment/2018/oct/10/huge-reduction-in-meat-eating-essential-to-avoid-climate-breakdown

Carrington, M. J., Neville, B. A., & Whitwell, G. J. (2010). Why ethical consumers don't walk their talk: Towards a framework for understanding the gap between the ethical purchase intentions and actual buying behaviour of ethically minded consumers. *Journal of Business Ethics*, *97*(1), 139–158. https://doi.org/10.1007/s10551-010-0501-6

Chambers, R., & Conway, G. (1992). Sustainable rural livelihoods : practical concepts for the 21st century. In *IDS Discussion Paper* (p. 42). Institute of Development Studies.

Chan, L., & Bishop, B. (2013). A moral basis for recycling: Extending the theory of planned behaviour. *Journal of Environmental Psychology*, *36*, 96–102. https://doi.org/10.1016/j.jenvp.2013.07.010

Chandon, P., Morwitz, V. G., & Reinartz, W. J. (2005). Do Intentions Really Predict Behavior? Self-Generated Validity Effects in Survey Research. *Journal of Marketing*, *69*(2), 1–14. https://doi.org/10.1509/jmkg.69.2.1.60755

Chen, M. F., & Tung, P. J. (2014). Developing an extended Theory of Planned Behavior model to predict consumers' intention to visit green hotels. *International Journal of Hospitality Management*, *36*, 221–230. https://doi.org/10.1016/j.ijhm.2013.09.006

Chong, D., & Druckman, J. N. (2007). Framing theory. *Annual Review of Political Science*, *10*, 103–126. https://doi.org/10.1017/S0003055407070554

Cialdini, R. B. (2003). Crafting Normative Messages to Protect the Environment. Current Directions in Psychological Science, 12(4), 105–109. https://doi.org/10.1111/1467-8721.01242

Cialdini, R. B., & Goldstein, N. J. (2004). Social Influence: Compliance and Conformity. *Annual Review of Psychology*, *55*, 591–621. https://doi.org/10.1146/annurev.psych.55.090902.142015

Cialdini, R. B., Kallgren, C. A., & Reno, R. R. (1991). A Focus Theory of Normative Conduct: A Theoretical Refinement and Reevaluation of the Role of Norms in Human Behavior. *Advances in Experimental Social Psychology*, *24*, 201–234. https://doi.org/10.1016/S0065-2601(08)60330-5

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, *58*, 1015–1026. http://dx.doi.org/10.1037/0022-3514.58.6.1015

Cieciuch, J., Schwartz, S. H., & Davidov, E. (2015). The Social Psychology of Values. In *International Encyclopedia of the Social & Behavioral Sciences* (pp. 41–46). Elsevier. https://doi.org/10.1016/B978-0-08-097086-8.25098-8

Clayton, S., & Myers, G. (2009). *Conservation psychology: Understanding and promoting human care for nature*. John Wiley & Sons.

Clarke, N., Barnett, C., Cloke, P., & Malpass, A. (2007). The political rationalities of Fairtrade consumption in the United Kingdom. *Politics and Society*, *35*(4), 583–607. https://doi.org/10.1177/0032329207308178

Cohen, L., Manion, L., & Morrison, K. (2006). *Research Methods in Education* (5th ed.). Routledge.

Cohen, M. J., & Murphy, J. (Eds.). (2001). Consumption, environment, and public policy. In *Exploring Sustainable Consumption: Environmental Policy and the Social Sciences* (pp. 3–17). Elsevier.

Çoker, E. N., & Van der Linden, S. (2020). Fleshing out the theory of planned behavior: Meat consumption as an environmentally significant behavior. *Current Psychology*, 1–10. https://doi.org/10.1007/s12144-019-00593-3

Conner, M., & Armitage, C. (1998). Extending the Theory of Planned Behaviour: A review and Avenues for Further Research. *Journal of Applied Social Psychology*, *28*, 1429–1464. https://doi.org/10.1111/j.1559-1816.1998.tb01685.x

Conner, M., Gaston, G., Sheeran, P., & Germain, M. (2013). Some feelings are more important: Cognitive attitudes, affective attitudes, anticipated affect, and blood donation. *Health Psychology*, *32*, 264–272. https://doi.org/doi:10.1037/a0028500

Connolly, J., & Prothero, A. (2008). Green Consumption: Life-politics, risk and contradictions. *Journal of Consumer Culture*, *8*(1), 117–145. https://doi.org/10.1177/1469540507086422

Creswell, J. (2003). *Research design: Qualitative, quantitative and mixed methods approaches* (2nd ed.). SAGE Publications.

Cronin, J. M., McCarthy, M. B., & Collins, A. M. (2014). Covert distinction: how hipsters practice food-based resistance strategies in the production of identity. *Consumption Markets & Culture*, *17*(1), 2–28. https://doi.org/10.1080/10253866.2012.678785

Dagevos, H., & Voordouw, J. (2013). Sustainability and meat consumption: is reduction realistic? *Sustainability: Science, Practice and Policy*, *9*(2), 60–69. https://doi.org/10.1080/15487733.2013.11908115

De Backer, C. J. S., & Hudders, L. (2015). Meat morals: Relationship between meat consumption consumer attitudes towards human and animal welfare and moral behavior. *Meat Science*, *99*, 68–74. https://doi.org/10.1016/j.meatsci.2014.08.011

De Backer, C. J. S., & Hudders, L. (2014). From Meatless Mondays to Meatless Sundays: Motivations for Meat Reduction among Vegetarians and Semi-vegetarians Who Mildly or Significantly Reduce Their Meat Intake. *Ecology of Food and Nutrition*, *53*(6), 639–657. https://doi.org/10.1080/03670244.2014.896797

De Bakker, E., & Dagevos, H. (2012). Reducing Meat Consumption in Today's Consumer Society: Questioning the Citizen-Consumer Gap. *Journal of Agricultural and Environmental Ethics*, *25*(6), 877–894. https://doi.org/10.1007/s10806-011-9345-z

De Bakker, E., & Dagevos, H. (2010). *Vleesminnaars, vleesminderaars en vleesmijders; Duurzame eiwitconsumptie in een carnivore eetcultuur* (No. 2010-0). LEI Wageningen UR.

De Boer, J., & Aiking, H. (2017). Pursuing a Low Meat Diet to Improve Both Health and Sustainability: How Can We Use the Frames that Shape Our Meals? *Ecological Economics*, *142*, 238–248. https://doi.org/10.1016/j.ecolecon.2017.06.037

De Boer, J., & Aiking, H. (2011). On the merits of plant-based proteins for global food security: Marrying macro and micro perspectives. *Ecological Economics*, *70*, 1259–1265. https://doi.org/10.1016/j.ecolecon.2011.03.001

De Boer, J., Helms, M., & Aiking, H. (2006). Protein consumption and sustainability: Diet diversity in EU-15. *Ecological Economics*, *59*(3), 267–274. https://doi.org/10.1016/j.ecolecon.2005.10.011

De Boer, J., Hoogland, C. T., & Boersema, J. J. (2007). Towards more sustainable food choices: Value priorities and motivational orientations. *Food Quality and Preference*, *18*(7), 985–996. https://doi.org/10.1016/j.foodqual.2007.04.002

De Boer, J., Schösler, H., & Aiking, H. (2014). 'Meatless days' or 'less but better'? Exploring strategies to adapt Western meat consumption to health and sustainability challenges. *Appetite*, *76*, 120–128. https://doi.org/10.1016/j.appet.2014.02.002

De Boer, J., Schösler, H., & Boersema, J. J. (2013). Climate change and meat eating: An inconvenient couple? *Journal of Environmental Psychology*, *33*(3), 1–8. https://doi.org/10.1016/j.jenvp.2012.09.001

De Groot, J. I. M., & Steg, L. (2008). Value Orientations to Explain Beliefs Related to Environmental Significant Behavior. *Environment and Behavior*, *40*(3), 330–354. https://doi.org/10.1177/0013916506297831

De Groot, J. I. M., & Steg, L. (2007). Value Orientations and Environmental Beliefs in Five Countries. *Journal of Cross-Cultural Psychology*, *38*(3), 318–332. https://doi.org/10.1177/0022022107300278

De Haan, C., Van Veen, T. S., Brandenburg, B., Gauthier, J., Le Gall, F., Mearns, R., & Simeon, M. (2001). Livestock development: Implications on rural poverty, the environment, and global food security. In *Livestock Development*. World Bank Publications. https://doi.org/10.1596/0-8213-4988-0

De Leeuw, A., Valois, P., Ajzen, I., & Schmidt, P. (2015). Using the theory of planned behavior to identify key beliefs underlying proenvironmental behavior in high-school students: Implications for educational interventions. *Journal of Environmental Psychology*, *42*, 128–138. https://doi.org/10.1016/j.jenvp.2015.03.005

Dean, M., Raats, M. M., & Shepherd, R. (2008). Moral concerns and consumer choice of fresh and processed organic foods. *Journal of Applied Social Psychology*, *38*(8), 2088–2107. https://doi.org/10.1111/j.1559-1816.2008.00382.x

Derbyshire, E. J. (2017). Flexitarian Diets and Health: A Review of the Evidence-Based Literature. *Frontiers in Nutrition*, *3*(55), 1–8. https://doi.org/10.3389/fnut.2016.00055

Dewey, J. (1902). The Evolutionary Method as Applied to Morality. *The Philosophical Review*, *11*(2), 107. https://doi.org/10.2307/2176631

Deutsch, M., & Gerard, H. B. (1955). A study of normative and informational social influences upon individual judgment. *Journal of Abnormal and Social Psychology*, *51*(3), 629–636. https://doi.org/10.1037/h0046408

Dibb, S., & Fitzpatrick, I. (2014). Let's talk about meat: changing dietary behaviour for the 21st century. In *Eating better*. https://www.eating-better.org/uploads/Documents/LetsTalkAboutMeat.pdf

Dietz, T., Fitzgerald, A., & Shwom, R. (2005). Environmental values. *Annual Review of Environment and Resources*, *30*(1), 335–372. https://doi.org/10.1146/annurev.energy.30.050504.144444

Doran, R., & Larsen, S. (2016). The Relative Importance of Social and Personal Norms in Explaining Intentions to Choose Eco-Friendly Travel Options. *International Journal of Tourism Research*, *18*(2), 159–166. https://doi.org/10.1002/jtr.2042

Dulany, D. E. (1961). Hypotheses and habits in verbal "operant conditioning". *Journal of Abnormal and Social Psychology*, *63*, 251–263. http://dx.doi.org/10.1037/h0047703

Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Harcourt Brace Jovanovich College Publishers. https://psycnet.apa.org/record/1992-98849-000

Easterby-Smith, M., Thorpe, R., & Jackson, P. (2015). *Management Research* (5th ed.). SAGE.

Edjabou, L. D., & Smed, S. (2013). The effect of using consumption taxes on foods to promote climate friendly diets - The case of Denmark. *Food Policy*, *39*, 84–96. https://doi.org/10.1016/j.foodpol.2012.12.004

2018 EPI Report. (2018). https://epi.envirocenter.yale.edu/2018/report/category/hlt

Evans, J. R., & Mathur, A. (2005). The value of online surveys. *Internet Research*, *15*(2), 195–219. https://doi.org/10.1108/10662240510590360

Fang, W. T., Ng, E., Wang, C. M., & Hsu, M. L. (2017). Normative beliefs, attitudes, and social norms: People reduce waste as an index of social relationships when spending leisure time. *Sustainability*, *9*(10), 1696. https://doi.org/10.3390/su9101696

FAO. (2010). Biodiversity and sustainable diets united against hunger. *International Scientific Symposium*, 1–27. http://www.fao.org/ag/humannutrition/29186-021e012ff2db1b0eb6f6228e1d98c806a.pdf

Farrow, K., Grolleau, G., & Ibanez, L. (2017). Social Norms and Pro-environmental Behavior: A Review of the Evidence. *Ecological Economics*, *140*, 1–13. https://doi.org/10.1016/j.ecolecon.2017.04.017

Fazio, R. H. (1995). Attitudes as object-evaluation associations: determinants, consequences, and correlates of attitude accessibility. *Attitude Strength: Antecedents Consequences*, *4*, 247–282.

Feather, N. T. (1982). *Expectations and Actions: Expectancy-value Models in Psychology*. Lawrence Erlbaum Associates.

Festinger, L. (1957). *A Theory of Cognitive Dissonance*. Stanford University Press.

Fielding, K. S., McDonald, R., & Louis, W. R. (2008). Theory of planned behaviour, identity and intentions to engage in environmental activism. *Journal of Environmental Psychology*, *28*(4), 318–326. https://doi.org/10.1016/j.jenvp.2008.03.003

Fishbein, M. (1967). Attitude and the prediction of behavior. In *M. Fishbein (Ed.), Readings in attitude theory and measurement* (pp. 477–492). John Wiley.

Fishbein, M., & Ajzen, I. (1975). *Belief; attitude, intention and behaviour: An introduction to theory and research. Reading, MA: Addison-Wesley.attitudes*. Gallup International Institute.

Forestell, C. A., Spaeth, A. M., & Kane, S. A. (2012). To eat or not to eat red meat. A closer look at the relationship between restrained eating and vegetarianism in college females. *Appetite*, *58*(1), 319–325. https://doi.org/10.1016/j.appet.2011.10.015

Fornara, F., Carrus, G., Passafaro, P., & Bonnes, M. (2011). Distinguishing the sources of normative influence on proenvironmental behaviors: The role of local norms in household waste recycling. *Group Processes and Intergroup Relations*, *14*(5), 623–635. https://doi.org/10.1177/1368430211408149

Fox, N., & Ward, K. (2008). Health, ethics and environment: a qualitative study of vegetarian motivations. *Appetite*, *50*(2–3), 422–429. https://doi.org/10.1016/j.appet.2007.09.007

Gaard, G. (2002). Vegetarian Ecofeminism: A Review Essay. In *Frontiers: A Journal of Women Studies* (Vol. 23, pp. 117–146). University of Nebraska Press. https://doi.org/10.2307/3347337

Garnett, T., Mathewson, S., Angelides, P., Borthwick F. (2015). *Policies and actions to shift eating patterns: What works? A review of the evidence of the effectiveness of interventions aimed at shifting diets in more sustainable and healthy directions*. Chatham House, London, UK.

Geng, L., Xu, J., Ye, L., Zhou, W., & Zhou, K. (2015). Connections with nature and environmental behaviors. *PLoS ONE*, *10*(5). https://doi.org/10.1371/journal.pone.0127247

Gerber, P. J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A., & Tempio, G. (2013). Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. *Food and Agriculture Organization of the United Nations (FAO)*. www.fao.org/publications

Gifford, R., & Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behaviour: A review. *International Journal of Psychology*, *49*(3), 141–157. https://doi.org/10.1002/ijop.12034

Gkargkavouzi, A., Halkos, G., & Matsiori, S. (2019). Environmental behavior in a private-sphere context: Integrating theories of planned behavior and value belief norm, self-identity and habit. *Resources, Conservation and Recycling*, *148*, 145–156. https://doi.org/10.1016/j.resconrec.2019.01.039

Godin, G., Conner, M., & Sheeran, P. (2005). Bridging the intention-behaviour “gap”: The role of moral norm. *British Journal of Social Psychology*, *44*(4), 497–512. https://doi.org/10.1348/014466604X17452

Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels. *Journal of Consumer Research*, *35*(3), 472–482. https://doi.org/10.1086/586910

Gollwitzer, P. M., Sheeran, P., & (Ed.), M. P. Z. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology*, *38*, 69–119. https://doi.org/10.1016/S0065-2601(06)38002-1

Gordon, R., Carrigan, M., & Hastings, G. (2011). A framework for sustainable marketing. *Marketing Theory*, *11*(2), 143–163. https://doi.org/10.1177/1470593111403218

Graça, J. (2016). Towards an Integrated Approach to Food Behaviour: Meat Consumption and Substitution, From Context to Consumers. *Psychology, Community & Health*, *5*(2), 152–169. https://doi.org/10.5964/pch.v5i2.169

Graça, J., Calheiros, M. M., & Oliveira, A. (2015). Attached to meat? (Un)Willingness and intentions to adopt a more plant-based diet. *Appetite*, *95*, 113–125. https://doi.org/10.1016/j.appet.2015.06.024

Graham, T., & Abrahamse, W. (2017). Communicating the climate impacts of meat consumption: The effect of values and message framing. *Global Environmental Change*, *44*, 98–108. https://doi.org/10.1016/j.gloenvcha.2017.03.004

Grimmer, M., Kilburn, A. P., & Miles, M. P. (2016). The effect of purchase situation on realized pro-environmental consumer behavior. *Journal of Business Research*, *69*(5), 1582–1586. https://doi.org/10.1016/j.jbusres.2015.10.021

Guba, E. (1990). *The Paradigm Dialog*. Sage.

Gupta, S., & Ogden, D. T. (2009). To buy or not to buy? A social dilemma perspective on green buying. *Journal of Consumer Marketing*, *26*(6), 378–393. https://doi.org/10.1108/07363760910988201

Ha, H. Y., & Janda, S. (2012). Predicting consumer intentions to purchase energy-efficient products. *Journal of Consumer Marketing*, *29*(7), 461–469. https://doi.org/10.1108/07363761211274974

Hage, O., Söderholm, P., & Berglund, C. (2009). Norms and economic motivation in household recycling: Empirical evidence from Sweden. *Resources, Conservation and Recycling*, *53*, 155–165. https://doi.org/10.1016/j.resconrec.2008.11.003

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate Data Analysis* (7th ed.). Pearson Education Limited. www.pearsoned.co.uk

Hall, L. (2005). Norms. In *Dictionary of Multicultural Psychology: Issues, Terms, and Concepts* (p. 127). SAGE Publications, Inc. https://doi.org/10.4135/9781452204437.n162

Ham, M., Jeger, M., & Ivković, A. F. (2015). The role of subjective norms in forming the intention to purchase green food The role of subjective norms in forming the intention to purchase green food. *Economic Research-Ekonomska Istraživanja*, *28*(1), 738–748. https://doi.org/10.1080/1331677X.2015.1083875

Han, H. (2015). Travelers' pro-environmental behavior in a green lodging context: Converging value-belief-norm theory and the theory of planned behavior. *Tourism Management*, *47*, 164–177. https://doi.org/10.1016/j.tourman.2014.09.014

Han, H., Hsu, L. T. (Jane), & Sheu, C. (2010). Application of the Theory of Planned Behavior to green hotel choice: Testing the effect of environmental friendly activities. *Tourism Management*, *31*(3), 325–334. https://doi.org/10.1016/j.tourman.2009.03.013

Han, H., & Kim, Y. (2010). An investigation of green hotel customers' decision formation: developing an extended model of the theory of planned behavior International. *Journal of Hospitality Management*, *29*, 659–668. https://doi.org/10.1016/j.ijhm.2010.01.001

Han, H., & Ryu, K. (2006). Moderating role of personal characteristics in forming restaurant customers' behavioral intentions: an upscale restaurant setting. *Journal of Hospitality & Leisure Marketing*, *15*(4), 25–53. https://doi.org/10.1300/J150v15n04_03

Harland, P., Staats, H., & Wilke, H. A. (1999). Explaining proenvironmental intention and behavior by personal norms and the theory of planned behavior. *Journal of Applied Social Psychology*, *29*, 2505–2528. https://doi.org/10.1111/j.1559-1816.1999.tb00123.x

Hertwich, E., Van der Voet, E., Suh, S., Tukker, A., Huijbregts, M., Kazmierczyk, P., Lenzen, M., McNeely, J., & Moriguchi, Y. (2010). *Assessing the Environmental Impacts of Consumption and Production Priority Products and Materials, A Report of the Working Group on the Environmental Impacts of Products and Materials to the International Panel for Sustainable Resource Management.* UNEP. https://www.resourcepanel.org/reports/assessing-environmental-impacts-consumption-and-production

Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *Journal of Environmental Education*, *18*(2), 1–8. https://doi.org/10.1080/00958964.1987.9943482

Hoek, A. C., Luning, P. A., Weijzen, P., Engels, W., Kok, F. J., & De Graaf, C. (2011). Replacement of meat by meat substitutes. A survey on person- and product-related factors in consumer acceptance. *Appetite*, *56*, 662–673. https://doi.org/10.1016/j.appet.2011.02.001

Hoek, A. C., Pearson, D., James, S. W., Lawrence, M. A., & Friel, S. (2017). Shrinking the food-print: A qualitative study into consumer perceptions, experiences and attitudes

towards healthy and environmentally friendly food behaviours. *Appetite*, *108*, 117–131. https://doi.org/10.1016/j.appet.2016.09.030

Hopper, J. R., & Nielsen, J. M. (1991). Recycling as altruistic behavior: Normative and Behavioral Strategies to Expand Participation in a Community Recycling Program. *Environment and Behavior*, *23*(2), 195–220. https://doi.org/10.1177/0013916591232004

Hsu, C. L., Chang, C. Y., & Yansritakul, C. (2017). Exploring purchase intention of green skincare products using the theory of planned behavior: Testing the moderating effects of country of origin and price sensitivity. *Journal of Retailing and Consumer Services*, *34*, 145–152. https://doi.org/10.1016/j.jretconser.2016.10.006

IPCC (2014a) Climate Change 2014: Impacts, Adaptation, and Vulnerability. Summary for policymakers and technical summary. Part A: Global and Sectoral Aspects. Part of the Working Group II. Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Geneva

IPCC (2014b) Climate Change 2014. Mitigation of climate change. Summary for policymakers and technical summary. Part of the Working Group III. Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Intergovernmental Panel on Climate Change, Geneva

Jackson, T. (2005). *Motivating Sustainable Consumption: A Review of Evidence on Consumer Behaviour and Behavioural Change*. Center for Environmental Strategy, University of Surrey.

Janda, S., & Trocchia, P. J. (2001). Vegetarianism: toward a greater understanding. *Psychology and Marketing*, *18*(12), 1205–1240. https://doi.org/10.1002/mar.1050

Janssen, M., Busch, C., Rödiger, M., & Hamm, U. (2016). Motives of consumers following a vegan diet and their attitudes towards animal agriculture. *Appetite*, *105*, 643–651. https://doi.org/10.1016/j.appet.2016.06.039

Jansson, J., & Dorrepaal, E. (2015). Personal Norms for Dealing with Climate Change: Results from a Survey Using Moral Foundations Theory. *Sustainable Development*, *23*(6), 381–395. https://doi.org/10.1002/sd.1598

Jansson, J., Marell, A., & Nordlund, A. (2010). Green consumer behavior: Determinants of curtailment and eco-innovation adoption. *Journal of Consumer Marketing*, *27*(4), 358–370. https://doi.org/10.1108/07363761011052396

Joy, M. (2011). *Why we love dogs, eat pigs, and wear cows: An introduction to carnism.* Conari press.

Kahneman, D. (2003). Maps of bounded rationality: Psychology for behavioral economics. *American Economic Review*, *93*(5), 1449–1475. https://doi.org/10.1257/000282803322655392

Kaiser, F. G. (2006). A moral extension of the theory of planned behavior: Norms and anticipated feelings of regret in conservationism. *Personality and Individual Differences*, *41*, 71–81. https://doi.org/10.1016/j.paid.2005.11.028

Kaiser, F. G., Hübner, G., & Bogner, F. X. (2005). Contrasting the theory of planned behavior with the value-belief-norm model in explaining conservation behavior. *Journal of Applied Social Psychology*, *35*(10), 2150–2170. https://doi.org/10.1111/j.1559-1816.2005.tb02213.x

Kates, R. W. (2017). Sustainability Science. In *D. Richardson, N. Castree, M. F. Goodchild, A. Kobayashi, W. Liu, & R. A. Marston. (Eds.), International Encyclopedia of Geography: People, the Earth, Environment and Technology* (pp. 1–4). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118786352.wbieg0279

Kates, R. W., Clark, W. C., Corell, R., Hall, J. M., Jaeger, C. C., Lowe, I., McCarthy, J. J., Schellnhuber, H. J., Bolin, B., Dickson, N. M., Faucheux, S., Gallopin, G. C., Grübler, A., Huntley, B., Jäger, J., Jodha, N. S., Kasperson, R. E., Mabogunje, A., Matson, P., … Svedin, U. (2001). Environment and Development: Sustainability Science. *Science*, *292*(5517), 641–642. https://doi.org/10.1126/science.1059386

Kim, Y., & Han, H. (2010). Intention to pay conventional-hotel prices at a green hotel – a modification of the theory of planned behavior. *Journal of Sustainable Tourism*, *18*(8), 997–1014. https://doi.org/10.1080/09669582.2010.490300

Kim, K., Reicks, M., & Sjoberg, A. (2003). Applying the Theory of Planned Behavior to Predict Dairy Product Consumption by Older Adults. *Journal of Nutrition Education and Behavior*, *35*(6), 294–301. https://doi.org/10.1016/S1499-4046(06)60343-6

Kinzig, A. P., Ehrlich, P. R., Alston, L. J., Arrow, K., Barrett, S., Buchman, T. G., Daily, G. C., Levin, B., Levin, S., Oppenheimer, M., Ostrom, E., & Saari, D. (2013). Social Norms and Global Environmental Challenges: The Complex Interaction of Behaviors, Values, and Policy. *BioScience*, *63*(3), 164–175. https://doi.org/10.1525/bio.2013.63.3.5

Kline, R. B. (2011). *Principles And Practice Of Structural Equation Modeling*. Guilford Press.

Kormos, C., & Gifford, R. (2014). The validity of self-report measures of proenvironmental behavior: A meta-analytic review. *Journal of Environmental Psychology*, *40*, 359–371. https://doi.org/10.1016/j.jenvp.2014.09.003

Köster, E. P. (2009). Diversity in the determinants of food choice: A psychological perspective. *Food Quality and Preference*, *20*(2), 70–82. https://doi.org/10.1016/j.foodqual.2007.11.002

Krystallis, A., Vassallo, M., Chryssohoidis, G., & Perrea, T. (2008). Societal and individualistic drivers as predictors of organic purchasing revealed through a portrait value questionnaire (PVQ)-based inventory. *Journal of Consumer Behaviour*, *7*(2), 164–187. https://doi.org/10.1002/cb.244

Kuhl, J., & Quirin, M. (2011). Seven steps toward freedom and two ways to lose it: Overcoming limitations of intentionality through self-confrontational coping with stress. *Social Psychology*, *42*(1), 74–84. https://doi.org/doi: 10.1027/1864-9335/a000045

Kuhlman, T., & Farrington, J. (2010). What is sustainability? *Sustainability*, *2*(11), 3436–3448. https://doi.org/10.3390/su2113436

Laestadius, L. I., Neff, R. A., Barry, C. L., & Frattaroli, S. (2014). "We don't tell people what to do": An examination of the factors influencing NGO decisions to campaign for reduced meat consumption in light of climate change. *Global Environmental Change*, *29*, 32–40. https://doi.org/10.1016/j.gloenvcha.2014.08.001

Laestadius, L. I., Neff, R. A., Barry, C. L., & Frattaroli, S. (2013). Meat consumption and climate change: The role of non-governmental organizations. *Climatic Change*, *120*(1–2), 25–38. https://doi.org/10.1007/s10584-013-0807-3

Lam, T., & Hsu, C. H. C. (2006). Predicting behavioral intention of choosing a travel destination. *Tourism Management*, *27*, 589–599. https://doi.org/10.1016/j.tourman.2005.02.003

Lam, T., & Hsu, C. H. C. (2004). Theory of planned behavior: potential travelers from China. *Journal of Hospitality & Tourism Research*, *28*(4), 463–482. https://doi.org/10.1177/1096348004267515

Lang, T., & Barling, D. (2013). Nutrition and sustainability: an emerging food policy discourse. *Proceedings of the Nutrition Society*, *72*(1), 1–12. https://doi.org/10.1017/S002966511200290X

Lange, F., Steinke, A., & Dewitte, S. (2018). The Pro-Environmental Behavior Task: A laboratory measure of actual pro-environmental behavior. *Journal of Environmental Psychology*, *56*, 46–54. https://doi.org/10.1016/j.jenvp.2018.02.007

Latvala, T., Niva, M., Mäkelä, J., Pouta, E., Heikkilä, J., Kotro, J., & Forsman-Hugg, S. (2012). Diversifying meat consumption patterns: Consumers' self-reported past behaviour and intentions for change. *Meat Science*, *92*(1), 71–77. https://doi.org/10.1016/j.meatsci.2012.04.014

Lea, E., & Worsley, A. (2008). Australian consumers' food-related environmental beliefs and behaviours. *Appetite*, *50*(2–3), 207–214. https://doi.org/10.1016/j.appet.2005.07.012

Lee, M. J., & Back, K. (2007). Association members' meeting participation behaviors: development of meeting participation model. *Journal of Travel & Tourism Marketing*, *22*(2), 15–33. https://doi.org/10.1300/J073v22n02_02

Lentz, G., Connelly, S., Mirosa, M., & Jowett, T. (2018). Gauging attitudes and behaviours: Meat consumption and potential reduction. *Appetite*, *127*, 230–241. https://doi.org/10.1016/j.appet.2018.04.015

Lindeman, M., & Sirelius, M. (2001). Food choice ideologies: The modern manifestations of normative and humanist views of the world. *Appetite*, *37*(3), 175–184. https://doi.org/10.1006/appe.2001.0437

Liobikienė, G., & Bernatonienė, J. (2017). Why determinants of green purchase cannot be treated equally? The case of green cosmetics: Literature review. *Journal of Cleaner Production*, *162*, 109–120. https://doi.org/10.1016/j.jclepro.2017.05.204

Loy, L. S., Wieber, F., Gollwitzer, P. M., & Oettingen, G. (2016). Supporting sustainable food consumption: Mental contrasting with implementation intentions (MCII) aligns intentions and behavior. *Frontiers in Psychology*, *7*. https://doi.org/10.3389/fpsyg.2016.00607

Macdiarmid, J. I., Douglas, F., & Campbell, J. (2016). Eating like there's no tomorrow: Public awareness of the environmental impact of food and reluctance to eat less meat as part of a sustainable diet. *Appetite*, *96*, 487–493. https://doi.org/10.1016/j.appet.2015.10.011

Madden, T. J., Ellen, P. S., & Ajzen, I. (1992). A Comparison of the Theory of Planned Behavior and the Theory of Reasoned Action. *Personality and Social Psychology Bulletin*, *18*(1), 3–9. https://doi.org/10.1177/0146167292181001

Maio, G. R., Verplanken, B., Manstead, A. S. R., Stroebe, W., Abraham, C., Sheeran, P., & Conner, M. (2007). Social Psychological Factors in Lifestyle Change and Their Relevance to Policy. *Social Issues and Policy Review*, *1*(1), 99–137. https://doi.org/10.1111/j.1751-2409.2007.00005.x

Maki, A., & Rothman, A. J. (2017). Understanding pro-environmental intentions and behaviors: The importance of considering both the behavior setting and the type of behavior. *The Journal of Social Psychology*, *157*(5), 517–531. https://doi.org/10.1080/00224545.2016.1215968

Manstead, A. S. R. (2000). The role of moral norm in the attitude–behavior relation. In *D. J. Terry & M. A. Hogg (Eds.), Applied social research. Attitudes, behavior, and social context: The role of norms and group membership* (p. 11–30). Lawrence Erlbaum Associates Publishers.

Markle, G. L. (2013). Pro-Environmental Behavior: Does It Matter How It's Measured? Development and Validation of the Pro-Environmental Behavior Scale (PEBS). *Human Ecology*, *41*, 905–914. https://doi.org/10.1007/s10745-013-9614-8

Martinez, J., Dabert, P., Barrington, S., & Burton, C. (2009). Livestock waste treatment systems for environmental quality, food safety, and sustainability. *Bioresource Technology*, *100*(22), 5527–5536. https://doi.org/10.1016/j.biortech.2009.02.038

McEachan, R. R. C., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the Theory of Planned Behaviour: a meta-analysis. *Health Psychology Review*, *5*(2), 97–144. https://doi.org/10.1080/17437199.2010.521684

McElwee, P. (2012). Sustainability. In *H. K. Anheier & M. Juergensmeyer (Eds.), Encyclopedia of Global Studies* (1st ed., pp. 1614–1617). SAGE Publications, Inc. https://doi.org/10.4135/9781452218557.n504

Mekonnen, M. M., & Hoekstra, A. Y. (2012). A Global Assessment of the Water Footprint of Farm Animal Products. *Ecosystems*, *15*, 401–415. https://doi.org/10.1007/s10021-011-9517-8

Meng, M. D., & Trudel, R. (2017). Using emoticons to encourage students to recycle. *The Journal of Environmental Education*, *48*(3), 196–204. https://doi.org/10.1080/00958964.2017.1281212

Menozzi, D., Sogari, G., Veneziani, M., Simoni, E., & Mora, C. (2017). Eating novel foods: An application of the Theory of Planned Behaviour to predict the consumption of an insect-based product. *Food Quality and Preference*, *59*, 27–34. https://doi.org/10.1016/j.foodqual.2017.02.001

Milfont, T. L. (2010). Global warming, climate change and human psychology. In *Psychological Approaches to Sustainability: Current Trends in Theory, Research and Applications* (pp. 19–42). Nova Science Publishers, Inc.

Montiel, I., & Delgado-Ceballos, J. (2014). Defining and Measuring Corporate Sustainability: Are We There Yet? *Organization and Environment*, *27*(2), 113–139. https://doi.org/10.1177/1086026614526413

Moraes, C., Carrigan, M., & Szmigin, I. (2012). The coherence of inconsistencies: Attitude–behaviour gaps and new consumption communities. *Journal of Marketing Management*, *28*(1–2), 103–128. https://doi.org/10.1080/0267257X.2011.615482

Morris, R. T. (1956). A Typology of Norms. *American Sociological Review*, *21*(5), 610–613. https://doi.org/10.2307/2089098

Moser, A. K. (2016). Consumers' purchasing decisions regarding environmentally friendly products: an empirical analysis of German consumers. *Journal of Retailing and Consumer Services*, *31*, 389–397. https://doi.org/10.1016/j.jretconser.2016.05.006

Moser, A. K. (2015). Thinking green, buying green? Drivers of pro-environmental purchasing behavior. *Journal of Consumer Marketing*, *32*(3), 167–175. https://doi.org/10.1108/JCM-10-2014-1179

Neff, R. A., Edwards, D., Palmer, A., Ramsing, R., Righter, A., & Wolfson, J. (2018). Reducing meat consumption in the USA: A nationally representative survey of attitudes and behaviours. *Public Health Nutrition*, *21*(10), 1835–1844. https://doi.org/10.1017/S1368980017004190

Nelson, B. (n.d.). *What If Everyone Stopped Eating Meat Once a Week? | Reader's Digest*. https://www.rd.com/food/fun/no-meat-once-a-week/

Nguyen, T. N., Lobo, A., & Greenland, S. (2016). Pro-environmental purchase behaviour: the role of consumers' biospheric values. *Journal of Retailing and Consumer Services*, *33*, 98–108. https://doi.org/10.1016/j.jretconser.2016.08.010

Niemiec, R. M., Champine, V., Vaske, J. J., & Mertens, A. (2020). Does the Impact of Norms Vary by Type of Norm and Type of Conservation Behavior? A Meta-Analysis. *Society & Natural Resources An International Journal* https://doi.org/10.1080/08941920.2020.1729912

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. https://doi.org/10.1348/014466609X449395

Nolan, J. M. (2010). "An Inconvenient Truth" increases knowledge, concern, and willingness to reduce greenhouse gases. *Environment and Behavior*, *42*(5), 643–658. https://doi.org/10.1177/0013916509357696

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. https://doi.org/10.1016/S0272-4944(03)00037-9

Nordlund, A. M., & Garvill, J. (2002). Value Structures behind Proenvironmental Behavior. *Environment and Behavior*, *34*(6), 740–756. https://doi.org/10.1177/001391602237244

Oluka, O. C., Nie, S., & Sun, Y. (2014). Quality Assessment of TPB-Based Questionnaires: A Systematic Review. *PLoS ONE*, *9*(4), 1-8. https://doi.org/10.1371/journal.pone.0094419

Onel, N. (2017). Pro-environmental Purchasing Behavior of Consumers: The Role of Norms. *Social Marketing Quarterly*, *23*(2), 103–121. https://doi.org/10.1177/1524500416672440

Oreg, S., & Katz-gerro, T. (2006). Predicting proenvironmental behavior cross-nationally values, the theory of planned behavior, and value-belief norm theory. *Environment and Behavior*, *38*(4), 462–483. https://doi.org/10.1177/0013916505286012

O'Riordan, T. & Stoll-Kleemann, S. (2015). The challenges of changing dietary behavior toward more sustainable consumption. *Environment*, *57*(5), 4–13. https://doi.org/10.1080/00139157.2015.1069093

Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin*, *124*, 54–74. http://dx.doi.org/10.1037/0033-2909.124.1.54

Park, J., & Ha, S. (2012). Understanding pro-environmental behavior: A comparison of sustainable consumers and apathetic consumers. *International Journal of Retail and Distribution Management*, *40*(5), 388–403. https://doi.org/10.1108/09590551211222367

Partidário, P. J., Lambert, J., & Evans, S. (2007). Building more sustainable solutions in production–consumption systems: the case of food for people with reduced access. *Journal of Cleaner Production*, *15*, 513–524. https://doi.org/10.1016/j.jclepro.2006.05.011

Patterson, R. R. (2001). Using the theory of planned behavior as a framework for the evaluation of a professional development workshop. *Journal of Microbiology & Biology Education*, *2*, 34–41. https://doi.org/10.1128/154288101X14285805939475

Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services*, *29*, 123–134. https://doi.org/10.1016/j.jretconser.2015.11.006

Peattie, K. (2010). Green Consumption: Behavior and Norms. *Annual Review of Environment and Resources*, *35*(1), 195–228. https://doi.org/10.1146/annurev-environ-032609-094328

Pereira, P. M. de C. C., & Vicente, A. F. dos R. B. (2013). Meat nutritional composition and nutritive role in the human diet. *Meat Science*, *93*(3), 586–592. https://doi.org/10.1016/j.meatsci.2012.09.018

Perumal, T. (2014). *Research Methodology*. Open University Malaysia. Retrieved from https://www.tankonyvtar.hu/en/tartalom/tamop412A/2011-0021_22_research_methodology/adatok.html

Piazza, J., Ruby, M. B., Loughnan, S., Luong, M., Kulik, J., Watkins, H. M., & Seigerman, M. (2015). Rationalizing meat consumption. The 4Ns. *Appetite*, *91*, 114–128. https://doi.org/10.1016/j.appet.2015.04.011

Pimentel, D., & Pimentel, M. (2003). Sustainability of meat-based and plant-based diets and the environment. *The American Journal of Clinical Nutrition*, *78*(3), 660–663. https://academic.oup.com/ajcn/article-abstract/78/3/660S/4690010

Piscicelli, L., Cooper, T., & Fisher, T. (2015). The role of values in collaborative consumption: Insights from a product-service system for lending and borrowing in the UK. *Journal of Cleaner Production*, *97*, 21–29. https://doi.org/10.1016/j.jclepro.2014.07.032

Pluhar, E. B. (2010). Meat and Morality: Alternatives to Factory Farming. *Journal of Agricultural and Environmental Ethics*, *23*, 455–468. https://doi.org/10.1007/s10806-009-9226-x

Portney, K. E. (2015). *Sustainability*. The MIT Press.

Povey, R., Wellens, B., & Conner, M. (2001). Attitudes towards following meat, vegetarian and vegan diets: An examination of the role of ambivalence. *Appetite*, *37*(1), 15–26. https://doi.org/10.1006/appe.2001.0406

Prentice, D. A. (2007). Norms, Prescriptive and Descriptive. In *R. F. Baumeister & K. D. Vohs (Eds.), Encyclopedia of Social Psychology* (p. 630). SAGE Publications, Inc. https://doi.org/10.4135/9781412956253.n376

Radnitz, C., Beezhold, B., & DiMatteo, J. (2015). Investigation of lifestyle choices of individuals following a vegan diet for health and ethical reasons. *Appetite*, *90*, 31–36. https://doi.org/10.1016/j.appet.2015.02.026

Ramayah, T., Lee, J. W. C., & Lim, S. (2012). Sustaining the environment through recycling: An empirical study. *Journal of Environmental Management*, *102*, 141–147. https://doi.org/10.1016/j.jenvman.2012.02.025

Redclift, M. (2005). Sustainable development (1987-2005): an oxymoron comes of age. Sustainable Development, 13(4), 212–227. https://doi.org/10.1002/sd.281

Rees, J. H., Bamberg, S., Jäger, A., Victor, L., Bergmeyer, M., & Friese, M. (2018). Breaking the Habit: On the Highly Habitualized Nature of Meat Consumption and Implementation Intentions as One Effective Way of Reducing It. *Basic and Applied Social Psychology*, *40*(3), 136–147. https://doi.org/10.1080/01973533.2018.1449111

Reisch, L., Eberle, U., & Lorek, S. (2013). Sustainable food consumption: an overview of contemporary issues and policies. *Sustainability: Science, Practice and Policy*, *9*(2), 7–25. https://doi.org/10.1080/15487733.2013.11908111

Reynolds, N., Diamantopoulos, A., & Schlegelmilch, B. (1993). Pre-Testing in Questionnaire Design: A Review of the Literature and Suggestions for Further Research. *International Journal of Market Research*, *35*(2), 1–11. https://doi.org/10.1177/147078539303500202

Rhee, J. J., Schein, C., & Bastian, B. (2019). The what, how, and why of moralization: A review of current definitions, methods, and evidence in moralization research. *Social and Personality Psychology Compass*, *13*(12), 1–14. https://doi.org/10.1111/spc3.12511

Rivis, A., & Sheeran, P. (2003). Descriptive Norms as an Additional Predictor in the Theory of Planned Behaviour: A Meta-Analysis. *Current Psychology: Developmental, Learning, Personality, Social*, *22*(3), 218–233.

Robinson, R., & Smith, C. (2002). Psychosocial and demographic variables associated with consumer intention to purchase sustainably produced foods as defined by the midwest food alliance. *Journal of Nutrition Education and Behavior*, *34*(6), 316–325. https://doi.org/10.1016/S1499-4046(06)60114-0

Rokeach, M., 1973. The Nature of Human Values. The Free Press, New York.

Rogers, R. W. (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In *Cacioppo, J. R. and Petty, R. E. (Eds.) Social Psychology: A Sourcebook* (pp. 153–176). Guilford.

Rosenfeld, D. L., & Burrow, A. L. (2018). Development and validation of the Dietarian Identity Questionnaire: Assessing selfperceptions of animal-product consumption. *Appetite*, *127*, 182–194. https://doi.org/10.1016/j.appet.2018.05.003

Rosenfeld, D. L., & Burrow, A. L. (2017a). The unified model of vegetarian identity: A conceptual framework for understanding plant-based food choices. *Appetite*, *112*, 78–95. https://doi.org/10.1016/j.appet.2017.01.017

Rosenfeld, D. L., & Burrow, A. L. (2017b). Vegetarian on purpose: Understanding the motivations of plant-based dieters. *Appetite*, *116*, 456–463. https://doi.org/10.1016/j.appet.2017.05.039

Rosenfeld, D. L., Rothgerber, H., & Tomiyama, A. J. (2019). Mostly Vegetarian, But Flexible About It: Investigating How Meat-Reducers Express Social Identity Around Their Diets. *Social Psychological and Personality Science*, 1–10. https://doi.org/10.1177/1948550619869619

Rothgerber, H. (2014). A comparison of attitudes toward meat and animals among strict and semi-vegetarians. *Appetite*, *72*, 98–105. https://doi.org/10.1016/j.appet.2013.10.002

Rothgerber, H. (2013). Real men don't eat (vegetable) quiche: Masculinity and the justification of meat consumption. *Psychology of Men and Masculinity*, *14*(4), 363–375. https://doi.org/10.1037/a0030379

Roy, J., & Pal, S. (2009). Lifestyles and climate change: Link awaiting activation. *Current Opinion in Environmental Sustainability*, *1*(2), 192–200. https://doi.org/10.1016/j.cosust.2009.10.009

Ruby, M. B., & Heine, S. J. (2012). Too close to home. Factors predicting meat avoidance. *Appetite*, *59*(1), 47–52. https://doi.org/10.1016/j.appet.2012.03.020

Rust, N. A., Ridding, L., Ward, C., Clark, B., Kehoe, L., Dora, M., Whittingham, M. J., McGowan, P., Chaudhary, A., Reynolds, C. J., Trivedy, C., & West, N. (2020). How to transition to reduced-meat diets that benefit people and the planet. *Science of the Total Environment*, *718*, 137208. https://doi.org/10.1016/j.scitotenv.2020.137208

Saba, A., & Di Natale, R. (1998). A study on the mediating role of intention in the impact of habit and attitude on meat consumption. *Food Quality and Preference*, *10*(1), 69–77. https://doi.org/10.1016/S0950-3293(98)00039-1

Saiia, D. H. (2018). Sustainability. In R. W. Kolb (Ed.), *The SAGE Encyclopedia of Business Ethics and Society* (1st ed., pp. 3308–3312). SAGE Publications, Inc. https://doi.org/10.4135/9781483381503.n1143

Saleki, Z., & Seyedsaleki, S. (2012). The main factors influencing purchase behaviour of organic products in Malaysia. *Interdisciplinary Journal of Contemporary Research in Business*, *4*(1), 98–116.

Säll, S., & Gren, I. M. (2015). Effects of an environmental tax on meat and dairy consumption in Sweden. *Food Policy*, *55*, 41–53. https://doi.org/10.1016/j.foodpol.2015.05.008

Sanchez-Sabate, R., & Sabaté, J. (2019). Consumer attitudes towards environmental concerns of meat consumption: A systematic review. *International Journal of Environmental Research and Public Health*, *16*(7), 1220. https://doi.org/10.3390/ijerph16071220

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for Business Students* (5th ed.). Pearson Education LTD.

Schacht, K., Filho, W. L., Koppe, W., Struksnaes, G., & Busch-Stockfisch, M. (2010). Sustainability as a new paradigm regarding food consumption. *British Food Journal*, *112*(5), 476–488. https://doi.org/10.1108/00070701011043736

Schösler, H., De Boer, J., & Boersema, J. J. (2012). Can we cut out the meat of the dish? Constructing consumer-oriented pathways towards meat substitution. *Appetite*, *58*, 39–47. https://doi.org/https://doi.org/10.1016/j.appet.2011.09.009

Schroeder, D. A. (2010). Norms. In *J. M. Levine & M. A. Hogg (Eds.), Encyclopedia of Group Processes & Intergroup Relations* (pp. 609–612). SAGE Publications, Inc. https://doi.org/10.4135/9781412972017.n186

Schuck, A. R. T., & de Vreese, C. H. (2012). When Good News Is Bad News: Explicating the Moderated Mediation Dynamic Behind the Reversed Mobilization Effect. *Journal of Communication*, *62*(1), 57–77. https://doi.org/10.1111/j.1460-2466.2011.01624.x

Schultz, P. W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology*, *21*(4), 327–339. https://doi.org/10.1006/jevp.2001.0227

Schultz, P. W., Gouveia, V. V., Cameron, L. D., Tankha, G., Schmuck, P., & Franěk, M. (2005). Values and their Relationship to Environmental Concern and Conservation Behavior. *Journal of Cross-Cultural Psychology*, *36*(4), 457–475. https://doi.org/10.1177/0022022105275962

Schultz, W. P., Khazian, A. M., & Zaleski, A. C. (2008). Using normative social influence to promote conservation among hotel guests. *Social Influence*, *3*, 4–23. https://doi.org/10.1080/15534510701755614

Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms: Research article. *Psychological Science*, *18*(5), 429–434. https://doi.org/10.1111/j.1467-9280.2007.01917.x

Schwartz, S. H. (2012). An Overview of the Schwartz Theory of Basic Values. *Online Readings in Psychology and Culture*, *2*(1). https://doi.org/10.9707/2307-0919.1116

Schwartz, S. H. (2006). Les valeurs de base de la personne: Théorie, mesures et applications [Basic human values: Theory, measurement, and applications]. *Revue française de sociologie, 42*, 249-288. https://doi.org/10.3917/rfs.474.0929

Schwartz, S. H. (1994). Are There Universal Aspects in the Structure and Contents of Human Values? *Journal of Social Issues*, *50*(4), 19–45. https://doi.org/10.1111/j.1540-4560.1994.tb01196.x

Schwartz, S. H. (1992). Universals in the content and structure of values: Theory and empirical tests in 20 countries. In *M. Zanna (Ed.), Advances in experimental social psychology* (Vol.25, pp. 1-65). New York: Academic Press.

Schwartz, S. H. (1977). Normative influences on altruism. *Advances in Experimental Social Psychology*, *10*(1), 221–279. https://doi.org/10.1016/S0065-2601(08)60358-5

Schwartz, S. H., Cieciuch, J., Vecchione, M., Davidov, E., Fischer, R., Beierlein, C., Ramos, A., Verkasalo, M., Lönnqvist, J.-E., Demirutku, K., Dirilen-Gumus, O., & Konty, M. (2012). Refining the theory of basic individual values. *Journal of Personality and Social Psychology*, *103*(4), 663–688. https://doi.org/10.1037/a0029393

Schwartz, S. H., & Howard, J. (1980). Explanations of the modeling effect of responsibility denial on the personal norm-behavior relationship. *Social Psychology Quarterly*, *43*, 441–446. https://doi.org/10.2307/3033965

Šedová, I., Slovák, Ľ., & Ježková, I. (2016). Coping with unpleasant knowledge: Meat eating among students of environmental studies. *Appetite*, *107*, 415–424. https://doi.org/10.1016/j.appet.2016.08.102

Shaw, D., & Shiu, E. (2003). Ethics in consumer choice: a multivariate modelling approach. *European Journal of Marketing*, *37*(10), 1485–1498. https://doi.org/10.1108/03090560310487202

Sheeran, P., Gollwitzer, P. M., & Bargh, J. A. (2013). Nonconscious processes and health. *Health Psychology*, *32*, 460–473. https://doi.org/doi:10.1037/a0029203

Sheeran, P., & Webb, T. L. (2016). The Intention–Behavior Gap. *Social and Personality Psychology Compass*, *10*(9), 503–518. https://doi.org/10.1111/spc3.12265

Singleton, R. A., & Straits, B. C. (2005). *Approaches to social research*. Oxford University Press.

Smith, P., Haberl, H., Popp, A., Erb, K. H., Lauk, C., Harper, R., Tubiello, F. N., De Siqueira Pinto, A., Jafari, M., Sohi, S., Masera, O., Böttcher, H., Berndes, G., Bustamante, M., Ahammad, H., Clark, H., Dong, H., Elsiddig, E. A., Mbow, C., … Rose, S. (2013). How much land-based greenhouse gas mitigation can be achieved without compromising food security and environmental goals? *Global Change Biology*, *19*, 2285–2302. https://doi.org/10.1111/gcb.12160

Smith, J. R., Louis, W. R., Terry, D. J., Greenaway, K. H., Clarke, M. R., & Cheng, X. (2012). Congruent or conflicted? The impact of injunctive and descriptive norms on

environmental intentions. *Journal of Environmental Psychology*, *32*(4), 353–361. https://doi.org/10.1016/j.jenvp.2012.06.001

Sniehotta, F. F., Presseau, J., & Araújo-Soares, V. (2014). Time to retire the theory of planned behaviour. *Health Psychology Review*, *8*(1), 1–7. https://doi.org/10.1080/17437199.2013.869710

Spaargaren, G., & Mol, A. P. J. (2008). Greening global consumption: Redefining politics and authority. *Global Environmental Change*, *18*, 350– 359. https://doi.org/10.1016/j.gloenvcha.2008.04.010

Sparkman, G., & Walton, G. M. (2017). Dynamic Norms Promote Sustainable Behavior, Even if It Is Counternormative. *Psychological Science*, *28*(11), 1663–1674. https://doi.org/10.1177/0956797617719950

Spence, A., & Pidgeon, N. (2010). Framing and communicating climate change: The effects of distance and outcome frame manipulations. *Global Environmental Change*, *20*(4), 656–667. https://doi.org/10.1016/j.gloenvcha.2010.07.002

Spence, A., Poortinga, W., & Pidgeon, N. (2012). The Psychological Distance of Climate Change. *Risk Analysis*, *32*(6), 957–972. https://doi.org/10.1111/j.1539-6924.2011.01695.x

Springmann, M., Clark, M., Mason-D'Croz, D., Wiebe, K., Bodirsky, B. L., Lassaletta, L., de Vries, W., Vermeulen, S. J., Herrero, M., Carlson, K. M., Jonell, M., Troell, M., DeClerck, F., Gordon, L. J., Zurayk, R., Scarborough, P., Rayner, M., Loken, B., Fanzo, J., … Willett, W. (2018). Options for keeping the food system within environmental limits. *Nature*, *562*, 519–525. https://doi.org/10.1038/s41586-018-0594-0

Steg, L., Bolderdijk, J. W., Keizer, K., & Perlaviciute, G. (2014). An Integrated Framework for Encouraging Pro-environmental Behaviour: The role of values, situational factors and goals. *Journal of Environmental Psychology*, *38*, 104–115. https://doi.org/10.1016/j.jenvp.2014.01.002

Steg, L., & De Groot, J.I.M. (2012). Environmental values. In *S. Clayton (Ed.), The Oxford handbook of environmental and conservation psychology* (pp. 81-92). Oxford University Press, New York

Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology*, *25*(4), 415–425. https://doi.org/10.1016/j.jenvp.2005.08.003

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, *29*, 309–317. https://doi.org/10.1016/j.jenvp.2008.10.004

Stehfest, E., Bouwman, L., Van Vuuren, D. P., Den Elzen, M. G. J., Eickhout, B., & Kabat, P. (2009). Climate benefits of changing diet. *Climatic Change*, *95*, 83–102. https://doi.org/10.1007/s10584-008-9534-6

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*, 407–424. https://doi.org/10.1111/0022-4537.00175

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism. *Human Ecology Review*, *6*, 81–97. https://doi.org/10.2307/24707060

Stern, P. C., Dietz, T., & Guagnano, G. A. (1998). A Brief Inventory of Values. *Educational and Psychological Measurement*, *58*(6), 984–1001. https://doi.org/10.1177/0013164498058006008

Stern, P. C., Dietz, T., & Guagnano, G. A. (1995). The new ecological paradigm in social-psychology context. *Environment and Behavior*, *26*, 723–743. https://doi.org/10.1177/0013916595276001

Stern, P. C., Dietz, T., & Kalof, L. (1993). Value Orientations, Gender, and Environmental Concern. *Environment and Behavior*, *25*(5), 322–348. https://doi.org/10.1177/0013916593255002

Stoll-Kleemann, S., & Schmidt, U. J. (2017). Reducing meat consumption in developed and transition countries to counter climate change and biodiversity loss: a review of influence factors. *Regional Environmental Change*, *17*(5), 1261–1277. https://doi.org/10.1007/s10113-016-1057-5

Strack, F., & Deutsch, R. (2004). Reflective and Impulsive Determinants of Social Behavior. *Personality and Social Psychology Review*, 8(3), 220–247. https://doi.org/10.1207/s15327957pspr0803_1

Sun, B., & Morwitz, V. G. (2010). Stated Intentions and Purchase Behavior: A Unified Model International. *Journal of Research in Marketing*, *27*(4), 356–366. https://doi.org/10.1016/j.ijresmar.2010.06.001

Sutton, S. (1994). The past predicts the future: Interpreting behaviour-behaviour relationships in social psychological models of health behaviour. In *D. R. Rutter & L. Quine (Eds.), Social psychology and health: European perspectives* (pp. 71–88). Avebury.

Tabachnick, B. G., & Fidell, L. S. (2001). Using Multivariate Statistics. In *Using Multivariate Statistics* (5th ed.).

Tarkiainen, A., & Sundqvist, S. (2005). Subjective norms, attitudes and intentions of Finnish consumers in buying organic food. *British Food Journal*, *107*(11), 808–822. https://doi.org/10.1108/00070700510629760

Terlau, W., & Hirsch, D. (2015). Sustainable Consumption and the Attitude-Behaviour-Gap Phenomenon - Causes and Measurements towards a Sustainable Development. *International European Forum on System Dynamics and Innovation in Food Networks*, *6*, 199–214. https://doi.org/10.18461/pfsd.2015.1516

Thøgersen, J. (2008). Social norms and cooperation in real-life social dilemmas. *Journal of Economic Psychology*, *29*(4), 458–472. https://doi.org/10.1016/j.joep.2007.12.004

Thøgersen, J. (2006). Norms for environmentally responsible behaviour: An extended taxonomy. *Journal of Environmental Psychology*, *26*(4), 247–261. https://doi.org/10.1016/j.jenvp.2006.09.004

Thøgersen, J. (2003). Monetary Incentives and Recycling: Behavioural and Psychological Reactions to a Performance-Dependent Garbage Fee. *Journal of Consumer Policy*, *26*(2), 197–228. https://doi.org/10.1023/a:1023633320485

Thøgersen, J. (2002). Direct Experience and the Strength of the Personal Norm - Behavior Relationship. *Psychology and Marketing*, *19*(10), 881–893. https://doi.org/10.1002/mar.10042

Thøgersen, J., & Grunert-Beckmann, S. C. (1997). Values and Attitude Formation Towards Emerging Attitude Objects: From Recycling to General, Waste Minimizing Behavior. *Advances in Consumer Research*, *24*, 182–189.

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. https://doi.org/10.1016/S0167-4870(02)00120-4

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. https://doi.org/10.1016/j.jclepro.2015.06.036

Tilman, D., & Clark, M. (2014). Global diets link environmental sustainability and human health. *Nature*, *515*(7528), 518–522. https://doi.org/doi.org/10.1038/nature13959

Tobler, C., Visschers, V. H. M., & Siegrist, M. (2011). Eating green. Consumers' willingness to adopt ecological food consumption behaviors. *Appetite*, *57*, 674–682. https://doi.org/10.1016/j.appet.2011.08.010

Triandis, H. C. (2002). Generic individualism and collectivism. In *M. J. Gannon & K. L. Newman (Eds.), Handbook of Cross-cultural Management* (p. 16-45). Blackwell.

Tripathi, A., & Singh, M. P. (2016). Determinants of sustainable/green consumption: A review. *International Journal of Environmental Technology and Management*, *19*(3–4), 316–358. https://doi.org/10.1504/IJETM.2016.082258

Trudel, R. (2018). Sustainable consumer behavior. *Consumer Psychology Review*, *2*, 85–96. https://doi.org/10.1002/arcp.1045

Tukker, A., & Jansen, B. (2006). Environmental Impacts of Products A Detailed Review of Studies. *Journal of Industrial Ecology*, *10*(3), 159–182. https://doi.org/https://doi.org/10.1162/jiec.2006.10.3.159

Turaga, R. M. R., Howarth, R. B., & Borsuk, M. E. (2010). Pro-environmental behavior: Rational choice meets moral motivation. *Annals of the New York Academy of Sciences, 1185,* 211–224. https://doi.org/10.1111/j.1749-6632.2009.05163.x

Tuu, H. H., Olsen, S. O., Thao, D. T., & Anh, N. T. K. (2008). The role of norms in explaining attitudes, intention and consumption of a common food (fish) in Vietnam. *Appetite*, *51*, 546–551. https://doi.org/10.1016/j.appet.2008.04.007

Valentino, N. A., Brader, T., Groenendyk, E. W., Gregorowicz, K., & Hutchings, V. L. (2011). Election night's alright for fighting: The role of emotions in political participation. *Journal of Politics*, *73*(1), 156–170. https://doi.org/10.1017/S0022381610000939

Valle, P. O., Rebelo, E., Reis, E., & Menezes, J. (2005). Combining behavioral theories to predict recycling involvement. *Environment and Behavior*, *37*(3), 364–396. https://doi.org/10.1177/0013916504272563

Van der Werff, E., Steg, L., & Keizer, K. (2014). I Am What I Am, by Looking Past the Present. *Environment and Behavior*, *46*(5), 626–657. https://doi.org/10.1177/0013916512475209

Van Doorn, J., & Verhoef, P. C. (2015). Drivers of and Barriers to Organic Purchase Behavior. *Journal of Retailing*, *91*(3), 436–450. https://doi.org/10.1016/j.jretai.2015.02.003

Van Liere, K. D., & Dunlap, R. E. (1978). Moral Norms and Environmental Behavior: An Application of Schwartz's Norm-Activation Model to Yard Burning. *Journal of Applied Social Psychology*, *8*(2), 174–188. https://doi.org/10.1111/j.1559-1816.1978.tb00775.x

Verain, M., Dagevos, H., & Antonides, G. (2015). Flexitarianism: a range of sustainable food styles. In *Handbook of Research on Sustainable Consumption* (pp. 209–223). https://www.elgaronline.com/view/edcoll/9781783471263/9781783471263.00023.xml

Verbeke, W. (2015). Profiling consumers who are ready to adopt insects as a meat substitute in a Western society. *Food Quality and Preference*, *39*, 147–155. https://doi.org/10.1016/j.foodqual.2014.07.008

Vermeir, I., & Verbeke, W. (2008). Sustainable food consumption among young adults in Belgium: Theory of planned behaviour and the role of confidence and values. *Ecological Economics*, *64*(3), 542–553. https://doi.org/10.1016/j.ecolecon.2007.03.007

Vermeir, I., & Verbeke, W. (2006). Sustainable Food Consumption: Exploring the Consumer "Attitude – Behavioral Intention" Gap. *Journal of Agricultural and Environmental Ethics*, *19*(2), 169–194. https://doi.org/10.1007/s10806-005-5485-3

Verplanken, B., & Wood, W. (2006). Interventions to break and create consumer habits. *Journal of Public Policy and Marketing*, *25*(1), 90–103. https://doi.org/10.1509/jppm.25.1.90

Vicente-Molina, M. A., Fernández-Sainz, A., & Izagirre-Olaizola, J. (2018). Does gender make a difference in pro-environmental behavior? The case of the Basque Country University students. *Journal of Cleaner Production*, *176*, 89–98. https://doi.org/10.1016/j.jclepro.2017.12.079

Wang, B., Wang, X., Guo, D., Zhang, B., & Wang, Z. (2018). Analysis of factors influencing residents' habitual energy-saving behaviour based on NAM and TPB models: egoism or altruism? *Energy Policy*, *116*, 68–77. https://doi.org/10.1016/j.enpol.2018.01.055

Westhoek, H. J., Rood, G. A., Van den Berg, M., Janse, J. H., Nijdam, D. S., & Reudink, M.A.Stehfest, E. E. (2011). The Protein Puzzle: The Consumption and Production of Meat, Dairy and Fish in the European Union. *European Journal of Nutrition & Food Safety*, *1*(3), 123–144. http://www.journalejnfs.com/index.php/EJNFS/article/view/3000

White, K., & Simpson, B. (2013). When Do (and Don't) Normative Appeals Influence Sustainable Consumer Behaviors? *Journal of Marketing*, *77*(2), 78–95. https://doi.org/10.1509/jm.11.0278

White, K. M., Smith, J. R., Terry, D. J., Greenslade, J. H., & McKimmie, B. M. (2009). Social influence in the theory of planned behaviour: The role of descriptive, injunctive, and in-group norms. *British Journal of Social Psychology*, *48*(1), 135–158. https://doi.org/10.1348/014466608X295207

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L. J., Fanzo, J., Hawkes, C., Zurayk, R., Rivera, J. A., De Vries, W., Majele Sibanda, L., … Murray, C. J. L. (2019). Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet Commissions*, *393*(10170), 447–492. https://doi.org/10.1016/S0140-6736(18)31788-4

Wright, K. B. (2005). Researching Internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services. *Journal of Computer-Mediated Communication*, *10*(3). https://doi.org/10.1111/j.1083-6101.2005.tb00259.x

Wynveen, C. J., Wynveen, B. J., & Sutton, S. G. (2015). Applying the Value-Belief-Norm Theory to Marine Contexts: Implications for Encouraging Pro-Environmental Behavior. *Coastal Management*, *43*(1), 84–103. https://doi.org/10.1080/08920753.2014.989149

Yadav, R., & Pathak, G. S. (2016). Young consumers' intention towards buying green products in a developing nation: Extending the theory of planned behavior. *Journal of Cleaner Production*, *135*, 732–739. https://doi.org/10.1016/j.jclepro.2016.06.120

Young, H. P. (2015). The evolution of social norms. Annual Review of Economics, 7, 359–387. https://doi.org/10.1146/annurev-economics-080614-115322

Young, S. T., & Dhanda, K. K. (2013). Sustainability: Essentials for Business. In *Sustainability: Essentials for Business*. SAGE Publications, Inc. https://doi.org/10.4135/9781544308432

Zhu, Q., Li, Y., Geng, Y., & Qi, Y. (2013). Green food consumption intention, behaviors and influencing factors among Chinese consumers. *Food Quality and Preference*, *28*(1), 279–286. https://doi.org/10.1016/j.foodqual.2012.10.005

Zur, I., & Klöckner, C. A. (2014). Individual motivations for limiting meat consumption. *British Food Journal*, *116*(4), 629–642. https://doi.org/10.1108/BFJ-08-2012-0193

Appendix A: Models and Additional Data

Appendix A1: Model 1 including Behavior

Appendix A2: Model 2 including Behavior

Appendix A3: Standardized Factor Loadings Measurement Models

Appendix A4: Standardized Factor Loadings Measurement Models after Modification

Appendix A5: Squared Multiple Correlations

Appendix A6: Construct Reliability

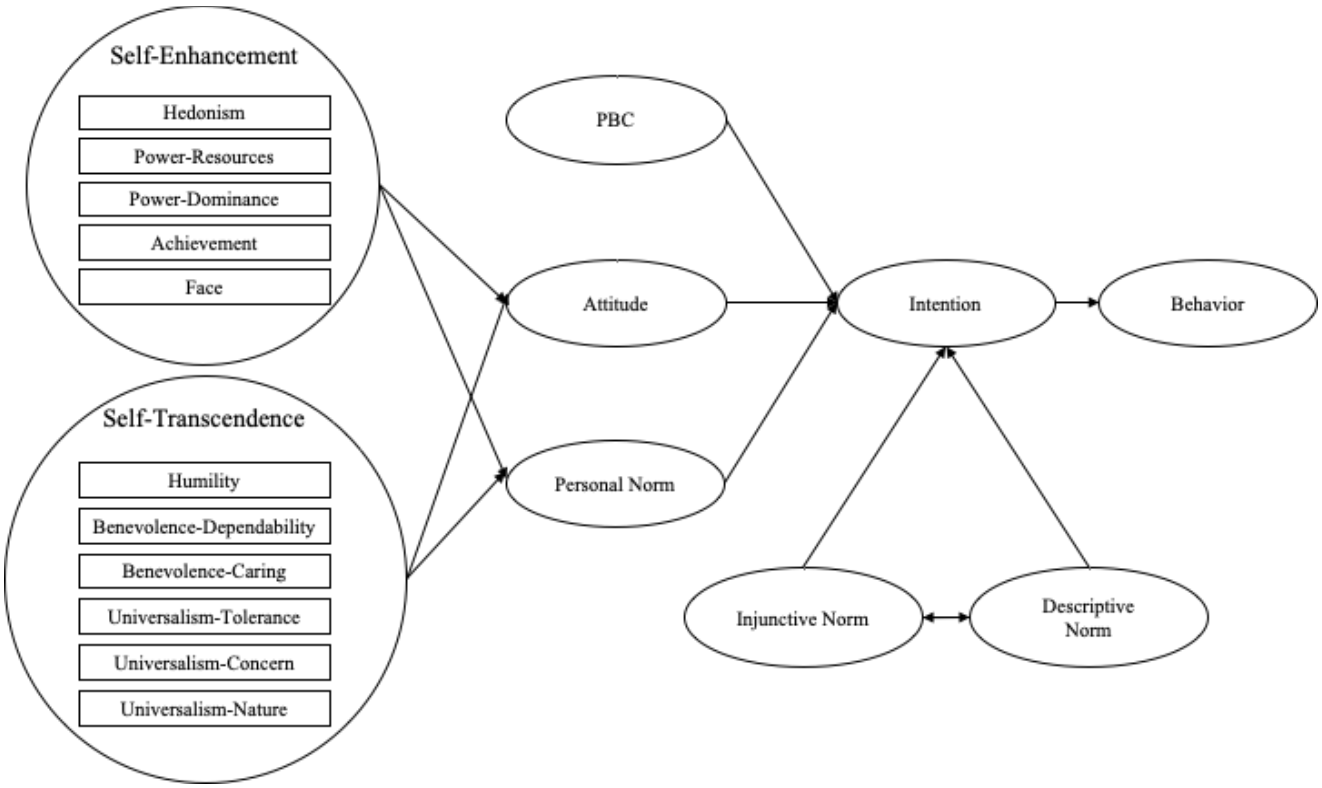
Appendix A7: AVE and Discriminant Validity

Appendix A8: Standardized Factor Loadings Structural and Measurement Model

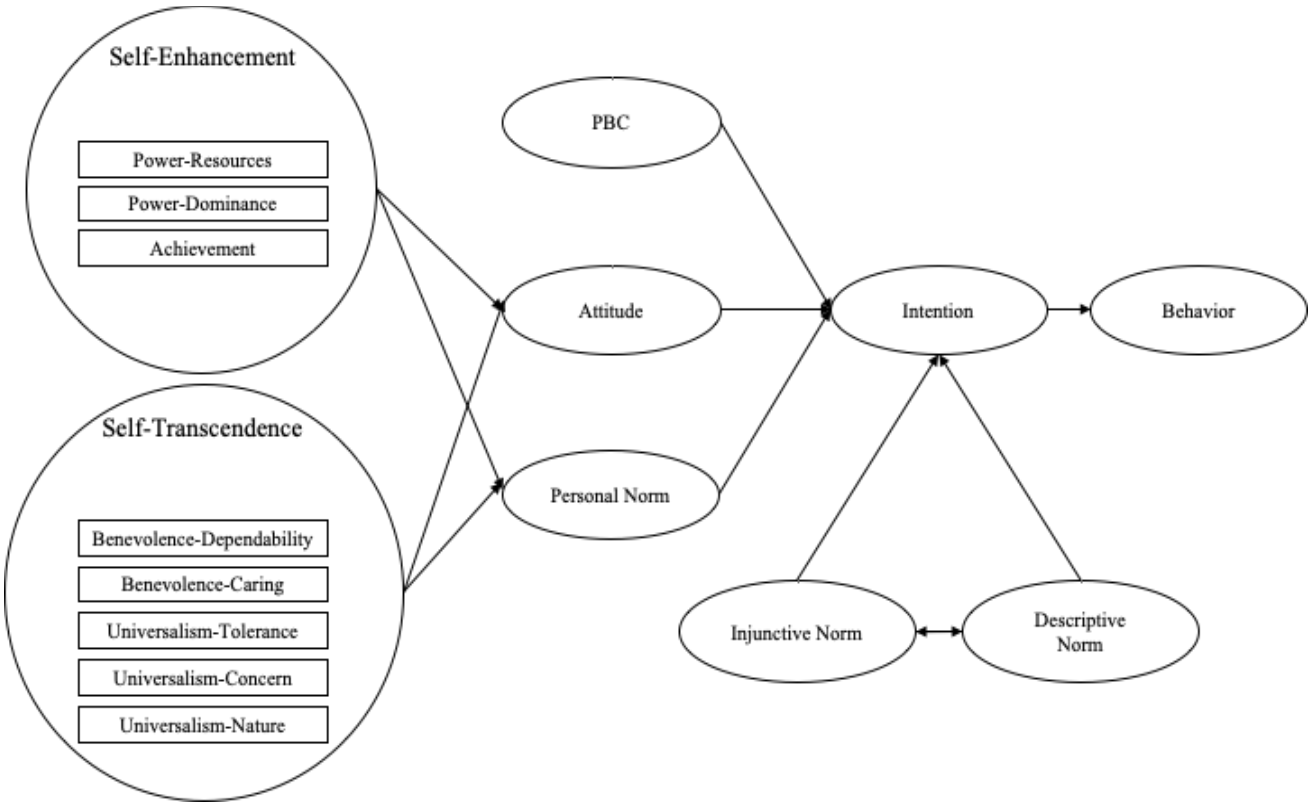
Appendix A9: Construct Reliability Structural and Measurement Model

Appendix A10: Comparison of Structural Relationships and Correlational Relationships

Appendix A1: Model 1 including Behavior



Appendix A2: Model 2 including Behavior



Appendix A3: Standardized Factor Loadings Measurement Models

Item	Model 1 with behavior	Model 1 without behavior	Model 2 with behavior	Model 2 without behavior
PBC 1	0.194	0.197	0.193	0.196
PBC 2	0.789	0.799	0.79	0.799
PBC 3	0.743	0.734	0.742	0.733
Attitude 1	0.873	0.872	0.873	0.872
Attitude 2	0.878	0.876	0.878	0.876
Attitude 3	0.732	0.734	0.733	0.734
Attitude 4	0.754	0.754	0.754	0.754
Attitude 5	0.877	0.878	0.877	0.878
Attitude 6	0.705	0.706	0.705	0.706
Attitude 7	0.817	0.818	0.817	0.818
Personal norm 1	0.815	0.812	0.815	0.813
Personal norm 2	0.766	0.768	0.766	0.768
Personal norm 3	0.729	0.73	0.729	0.73
Injunctive norm 1	0.54	0.537	0.538	0.535
Injunctive norm 2	0.583	0.584	0.583	0.584
Injunctive norm 3	0.809	0.81	0.81	0.811
Descriptive norm 1	0.364	0.364	0.363	0.362
Descriptive norm 2	0.785	0.784	0.786	0.811
Descriptive norm 3	0.701	0.703	0.701	0.785
Self-enhancement 1	0.186	0.187		
Self-enhancement 2	0.227	0.228		
Self-enhancement 3	0.285	0.285		
Self-enhancement 4	0.42	0.421	0.416	0.417
Self-enhancement 5	0.65	0.651	0.637	0.638
Self-enhancement 6	0.692	0.693	0.685	0.686
Self-enhancement 7	0.771	0.771	0.776	0.777
Self-enhancement 8	0.666	0.666	0.66	0.661
Self-enhancement 9	0.859	0.858	0.871	0.87

Self-enhancement 10	0.66	0.66	0.67	0.67
Self-enhancement 11	0.557	0.556	0.56	0.559
Self-enhancement 12	0.584	0.583	0.583	0.582
Self-enhancement 13	0.258	0.258		
Self-enhancement 14	0.424	0.425		
Self-enhancement 15	0.228	0.229		
Self-transcendence 1	0.182	0.182		
Self-transcendence 2	0.535	0.533		
Self-transcendence 3	0.216	0.218		
Self-transcendence 4	0.584	0.579	0.558	0.552
Self-transcendence 5	0.58	0.575	0.555	0.549
Self-transcendence 6	0.405	0.401	0.392	0.386
Self-transcendence 7	0.627	0.622	0.612	0.606
Self-transcendence 8	0.55	0.546	0.533	0.528
Self-transcendence 9	0.521	0.516	0.503	0.497
Self-transcendence 10	0.644	0.648	0.649	0.652
Self-transcendence 11	0.7	0.701	0.707	0.709
Self-transcendence 12	0.716	0.717	0.723	0.724
Self-transcendence 13	0.615	0.618	0.633	0.637
Self-transcendence 14	0.537	0.541	0.565	0.57
Self-transcendence 15	0.557	0.562	0.579	0.585
Self-transcendence 16	0.439	0.442	0.461	0.464
Self-transcendence 17	0.494	0.497	0.498	0.502
Self-transcendence 18	0.437	0.44	0.433	0.436

Appendix A4: Standardized Factor Loadings Measurement Models after Modification

Item	Model 1 with behavior	Model 1 without behavior	Model 2 with behavior	Model 2 without behavior
PBC 1	0.192	0.195	0.192	0.195
PBC 2	0.783	0.792	0.783	0.793
PBC 3	0.748	0.74	0.748	0.74
Attitude 1	0.879	0.877	0.879	0.877
Attitude 2	0.889	0.887	0.889	0.887
Attitude 3	0.716	0.718	0.716	0.718
Attitude 4	0.728	0.729	0.729	0.729
Attitude 5	0.874	0.875	0.874	0.875
Attitude 6	0.687	0.689	0.687	0.689
Attitude 7	0.795	0.796	0.795	0.796
Personal norm 1	0.815	0.812	0.815	0.813
Personal norm 2	0.769	0.771	0.769	0.771
Personal norm 3	0.726	0.727	0.726	0.727
Injunctive norm 1	0.54	0.537	0.539	0.536
Injunctive norm 2	0.583	0.585	0.583	0.584
Injunctive norm 3	0.808	0.809	0.81	0.811
Descriptive norm 1	0.364	0.364	0.363	0.362
Descriptive norm 2	0.787	0.786	0.787	0.786
Descriptive norm 3	0.7	0.701	0.701	0.702
Self-enhancement 1	0.162	0.163		
Self-enhancement 2	0.192	0.193		
Self-enhancement 3	0.251	0.251		
Self-enhancement 4	0.383	0.383	0.385	0.386
Self-enhancement 5	0.64	0.64	0.632	0.632
Self-enhancement 6	0.682	0.682	0.677	0.678
Self-enhancement 7	0.814	0.815	0.818	0.819
Self-enhancement 8	0.706	0.707	0.699	0.7
Self-enhancement 9	0.87	0.869	0.877	0.875

Self-enhancement 10	0.59	0.59	0.595	0.595
Self-enhancement 11	0.462	0.461	0.462	0.46
Self-enhancement 12	0.482	0.481	0.479	0.478
Self-enhancement 13	0.21	0.21		
Self-enhancement 14	0.429	0.429		
Self-enhancement 15	0.211	0.212		
Self-transcendence 1	0.215	0.214		
Self-transcendence 2	0.533	0.531		
Self-transcendence 3	0.23	0.231		
Self-transcendence 4	0.45	0.445	0.474	0.467
Self-transcendence 5	0.463	0.459	0.482	0.477
Self-transcendence 6	0.34	0.335	0.362	0.355
Self-transcendence 7	0.497	0.493	0.53	0.524
Self-transcendence 8	0.395	0.392	0.424	0.42
Self-transcendence 9	0.367	0.364	0.411	0.407
Self-transcendence 10	0.716	0.721	0.709	0.715
Self-transcendence 11	0.729	0.728	0.717	0.717
Self-transcendence 12	0.721	0.719	0.721	0.719
Self-transcendence 13	0.584	0.585	0.578	0.579
Self-transcendence 14	0.499	0.501	0.502	0.504
Self-transcendence 15	0.526	0.53	0.528	0.532
Self-transcendence 16	0.477	0.479	0.501	0.504
Self-transcendence 17	0.513	0.515	0.524	0.528
Self-transcendence 18	0.434	0.436	0.426	0.428

Appendix A5: Squared Multiple Correlations

Item	Model 1 with behavior	Model 1 without behavior	Model 2 with behavior	Model 2 without behavior
PBC 1	0.037	0.038	0.037	0.038
PBC 2	0.614	0.628	0.614	0.628
PBC 3	0.56	0.547	0.56	0.547
Attitude 1	0.772	0.77	0.772	0.77
Attitude 2	0.79	0.787	0.79	0.787
Attitude 3	0.513	0.515	0.513	0.515
Attitude 4	0.531	0.531	0.531	0.531
Attitude 5	0.763	0.766	0.763	0.766
Attitude 6	0.472	0.475	0.472	0.475
Attitude 7	0.632	0.634	0.633	0.634
Personal norm 1	0.664	0.66	0.664	0.66
Personal norm 2	0.592	0.595	0.591	0.594
Personal norm 3	0.527	0.528	0.527	0.528
Injunctive norm 1	0.292	0.289	0.29	0.287
Injunctive norm 2	0.34	0.342	0.34	0.341
Injunctive norm 3	0.653	0.655	0.656	0.658
Descriptive norm 1	0.133	0.132	0.132	0.131
Descriptive norm 2	0.619	0.617	0.62	0.618
Descriptive norm 3	0.49	0.492	0.491	0.492
Self-enhancement 1	0.026	0.027		
Self-enhancement 2	0.037	0.037		
Self-enhancement 3	0.063	0.063		
Self-enhancement 4	0.147	0.147	0.148	0.149
Self-enhancement 5	0.409	0.41	0.399	0.399
Self-enhancement 6	0.465	0.466	0.458	0.46
Self-enhancement 7	0.663	0.664	0.669	0.671

Self-enhancement 8	0.499	0.499	0.489	0.49
Self-enhancement 9	0.758	0.755	0.768	0.765
Self-enhancement 10	0.348	0.348	0.354	0.354
Self-enhancement 11	0.214	0.212	0.213	0.212
Self-enhancement 12	0.232	0.231	0.23	0.228
Self-enhancement 13	0.044	0.044		
Self-enhancement 14	0.184	0.184		
Self-enhancement 15	0.045	0.045		
Self-transcendence 1	0.046	0.046		
Self-transcendence 2	0.284	0.282		
Self-transcendence 3	0.053	0.054		
Self-transcendence 4	0.203	0.198	0.224	0.218
Self-transcendence 5	0.214	0.211	0.233	0.227
Self-transcendence 6	0.116	0.112	0.131	0.126
Self-transcendence 7	0.247	0.243	0.281	0.274
Self-transcendence 8	0.156	0.154	0.18	0.176
Self-transcendence 9	0.135	0.132	0.169	0.165
Self-transcendence 10	0.513	0.519	0.503	0.511
Self-transcendence 11	0.532	0.531	0.514	0.514
Self-transcendence 12	0.52	0.517	0.52	0.517
Self-transcendence 13	0.342	0.342	0.334	0.335
Self-transcendence 14	0.249	0.251	0.252	0.254
Self-transcendence 15	0.277	0.28	0.279	0.283
Self-transcendence 16	0.228	0.23	0.251	0.254
Self-transcendence 17	0.263	0.266	0.275	0.279
Self-transcendence 18	0.189	0.19	0.181	0.183

Appendix A6: Construct Reliability

Construct	CR Measurement Model
PBC	0.633
Attitude	0.845
Personal norm	0.731
Injunctive norm	0.622
Descriptive norm	0.289
Self-enhancement	0.791
Self-transcendence	0.841

Appendix A7: AVE and Discriminant Validity

Construct	AVE	Highest correlation with other construct	Square of Correlation between two factors
PBC	0.405	0.431	0.186
Attitude	0.640	0.678	0.460
Personal norm	0.595	0.678	0.460
Injunctive	0.429	0.773	0.598
Descriptive	0.414	0.773	0.598
Self-enhancement	0.414	-0.117	0.014
Self-transcendence	0.288	0.401	0.161

Appendix A8: Standardized Factor Loadings Structural and Measurement Model

Item	Structural Model	Measurement Model
PBC 1	0.237	0.195
PBC 2	0.918	0.793
PBC 3	0.631	0.74
Attitude 1	0.876	0.877
Attitude 2	0.88	0.887
Attitude 3	0.715	0.718
Attitude 4	0.733	0.729
Attitude 5	0.879	0.875
Attitude 6	0.683	0.689
Attitude 7	0.802	0.796
Personal norm 1	0.787	0.813
Personal norm 2	0.787	0.771
Personal norm 3	0.744	0.727
Injunctive norm 1	0.531	0.536
Injunctive norm 2	0.564	0.584
Injunctive norm 3	0.837	0.811
Descriptive norm 1	0.352	0.362
Descriptive norm 2	0.884	0.786
Descriptive norm 3	0.627	0.702
Self-enhancement 4	0.387	0.386
Self-enhancement 5	0.634	0.632
Self-enhancement 6	0.678	0.678
Self-enhancement 7	0.817	0.819
Self-enhancement 8	0.699	0.7
Self-enhancement 9	0.876	0.875
Self-enhancement 10	0.595	0.595

Self-enhancement 11	0.462	0.46
Self-enhancement 12	0.48	0.478
Self-transcendence 4	0.456	0.467
Self-transcendence 5	0.47	0.477
Self-transcendence 6	0.345	0.355
Self-transcendence 7	0.51	0.524
Self-transcendence 8	0.418	0.42
Self-transcendence 9	0.398	0.407
Self-transcendence 10	0.714	0.715
Self-transcendence 11	0.698	0.717
Self-transcendence 12	0.699	0.719
Self-transcendence 13	0.59	0.579
Self-transcendence 14	0.517	0.504
Self-transcendence 15	0.549	0.532
Self-transcendence 16	0.519	0.504
Self-transcendence 17	0.532	0.528
Self-transcendence 18	0.42	0.428

Appendix A9: Construct Reliability Structural and Measurement Model

Construct	**CR Structural Model**	**CR Measurement Model**
PBC	0.648	0.633
Attitude	0.845	0.845
Personal norm	0.732	0.731
Injunctive norm	0.622	0.622
Descriptive norm	0.292	0.289
Self-enhancement	0.791	0.791
Self-transcendence	0.840	0.841

Appendix A10: Comparison of Structural Relationships and Correlational Relationships

Structural Relationship	Standardized Estimate	Correlational Relationship	Correlational Estimate
Self-enhancement → Attitude	-0.081	Self-enhancement ↔ Attitude	-0.114
Self-enhancement → Personal norm	-0.05	Self-enhancement ↔ Personal norm	-0.090
Self-transcendence → Attitude	0.382	Self-transcendence ↔ Attitude	0.335
Self-transcendence → Personal norm	0.437	Self-transcendence ↔ Personal norm	0.401
Personal norm → Intention	0.877	Personal norm ↔ Intention	0.506
Attitude → Intention	0.057	Attitude ↔ Intention	0.310
PBC → Intention	0.295	PBC ↔ Intention	0.344
Injunctive → Intention	0.482	Injunctive ↔ Intention	0.277
Descriptive → Intention	-0.466	Descriptive ↔ Intention	0.257