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The Gap between Citizens' Concerns and Consumers' Actions: Which Factors Impair the Adoption of Food-related Mitigation Options?

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ABSTRACT

The main aim of this contribution is to identify factors that influence consumers' willingness to adopt food-related options to mitigate climate change and reveal how these factors are interlinked. In-depth interviews were carried out with 32 consumers in Germany, France and the UK; the results were analyzed and described in the context of Alphabet Theory. The allocation of findings from the interviews to the theoretical framework helps to identify interrelations, to provide explanations and thereby achieve to take a holistic view on the topic, without neglecting contextual information. The findings of this study indicate that a higher level of knowledge will result in more personal responsibility assumed by the consumers and will increase their willingness to adopt mitigation options. Hence, it is relevant to enhance consumers' knowledge on climate-friendly food choices through broad public information campaigns and education programs.

***Keywords**: Climate change; food-related mitigation options; in-depth interviews; Alphabet Theory*

1 Introduction

The EU aims to be climate neutral by 2050. A recent special Eurobarometer on climate change reveals that almost 80% of the respondents think that climate change is a very serious problem and almost one quarter thinks that it is the single most serious problem facing the world today. Regarding the responsibility for tackling climate change, 55% of the respondents mention their national government and 36% state that the responsibility lies with them personally. While the most often mentioned personal action is the reduction of waste and its separation for recycling (75%), the adoption of climate-friendly food purchases is only named by 18% of the respondents (European Commission, 2019).

An important contribution to climate neutrality can be expected from agriculture and food production, as this sector accounts for over 25% of the anthropogenic greenhouse gas emissions (Springmann et al. 2016). Those emissions can, for example, be reduced by eating seasonal fruits and vegetables or by replacing meat with plant-based proteins, but consumers are relatively unaware of the effectiveness of different measures (Kause et al. 2019).

Carbon Footprint labels (also called carbon labels or CO_2-labels) have been introduced to the market to enable consumers to make climate-friendly choices (Carbon Trust, 2009; Plassmann & Edward-Jones, 2009; Finkbeiner, 2009). So far, CO_2 labelling schemes only have minor relevance in most European countries, even though different studies show that consumers are generally concerned about climate change and therefore partly favor the introduction of such labels for food (European Commission, 2009; Guenther et al., 2012; Rückert-John et al., 2012). One of the reasons for the low relevance of CO_2-labels is supposed to be a lack of awareness and knowledge among consumers on the possibilities to impede climate change by adjusting their buying behavior (Frey & Mühlbach, 2009; Lippincott, 2008; Lippincott Mercer, 2006). Only if consumers are aware of the social and environmental effects of their food purchases and know how to mitigate the adverse effects, they might adapt their food purchasing and consumption behavior accordingly (Berry et al., 2008; Rückert-John et al., 2012; Walter & Schmidt, 2008).

This is the starting point for the present contribution: it is important to learn more about consumers' associations with climate change as well as their perceptions on climate-friendly food purchases and mitigation options in order to understand how these aspects influence the discrepancy between the general concern and consumers' actual behavior. The aim of this study is to deeply analyze consumers' associations with climate change, their information needs, their willingness to adapt their purchase behavior and the barriers for climate-friendly consumption behavior. In this line, the present contribution also explores consumers' knowledge on the environmental effects of meat and dairy production and consumption.

The research presented here was part of a broader research project looking into climate-friendly behavior and carbon footprint labels, comprising a quantitative survey with choice experiments as well as personal interviews with consumers. The results on the appropriateness and effectiveness of carbon labels as a tool for supporting climate-friendly food consumption were previously published by the co-authors of this paper.[1] The present contribution solely focuses on the interviews, which revealed a multitude of valuable insights with respect to the factors impairing the adoption of food-related mitigation options which were beyond the scope of the previous publication.

The article continues with a description of the theoretical model, namely Alphabet theory, that is used to structure the results and draw meaningful conclusions from the interviews. Following, a literature overview on different aspects of climate-friendly purchase behavior collected from recent scientific publications is presented. The subsequent section introduces the methodological approach of this study. In section 5 the results from the interviews are presented, related to the elements of the theoretical framework and discussed in the context of recent scientific literature. Finally, conclusions are drawn from the findings of this study and recommendations are given to politicians and retailers as well as for future research.

2 Alphabet Theory

Alphabet Theory is applied as the theoretical framework for this study because it helps to structure the most important aspects and their interactions with regard to climate-friendly food purchase and consumption behavior. Thereby it is possible to draw a holistic picture on factors influencing climate-friendly behavior and to identify reasons for the discrepancy between consumers' attitudes and their actions.

[1] "Yvonne Feucht, Katrin Zander, Consumers' preferences for carbon labels and the underlying reasoning. A mixed methods approach in 6 European countries, Journal of Cleaner Production (2017: 178)"

Alphabet Theory combines Attitude-Behavior-Context (ABC) Theory (Guagnano et al., 1995) and Value-Belief-Norm (VBN) Theory (Stern et al., 1999). The ABC Theory (Guagnano et al., 1995) provides a framework for describing how attitudes can result in behavior (Zepeda & Deal, 2009). The theory is based on the assumption that consumers act according to the functional and psychological gain, which they expect from a given behavior (Eide & Toft, 2013). The VBN Theory was developed to predict pro-environmental behavior by the means of altruistic considerations and combines three theories: Value Theory (Schwartz, 1994), the New Ecological Paradigm (Dunlap & Van Liere, 1978), and Norm-Activation Theory (Schwartz, 1977). The linkage of these three theories results in a model for the prediction of environmentally significant behavior. Zepeda & Deal (2009) merged ABC and VBN Theory and added knowledge (K), information seeking (IS), habits (H), and demographic data (D) in order to better explain consumers' preferences. Their original theoretical model is presented in Figure 1.

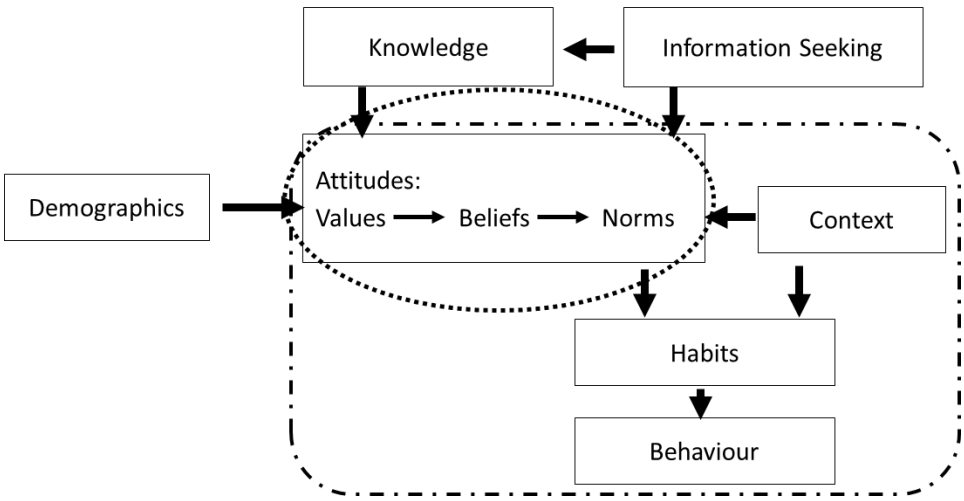

Figure 1: Alphabet Theory from Zepeda & Deal (2009)
(····· VBN Theory, — · · — ABC Theory)

Zepeda & Deal (2009) successfully applied Alphabet Theory to determine consumer motivations for purchasing organic and local food and concluded that the combination of ABC Theory and VBN Theory is very valuable in explaining and predicting consumers' food purchasing behavior. They also found that the additional elements increased the predictive power of the theoretical model as they interact with the formation of attitudes and thus, directly and indirectly, influence habits and behavior. The interactions between the elements of the combined theoretical framework help to better explain food purchase behavior as compared to both individual models without any additional elements. The adaptations of the theoretical framework to the context of climate-friendly behavior are described in the subsequent section and illustrated in figure 2.

Knowledge and information seeking implies participants' understanding of climate change and climate-friendly food purchase behavior, knowledge on the impact of climate change as well as participants' experience with climate change and potential mitigation options. Information seeking refers to consumers' awareness and perception of carbon labels, their perception of information on climate-friendly food choices, and the sources of information. Knowledge and information seeking are elements of the Alphabet theory which are closely related to each other. Therefore, they are discussed in one section in this contribution.

Attitudes, the central element of Alphabet Theory, involve general attitudes towards climate change (ignorant vs. concerned), attitudes towards the reduction of milk and meat as well the perceived effectiveness of consumers' actions. One special characteristic of the framework is that information seeking does not only influence knowledge and attitudes, but knowledge and attitudes also have an impact on information seeking, e.g. concerned food shoppers look for more information on food products' quality (Zepeda & Deal, 2009; Feldmann & Hamm, 2015). Consumers actively searching for additional information might develop stronger attitudes towards certain product characteristics, which in turn might facilitate behavior and possibly translate into the creation of habits. Knowledge, as a result of information seeking, also influences attitudes and thereby supports or prevents further information seeking.

One reason, why the use of this theoretical framework is valuable for the understanding of the results, is the factor 'context'. This factor refers to external influences on food purchase decisions, such as for example influence of others. These influences can be negative as well as positive. Context acts as a mediator between attitudes and behavior, and can reinforce the formation of both, attitudes and behavior. Through the negative or positive influence that contextual factors exert on attitudes, they also indirectly affect information seeking and knowledge,

and hence might reinforce or weaken the development of attitudes. Context may comprise incentives and barriers to food purchases, such as availability, price, complexity, and inconvenience (Sirieix et al., 2008; Steg & Vlek, 2009; Feldmann & Hamm, 2015). Stern (2000) reported that contextual factors might even have a stronger influence on the formation of behavior than attitudes.

New elements and relations have been included to the initial Alphabet Theory to better suit the characteristics of this study (Figure 2). First of all, responsibility for the mitigation of climate change has been added to the theoretical framework, since it appears to be important in consumers' argumentation with respect to climate-friendly food purchases. The sense of responsibility can be influenced through contextual factors and attitudes towards climate-friendliness and has a direct impact on behavior. Especially the influence of others, as one contextual factor, affects consumers' willingness to feel responsible for the mitigation of climate change. Information seeking and knowledge have an indirect impact on the responsibility for the mitigation of climate change through the formation of attitudes.

Secondly, a direct relation between attitudes and behavior as well as between context and behavior was included. Furthermore, a two-way interdependence was introduced between habits and behavior, because "habits are formed when using the same behavior frequently and consistently in a similar context for the same purpose" (Danner et al., 2008: p.245) and because "it is argued that the purchase of everyday food products […] is, in many cases, a behavior guided by habits" (Grankvist & Biel, 2007: p. 702). Hence, behavior might reinforce habits, e.g. local food purchases might create the habit of regularly visiting farmers' markets.

Another change, which was made to the original theoretical model, is the removal of demographics. Since the interviews were only carried out with few participants, demographic data could not be used to explain consumers' attitudes and behavior in general. In the following sections, the elements and their interactions are presented step by step and in detail. On this basis, it is possible to draw reasonable and well-established conclusions from the interviews.

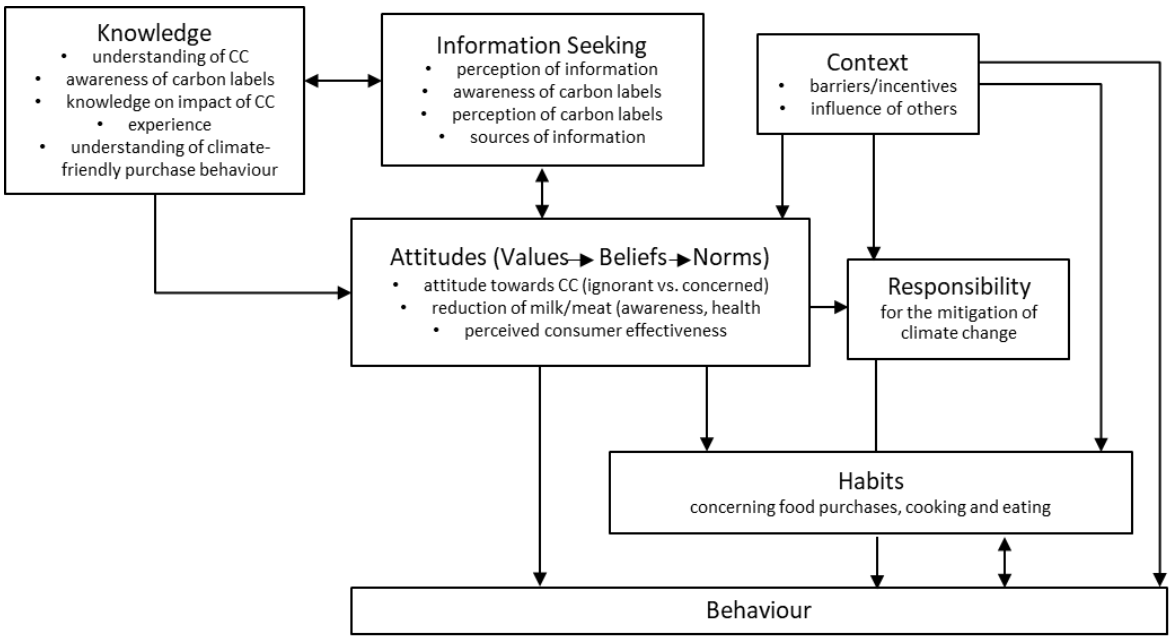

Figure 2: Behavioral model for climate-friendly consumption (based on Alphabet Theory), adopted from Zepeda & Deal (2009)

3 Literature review

3.1 Knowledge, information and labelling

Consumers' environmental knowledge as well as specific knowledge on eco-labels influences consumers' attitudes towards the environment in general. Hence, knowledge indirectly influences pro-environmental behavior through the formation of attitudes. Better information on environmental issues and educational programs can increase consumers' knowledge (Taufique et al. 2016). Barr et al. (2011) differentiate between expert and public knowledge and reveal that great media attention on issues related to climate change or controversial scientific results create

a distance between both parties. To increase consumers' knowledge, it is necessary to choose appropriate means of communication, which correctly convey relevant content.

Consumers' knowledge on climate-friendly food options is limited; hence, consumers are not able to act according to their attitudes and preferences and purchase climate-friendly food (Baldo et al., 2009; Boardman, 2008; Beattie & Sale, 2009; Burger et al., 2010; Gadema & Oglethorpe, 2011; Hartikainen et al., 2014; Onozaka et al., 2015). Since climate friendliness is a credence good, it cannot be verified through closer inspection or consumption of the product. Labels aim at informing consumers in a condensed and easily understandable way, reaching a high recognition value at the same time. They might help consumers to get information on the production standards and to reduce the information asymmetry between producers and consumers. But, only if consumers know about the labels, their content and the underlying production standards, producers are able to achieve a price premium for their sustainable practices, creating a market for these products (Tonsor and Wolf 2011).

Grunert et al. (2014) studied the understanding and use of four selected sustainability labels, one of which was on carbon footprint, in six European countries. Overall, they revealed a low level of use, but the more consumers are concerned about sustainability issues with regard to food production, the higher was the level of use. The authors conclude that, in general, the relation between motivation (i.e. level of concern), understanding and use of labels is complex (Grunert et al. 2014).

So far, carbon labels have not been successful. Hornibrook et al. (2015) reported that the introduction of the Carbon Trust's carbon reduction label in the UK had little effect on consumers' purchase behavior, in other words: there was an overall lack of willingness to purchase carbon labelled products across all consumer groups. Berry et al. (2008) revealed that the level of awareness for the UK Carbon Trust label was very low among consumers and that it was criticized by experts because of its complexity and information overload. A UK study showed that 89% of the respondents experienced difficulties in understanding and interpreting carbon labels, indicating that the content provided by carbon labels was often not readily understood by consumers (Gadema & Oglethorpe, 2011). In the same context, Upham & Bleda (2009) maintained that carbon labels need to be simple, clear and eye-catching to be adopted more widely. Moreover, they should be accompanied by a broader public campaign to increase consumers' awareness and knowledge, because the underlying concepts and their implications are complicated and sometimes scientifically controversial such as the calculation of the carbon footprint itself (Baldo et al., 2009; Boardman, 2008; Burger et al., 2010; Onozaka et al., 2015). Panzone et al. (2011) investigate the effectiveness of different policy instruments to generate climate-friendly food consumption and reveal that labelling is less effective than quantity instruments (e.g. a ban or an exogenous removal of the most polluting alternative).

3.2 Attitudes towards climate-friendliness and climate-friendly behavior

There is no overall definition on climate-friendly behavior and many different forms of climate-friendly behavior exist. Options for climate-friendly food choice and consumption behavior range from the reduction of consumption in general via the avoidance of food waste to the choice of climate-friendly alternatives whenever possible. One very prominent and effective way is the reduction of meat and dairy consumption and the replacement of animal based proteins through plant based proteins in the diet. Another option is the choice of food with lower food miles (transport distances from production, processing to consumption), such as seasonal and local food.

Although 36% of the Europeans think that they are personally responsible to tackle climate change (European Commission, 2019), only few people consider climate effects when purchasing or consuming food (Feucht & Zander, 2018). In order to behave climate-friendly in food purchase and consumption situations, consumers need to perceive their actions as being effective. De Boer et al. (2016) show that the perception of human causation of climate change and high individual importance of climate change is positively associated with perceived effectiveness of mitigation options. Furthermore, the perceived effectiveness of food-related mitigation options (i.e. "Buy local, seasonal foods", "Eat less meat", "Buy (more) organic foods") is based on consumers' concern with more "general" green goals than on beliefs which are specific to climate change (De Boer et al., 2016: p.24). Generally, climate concerns motivate consumers' food choices less strongly than other ethical considerations, e.g. animal welfare (European Commission, 2014; Hartikainen et al., 2014; Guenther et al., 2012). Furthermore, non-ethical considerations, such as taste, price, safety and nutrition, are predominantly viewed as most relevant reasons for choosing food (Lusk & Briggemann, 2009).

Waste reduction and recycling are the actions that are stated to be taken by most of the Europeans (75%) as options to mitigate climate change (European Commission, 2019). More than one third (36%) report to purchase local and seasonal food and 28% of the Europeans maintain to use alternative/public transportation (European Commission, 2019). Simultaneously, results of Austgulen et al. (2015), Tobler et al. (2011), and Lea & Worsley (2008) indicate that the purchase of local food and the reduction of food waste are the most effective activities

while the reduction of meat as well as the purchase of organic food are perceived as the least beneficial activities to mitigate climate change through food consumption. In contrast, the increase in meat and dairy production and consumption that has taken place over the last decades appears to have the strongest effect on climate change in the context of food (Reisch et al., 2013).

3.3 Barriers to climate-friendly purchase behavior and contextual factors

Most people struggle to conceptualize climate change and to relate it to everyday life due to its abstract and complex nature (Lorenzoni & Pidgeon, 2006). Hence, a lack of knowledge might act as a barrier to climate-friendly behavior: If consumers are not sure about the impact of their purchase behavior on climate change they might refer from buying climate-friendly food. The term "perceived consumer effectiveness" describes participants' perception of the impact of their own behavior on global warming and climate change. Lorenzoni et al. (2007), Hagen & Pijawka (2015) as well as Whitmarsh et al. (2011) argue that climate change is mainly perceived as a risk which is far away in terms of space and time. Hence, it is not perceived as an immediate personal risk and thereby personal consequences are underestimated, whereas risks for the society as a whole and for future generations are acknowledged. Shifting the blame and denying personal responsibility is another important barrier to engagement (Lorenzoni et al., 2007). However, altruistic motives such as a perceived moral obligation towards future generations motivate people to act in a climate-friendly way (e.g. Lorenzoni & Pidgeon, 2006).

Consequently, the willingness to engage in actions to tackle climate change for one's own well-being is frequently low to moderate (Berry et al., 2008; Upham & Bleda, 2009). Several studies show that consumers hesitate to pay a price premium for climate-friendly products and state that they would rather purchase those products if the climate-friendliness would come at no cost, while all other product attributes remain the same (Grunert et al., 2014; Hartikainen et al., 2014; Lüth et al., 2009). In addition, consumers frequently associate climate-friendly purchase behavior with constraints (e.g. less air miles, less taste, less pleasure, less heating, etc.) and reduced product quality (Lüth et al., 2009).

As mentioned above, reduction of animal based protein presents a particular efficient option for climate-friendly engagement, but most consumers are reluctant to change their dietary patterns. This is due to several reasons, First, because people are not aware of the environmental benefits of a meat-free diet (Austgulen et al., 2015), and second because consumers frequently cannot imagine to change their diet, even if they are confronted with scientifically proven arguments, since they perceive meat as an important part of their meals and associate meat consumption with pleasure as well as with various social and personal values (Macdiarmid et al. 2016). Some consumers also tend to engage in ignorance, in case they do not want to accept responsibility for the circumstances under which their food is produced (Walters, 2018). As the mere increase of information potentially leads to further disassociation, information on the realities of the climate impact of animal-based meals needs to be communicated in a scientifically sound, rational, and comprehensible way. Schösler et al. (2012) notice cultural change in the context of meat reduction and substitution. Preferences with regard to meat, meat substitution, and meal formats are influenced by the age of consumers. The special status of meat as one meal component is less prominent in the lower age groups. Hence, the substitution of meat might be easier to implement in the upcoming generations. Furthermore, a relation between the level of education and meat consumption was identified, in that better educated people are more likely to reduce their meat consumption (De Bakker and Hudders 2015).

4 Methodological approach

This research used a qualitative approach. In total 32 personal interviews with consumers were carried out in three European countries. Eleven took place in Brunswick (Germany) and in Edinburgh (Scotland) respectively, and ten in Paris (France). All interviews were directed by the same interviewer in the national language. Thereby, a consistent interviewing procedure in all three countries was achieved. The participants were recruited by means of convenience sampling. Participants in Paris were randomly recruited from the street by students trained for the recruitment. In Brunswick and Edinburgh researchers themselves recruited the participants by means of a snowball procedure. In Germany 64%, in France 70% and in the UK 82% of the interviewees were female. Altogether, 23 interviewees were female and nine interviewees were male.

Participants had to be at least partially responsible for doing the grocery shopping in their households. Also, a maximum of seven participants per country was allowed to have an academic degree and the majority of the participants in each country needed to be women in order to reflect their higher responsibility for grocery shopping in Europe. An incentive of 40 € was offered for participation. Each interview took about 30 to 60 minutes and was recorded. Participants were informed beforehand that the interview would be centered on their food purchase behavior.

The interview guideline included questions on the participants' understanding of climate change and their perception of climate change. Participants were also asked about the responsibility for the mitigation of climate change in their opinion. Furthermore, the participants were questioned on their preparedness to reduce meat and dairy products in order to mitigate climate change as well as on barriers and incentives for climate-friendly food purchase behavior. Participants' demand for information and their preference for different information sources were inquired near the end of the interviews.

The interviews were transcribed by native speakers. For the analysis of the transcripts we used content analysis according to Mayring (2010) and the software MAXQDA versions 10 and 11. The basic unit of analysis was a word. The category system was developed beforehand in a deductive manner based on the Alphabet theory and findings from a previous quantitative survey (Feucht & Zander, 2018). Each text segment could be assigned to more than one category. The system was pretested with six interviews, two for each country, and adjusted where necessary. In the presentation of the results no distinction between the interviews from the three countries was made since no systematic differences were found.

Through the application of a qualitative approach it is possible to embed findings into a more meaningful context, as more in-depth information is gathered from respondents, providing valuable insights into their associations and thoughts that would remain undiscovered in more scalable research. The insights gained through the interviews were presented and discussed in the framework of Alphabet Theory. Thereby, a comprehensive picture of the results on consumers' perceptions, attitudes, and behavior with regard to climate change can be drawn.

5 Results and discussion

5.1 Knowledge and information seeking

Most of the interviewees had some general idea on what climate change means, respectively they were able to report on their associations or experiences with climate change, but many of them were not sure about the immediate and future consequences as well as the relation between food purchases and climate change. Asking participants about their understanding of climate change frequently yielded responses related to weather and ecosystem changes in general: participants associated global warming, ice melting, and sea-level rise with climate change. Further associations, such as the loss of habitat, the influence on food production, and the spreading of diseases, were only mentioned by very few participants. Concerning interviewees' perceptions of climate-friendly food, locally as well as organically produced foods were often regarded as climate-friendly purchase options. Some also mentioned seasonal food or brought up the very broad term "naturally grown".

One aspect of climate-friendly food purchases, contradictorily discussed in the interviews, refers to information. A large number of participants argued that there was a lack of information about the climate-friendliness of food products as well as a lack of knowledge about the impact of one's food choices on the climate or the environment. Participants' understanding of the impact of food purchase behavior on climate change mainly extended to the reduction of waste (e.g., food or packaging waste) and recycling activities. Although information on climate-friendly food purchases was perceived to be scarce and participants felt a lack of knowledge, some participants mentioned a general information overflow due to the multitude of labels on food products.

> *"So if you add climate friendliness, it's quite a lot of information to communicate to people I think."* (Male, UK, 3)

In addition, a few interviewees reported a lack of trust in information that can be found on food products, because they did not have any background information concerning these labels and because it is not immediately verifiable at the point of purchase.

> *"Of course, that is a problem: Can I believe that?"* (Male, Germany, 5)

These results are in line with earlier research according to which knowledge regarding measures to impact climate change is very limited (Berry et al. 2008)

When asked for their knowledge of a carbon label, many of the interviewees stated that they were unaware of any carbon labels on food products, but they believed that there are such labels. Only very few participants claimed that they had recognized carbon labels before; one participant named the eco-label "Blue Angel".

The mere introduction of carbon labels with basic information might not be enough to enhance consumers' knowledge. When asked for promising sources of information to communicate climate-friendliness, media channels (e.g. TV and radio) and in-store measures were mentioned. Information on packages was suggested by only a few participants. This corresponds to participants' frequent experience of information overflow through product labels and a lack of knowledge at the same time. Hence, interviewees asked for more comprehensive

information, for example through public campaigns on TV, radio or in-store, and educational programs about climate change at schools.

> *"Maybe it has to start in school because if children are brought up more aware well going forward they're going to behave more responsibly and take things seriously."* (Female, UK, 5)

Participants in the interviews also came forward with concrete proposals to raise consumers' awareness. These ideas ranged from public campaigns similar to those for slow driving in Germany, through more social media activities to separate aisles or shelves for climate-friendly food products in supermarkets.

> *"I can perhaps mainly imagine a marketing initiative. There tend to be for example more frequently campaigns for slow driving or so, which can be very effective. If there was something like that for climate change, I would appreciate that."* (Male, Germany, 4)

These findings are in line with recent studies stating that it is necessary to increase consumers' knowledge through awareness-raising campaigns and/or information at the point of sale, in order to build a basis for further consumer-oriented policies and to activate environmentally-friendly attitudes (Grankvist & Biel, 2007; Dagevos & Voordouw, 2013; Garnett, 2014). With this kind of campaigns and programs consumers' knowledge can be enhanced and the level of information increased. Increasing knowledge will affect the formation of attitudes and might finally foster climate-friendly purchase behavior.

5.2 Attitudes and climate-friendly behavior

Concerning the attitudes towards actions against climate change the interviewees can be divided into two groups. On the one hand there are those who feel a moral obligation to tackle climate change (participants with a relatively high level of knowledge and more positive attitudes) and on the other hand there are the interviewees who do not see an urgent need to change their present behavior, because the consequences of climate change are not immediately tangible. The first group stated that they were concerned regarding the consequences of climate change, especially with respect to the consequences for future generations. They perceived climate change to be a danger which potential consequences cannot yet be assessed. Despite this uncertainty some interviewees felt a moral obligation to contribute to the mitigation of climate change.

> *"I think I will probably see a small impact, but I think future generations will see more. So it's up to us now to be doing stuff. To try and slow that down."* (Female, UK, 3)

The second group can be characterized by lower knowledge and ignorance of any personal effect of climate change.

> *"Not particularly, I don't think it has a particular or personal impact on me at the moment."* (Female, UK, 2)

Lorenzoni et al. (2007), Hagen & Pijawka (2015), and Whitmarsh et al. (2011) show that some consumers are not willing to change their behavior, because the risk of climate change does not seem to affect them. Altruistic motives (i.e. perceived moral obligation) towards future generations, however, rather motivate people to act in a climate-friendly way according to Lorenzoni & Pidgeon (2006).

Some participants felt that each individual's behavior will have an impact on climate change and its consequences. This phenomenon is referred to in the literature as perceived consumer effectiveness. Those participants were more likely willing to take responsibility for the mitigation of climate change.

When asked for the possible actions to mitigate climate change, participants frequently named measures such as waste reduction and recycling, the purchase of local, organic, and/or seasonal food, and the use of alternative/public transportation.

> *"Reuse. Recycle. Shop local. Something I've ever done but probably you maybe bulk buy with a friend or a couple other families."* (Female, UK, 4)

Besides the reduction of food waste, the interviewees were seldom aware of food-related mitigation options. Although scientific evidence for the negative impact of beef and dairy production on climate change exists (cf. Steinfeld & Gerber, 2010; Westhoek et al., 2014), many people have not heard about this before. Some interviewees even expressed doubts on the effect of meat and dairy consumption on climate change, whilst others said that they would consider a reduction, if the reasons were better explained to them. Only very few interviewees mentioned the impact of meat and dairy production on the climate themselves.

> *"Food production and consumption. The thing that's popping into my mind is the big story about McDonalds chopping down all the trees to make grazing land for all their beef burgers… There was something about the beef giving off all these emissions that's effecting the ozone."* (Female, UK, 3)

If participants in the interviews considered the reduction of meat and dairy, most of them would rather do it out of health reasons than out of environmental concerns. Likewise, Macdiarmid et al. (2016) reveal that most consumers would rather be willing to reduce their meat consumption because of health reasons. This finding also corresponds to the results of a study by Austgulen et al. (2015) who identify the reduction of meat as one of the least environmental beneficial activities to mitigate climate change in the opinion of consumers. Nevertheless, few participants also argued that the reduction of meat and dairy products would be opposed to a balanced diet.

> *"Well, I think, to do without meat or to reduce it in a way, that is something you rather do out of nutritional reasons."* (Female, Germany, 3)

Many interviewees named pleasure and habits as reasons for the consumption of meat and dairy products. Both reasons often coincided, since participants were used to the regular consumption of meat and dairy products and could not imagine living without it. In addition, few participants did not only mention the habit of eating meat and dairy, but also cooking habits, which involved the regular use of meat and dairy products.

> *"…I think it would be hard because then you are making big changes to your weekly sort of kind of cooking and the dishes that you serve... So I would be reluctant."* (Female, UK, 6)

Interviewees mentioned that the implementation of meat-free diets might be easier in future generations, because cooking habits and trends change over time.

> *"Yes, if you educate children in that direction, it maybe might work to introduce new eating habits,…" (Male, Germany, 5)*

Some interviewees also recognized the impact of intensive agriculture and the use of chemicals on climate change and for this reason proposed the purchase of organic and/or local food as mitigation options. However, at the same time they named other reasons for the purchase of sustainably produced food, which were more important to them than slowing down climate change (e.g. health and welfare aspects).

> *"...for an example say you buy free range eggs, might not be the most climate-friendly method of egg production but there's sort of welfare aspects and things which you prioritize if you're choosing that particular category of food."* (Male, UK, 3)

In this respect, participants' responses confirm earlier research results which reveal a stronger preference for other ethical product attributes (e.g. animal welfare, local production, organic production) than for climate-friendliness (cf. European Commission, 2014; Hartikainen et al., 2014; Gadema and Oglethorpe 2011; Guenther et al., 2012), because the development of climate change, respectively the outcome, is unforeseeable.

This section illustrates the link between knowledge and attitudes, in that it shows how better information and communication could increase consumers' knowledge and awareness and could thereby help to form more positive attitudes towards climate-friendly food purchases.

5.3 Context

One contextual factor of climate-friendly purchase behavior that frequently came up during the interviews was price. High prices appeared as a major barrier to climate-friendly food purchases as most interviewees felt that these products are more expensive. The perception of high prices for climate-friendly products derived from the association of climate-friendliness with local, seasonal, and organic food products, which were also often perceived to be more expensive. Hence, participants suggested tackling the price to increase climate-friendly food purchases.

> *"Perhaps, it is somewhat the price. That is very expensive, now and then."* (Female, France, 4)

Another contextual factor that prevents consumers from buying climate-friendly products is convenience (with respect to shopping time and availability), since these products either were perceived to be more difficult to be found in supermarkets or not available at all.

> *"Then I think when you're in a rush, getting your messages and going for groceries and things, you've not always got time to kind of look for tiny labels."* (Female, UK, 1)

High prices and low availability are also reported by other recent studies as barriers for climate-friendly food purchases (Baldo et al., 2009; Boardman et al., 2008; Grunert et al., 2014; Hartikainen et al., 2014; Lüth et al., 2009).

A very relevant factor in the context of sustainable food choices is the influence of others on consumers' individual behavior. The reduction of meat, for example, depends on the family environment and might also depend on the cultural/educational background. Some interviewees were influenced by their family environment as they believed

that at least some of their family members and/or friends were reluctant to reduce meat and dairy products. This last issue is an example that shows the influence of contextual factors on the formation of attitudes, respectively it illustrates the influence of others on the personal relevance of mitigation options as well as the attitude formation in general. Thus, participants felt more compelled to act in a climate-friendly way, if other people also engaged in climate-friendly behavior. Many interviewees reported that they believe that only concerted actions of the many can make a difference. Hence, their motivation depended on other people's willingness to change something.

> *"Well I hope so, I mean my little effort doesn't count for much but if everybody was doing some sort of change that was quite significant then yes."* (Female, UK, 6)

Jackson (2005) for example states that people are guided as much by personal choice as by the behavior and attitudes of people in the environment. Likewise, Salazar et al. (2013) identify the social influence through peer groups on sustainable purchase behavior. It seems to be personal communication rather than just the observation of behavior in peer groups that has a strong impact on consumers' sustainable choices. This influence depends on the type of sustainable behavior, e.g. it is stronger for organic food purchases than for the use of green electricity (Welsch & Kühling, 2009).

5.4 Responsibility for the mitigation of climate change

Most of the participants expected the government to take responsibility for the mitigation of climate change, while many interviewees also thought that the society as a whole, respectively consumers and citizens, as well as the industrial sector were responsible. Interviewees believed that the government can be most effective through imposing regulations and strategies to slow down climate change. Politicians are supposed to set the frame, in which consumers and citizens can contribute their share to more climate-friendliness. In addition, some interviewees mentioned that retailers should take more responsibility by introducing a more climate-friendly product range and thereby support consumers in their food choices. Similar to this finding from the interviews, the special Eurobarometer on climate change reveals that a quarter of the respondents thinks that they have a personal responsibility to tackle climate change, while most of the participants think that the national governments need to develop and implement policies to slow down climate change (European Commission, 2014). In a study by Berry et al. (2008), 77% of the surveyed UK consumers were of the opinion that the government should set higher environmental standards to reduce the range of products that cause environmental damage. Furthermore, the authors recommend that retailers make climate-friendly choices for their customers, in that they decide against products, ingredients and/or processes that are high in carbon.

The way participants thought about who should be responsible for the mitigation of climate change depends on their general attitudes towards climate change as well as the contextual factors (e.g. purchase barriers and incentives) and directly influences the implementation of climate-friendly actions.

In the same context de Boer et al. (2016) report that people who perceive climate change as an important issue more highly rate the effectiveness of options to mitigate climate change (e.g. purchase of local and seasonal food). Consequently, their perceived consumer effectiveness is higher. Nevertheless, quite a few participants admitted that they would need support to make climate-friendly purchase decisions and suggested to introduce public campaigns and education programs at schools. They also asked for support from retailers, who can control the product assortment in their stores and can place climate-friendly choices more prominently, so that consumers do not have to invest a lot of time for their food shopping.

> *"Well, I think supermarkets and retailers should take some responsibility. They can drive the consumer to buy what they want to sell. And they of course have a major effect on their suppliers."* (Female, UK, 4)

Some interviewees brought up the need for information campaigns and political guidance to create a basis, on which consumers are enabled to act in a climate-friendly way. The following quotation from an interview confirms this idea, in that it reveals participants' need for support to make climate-friendly purchase decisions.

> *"…but definitely politicians need to take action, because people need to be forced a little bit to do what's good for them."* (Female, Germany, 4)

Dagevos and Voordouw (2013) suggest implementing a consumer-oriented policy strategy, but also emphasize the importance of politicians' and policy-makers' commitment to support climate-friendly purchase behavior. They recommend, for example, awareness-raising campaigns, because they help to create consumer knowledge and build a basis for further, more invasive policy instruments. In addition, a workshop held by the Food Climate Research Network identified the need of action from policy and business. Although responsibility equally needs to be recognized by government, industry, academics, civil society, and consumers "the policy leadership should set the direction of travel and provide support" (Garnett, 2014: p.3).

6 Conclusions

The allocation of the information drawn from the in-depth interviews to the Alphabet Theory revealed that knowledge (i.e. a lack of knowledge) is a key determinant for the adoption of climate-friendly food purchase and consumption behavior. Participants' general lack of knowledge can be attributed to a lack of information concerning food-related mitigation options. Most respondents have not knowingly recognized carbon labels on food before and some are not sure whether they can trust those labels. The theoretical framework shows that attitudes towards climate change influence the degree to which consumers seek information, which in turn influences knowledge and knowledge influences consumers' attitudes. In addition, attitudes affect responsibility, i.e. whether consumers believe that they personally are responsible or whether they allocate responsibility for climate change mitigation to other actors. Hence, consumers' knowledge also has an indirect impact on the extent to which consumers accept responsibility for the mitigation of climate change. The interviews show that most consumers ask for support from policy makers and retailers, because they do not feel able to gather enough information to make the "right" choices themselves.

While many consumers have some idea on the meaning of climate change and its consequences, only very few see a relation between their food purchase behavior, or consumption and climate change. Against the background of the results of this research, three different options exist to support those consumers, who are not yet willing or able to adopt food-related mitigation options. First, consumers need more information which is easily available and catchy to enhance their knowledge. Second, climate-friendly products have to be widely available and easy to identify. And third, it needs to be communicated that these products are not necessarily more expensive and that there are additional ways to mitigate climate change, such as the reduction of meat and dairy products which would be a low cost option. However, the interviews show that the positive effect of the reduction of meat and dairy products on our climate is either not known or not very popular with consumers. Most of them state that they would rather reduce meat and dairy products out of health than out of environmental reasons. This reasoning needs to be considered in communication measures.

The willingness to act in a climate-friendly way strongly depends on consumers' attitudes and on the question about the responsibility for the mitigation of climate change. The degree of information and the level of knowledge as well as contextual factors have in turn an impact on the formation of attitudes and indirectly on the formation of habits and behavior. Hence, it is very important to improve the information (way of communication and content) on climate-friendly food purchase and consumption behavior and to enhance consumers' knowledge.

Particularly for complex issues and where consumer knowledge is low, the mere provision of information might only confuse consumers and thereby can conversely result in less sustainable food choices. Accordingly, Berry et al. (2008) recommend communication at a higher level rather than just introducing another label, i.e. educating consumers about climate change (e.g. avoiding food waste) in-store, via television advertising or through new media. Thereby, it is important that governments support retailers' actions, because the mitigation of climate change is a higher-level political aim which is globally agreed upon in the United Nations Framework Convention on Climate Change.

The intervention of governments, i.e. policy measures to facilitate climate-friendly food choices through consumers, is needed to support climate-friendly purchase and consumption behavior. Consumers frequently state that they would prefer more convenient solutions, demanding less active engagement on their own initiative as well as more support from the government and retailers. Some participants, for example, propose concrete ideas, such as separate aisles or shelves for climate-friendly products. In other words, consumers are willing to engage in the mitigation of climate change by purchasing more climate-friendly food if it is easy to find and affordable. Hence, responsibility for the mitigation of climate change lies as much with the consumers as it does with the whole value chain and political institutions.

The Alphabet Theory turned out to be a useful framework to structure the results from the interviews on climate-friendly purchase and consumption behavior. In future research, the relations identified through the theoretical framework should be verified by applying quantitative studies. So far, the results of the interviews help to explain why consumers do not adopt food-related mitigation options for climate change in their everyday lives. A lack of knowledge, low levels of awareness and information seeking, contextual factors and low perceived own responsibility for climate change inhibit changes in purchase and consumption behavior. This effect is increased by eating habits which have a negative impact on the climate, i.e. meat and dairy consumption. A change of eating habits might be most successful in younger generations, because they appear to be more used to, respectively open for, new (vegetarian) products and meals. Supporting consumers in the change of habits should be accepted as a long-lasting process towards more climate-friendly behavior.

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References

Austgulen, M.H., Skuland, S., Schjøll, A., and Alfnes, F. (2015). Consumer readiness to reduce meat consumptions and eat more climate-friendly. *Paper prepared for presentation at the EAAE-AAEA Joint Seminar "Consumer Behavior in a Changing World: Food, Culture, Society",* Naples (Italy), March 25th to 27th, 2015.

Barr, S., Gilg, A.,and Shaw, G. (2011). Citizens, consumers and sustainability: (Re)Framing environmental practice in an age of climate change. *Global Environmental Change,* **21**: 1224-1233.

Baldo, G. L., Marino, M., Montani, M., and Ryding, S. (2009). The carbon footprint measurement toolkit for the EU Ecolabel. *International Journal of Life Cycle Assessment* **14**: 591-596.

Beattie, G., Sale, L. (2009). Explicit and Implicit Attitudes to Low and High Carbon Footprint Products. *International Journal of Environmental, Economic and Social Sustainability,* **5**(4): 191-206.

Berry, T., Crossley, D., and Jewell, J. (2008). Check-out carbon - the role of carbon labelling in delivering a low-carbon shopping basket. *Forum for the Future, Report.* Online available at: https://www.forumforthefuture.org-/sites/default/files/project/downloads/check-out-carbon-final300608.pdf.

Boardman, B. (2008). Carbon labelling: too complex or will it transform our buying? *Significance,* **5**(4):168-171.

Burger, E., Meixner, O., and Pöchtrager, S. (2010). Carbon Footprint bei Lebensmitteln – Inhaltanalytische Ermittlung relevanter Berechnungskriterien. Schriftenreihe des Instituts für Marketing & Innovation, Band 5, Wien. ISSN: 2074-1022.

Carbon Trust (2009). Calculate your organisation's Carbon footprint. Online available at: http://www.carbontrust.co.uk/solutions/CarbonFootprinting/FootprintCalculators.htm.

Danner, U.A., Aarts, H., and de Vries, N.K. (2008). Habit vs. intention in the prediction of future behaviour: The role of frequency, context stability and mental accessibility of past behaviour. *British Journal of Social Psychology,* **47**: 245-265.

Dagevos, H., Voordouw, J. (2013). Sustainability and meat consumption: is reduction realistic? *Sustainability: Science, Practice, and Policy,* **9**(2): 60-69.

Darnton, A., White, P., Sharp, V., Downing, P., Inman, A., Strange, K., and Garnett, T. (2009). *Food Synthesis Review Summary Report: A report to the Department for Environment, Food and Rural Affairs.* The Social Marketing Practice et al. Defra, London.

De Bakker, 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.

De Boer, J., De Witt, A., and Aiking, H. (2016). Help the climate, change your diet. A cross-sectional study on how to involve consumers in a transition to a low carbon-society. *Appetite,* **98**: 19-27.

Dunlap, R.E., Van Liere, K.D. (1978). The 'new environmental paradigm'. *Journal of Environmental Education,* **9**: 10-19.

Eide, B., Toft, M. B. (2013). Consumer Behavior Theories – Purchasing Organic Food. Bachelor Thesis, Department of Business Administration, Aarhus University (Denmark). Online available at: http://pure.au.dk/portal/files/-53767745/Bachelor_Thesis_Consumer_Behavior_Theories_Purchasing_Organic_Food.pdf.

European Commission (2009). Europeans' attitudes towards climate change. Special Eurobarometer 313/ Wave 71.1 – TNS Opinion & Social. Online available at: http://ec.europa.eu/public_opinion/archives/ebs/ebs_313_en.pdf.

European Commission (2014). Climate Change Report. Special Eurobarometer 409/ Wave EB80.2 – TNS Opinion & Social. Online available at: http://ec.europa.eu/public_opinion/archives/ebs/ebs_409_en.pdf.

European Commission (2015). Factsheet Climate Change. ISBN 978-92-79-52756-2, doi:10.2834/34323. Online available at: http://ec.europa.eu/clima/publications/docs/factsheet_climate_change_2015_en.pdf.

European Commission (2019). Climate Change Report. Special Eurobarometer 490/ Wave EB91.3 – Kantar. Online available at: https://ec.europa.eu/clima/sites/clima/files/support/docs/report_2019_en.pdf.

Feldmann, C., Hamm, U. (2015). Consumers' perceptions and preferences for local food: A review. *Food Quality and Preference,* **40**: 152-164.

Feucht, Y., Zander, K. (2018). Consumers' preferences for carbon labels and the underlying reasoning. A mixed methods approach in 6 European countries. *Journal of Cleaner Production,* **178**: 740-748.

Finkbeiner, M. (2009). Carbon footprinting – opportunities and threats. *International Journal of Life Cycle Assessment,* **14**: 91-94.

Frey, B., Mühlbach, D.S. (2009). Betriebliche Klimastrategie und Carbon Footprint. Gesellschaftliche Verantwortung im Einzelhandel. M.S. Aßländer und K. Senge (Eds.) *Corporate Social Responsibility im Einzelhandel:* 179-206.

Gadema, Z., Oglethorpe, D. (2011). The use and usefulness of carbon labelling food: A policy perspective from a survey of UK supermarket shoppers. *Food Policy,* **36**(6): 815-822.

Garnett, T. (2014). Changing what we eat. A call for research & action on widespread adoption of sustainable healthy eating. Food Climate Research Network. Online available at: http://www.fcrn.org.uk/sites/default/files/-fcrn_wellcome_gfs_changing_consumption_report_final.pdf.

Grankvist, G., Biel, A. (2007). Predictors of purchase of eco-labelled food products: A panel study. *Food Quality and Preference,* **18**(4): 701-708.

Grunert, K.G., Hieke, S., and Wills, J. (2014). Sustainability labels on food products: Consumer motivation, understanding and use. *Food Policy,* **44**: 177-189.

Guagnano, G.A., Stern, P.C., and Dietz, T. (1995). Influences on attitude–behavior relationships: a natural experiment with curbside recycling. *Environment and Behavior,* **27**: 699-718.

Guenther, M., Saunders, C. M.,and Tait, PR. (2012). Carbon labeling and consumer attitudes. *Carbon Management Journal,* **3**(5): 445-455.

Hagen, B., Pijawka, D. (2015). Public perceptions and support of renewable energy in North America in the context of global climate change. *International Journal of Disaster Risk Science,* **6**(4): 385-398.

Hartikainen, H., Roininen, T., Katajajuuri, J., and Pulkkinen, H. (2014). Finnish consumer perceptions of carbon footprints and carbon labelling of food products. *Journal of Cleaner Production,* **73**: 285-293.

Hornibrook, S., May, C., and Fearne, E. (2015). Sustainable Development and the Consumer: Exploring the Role of Carbon Labelling in Retail Supply Chains. *Business Strategy and Environment,* **24**: 266-276.

Jackson, T. (2005). Motivating sustainable consumption – a review of evidence on consumer behavior and behavioural change. A report to the Sustainable Development Research Network, University of Surry, UK.

Kause, A., Bruine de Bruin, W., Millward-Hopkins, J., and Olsson, H. (2019). Public perceptions of how to reduce carbon footprints of consumer food choices. *Environmental Research Letters,* **14**: 114005.

Lea, E., Worsley, A. (2008). Australian consumers' food-related environmental beliefs and behaviours. *Appetite,* **50**(2-3): 207-214.

Lippincott (2008). Consumers, brands, and climate change. Online available at: http://www.lippincott.com/pdfs-/Consumers_Brands_and_Climate_Change_UK_08.pdf.

Lippincott Mercer (2006). Serving the climate-change-conscious consumer. Online available: www.lippincott.com/pdfs/a_glynn_climate.pdf.

Lorenzoni, I., Pidgeon, N.F. (2006). Public Views on Climate Change: European and USA Perspectives. *Climatic Change,* **77**: 73-95.

Lorenzoni, I., Nicholson-Cole, S., and Whitmarsh, L. (2007). Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environmental Change,* **17**(3-4): 445-459.

Lusk, J.L, Briggemann, B.C. (2009). Food Values. *American Journal of Agricultural Economics,* **91**(1): 184-196.

Lüth, A., von Winning, A., Feigs, F., Kölsch, A., and Ströbel, M. (2009). Klimaschutz für Alle! Klimafreundlicher Konsum als neue Säule für den Klimaschutz. Strategiebericht 01.2009. Initiative „2 – Deutsche Unternehmer für Klimaschutz" (Hrsg.). Online available at: https://www.allianz.com/v_1339507806000/media/current/de/presse/-news/studien/archiv/downloads/strategiebericht_klimaschutz.pdf.

Macdiarmid, J.I., Kyle, J., Horgan, G.W., Loe, J., Fyfe, C., Johnstone, A., and McNeill, G. (2016). Sustainable diets for the future: can we contribute to reducing greenhouse gas emissions by eating a healthy diet? *American Journal of Clinical Nutrition,* **96**: 632–639.

Mayring, P. (2010). Qualitative Inhaltsanalyse - Grundlagen und Techniken. (11th ed.). Beltz-Verlag. ISBN: 978-3-407-29142-4.

Mayring, P. (2014). Qualitative content analysis: theoretical foundation, basic procedures and software solution. Klagenfurt, 2014. URN: http://nbn-resolving.de/urn:nbn:de:0168-ssoar-395173.

Onozaka, Y., Hu, W., and Thilmany, D.D. (2015). Can eco-labels reduce carbon emissions? Market-wide analysis of carbon labeling and locally grown fresh apples. *Renewable Agriculture and Food Systems,* **31**(2): 122-138.

Panzone, L., Perino, G., Swanson, T., and Leung, D. (2011). Testing for the Best Instrument to Generate Sustainable Food Consumption. *Int. J. Food System Dynamics,* **2**(3): 237-252.

Plassmann, K., Edward-Jones, G. (2009). Where does the carbon footprint fall? Developing a carbon map of food production. IIED, London. Online available: http://www.iied.org/pubs/pdfs/16023IIED.pdf.

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.

Rückert-John, J., Bormann, I., John, R. (2012). Umweltbewusstsein in Deutschland 2012 - Ergebnisse einer repräsentativen Bevölkerungsumfrage. Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Hrsg.). Berlin, Marburg, 2013. Online available at: https://www.umweltbundesamt.de/sites/default/-files/medien/publikation/long/4396.pdf.

Salazar, H.A., Oerlemans, L., and van Stroe-Biezen, S. (2013). Social influence on sustainable consumption: evidence from a behavioural experiment. *International Journal of Consumer Studies,* **37**(2): 172-180.

Schösler, H., de Boer, J., and Boersema, J.J. (2012). Can we cut out the meat of the dish? Constructing consumer-oriented pathways towards meat substitution. *Appetite* 58 (1), pp. 39–47.

Schwartz, S.H. (1977). Normative influences on altruism. *Advances in Experimental Social Psychology,* **10**: 221-279.

Schwartz, S.H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues,* **50**: 19-46.

Sirieix, L., Gilles, G., and Schaer, B. (2008). Do consumers care about food miles? An empirical analysis in France. *International Journal of Consumer Studies,* **32**(5): 508-515.

Springmann, M., Godfray, H.C.J., Rayner, M.,and Scarborough, P. (2016). Analysis and valuation of the health and climate change cobenefits of dietary change. *Proc. Natl. Acad. Sci. USA,* **113**: 4146-51.

Steg, L., Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology,* **29**: 309-317.

Steinfeld, H., Gerber, P. (2010). Livestock production and global environment: Consume less or produce better. *Proceedings of the National Academy of Sciences of the United States of America,* **107**(43): 18237-18238.

Stern, P.C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues,* **56**: 407-424.

Stern, P.C., Dietz, T., Abel, T., Guagnano, G.A., and Kalof, L. (1999). A value-belief-norm theory of support for social movements: the case of environmentalism. *Human Ecology Review,* **6**: 81-97.

Taufique, K.M.R., Siwar, C., Chamhuri, N., and Sarah, H.F. (2016). Integrating General Environmental Knowledge and Eco-Label Knowledge in Understanding Ecologically Conscious Consumer Behavior. *Procedia Economics and Finance,* **37**: 39-45.

Tobler, C., Visschers, V. H.M., and Siegrist, M. (2011). Eating green. Consumers' willingness to adopt ecological food consumption behaviors. *Appetite,* **57**(3): 674-682.

Tonsor, G., Wolf, C. (2011). On mandatory labeling of animal welfare attributes. *Food Polic,y* **36**(3): 430-437.

Upham,P., Bleda, M. (2009). Carbon Labelling: Public Perceptions of the Debate. Summary report. Funded by: The Sustainable Consumption Institute - The University of Manchester. Online available at: http://www.fcrn.org.uk/sites/default/files/Tyndall%20carbon%20label%20report.pdf.

Walter, S., Schmidt, M. (2008). Carbon Footprints und Carbon Label – eine echte Hilfe bei der Kaufentscheidung? *UmweltWirtschaftsForum (uwf),* **16**(3): 175-181.

Walters R. (2018). Climate Change Denial: 'Making Ignorance Great Again'. In: Barton A., Davis H. (eds) Ignorance, Power and Harm. Critical Criminological Perspectives. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-97343-2_8.

Welsch, H., Kühling, J. (2009). Determinants of pro-environmental consumption: The role of reference groups and routine behaviour. *Ecological Economics,* **69**: 166-176.

Westhoek, H., Lesschen J.P., Rood, T., Wagner, S., De Marco, A., Murphy-Bokern, D., Leip, A., van Grinsven, H., Suttong, M.A., and Oenema, O. (2014). Food choices, health and environment: Effects of cutting Europe's meat and dairy intake. *Global Environmental Change,* **26**: 196-205.

Whitmarsh, L. (2009). Behavioural responses to climate change: Asymmetry of intentions and impacts. *Journal of Environmental Psychology,* **29**: 13-23.

Whitmarsh, L., Seyfang G., and O'Neill, S. (2011). Public engagement with carbon and climate change: To what extent is the public 'carbon capable'? *Global Environmental Change*, **21**(1): 56-65.

Zepeda, L., Deal, D. (2009). Organic and local food consumer behaviour: Alphabet Theory. *International Journal of Consumer Studies,* **33**(6): 697-705.