WU
WIRTSCHAFTS
UNIVERSITÄT
WIEN VIENNA
UNIVERSITY OF
ECONOMICS
AND BUSINESS

EFMD
EQUIS
ACCREDITED

ePub^{WU} Institutional Repository

Elfriede Penz and Barbara Hartl and Eva Hofmann

Explaining consumer choice of low carbon footprint goods using the behavioral spillover effect in German-speaking countries

Article (Published)
(Refereed)

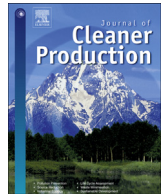# Explaining consumer choice of low carbon footprint goods using the behavioral spillover effect in German-speaking countries

Elfriede Penz [a, *], Barbara Hartl [b, c], Eva Hofmann [c]

[a] WU Vienna University of Economics and Business, Institute for International Marketing Management, Building D2, Level 2 (Entrance A), Welthandelsplatz 1, 1020, Vienna, Austria
[b] Johannes Kepler University Linz, Institute of Organization and Global Management Education, Altenberger Straße 69, 4040, Linz, Austria
[c] WU Vienna University of Economics and Business, Center for Empirical Research Methods, Welthandelsplatz 1, 1020, Vienna, Austria

ABSTRACT

The aim of the research was to investigate how to stimulate sustainable consumer behaviors that lead to a lowering of the carbon footprint. Because of environmental challenges at the individual and societal levels, researchers agree that behavioral change is necessary. We argue that when already performing a sustainable behavior, this behavior can spill over to other sustainable actions, even to more difficult ones. First, we studied whether a positive behavioral spillover occurs between product categories and whether the spillover effect depends on the ease or difficulty of the sustainable behavior. Second, we investigated whether high awareness of sustainability determines the spillover between categories. We conducted three online experiments in Central Europe, investigating whether spillover takes place between behaviors assigned to the same category (transport or food) or between behaviors assigned to different categories (transport or food). In all three studies participants had to make two independent decisions. In studies 1a ($N = 281$) and 1b ($N = 195$), the effect of the ease/difficulty of the behavior was tested. In study 2 ($N = 164$), awareness of CO_2 emission reducing effects was manipulated. Findings revealed a behavioral spillover between sustainable choices. Consumers who behave sustainably by choosing a CO_2 emission reducing option in the first decision (related to either transport or to food) were more likely to show sustainable behavior in the second decision. The difficulty of performing a sustainable behavior did not impact the spillover effect. By manipulating awareness of negative effects of CO_2 emissions specifically, a positive spillover effect was found. Results thereby confirm behavioral spillover effects. Although it appears that the difficulty or ease of a behavior did not matter for the spillover effect, awareness of consequences of sustainable behavior did. The research contributes to the field of sustainable consumption by suggesting the positive behavioral spillover effect as means to increase sustainable choices. This may stimulate corporate sustainability strategies of companies. Moreover, increasing problem awareness strengthens the sustainable behavior. Education in sustainable development may address this.

1. Introduction

Consumers are increasingly confronted with sustainable choices. One outcome of sustainable choices is the reduction of carbon footprint, which is a measure of the emission of greenhouse gases from an object (Pandey et al., 2011). In order to fight the environmental challenges at the individual and societal level, researchers agree that behavioral change is necessary and

mechanism to increase sustainable choices are needed. However, for the most part, consumers are little informed about how their consumption choices impact such outcomes. Adding to their confusion is that certain behaviors presumably perceived as sustainable and easy to perform, such as switching off the lights when not needed or buying energy-saving light bulbs, are not efficient in terms of reducing CO_2 emissions even if consumers think they were (Bilharz and Schmitt, 2011). In addition, key literature indicates that mainstream consumer behavior is far from sustainable or ecologically sound, since consumption choices occur as a matter of routine, and the attribute "sustainable" has only recently been added to the set of choices (e.g., Ölander and Thøgersen, 1995; Olson, 2013). This

* Corresponding author.
E-mail addresses: Elfriede.Penz@wu.ac.at (E. Penz), Barbara.Hartl@wu.ac.at (B. Hartl), Eva.Hofmann@wu.ac.at (E. Hofmann).

is where the current research sets in, which argues that sustainable behaviors can have positive spillover effects. Since consumers already perform sustainable behaviors, it is relevant whether this sustainable behavior can spillover to other sustainable actions. While there is some evidence in the literature (Thøgersen, 1999; Truelove et al., 2014) for such behavioral spillover effects, the effect is not always apparent. It is argued that sustainable behavior in one domain ("food", for instance, buying organic food, which is the sustainable choice instead of imported non-seasonal food) can lead to additional sustainable behavior in other domains ("transport", for instance, choosing a bicycle, which is a sustainable choice instead of a car, which is not sustainable; Catlin and Wang, 2012).

We argue that the behavioral spillover effect depends on the ease or difficulty of performing sustainable behavior. People might find it too difficult to change their behavior completely (such as taking the bus instead of taking the plane for holidays) but might be willing to make effortless and environmentally-friendly behavior changes (see also Roy et al., 2015), such as switching off the light. We study a country context where consumers already show some inclination to behave sustainably, e.g., in Austria 65 percent of the population is already recycling their waste (Herczeg, 2013).

The category of behavior (food, transport) might also alter the effect. A positive effect of environmental concern on purchase decisions (Grunert and Juhl, 1995; Juhl et al., 2017) was found with regard to organic products. Health consciousness also plays an important role in the purchase decisions for organic food products (McEachern et al., 2005), contrary to price, which was found to be a barrier for purchasing sustainable food products (Robinson and Smith, 2002).

Based on these prior findings, our aim is to analyze whether behaving sustainably in one consumption category (e.g., "food") can spill over to another category (e.g., "transport"), thus establishing the behavioral spillover. We selected these two categories because consumers' large environmental footprints predominately arise from behavior in the domains nutrition and transport (Ivanova et al., 2017). Housing as the third domain will not be covered in this research since consumers less frequently make decisions in this domain (Tukker et al., 2008, 2010).

In addition, subjective knowledge is assumed to have a stronger effect on consumers' purchase decisions than objective knowledge, at least regarding organic food (Pieniak et al., 2010). Thus, an additional aim is to study the impact that awareness has on CO_2 emission reducing behaviors.

Understanding the relationship between different behaviors and the reasons for the overlapping effect is vital to changing people's behavior by strengthening positive spillover (Barr et al., 2011). A better understanding of the spillover might be a good basis for developing effective ways and means of communicating sustainability issues to consumers and helping them behave sustainably. In addition, marketers may benefit from this research when developing means to urge consumers toward more sustainable behavior, such as product labels (e.g., indicating relevant information for consumers, for example CO_2 versus traffic light labels). This also contributes to theory building in sustainability research as it allows for offering behavioral options in a systematic way so that the desired (CO_2 emission reducing) option is shown more often. To this end, the research advances theory through a better understanding of the behavioral spillover effect.

Thus, this research focuses on two different categories of sustainable consumption categories, the difficulties of performing these, and how awareness of negative effects of CO_2 emissions on climate issues affects the spillover effect. It aims to study, first, whether a positive behavioral spillover occurs between product categories and whether the effect depends on the difficulty of the behavior. Second, we investigate whether high sustainable awareness determines the spillover between categories. Therefore, we manipulate sustainable awareness and test whether a positive behavioral spillover occurs between product categories.

Experiments investigating sustainable behavior are rare (for exceptions, see, e.g., Ferguson et al., 2011; Lanzini and Thøgersen, 2014), however, such scenario-based experiments are an important method in social sciences research (cf., Chen et al., 2016; Kim and Jang, 2014) as they allow the manipulation of decision environments (e.g., decision to buy organic food) while controlling for confounding variables.

The remainder of the paper is organized as follows. The conceptual background describes the main theoretical background and suggests hypotheses, followed by the methodology, which discusses the experimental studies 1a, 1b and 2. In a general discussion, results from all studies are discussed. Eventually, conclusions outline implications, limitations and further research.

2. Conceptual background and development of hypotheses

2.1. Behavioral spillover effect

Behavioral spillover occurs when a first behavior is shown in one context and a second in another, which means that "spillover effects" across different categories of — in our case — sustainable and CO_2 reducing consumption can be found (Evans et al., 2013; Thomas and Sharp, 2013). While this refers to a positive spillover effect, which is the focus of the present research, there is also a negative spillover effect ("moral licensing") discussed in literature (e.g., Truelove et al., 2014), which refers to the phenomenon that a moral behavior (for instance recycling) leads to a less moral behavior (such as taking the car instead of public transportation). If the individual recognizes a certain relation between those situations, a behavioral spillover occurs, which is explained by response generalization (Thøgersen, 1999). When people behave environmentally friendly in one domain, they are more likely to behave sustainably in other domains, too (Thøgersen and Ölander, 2003). As a result, people's behavior in terms of sustainable consumption remains consistent and a positive spillover effect occurs.

Especially behaviors that are conceptually similar lead more often to spillover (e.g., consuming organic milk and organic apples) than behaviors that are very dissimilar (e.g., switching off the light when not needed and cycling to work) (cf. Thøgersen, 2004).

Understanding the relationship between different behaviors is vital to be able to change people's behavior by strengthening positive spillover (Barr et al., 2011).

It also seems that increased knowledge of environmentally friendly behavior support more sustainable behavior in other areas as it becomes easier for the individual to adapt, although a certain similarity between the activities is necessary. Exposure to environmental information and pro-environmental values will likely result in positive spillover. On the other hand, people who do not value sustainability will not alter their behavior at all and will do so even less in other areas (Thøgersen, 2014).

Spillover can be explained by psychological theories, such as cognitive dissonance (Festinger, 1962; Miller et al., 2015) and Heider's (1958) balance theory (individuals are motivated to behave in a consistent way, e.g., Rashid and Mohammad, 2011; Thøgersen and Noblet, 2012). Cognitive dissonance theory (Festinger, 1962; Miller et al., 2015) proposes that people strive towards consistency with themselves and avoid inconsistencies in their beliefs, attitudes, and behaviors; otherwise they will

experience a negative affective and unpleasant state (cognitive dissonance). Thus, undertaking a sustainable behavior in the first place is prohibiting acting unsustainable, because it would be inconsistent with the earlier behavior, and fosters a sustainable behavior, because it is consistent with this first behavior. Likewise, Heider (1958) suggests in his balance theory that people desire harmony among the components in a triadic relationship and individuals are motivated to behave in a consistent way. Behavioral spillover effects may occur if people feel it is inconsistent to behave in an environmentally-friendly way in one area while refraining from doing so in another area (Thøgersen, 2004). In line, consistency in sustainable behavior is found (Rashid and Mohammad, 2011). People who are involved in environmental management activities at work, tend to behave in an environmentally-friendly way at home as well. In addition, performance of one behavior makes other behaviors from the same category more salient, suggesting that behaviors are related if they are salient (e.g., Bartels and Hoogendam, 2011; Spence et al., 2014).

According to spreading activation theory (e.g., Collins and Loftus, 1975; Scherer and Wentura, 2018), the semantic memory is organized along similarity and when a concept, such as recycling, is processed, activation spreads out to related concepts. The strength of a behavioral relation depends on the (semantic/conceptual) proximity of constructs. For instance, being persuaded by a public campaign to show a pro-environmental behavior (e.g., recycling) for the first time might lead to the activation of a conceptually similar behavior (e.g., avoiding waste) or general environmental consciousness.

Hypothesis 1. A first sustainable behavior makes a second sustainable behavior more likely (=spillover) if both behavior belong to the same category (transport-transport; food-food) than to different categories (transport-food; food-transport).

2.2. Ease/difficulty of sustainable behavior

Pro-environmental behavior that is easier to perform is more likely to be adopted. People who have pro-environmental attitudes but find it too difficult to change their behavior might be likely to make effortless and environmentally-friendly behavior changes (see also Roy et al., 2015) to relieve their cognitive dissonance.

Individuals believe that adopting a simple environmental behavior is enough to behave sustainably, although it might have less of an effect in reducing CO_2 (Catlin and Wang, 2012). A simple behavior is often perceived as a fair (enough) contribution (Thøgersen and Crompton, 2009). It is argued that investments in renewable energies, participation in car-sharing programs, and eating organic food, etc. trigger behavioral change that reduces people's environmental footprint (Bilharz and Schmitt, 2011; Gardner and Stern, 2008). However, the behaviors are more difficult to perform than, for instance, switching off the light when it is not needed. Despite more recent research, including the study of different sustainable behaviors that vary in their ease of performance, the systematic comparison between easy and difficult-to-perform sustainable behaviors and its impact on spillover effects has not yet been researched within and between specific categories of behavior, such as food and transport. Thus, it is the aim of this project to understand how to stimulate these kinds of behaviors.

Hypothesis 2. A spillover is more likely to occur with an easy to perform behavior than with a difficult behavior.

2.3. Awareness about sustainable behavior

Conceptualized as a multidimensional construct, awareness, i.e., environmental consciousness, comprises values, knowledge, and attitudes towards the environment. The concept of values has already been related to environmentalism and its relatedness is well established (Aertsens et al., 2009; Gatersleben et al., 2012). Likewise, knowledge has been argued to be significant for predicting environmental action (Roy et al., 2015). However, knowledge does not always make people act accordingly. Activities that build on creating awareness for sustainable behavior fail to establish the link between intention and action (de Koning et al., 2016). Identification with environmentally conscious consumers and a green personality − a person's "environmentalist" self-perception or identity (Thøgersen and Noblet, 2012) − are assumed to lead to more sustainable behavior because people who are concerned with the environment feel more attached to a specific behavior, such as organic food consumption (e.g., Bartels and Hoogendam, 2011; Thomas and Sharp, 2013).

Hypothesis 3. Awareness of the harmful effects of CO_2 emissions to the climate leads to a positive behavioral spillover effect.

Fig. 1 gives an overview of the conceptual background.

3. Overview of studies

To test the hypotheses, we conducted three online experiments (study 1a, study 1b, study 2). Experiments investigating sustainable behavior are rare (for exceptions, see, e.g., Ferguson et al., 2011; Lanzini and Thøgersen, 2014). In a between subject design, each group of participants was provided with an identical scenario, only differing in single words and phrases related to the manipulation. Such scenario-based experiments are an important method in social sciences research (cf., Chen et al., 2016; Kim and Jang, 2014) as they allow the manipulation of decision environments (e.g., decision to buy organic food) while controlling for confounding variables. A big advantage of the current procedure is that participants are randomly assigned to similar scenarios containing different decisions (e.g., decision to behave in an environmentally-friendly way either in a context related to food or transport), while important influencing factors, such as financial costs or monetary savings, remain constant.

All three studies aimed to investigate whether a spillover takes place between behaviors assigned to the same category or between behaviors assigned to different categories. In all three studies participants therefore had to make two independent decisions. In study 1a, the first behavior was related to *transportation* (study 1a: *Decision 1*), in study 1b the first behavior was related to *food* (study 1b: *Decision 1*). We selected these two categories because consumers' large environmental footprints predominately arise from behavior in the domains nutrition and transport (Ivanova et al., 2017). Housing as the third domain will not be covered in this research since decision-making is less frequent (Tukker et al., 2008, 2010).

To overcome the well-known problems of self-reported data on the intention to perform easy versus difficulty sustainable behavior, (self-reported behavior reflects beliefs about people's own behavior rather than their actual behavior (Gatersleben et al., 2002)), we aimed to measure behavioral data in study 1a and study 1b to gather additional information apart from self-reported behavior: Participants who decided in favor of the CO_2 emission reducing option had to complete a task, i.e., they had to locate an icon representing the option with the lowest CO_2 emission (e.g., a city bike
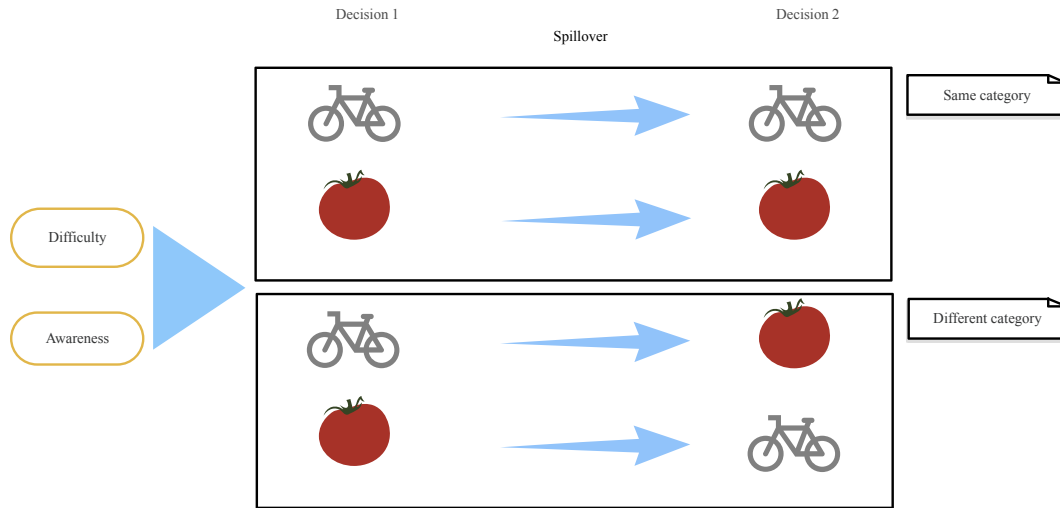
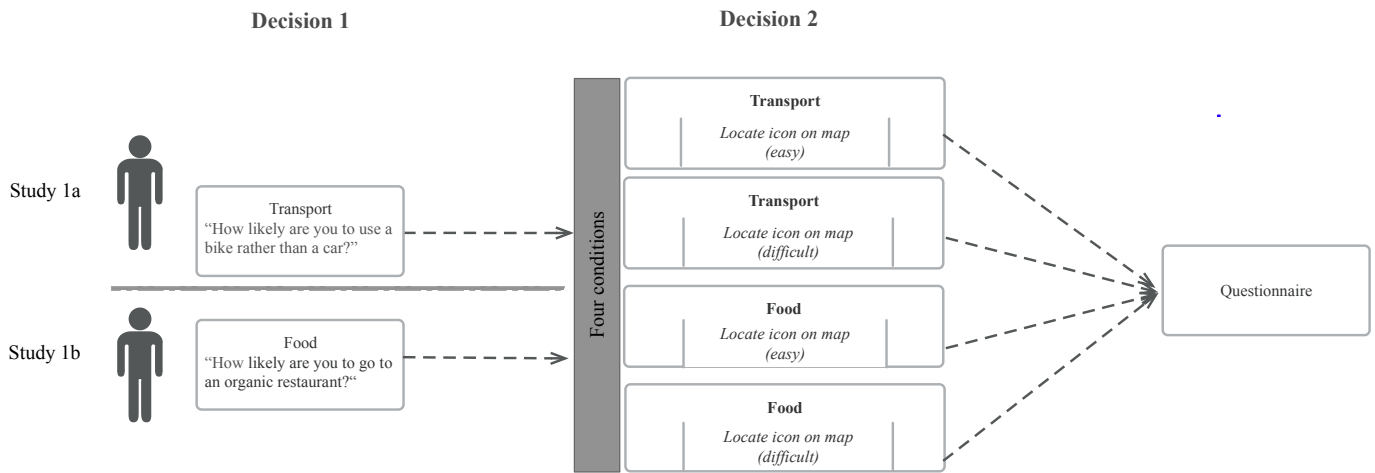**Fig. 1.** Overview of conceptual background.

Fig. 2. Procedure of studies 1a and 1b.

service) on a map. In both studies 1a and 1b, the difficulty of the behavior was experimentally manipulated, by using either a clear and comprehensible (*easy*) or complex (*difficult*) map (see Appendix A and Appendix B).[1] By varying the complexity of the map, we aimed to manipulate the time as well as the cognitive effort that participants had to invest to show the sustainable behavior intention. In doing so, we wanted to extend previous scenario-based experiments that measure behavioral intention via self-disclosure. We therefore add the task of finding the icon on a map. For an overview of the procedure see Fig. 2.

4. Methodology

The preparation and pre-testing of the material as well as running the actual studies 1a, 1b and 2 took place between 2012 and 2016. The participants were recruited using snowball recruiting method, which is a widely recognized strategy to increase the number of respondents in an efficient way. The research team used several university mailing lists that target primarily students and staff. In addition, students from a subject pool were recruited and students in the research team forwarded the link to the online surveys to their peers. The relative youth of the student samples is appropriate to specifically test the research question as students appear to be environmentally conscious in previous studies (e.g., Martinello and Donelle, 2012). For each study, a new sample was drawn because due to the nature of the spillover effect, the behavior in the first experiment may have an influence on the behavior in the second experiment.

4.1. Study 1a (difficulty/category)

4.1.1. Method
In study 1a we test whether there is a correlation between the first and second behavior (Hypothesis 1), i.e., a spillover, if it differs over categories (*food, transport*), and whether it depends on the effort (*easy/difficult*) to perform the behavior (Hypothesis 2).

4.1.2. Participants
The online experiment was completed by a convenience sample of 281 participants (65.8% women, $M_{age} = 40.13$ years,

---

[1] A test with 40 students shows that the average time to find the icon on the easy map is 22.75 s vs. 78.45 s on the difficult map.

$SD_{age} = 15.88$) mainly from Austria (89.0%), Germany (5.7%) and Switzerland (0.4%). The majority stated that they live in a two-person household (47.3%), followed by a single person household (26.7%). Most held a university degree (59.1%).

4.1.3. Procedure

At first, all participants received the same information (*Decision 1*: transport, easy). A shortened translation of the instruction, which explains the task of finding an icon on the clear and comprehensible (*easy*) map, reads as follows:

You are now planning a trip to a nearby lake the following weekend and you have to decide whether to go there by bike or by car.

[…] there are several city bike stations where bikes are provided specifically for day trips.

[…]

This could be an alternative to driving with your own car, which would reduce CO^2 emissions.

[…] you will have to locate the city bike station on a map of your new hometown on the next page. You will have to work superficially through a map (scale 1:4000), which shows a small area. This won't take you much time and it won't be very hard to do. […]

The information about how difficult the task is was only relevant for the later differentiation between the easy and difficult sustainable behavior and is not related to taking a car. Participants then had to indicate how likely it was that they would use the bike instead of the car in order to get to the lake. The map's reduced representation helped participants estimate their effort to locate the city bike station. If they decided to use the bike, they had to click on a "map"-button to open the map and find the location where they could borrow the bike.

After *Decision 1*, participants were randomly assigned to one of four conditions (*Decision 2*) and were provided with a scenario similar to the previous one: This time, participants had to decide whether they would − based on the condition - either perform an *easy* or *difficult* sustainable behavior, within the same category as in *Decision 1* (*transport*) or a different category than in *Decision 1* (*food*), resulting in a 2 (*category: transport versus food*) by 2 (*easy versus difficult*) design. Again, they were asked how likely it was that they would use a CO_2 emission reducing behavior and if they decided to behave in a way that would lead to a reduction of CO_2 emissions, they had to find the location of either a public transport station (same category: *transport*) or organic food store (different category: *food*) on either a clear and comprehensible (*easy*) map or on a complex (*difficult*) map. Participants then had to fill in a questionnaire assessing environmental consciousness (10 items, e.g., "I respect all efforts to maintain and preserve the environment"), and green consumerism (12 items; e.g., "I usually choose products that do not consume a lot of energy"; see Appendix C), (all Alsmadi, 2007), and other scales not relevant for the study (values, environmental concerns, regular use of bike and public transport, regular purchase of organic food, moral perception of bike use, public transport and organic food). Environmental consciousness is characterized by a strong sense of environmental responsibility, referring to a general attitude towards environmental protection. Green consumerism is defined as a pro-environmental consumer culture, and thereby as a strong sense of environmental responsibility in consumption behavior, focusing on consumption. Responses were indicated on a 7-point Likert scale ranging from 1 ("I totally disagree") to 7 ("I totally agree").

4.1.4. Results

The mean for the likelihood to perform a CO_2 emission reducing behavior (use the bicycle) in the first scenario is M (mean) = 4.06 (SD (standard deviation) = 2.16). In the second scenario the willingness to perform a CO_2 emission reducing behavior is M = 5.27 (SD = 1.73) for an easy decision on food, M = 4.71 (SD = 1.96) for a difficult decision on food, M = 5.56 (SD = 2.04) for an easy decision on transport and M = 5.18 (SD = 2.14) for a difficult decision on transport. To test whether a spillover from the first behavior to the second behavior occurred, a correlation was calculated. The second decision, whether to perform a CO_2 emission reducing behavior or not, was significantly related to the first decision (r (correlation) = 0.15, p (probability level) = 0.012).

To test whether the likelihood of a spillover effect depends on the category (*same category* [food] versus *different category* [transport]) and difficulty (*easy* versus *difficult*) of the sustainable behavior, a two-factor ANOVA with category and difficulty as independent variables, controlling for green consumerism and environmental consciousness, was performed with the CO_2 emission reducing behavior (*How likely will you use the public transport?/buy the food in an organic shop?*) as dependent variable. Only those participants with a behavioral spillover who indicated that they would behave sustainably in the first scenario were included in the ANOVA analysis (N = 160).

The analysis revealed a significant main effect related to *category*, $F(1, 154) = 10.939$, $p = .001$, $\eta^2 = 0.07$, showing that CO_2 emission reducing behavior within the same category was more likely to be performed (M = 5.10, SD = 1.77) than CO_2 emission reducing behavior within a different category (M = 5.82, SD = 1.84). There was no significant main effect related to *difficulty* ($p = .309$) and no interaction effect related to *difficulty* and *category* ($p = .752$).

4.1.5. Discussion

In study 1a, a spillover occurred from the first to the second CO_2 emission reducing behavior. The study shows that a spillover was more likely if the second behavior was related to the same category (transport) as the first behavior. Contrary to expectations, the difficulty of the behavior had no impact on spillover effect. In order to strengthen the results of study 1a, study 1b was conducted.

4.2. Study 1b (difficulty/category)

4.2.1. Method

Study 1b was similar to study 1a, except for the following characteristic: In Study 1a, participants first had to decide whether they would perform a sustainable behavior belonging to the category "*transport*" (*Decision 1*). In Study 1b participants first had to decide whether they would go to an organic restaurant rather than a conventional restaurant (*Decision 1*; category: *food*).

4.2.2. Participants

The online experiment was completed by a convenience sample of 195 students (56.4% women, $M_{age} = 22.34$ years, $SD_{age} = 3.86$) mainly from Austria (74.4%) and Germany (13.3%).

4.2.3. Procedure

The same procedure was used as in Study 1a, differing only in the category of the CO_2 emission reducing behavior (Study 1a: transport; Study 1b: food) in the first scenario (*Decision 1*). Again, participants had to indicate how likely it was that they would perform the sustainable behavior and had to find an icon on a clear and comprehensible map. After *Decision 1*, the procedure was the same as in Study 1a: Participants were randomly assigned to one of four conditions (*Decision 2*) and had to decide whether they would perform an easy or difficult CO_2 emission reducing behavior

belonging to the same category as in *Decision 1* (*food*) or to a different category than in *Decision 1* (*transport*), resulting in a 2 (*category: transport versus food*) by 2 (*easy versus difficult*) design. Again, they were asked how likely it was that they would use a CO_2 emission reducing behavior and if they decided to engage in a CO_2 emission reducing behavior, they had to find the location of either a public transport station (*transport*) or organic food store (*food*) on either a clear and comprehensible map (*easy*) or on a complex map (*difficult*).

4.2.4. Results

To test whether a spillover from the first behavior to the second behavior occurred, a correlation was calculated. The second decision, whether to perform a sustainable behavior or not, was significantly related to the first decision ($r = .39$, $p = .001$).

To test whether the likelihood of a spillover effect depends on the category (*same category* [food] versus *different category* [transport]) and difficulty (*easy* versus *difficult*) of the sustainable behavior, an ANOVA, controlling for green consumerism and environmental consciousness, was performed with the CO_2 emission reducing behavior (*How likely will you use the public transport?/ buy the food in an organic shop?*) as dependent variable. Only those participants who indicated that they would behave sustainably in the first scenario were included in the analysis ($N = 126$). The analysis revealed no significant main effect of *category* ($p = .221$) or *difficulty* ($p = .165$) and no interaction effect of *difficulty* and *category* ($p = .526$).

4.2.5. Discussion

In study 1b, as in study 1a, a spillover occurred between the first behavior and the second behavior, independent of the difficulty of the sustainable behavior. Contrary to study 1a, the category of the sustainable behavior had no impact on the spillover effect. In study 1a, a spillover effect was more likely when both behaviors were related to transportation. In study 1b, the spillover effect was independent of the category of the second behavior. A possible explanation for this inconsistent result could be that participants' first choice determines the strength of spillover. Whereas the transport mode triggers a stronger spillover only when the second choice is also related to transportation, food as a first choice shows no differences in spillover. Thus, organic food seems to be a category that triggers a more general spillover effect than transportation.

Study 2 was conducted based on these results using *food* as initial and general decision stimulus and in addition manipulated awareness of a negative impact of CO_2 emissions on the climate. Study 2 thus tests whether awareness has an impact on a positive behavioral spillover (Hypothesis 3).

4.3. Study 2 (awareness/category)

Study 2 aims to extend the results of studies 1a and 1b concerning the impact of the awareness on the choice between three options that help in reducing CO_2 emissions. For this purpose, participants in study 2 had to either read a text containing information about harmful effects on the environment or neutral information and afterwards they first had to decide whether they would perform a sustainable behavior related to food. Afterwards, spillover was investigated again by different categories (food, transport) and whether awareness promotes spillover. For an overview of the procedure see Fig. 3.

4.3.1. Method

In study 2, we test whether there is a spillover from one category (*food*) to the same category (*food*) or to another category

(*transport*). We test whether this depends on an awareness of how to reduce CO_2 emissions.

4.3.2. Participants

An online experiment was completed by a convenience sample of 164 participants (74.4% women; 51.8% students and 43.3% employees, $M_{age} = 27.16$ years, $SD_{age} = 6.27$), living in a household of 2.57 people ($SD = 1.37$; 73.2% urban area mainly in Austria). Higher education was secondary school graduation (61.6%) and 36.6% had a university degree.

4.3.3. Procedure

All participants were provided with information. One group read a text that informs how CO_2 emissions effect the climate in the food sector (*awareness group: harm to the climate*) and one group read a text with neutral (i.e. not mentioning CO_2 emission reduction) information about an event related to sustainable consumption (*neutral group*). This was followed by two decisions they had to make (see Fig. 2). After *decision 1*, which was related to sustainable *food* behavior like in study 1b, participants had to decide (*Decision 2*) whether to behave in a CO_2 emission reducing way in the context of *food* (*same* category) or whether they would behave in a CO_2 emission reducing way in the context of *transport* (*different* category). In both, *Decision 1* and *Decision 2*, participants had to choose one out of three options, which ranged from *low to high CO_2 emission reduction consequences*[2] (*"You entered [the second round of] a prize draw and can choose your prize among the following three options"*). Decision options differed between *decision 1* (*food*: apple juice produced abroad, normal apple juice produced nationally, organic apple juice produced nationally) and *decision 2* (*food*: imported kiwis from overseas, imported tomatoes from same continent, organic vegetables from regional farmers; *transport*: gasoline-driven motorbike, electric bicycle, public transportation).

The hypotheses were tested with a 2 (awareness versus neutral) x 2 (*decision 2*: food versus transport) between subject design. In addition, questions regarding purchase behavior and environmental concern were asked. In order to motivate participants to attend and to respond honestly, they were remunerated for their attendance by participating in a lottery drawing for a gift box containing an assortment of fruit and vegetables worth 50 EUR (approximately 56.90 USD[3]).

4.3.4. Results

The analysis was run separately for two conditions, i.e., awareness and neutral. To test whether a spillover from the first decision to the second decision occurred, Spearman rang correlations were calculated. The second decision, whether to perform a sustainable behavior or not (regardless of the category), was related to the first decision. Overall, the correlation was $r = 0.17$, $p = .057$ in the awareness group. In the neutral group, no correlation was found ($r = 0.007$, $p = .475$). Based on the identified spillover effect in the experimental group, in the following, the impact of awareness (manipulation) was further inspected regarding differences between categories (*food, transport*) and between CO_2 emission

---

[2] The ranking of CO_2 emission reduction was measured subjectively by directly asking the respondents in the study. For *food*, they rated organic vegetables from regional farmers, for transportation, they rated public transportation as producing the lowest CO_2 emissions. Although electric bicycles might be objectively the lowest CO_2 emissions option, public transportation, which consumes renewable electricity or natural gas, is used by 18%, while the use of bicycles is only 3% in the country studied. Sales of electric bicycles are currently picking up, although at the time of investigation, were still low.

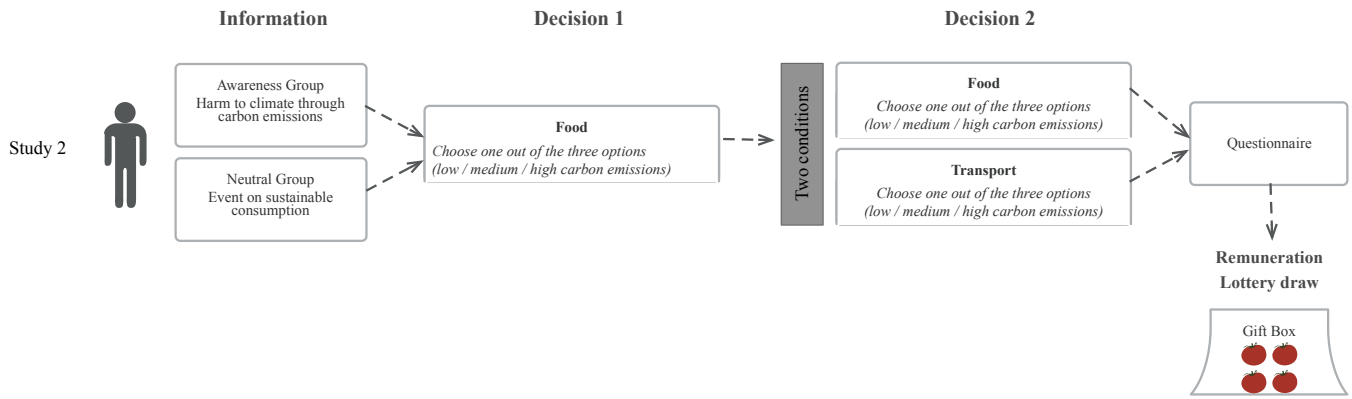[3] Currency conversion rate of 1.14 calculated on November 30th, 2018.

Fig. 3. Procedure of study 2.

Table 1
Frequencies of CO_2 emission reduction options in Decision 2.

CO_2 emission reduction levels		Category		Total
		Food	Transport	
low CO_2 emission reduction	f	0	3	3
	Std. Res.	−1.3	1.4	
medium CO_2 emission reduction	f	21	16	37
	Std. Res.	.3	-.3	
high CO_2 emission reduction	f	23	19	42
	Std. Res.	.1	-.1	
Total		44	38	82

reduction levels of choices (*low/medium/strong CO_2 emission reduction*). To test whether behavior in *Decision 2* differs according to category, a cross-tabulation with Pearson chi-square test was run. There is no significant difference in *Decision 2* between categories (*food* and *transport*) and between CO_2 emission reduction levels of choices (Pearson chi-square = 3.637 (df = 2), p = .162) (see Table 1).

4.3.5. Discussion

Like in the studies 1a and 1b, we find a tendency for a spillover from the first behavior to the second behavior, independent of the category, like in study 1b, where the first decision was related to food. Contrary to the two previous studies, the awareness of CO_2 emission effects in the food sector was manipulated and used as potential influence on decisions. The results show that a spillover occurred only in the awareness condition. However, with awareness, the spillover effect was independent of the category of the second behavior. These results mirror study 1b, where also food served as initial stimulus for showing CO_2 emission reducing behavior in a second decision. Manipulating awareness did not lead to any category-specific spillover effects.

5. General discussion

Sustainable consumption is a major issue in the marketplace in the early twenty-first century (e.g., Berger and Schrader, 2016; Mylan et al., 2016), as over-consumption and exploitation of resources are being held responsible for major environmental problems (Piscicelli et al., 2015). It is the aim of the current research to contribute to the literature on sustainable consumption, in particular focusing on one consequence, i.e., CO_2 emission reduction, by

examining how to stimulate spillover effects of sustainable behavior.

The current paper builds on three major findings. First, empirical evidence of positive spillover effects was found in all three studies, following previous research (Thøgersen and Ölander, 2003): A CO_2 emission reducing behavior can lead to another CO_2 emission reducing behavior. Furthermore, the category of the behavior seems to matter in the case of transportation: When the first behavior was related to sustainable transportation, a spillover effect was more likely when the second behavior was also related to transportation, confirming Hypothesis 1; there was also a positive spillover starting with the category food, but in this case we did not find that the spillover was stronger within the same category (*food*) as opposed to the other category (*transport*). Thus, an initial sustainable behavior in the category transport makes it more likely that a related sustainable behavior is also shown in this category (study 1a), while for food the likelihood is the same for every other sustainable behavior (study 1b, study 2). It would be interesting, though, to find out what makes a subsequent sustainable behavior in the *food* category more likely when the first behavior is also shown in the *food* category.

Second, study 1a and 1b further reveal that the difficulty of the second behavior does not impact the likelihood of a spillover effect, rejecting Hypothesis 2. Previous research indicates that pro-environmental behavior that is easier to perform is more likely to be adopted (Catlin and Wang, 2012). Showing that a behavioral spillover does not depend on the ease or difficulty of the task (in our case, the difficult map was viewed longer by participants) is noteworthy because campaigns motivate consumers more to engage in small changes that are easy to perform than more difficult tasks, which have a stronger impact on reducing CO_2 emissions. In the current studies (study 1a and 1b), the initial behavior (*Decision 1*)

was always a behavior that was easy to perform, only the difficulty of the second behavior (*Decision 2*) varied. As the first decision was always related to a CO_2 emission reducing behavior that was easy to perform, people might not feel that they have already done their share and therefore choose the sustainable option as suggested by the moral licensing effect (e.g., Truelove et al., 2014). This could explain the some findings (Steg and Vlek, 2009) that consumers are fairly inconsistent in their environmental behavior depending on when they have the feeling that they have contributed their fair share. Further research should therefore examine whether the difficulty of behavior has an impact on a spillover effect when the first behavior is difficult to perform (Thøgersen and Crompton, 2009).

Third, to substantiate the findings, in study 2, the awareness for CO_2 emission reducing consciousness was manipulated and it was found that subjects in the awareness condition leaned to show spillover effects independent of category, which confirms Hypothesis 3 and indicates that raising awareness might lead to more CO_2 reducing behavior (Roy et al., 2015). According to dissonance theory (Festinger, 1962) increased awareness of CO_2 emission reduction is a cognitive entity that is consistent with sustainable behavior and the deeper the awareness the more likely sustainable behavior.

Extending previous studies on sustainable behavior, the presented studies investigated actual behavior (finding something on the map, choosing among product options), using online experiments. The studies showed that spillover occurs, but the patterns are not yet clear and some inconsistencies seem to exist. As shown, the difficulty of the behavior did not have a significant impact on the spillover effect; however, a possible explanation might be that it was operationalized as complexity or time that was needed to perform the behavior.

Table 2 summarizes the findings of the three presented studies.

From an academic perspective, our research contributes to existing literature on environmental sustainability (e.g., Barr et al., 2011; Thøgersen, 1999) and on behavioral spillover by shedding more light on the relationship between different behavioral categories and the reasons for the overlapping effect, such as ease and difficulty to perform a behavior and awareness of sustainable behavior. It thereby helps to better understand the dynamics of which aspects might make people adapt their behavior to a more sustainable and responsible behavior by strengthening positive spillover.

It extends research that called for methods to make the public "think more" and to use messages that make individuals' values more salient (Roy et al., 2015). By focusing on specific behaviors, "such as travel mode choices because different behaviors require different levels of commitment and motives, revealing a lot of inconsistency across different domains" (Roy et al., 2015), our research added more understanding to the effect of awareness building messages on sustainable consumption in different categories.

Inconsistencies might also occur if sustainability is not of the utmost importance to individuals (Giddens, 1984), sustainable behavior has become habitual (Verplanken et al., 1998; Verplanken and Wood, 2006), and people use consumption to express and create their self-identity, yet there are other aspects that are more important, such as costs, or living a healthy life (Jensen, 2008). Another explanation might be that small and visible sustainable actions have more symbolic meaning to consumers than significant ones (recycling versus travelling to exotic places, e.g., Jensen, 2008) and thereby lead to inconsistencies in their consumption behavior (Bourdieu, 1998). Sustainable products have a social value for consumers and thereby help them to distinguish themselves from others (Costa et al., 2014).

5.1. Managerial implications

From study 1a we learn that transportation has the potential to increase CO_2 emission reducing behavior in the same category, while food as first behavior triggers CO_2 emission reducing behavior in other categories as well. This is valuable from a practical perspective, since CO_2 emissions are considered particularly high in the transportation sector but changing behavior in this category was found to be effective for energy saving (Dietz et al., 2009; Gardner and Stern, 2008). Marketers in the transportation industry might build on this by having customers try out low CO_2 emission transportation modes (e.g., free tickets for public transportation or free rental bikes), which motivates consumers to choose similar modes (e.g., electric bike, electric car).

The key drivers of CO_2 emission reducing behavior according to our research are CO_2 emission reducing behaviors exemplified as initial behavior in all three studies. Contrary to some studies, the ease or difficulty of performing a behavior was not relevant for spillover effects in our studies, thus difficult-to-perform behaviors should be promoted since they have the greatest impact on reducing CO_2 emissions. In a similar vein, awareness of CO_2 emissions consequences enable a spillover effect, which means that information campaigns are effective tools. Campaigns, either from public policy, non-profit or for-profit sources that inform about the impact of CO_2 emissions on the environment should be fostered. In particular, it is not enough to talk about sustainable consumption, which might be the answer to environmental problems, but to increase the subjective knowledge about the consequences of CO_2 emission. Our result shows that awareness might be raised through manipulation but it seems to have no significant effect on whether CO_2 reducing behavior is shown in the same or in a different category. For instance, marketers stressing the CO_2 labels of food products might trigger awareness. However, it could also motivate consumers to turn to other

Table 2
Overview of study results.

	Spillover effects		Same or other category	Easy/difficult to perform	Awareness of CO_2 emissions
	Individual studies	Meta-analysis			
Study 1a	$r = .15$ ($p = .012$)	fixed effects: $r = .213$ ($p = .000$), random effects: $r = .194$ ($p = .010$),	Spillover effect more likely for same (transport − transport)	n.s.	
Study 1b	$r = .39$ ($p = .001$)		Spillover effect similar for same and other (food − transport/food)	n.s.	
Study 2	experimental group: $r = .17$ ($p = .057$), neutral group: $r = .007$ ($p = .475$),		Spillover effect similar for same and other (food − transport/food)		Spillover effect only for experimental (awareness) group

categories, such as choosing a low CO_2 emission transportation option (such as public transportation), and not choosing the labeled food product.

5.2. Limitations and further research

Past research has shown that organic food seems to be one domain of sustainability in which only few inconsistencies exist. Research implies that the social identification as an organic consumer enhances especially the chances of consistently buying organic food (Bartels and Onwezen, 2014; Whitmarsh and O'Neill, 2010). Based on our studies, it seems that the two categories *transport* and *food* have different consequences on subsequent behavior, no matter how difficult or easy they are to perform.

Besides its merits the study has also some limitations: we did not measure actual behavior but behavioral intentions, which is in line with established research practice and theory. However, it would strengthen the validity of the research to replicate our findings in a study with respondents actually choosing products as consequence of a (prior/past) choice. This would also shed more light on the causality in the behavior that spills over from one domain to another.

Another limitation is the composition of the sample in study 1b, as the sample consists of students only. When using a student sample, researchers must consider strengths and weaknesses of student samples (c.f., Schneider and Bos, 2014). As the spillover effect describes the spillover of a sustainable behavior to another, the examination of influencing factors necessitates that a high percentage of the sample already performs small sustainable actions, e.g., recycling. Previous research reports, for instance that two-third of university students were recycling returnable bottles and cans (Williams, 1991) or that students are highly positive towards green power products (Gossling et al., 2005). Study 1b complements study 1a, using a student sample, which represent a good sample for examining the spillover effect as they have already developed some educated understanding about environmental problems as in higher education the issue of ecological sustainability is part of the curriculum. Students usually have very tight budgets, which might hinder the adoption of sustainable behavior, which often involves higher costs (c.f., Lanzini and Thøgersen, 2014). However, financial costs and monetary savings remained constant over the conditions in study 1a and 1b. Although the procedure of study 1a and study 1b is highly similar, they differ in the category of the first decision. Hence, replications should be made with samples representative of the overall adult population.

We manipulated the difficulty of the task using a street map on which respondents had to identify icons that indicated sustainable options. While this procedure differentiated between "difficult" and "easy", the link to the actual concept, i.e. to carry out easy or difficult sustainable tasks as suggested in the literature, could be stronger.

Finally, financial and other costs, which often are related to sustainable choices, were not considered and we did not control the visibility of behaviors to others.

In order to understand the dynamics better, a qualitative research design investigating the values of each category for consumers (e.g., hedonic versus utilitarian) and reasons for the effects is suggested. In addition, as regards the methodology and material used in our studies, we suggest that future studies extend the current findings by conducting field experiments (Xie and Peng, 2009). As there is increasing research on, and more sophisticated tools for assessing the environmental impact of

products (e.g., Steg and Vlek, 2009), these should be considered in future studies.

Further research could analyze whether easy and difficulty-to-perform behaviors are equally insignificant in other sustainable categories and what this means for intervention activities in marketing. In addition, it could analyze whether easy and difficulty-to-perform behaviors work the other way around (first behavior difficult, second behavior easy).

Funding

Appendix A

Study 1a and 1b, comprehensive (easy) map, where participants had to find the icon .
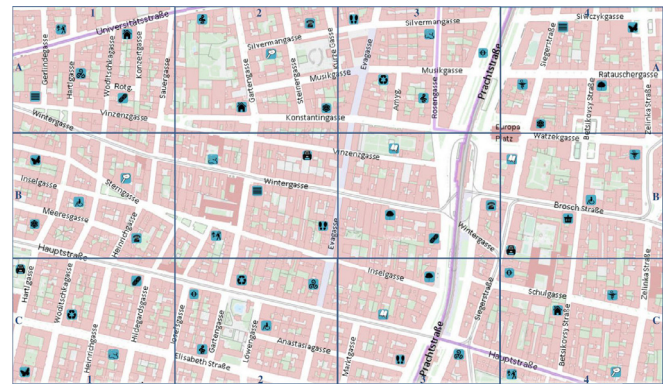
Note: This map presents solely the map for the food condition. In the transport condition participants had to look for an icon with a bicycle.

Appendix B

Study 1a and 1b, complex (difficult) map, where participants had to find the icon .

Note: This map presents solely the map for the food condition. In the transport condition participants had to look for an icon with a bicycle.

Appendix C. Items for environmental consciousness and green consumerism

Scale (Author)	Original item	Translated item (German)
Environmental consciousness (Alsmadi, 2007)	I always advise others to keep the environment clean.	Ich rate anderen immer, die Umwelt sauber zu halten.
	I get annoyed when someone contaminates the environment.	Ich ärgere mich, wenn jemand die Umwelt verschmutzt.
	I respect all efforts to maintain and preserve the environment.	Ich respektiere alle Bemühungen, die Umwelt zu erhalten und zu schonen.
	I appreciate living in a healthy and clean environment.	Ich schätze es, in einer gesunden und sauberen Umwelt zu leben.
	I respect rules and regulations to maintain and preserve the environment.	Ich respektiere Regeln und Vorschriften, um die Umwelt zu erhalten und zu schonen.
	I always admire those who rationalize energy consumption.	Ich bewundere immer jene, die ihren Energiekonsum einschränken.
	I am aware of the impact of population explosion on the environment.	Mir sind die Auswirkungen der Bevölkerungsexplosion auf die Umwelt bewusst.
	I realize that natural resources are scarce, thus must be used wisely	Mir ist klar, dass die natürlichen Ressourcen knapp sind und daher mit Bedacht eingesetzt werden müssen.
	I believe that man and nature have to be in harmony for survival.	Ich glaube, dass Mensch und Natur in Harmonie sein müssen, um das Überleben zu sichern.
	I understand that the environment is for us and future generations, thus must be well maintained and preserved.	Ich verstehe, dass die Umwelt uns und zukünftigen Generationen zur Verfügung steht, und dass sie daher erhalten und geschont werden muss.
Green consumerism (Alsmadi, 2007; Hofmann et al., 2017)	I drive my car within speed limits to rationalize petrol consumption.	Ich fahre mein Auto innerhalb der Geschwindigkeitsbegrenzung, um Treibstoff zu reduzieren.
	I avoid buying products which extensively use scarce resources.	Ich vermeide den Kauf von Produkten, die hauptsächlich knappe Ressourcen verwenden.
	I usually choose the products that do not consume much energy.	Ich verwende gewöhnlich Produkte, die nicht viel Energie verbrauchen.
	I usually buy environment-friendly products.	Ich kaufe gewöhnlich umweltfreundliche Produkte.
	I may change brand loyalty for environmental reasons.	Ich würde aus Umweltschutzgründen die Produktmarke wechseln.
	I always choose recyclable products.	Ich wähle immer wiederverwertbare Produkte.
	I always advise others to buy environment-friendly products.	Ich rate anderen immer, umweltfreundliche Produkte zu kaufen.
	I always choose products with reusable packaging.	Ich wähle immer Produkte mit wiederverwendbarer Verpackung. Ich bin bereit, für umweltfreundliche Produkte mehr zu bezahlen.
	I am willing to pay extra for green products.	
	When I buy a product I always consider its impact on the environment.	Wenn ich ein Produkt kaufe, denke ich immer an seine Auswirkung auf die Umwelt.
	I always prefer to deal with pro-environmental sellers over others.	Ich kaufe immer lieber bei umweltfreundlichen Verkäufer/inne/n als bei anderen.
	I am willing to spend considerable time and efforts to buy green products.	Ich bin bereit, viel Zeit und Mühen auf mich zu nehmen, um umweltfreundliche Produkte zu kaufen.

References

Aertsens, J., Verbeke, W., Mondelaers, K., Van Huylenbroeck, G., 2009. Personal determinants of organic food consumption: a review. Br. Food J. 111 (10), 1140—1167.

Alsmadi, S., 2007. Green marketing and the concern over the environment: measuring environmental consciousness of Jordanian consumers. J. Promot. Manag. 13 (3—4), 339—361.

Barr, S., Gilg, A., Shaw, G., 2011. 'Helping people make better choices': exploring the behaviour change agenda for environmental sustainability. Appl. Geogr. 31 (2), 712—720.

Bartels, J., Hoogendam, K., 2011. The role of social identity and attitudes toward sustainability brands in buying behaviors for organic products. J. Brand Manag. 18 (9), 697—708.

Bartels, J., Onwezen, M.C., 2014. Consumers' willingness to buy products with environmental and ethical claims: the roles of social representations and social identity. Int. J. Consum. Stud. 38 (1), 82—89.

Berger, V., Schrader, U., 2016. Fostering sustainable nutrition behavior through gamification. Sustainability 8 (1), 67.

Bilharz, M., Schmitt, K., 2011. Going big with big matters. The key points approach to sustainable consumption. GAIA - Ecol. Perspect. Sci. Soc. 20 (4), 232—235.

Bourdieu, P., 1998. Practical Reason: on the Theory of Action. Stanford University Press.

Catlin, J.R., Wang, Y., 2012. Recycling gone bad: when the option to recycle increases resource consumption. J. Consum. Psychol. 23 (1), 122—127.

Chen, Y.-S., Su, H.-C., Ro, Y.K., 2016. Can I read your mind? Perception gaps in supply chain relationships. J. Purch. Supply Manag. 22 (4), 311—324.

Collins, A.M., Loftus, E.F., 1975. A spreading-activation theory of semantic processing. Psychol. Rev. 82 (6), 407.

Costa, S., Zepeda, L., Sirieix, L., 2014. Exploring the social value of organic food: a qualitative study in France. Int. J. Consum. Stud. 38 (3), 228—237.

de Koning, J.I.J.C., Ta, T.H., Crul, M.R.M., Wever, R., Brezet, J.C., 2016. GetGreen Vietnam: towards more sustainable behaviour among the urban middle class. J. Clean. Prod. 134 (Part A), 178—190.

Dietz, T., Gardner, G.T., Gilligan, J., Stern, P.C., Vandenbergh, M.P., 2009. Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. Proc. Natl. Acad. Sci. Unit. States Am. 106 (44), 18452—18456.

Evans, L., Maio, G.R., Corner, A., Hodgetts, C.J., Ahmed, S., Hahn, U., 2013. Self-interest and pro-environmental behaviour. Nat. Clim. Change 3 (2), 122—125.

Ferguson, M.A., Branscombe, N.R., Reynolds, K.J., 2011. The effect of intergroup comparison on willingness to perform sustainable behavior. J. Environ. Psychol. 31 (4), 275—281.

Festinger, L., 1962. A Theory of Cognitive Dissonance. Stanford University Press.

Gardner, G.T., Stern, P.C., 2008. The short list: the most effective actions U.S. Households can take to curb climate change. Environ. Sci. Pol. Sustain. Dev. 50 (5), 12—25.

Gatersleben, B., Murtagh, N., Abrahamse, W., 2012. Values, identity and pro-environmental behaviour. Contemporary Soc. Sci. 1—19.

Gatersleben, B., Steg, L., Vlek, C., 2002. Measurement and determinants of environmentally significant consumer behavior. Environ. Behav. 34 (3), 335—362.

Giddens, A., 1984. The Constitution of Society: Outline of the Theory of Structuration. Univ of California Press.

Gossling, S., Kunkel, T., Schumacher, K., Heck, N., Birkemeyer, J., Froese, J., Naber, N., Schliermann, E., 2005. A target group-specific approach to "green" power retailing: students as consumers of renewable energy. Renew. Sustain. Energy Rev. 9 (1), 69—83.

Grunert, S.C., Juhl, H.J., 1995. Values, environmental attitudes, and buying of organic foods. J. Econ. Psychol. 16 (1), 39—62.

Heider, F., 1958. The Psychology of Interpersonal Relations. Editorial John Wiley and sons, USA.

Herczeg, M., 2013. Municipal Waste Management in Austria, ETC/SCP Working Paper. European Environment Agency.

Hofmann, E., Hartl, B., Penz, E., 2017. Power versus trust — What matters more in collaborative consumption? J. Serv. Market. 31 (6), 589—603.

Ivanova, D., Vita, G., Steen-Olsen, K., Stadler, K., Melo, P.C., Wood, R., Hertwich, E.G., 2017. Mapping the carbon footprint of EU regions. Environ. Res. Lett. 12 (5), 054013.

Jensen, J.O., 2008. Measuring consumption in households: interpretations and

strategies. Ecol. Econ. 68 (1), 353—361.

Juhl, H.J., Fenger, M.H.J., Thøgersen, J., 2017. Will the consistent organic food consumer step forward? An empirical analysis. J. Consum. Res. 44 (3), 519—535.

Kim, J.-H., Jang, S., 2014. A scenario-based experiment and a field study: a comparative examination for service failure and recovery. Int. J. Hospit. Manag. 41, 125—132.

Lanzini, P., Thøgersen, J., 2014. Behavioural spillover in the environmental domain: an intervention study. J. Environ. Psychol. 40, 381—390.

Martinello, N., Donelle, L., 2012. Online conversations among Ontario university students: environmental concerns. Inf. Health Soc. Care 37 (3), 177—189.

McEachern, M., Seaman, C., Padel, S., Foster, C., 2005. Exploring the gap between attitudes and behaviour: understanding why consumers buy or do not buy organic food. Br. Food J. 107 (8), 606—625.

Miller, M.K., Clark, J.D., Jehle, A., 2015. Cognitive Dissonance Theory (Festinger), The Blackwell Encyclopedia of Sociology.

Mylan, J., Holmes, H., Paddock, J., 2016. Re-introducing consumption to the 'circular economy': a sociotechnical analysis of domestic food provisioning. Sustainability 8 (8), 794.

Ölander, F., Thøgersen, J., 1995. Understanding of consumer behaviour as a prerequisite for environmental protection. J. Consum. Pol. 18 (4), 345.

Olson, E.L., 2013. It's not easy being green: the effects of attribute tradeoffs on green product preference and choice. J. Acad. Market. Sci. 41 (2), 171—184.

Pandey, D., Agrawal, M., Pandey, J.S., 2011. Carbon footprint: current methods of estimation. Environ. Monit. Assess. 178 (1—4), 135—160.

Pieniak, Z., Aertsens, J., Verbeke, W., 2010. Subjective and objective knowledge as determinants of organic vegetables consumption. Food Qual. Prefer. 21 (6), 581—588.

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. J. Clean. Prod. 97, 21—29.

Rashid, N., Mohammad, N., 2011. Spill over of environmentally friendly behaviour phenomenon: the mediating effect of employee organizational identification. OIDA Int. J. Sustain. Dev. 2 (12), 29—42.

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. J. Nutr. Educ. Behav. 34 (6), 316—325.

Roy, D., Verplanken, B., Griffin, C., 2015. Making sense of sustainability: exploring the subjective meaning of sustainable consumption. Appl. Environ. Educ. Commun. 14 (3), 187—195.

Scherer, D., Wentura, D., 2018. Combining the post-cue task and the perceptual identification task to assess parallel activation and mutual facilitation of related primes and targets. Exp. Psychol. 65 (2), 84—97.

Schneider, M.C., Bos, A.L., 2014. Measuring stereotypes of female politicians. Polit.

Psychol. 35 (2), 245—266.

Spence, A., Leygue, C., Bedwell, B., O'Malley, C., 2014. Engaging with energy reduction: does a climate change frame have the potential for achieving broader sustainable behaviour? J. Environ. Psychol. 38 (0), 17—28.

Steg, L., Vlek, C., 2009. Encouraging pro-environmental behaviour: an integrative review and research agenda. J. Environ. Psychol. 29 (3), 309—317.

Thøgersen, J., 1999. Spillover processes in the development of a sustainable consumption pattern. J. Econ. Psychol. 20 (1), 53—81.

Thøgersen, J., 2004. A cognitive dissonance interpretation of consistencies and inconsistencies in environmentally responsible behavior. J. Environ. Psychol. 24 (1), 93—103.

Thøgersen, J., 2014. Unsustainable consumption: basic causes and implications for policy. Eur. Psychol. 19 (2), 84—95.

Thøgersen, J., Crompton, T.J., 2009. Simple and painless? The limitations of spillover in environmental campaigning. Consum. Pol. 32 (2), 141—163.

Thøgersen, J., Noblet, C., 2012. Does green consumerism increase the acceptance of wind power? Energy Pol. 51, 854—862.

Thøgersen, J., Ölander, F., 2003. Spillover of environment-friendly consumer behaviour. J. Environ. Psychol. 23 (3), 225—236.

Thomas, C., Sharp, V., 2013. Understanding the normalisation of recycling behaviour and its implications for other pro-environmental behaviours: a review of social norms and recycling. Resour. Conserv. Recycl. 79 (0), 11—20.

Truelove, H.B., Carrico, A.R., Weber, E.U., Raimi, K.T., Vandenbergh, M.P., 2014. Positive and negative spillover of pro-environmental behavior: an integrative review and theoretical framework. Global Environ. Change 29, 127—138.

Tukker, A., Cohen, M.J., Hubacek, K., Mont, O., 2010. Sustainable consumption and production. J. Ind. Ecol. 14 (1), 1—3.

Tukker, A., Emmert, S., Charter, M., Vezzoli, C., Sto, E., Munch Andersen, M., Geerken, T., Tischner, U., Lahlou, S., 2008. Fostering change to sustainable consumption and production: an evidence based view. J. Clean. Prod. 16 (11), 1218—1225.

Verplanken, B., Aarts, H., Van Knippenberg, A., Moonen, A.-C., 1998. Habit versus planned behaviour: a field experiment. Br. J. Soc. Psychol. 37, 111—128.

Verplanken, B., Wood, W., 2006. Interventions to break and create consumer habits. J. Publ. Pol. Market. 25 (1), 90—103.

Whitmarsh, L., O'Neill, S., 2010. Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. J. Environ. Psychol. 30 (3), 305—314.

Williams, E., 1991. College students and recycling: their attitudes and behaviors. J. Coll. Student Dev. 32 (1), 86—88.

Xie, Y., Peng, S., 2009. How to repair customer trust after negative publicity: the roles of competence, integrity, benevolence, and forgiveness. Psychol. Market. 26 (7), 572—589.