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## Avoiding cognitive inconsistency: Experimental evidence on sustainable online shopping

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## **Avoiding Cognitive Inconsistency: Experimental Evidence on Sustainable Online Shopping**

## Imprint

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Experimental Evidence on Sustainable  
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Jana Eßer, Daniela Flörchinger, Manuel Frondel, and Stephan Sommer\*

# Avoiding Cognitive Inconsistency: Experimental Evidence on Sustainable Online Shopping

## Abstract

*Cognitive inconsistency, the discrepancy between individuals' behavior and their self-image, can cause the psychological discomfort called cognitive dissonance. In this paper, we investigate whether providing information that enhances the salience of cognitive inconsistency can increase sustainable consumption. Specifically, we analyze whether individuals avoid cognitive inconsistency by (a) a change in behavior to comply with own attitudes and by (b) the denial of attitudes and of knowledge about the criticism of conventional online shopping. To this end, we embed an incentivized discrete-choice task in a large-scale survey conducted in Germany in 2021, with the choice being between a voucher for either a conventional or a sustainable online market place. With our experimental setting, we aim to increase the salience of cognitive inconsistency by either randomly reminding participants of their previously stated attitudes towards sustainable production or by informing them about the typical criticism of conventional online shopping. Our empirical results indicate that individuals adapt their behavior after having received the reminder of their stated attitudes and the criticism about conventional online shopping. Yet, participants do not deceive themselves by aligning their attitudes with their behavior or by denying to have been aware of the criticism.*

JEL-Codes: A13, H23, D91

Keywords: Behavioral economics; cognitive dissonance; sustainable behavior

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\* Jana Eßer, RWI and RUB; Daniela Flörchinger, RWI and RUB; Manuel Frondel, RWI and RUB; Stephan Sommer, Bochum University of Applied Sciences and RWI. – This is an updated version of REP 1063 (“Avoiding Cognitive Dissonance: Experimental Evidence on Sustainable Online Shopping”). We are highly grateful for valuable comments and suggestions by Timo Goeschl, Gerhard Riener, Philipp Hiemann, Eva Hümmecke, Delia Niehues, participants of the RWI therapy research seminar, the 27th EAERE Conference, the 10th Mannheim Conference on Energy and the Environment, the 16th RGS Doctoral Conference in Economics, and the IAREP-SABE 47th International Conference. We gratefully acknowledge financial support by the E.ON foundation, the Collaborative Research Center “Statistical Modeling of Nonlinear Dynamic Processes” (SFB 823) of the German Research Foundation (DFG), Project A3, “Dynamic Technology Modeling”, and by the Federal Ministry of Education and Research (BMBF) under grant 03SF5500-2 (Kopernikus Project Ariadne 2) and grant 01LA1823A (Project Eval-Map II) within the funding measure “Economics of Climate Change”. The experimental design of this study, as well as the hypotheses to be examined, were pre-registered at the AEA RCT Registry (trial number: AEARCTR-0007882). – All correspondence to: Manuel Frondel, RWI, Hohenzollernstraße 1–3, 45128 Essen, Germany, e-mail: frondel@rwi-essen.de

# 1 Introduction

In everyday life, people sometimes act against their own moral principles – with the result that their behavior is not in line with their attitudes. For example, individuals choose to eat meat despite being aware of the negative health, environmental, and ethical consequences (Rothgerber & Rosenfeld, 2021). Such a discrepancy between individual attitude and behavior, in social psychology called cognitive inconsistency, may cause cognitive dissonance, which denotes the psychological discomfort that arises when a person holds two conflicting cognitions (Aronson, 1969; Festinger, 1962; Harmon-Jones & Mills, 2019). For instance, if individuals think of themselves as moral people and believe that lying is immoral, they experience cognitive dissonance when lying. Since the feeling of cognitive dissonance is unpleasant (Rabin, 1994), individuals try to avoid this inconsistency. In principle, there are two basic mechanisms to avoid cognitive inconsistency and the potentially resulting cognitive dissonance: individuals can either align their behavior with their attitudes or they can adjust their attitudes to match their behavior, the latter leading to self-deception (Festinger, 1962).

In this paper, we extend the economic models of cognitive dissonance developed by Rabin (1994) and Konow (2000) and test the theory of cognitive dissonance reduction through self-deception and behavior change in the context of sustainable online shopping. Specifically, we investigate whether increasing the salience of the attitude-behavior gap, i.e. of cognitive inconsistencies, either through a reminder of their previously stated attitude or through an information intervention, can nudge individuals to select more sustainable consumption options, or whether they engage in self-deception in order to reduce cognitive dissonance.

To this end, we analyze the answers of roughly 3,000 respondents of a survey conducted in Germany in summer 2021, in which we elicited the participants' attitudes toward sustainability through a series of questions on sustainable production. Thereafter, in an incentivized discrete-choice task, respondents could opt for a voucher

from either a conventional or a sustainable online market place. To induce incentive-compatible response behavior (Murphy et al., 2005), one out of 20 respondents had the chance to win a voucher worth 20 euros that was valid for either a conventional or a sustainable online shop. The discrete-choice task was combined with an experimental setting in which we increase the salience of cognitive inconsistency by either randomly reminding participants of their previously stated attitudes towards sustainable production and asking them to confirm these (reminder treatment), or by providing information about the negative aspects of conventional online shopping and asking them about their prior knowledge of these aspects (information treatment). While a proportion of the participants received one of the questions prior to their voucher choice (pre-decision groups), another proportion encountered the questions afterwards (post-decision groups), making an adjustment of behavior impossible and self-deception the only alternative to avoid cognitive inconsistency and the potentially resulting psychological discomfort. The experimental design builds on Flörchinger et al. (2024) who examine whether individuals act pro-environmentally to avoid cognitive dissonance after being reminded of their own attitude.

Numerous empirical studies have confirmed that treatments designed to arouse cognitive inconsistency, notably through priming (e.g., Kessler & Milkman, 2018; Gosnell, 2018; Flörchinger et al., 2024) or highlighting hypocrisy (Dickerson et al., 1992; Pelt et al., 2020; Stone et al., 1994; see Stone & Fernandez (2008) for an overview), can be effective in fostering prosocial behavior, in particular sustainable behavior, because individuals aim at avoiding cognitive inconsistency and the potentially resulting cognitive dissonance. However, other studies find that when cognitive inconsistency is aroused by informing individuals about the negative aspects of their behavior, they attempt to ignore this information (e.g., Dana et al., 2007; Edenbrandt et al., 2021; Matthey & Regner, 2011; Momsen & Ohndorf, 2023). Similarly, individuals deny or adapt their attitudes if it becomes evident that these are not in line with their past behavior (e.g., Fried, 1998; Artiga González et al., 2022; McKimmie et al., 2003; Beasley & Joslyn, 2001).



There is a large literature that investigates the avoidance of cognitive inconsistency and the potentially resulting cognitive dissonance through denial of or changes in attitudes or changes in behavior, with many of these studies being based on small samples, frequently consisting of students (Dickerson et al., 1992; McKimmie et al., 2003; Fried, 1998; Dana et al., 2007; Matthey & Regner, 2011), and using stated-preference designs (Edenbrandt et al., 2021; Onwezen & van der Weele, 2016). Yet, the received literature has not compared different mechanisms of enhancing the salience of cognitive inconsistency, including priming, highlighting hypocrisy, or providing information on the negative effects of own actions, nor the mechanisms for avoiding this inconsistency through a change in behavior or the denial of or changes in attitudes.

Based on a survey experiment and an extended model of cognitive dissonance that theoretically analyzes the effects of alternative ways to enhance the salience of cognitive inconsistency, we contribute to this literature by, first, comparing two mechanisms for increasing awareness of cognitive inconsistency: (a) informing about negative consequences of one's behavior and (b) appealing to previously stated attitudes. Second, we are able to simultaneously analyze whether this information induces self-deception or leads individuals to align their behavior with their attitudes. Third, to our knowledge, this is the first study that examines the effects of increased salience of cognitive inconsistency in the context of sustainable online shopping.

Our empirical results suggest that if individuals are informed about the negative aspects of conventional online shopping before choosing a voucher, they tend to act in line with their previously stated positive attitudes and choose the sustainable voucher. In a similar vein, survey participants are more likely to behave in line with their attitudes when they are reminded of their previously stated attitudes towards sustainable production. Comparing the empirical effects, we find tentative evidence that providing information about criticism is more effective in increasing the proportion of sustainable voucher choices than reminding respondents of their previously stated attitudes. In contrast, respondents do not appear to deceive themselves by adjusting

their attitudinal statements to their behavior or by denying their awareness of negative aspects of conventional online shopping. In sum, our results suggest that in the context of online shopping, individuals tend to avoid cognitive inconsistency by changing their behavior, but they seem to accept cognitive inconsistency when behavioral change is impossible, as it is the case for the post-decision groups.

The subsequent Sections 2, 3, and 4 explain the underlying theoretical model, the experimental design and the hypotheses, respectively. Section 5 describes the data employed for our empirical analysis. Section 6 provides the results, while the last section summarizes and concludes.

## **2 Theoretical underpinnings**

Our theoretical analysis builds upon Rabin (1994), as well as Konow (2000), who developed rational choice models in which cognitive dissonance negatively affects people's utility "because it is unpleasant" (Rabin, 1994, p. 178). Accordingly, individuals try to avoid cognitive inconsistency and the potentially resulting cognitive dissonance, either by adjusting their behavior to fit their beliefs about what is moral, or by modifying these beliefs to fit their behavior, that is, by deceiving themselves. Both options come at a cost: Adapting behavior may reduce utility, whereas changing beliefs causes cognitive unease because "there is likely to be a natural [...] set of beliefs about the morality of an activity" (Rabin, 1994, p. 180) and an "intellectually honest view of what is fair" (Konow, 2000, p. 1077). Individuals therefore try to balance the material utility derived from their actions and the affective disutility that stems from either cognitive dissonance or dishonest beliefs.

Contrasting with Rabin (1994) and Konow (2000), we argue that, in addition to individuals' attitudes, their knowledge about whether an action is in line with their attitudes also needs to be taken into account. For example, if individuals are opposed to the exploitation of workers, but do not know that workers are exploited in the pro-

duction of a certain product, purchasing this product will not cause cognitive dissonance because there is no inconsistency between attitudes and behavior due to the lack of knowledge. In this respect, we extend the models developed by Rabin (1994) and Konow (2000). While those models focus on moral values alone, i.e., the personal view of individuals on what is the correct behavior, we add individuals' knowledge about whether their actions are in line with their values.

Our model, which is described formally and in more detail in Appendix A, is similar to that of Momsen & Ohndorf (2023), who also expanded on the models developed by Rabin (1994) and Konow (2000) by incorporating individuals' knowledge about the consequences of their actions, but unlike their model, where individuals can choose to reveal or avoid information, in our setting, individuals are already informed about the morality of their actions but can deny this knowledge.

Additionally, based on Bénabou & Tirole (2011), we assume that individuals are not always fully aware of their actions, values and knowledge. This lack of awareness may affect the degree of cognitive dissonance as well as the costs of self-deception: If individuals are not fully aware of, e.g., their values, an existing discrepancy between actions and values is less salient such that the level of cognitive dissonance is lower than in a situation with full awareness. Similarly, the costs of self-deception are lower.

Therefore, we argue that it is important to account for the salience of actions, values and knowledge. The purpose of our theoretical model is to demonstrate that by increasing the salience of both moral concerns and the knowledge of the own moral standards, as well as by increasing the salience of an action, the likelihood of choosing the more sustainable of two consumption options, or more generally of behaving prosocially, can be increased.

Throughout the model, we assume that individuals have prosocial values and are informed about the morality of their actions. Given the empirical fact that there is often a gap between individuals' attitudes and their actual behaviors (Nyborg et al., 2006;

Rothgerber & Rosenfeld, 2021), we take the situation in which individuals admit to have a positive attitude towards prosocial behavior and hold congruent beliefs about the morality of each action but still behave selfishly as the baseline.

In this baseline situation, individuals experience cognitive dissonance because they are aware of their cognitive inconsistencies, that is, they are aware that their behavior is not in line with their moral values. Starting from this baseline, individuals are more likely to choose the prosocial action, i.e., to adapt their behavior to their values, the larger is the material utility from this action. Furthermore, their choice depends on the salience of the action, the salience of moral concerns, and the salience of their knowledge. Regarding an increase in the salience of actions, moral concerns and knowledge, we derive the following propositions from the model:

**Proposition 1:** Departing from the baseline situation, individuals are more likely to either adapt their behavior to their values or to deceive themselves by pretending not to be informed about the morality of each action when moral concerns are more salient.

**Proposition 2:** Departing from the baseline situation, individuals are more likely to either adapt their behavior to their values, or to deceive themselves by modifying their beliefs about their values when their knowledge about the morality of each action is more salient.

**Proposition 3:** Departing from the baseline scenario, individuals are more likely to either adapt their behavior to their values, to deceive themselves by pretending not to be informed about the morality of each action, or to deceive themselves by modifying their beliefs about their values when the salience of their action increases.

The formal model and the derivations of the three propositions can be found in Appendix A.

### 3 Experimental Design

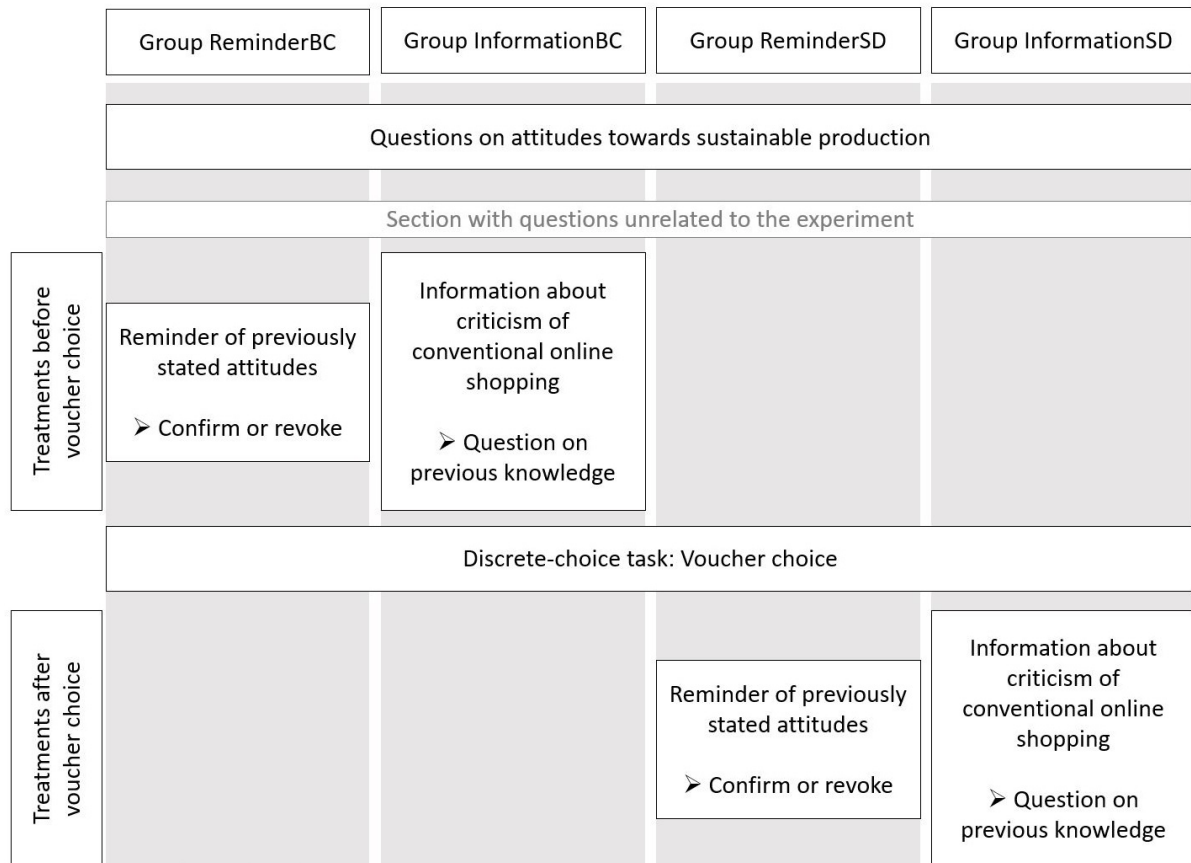
To empirically investigate the effect of information that increases the salience of cognitive inconsistency on individuals' behavior and beliefs, we conducted an incentivized discrete-choice experiment that was embedded in a survey. At the outset of the questionnaire, we informed participants that for some years now, more and more ecologically sustainable and fairly produced goods have been on offer, and asked them whether they are in favor of sustainable production – for more details, see Section 5 on the data description. After a passage with questions on topics that are unrelated to sustainable production, the participants had to decide on whether they would prefer to win a voucher worth 20 euros for a conventional online shop or for an online shop focusing on sustainable products. To induce incentive-compatible response behavior, we informed all participants that one out of 20 respondents would actually receive their chosen voucher.

We chose Amazon as the conventional market place and memolife as the sustainable market place. The retailer memolife offers a wide range of products such as food, clothing, electronics, and furniture – see [memolife.de](http://memolife.de). The retailer attaches great importance to resource-efficient production, socially responsible working conditions during the production process, resource-saving and recyclable packaging, as well as reparability and longevity of the products. Amazon is one of the largest online retailers and offers a large variety of products and brands, including sustainably produced products. However, Amazon has no particular focus on sustainability. On the contrary, it is frequently criticized for poor working conditions, systematic destruction of returned products, and pollution of marine ecosystems with its packaging waste (Oceana, 2020; Forbes, 2020).

In a discrete-choice experiment, we randomly assigned participants to four equally-sized experimental groups (see Figure 1): ReminderBC and InformationBC, with BC denoting behavioral change, as well as the groups ReminderSD and InformationSD,

where SD stands for self-deception. The experiment aimed at increasing the salience of cognitive inconsistency by either randomly reminding participants of their previously stated attitude towards sustainable production or by informing them about the negative aspects of conventional online shopping.

**Figure 1: Experimental Design**



We asked subjects of group ReminderBC whether they would confirm or revoke being in favor of sustainable production, depending on their previously stated attitude. Thereby, we indirectly reminded them of their attitudes and increased the salience of their attitudes and underlying values (see Items ExpA in Appendix B for the exact wording). This reminder may increase the salience of cognitive inconsistency, thereby potentially causing cognitive dissonance if participants choose a voucher that is not in line with their attitudes (reminder treatment). Since we reminded participants of their attitudes before they chose the voucher, they had the opportunity to avoid cognitive inconsistency by aligning their choice with their attitude and values.

Subjects of group InformationBC received information on the common criticism of conventional online shopping, such as the systematic destruction of returned products, packaging waste ending up in the ocean, as well as bad working conditions (see Item ExpA4 in Appendix B). When providing this information, we immediately asked respondents whether they had already been familiar with this criticism prior to the survey. The information on negative aspects of conventional online shopping may increase the salience of cognitive inconsistency when participants have a positive attitude towards sustainable production, but choose the conventional voucher (information treatment): The information raises their awareness  $s_k$  that their voucher choice is not in line with their values. As subjects of group InformationBC received the information before their voucher choice, they had the opportunity to avoid cognitive inconsistency by aligning their choice with this information. Former studies have found that when cognitive inconsistency is made salient by informing people about the negative aspects of their behavior, they tend to ignore this information (e.g., Dana et al., 2007; Matthey & Regner, 2011; Edenbrandt et al., 2021; Onwezen & van der Weele, 2016). In our study, however, participants have to actively confirm or deny to have known the information before, which makes it more difficult to ignore this information.

Both groups, ReminderSD and InformationSD, received exactly the same information and questions as the respective BC groups, but only after their voucher choice (see Figure 1). With this design, we aimed at increasing the awareness of cognitive inconsistency as well by increasing the salience  $s_a$  of the action, but since subjects of these groups had already chosen a voucher when receiving the information, they were unable to align their behavior with their attitudes. As an alternative way of avoiding cognitive inconsistency, subjects of group ReminderSD could deceive themselves by changing their attitudes so that they are in accordance with their behavior. To capture this reaction, we analyze whether participants revoke their attitude towards sustainable production after their voucher choice.

In a similar vein, participants of group InformationSD could deceive themselves by denying their knowledge about the criticism of conventional online shopping. To capture this type of self-deception, we compare the stated knowledge about criticism of conventional online shopping between participants of group InformationSD, who received the question after their voucher choice, and participants of group InformationBC, who received the question before the discrete-choice task.

## 4 Hypotheses

Assuming that for many participants there is a discrepancy between their attitude and behavior, known as cognitive inconsistency, our objective is to increase the salience of this inconsistency by providing information, which may subsequently elevate cognitive dissonance levels. We expect that these interventions may help individuals to close the attitude-behavior gap by adjusting either their behavior or attitudes to avoid cognitive inconsistency and the potentially resulting cognitive dissonance.

Both mechanisms of cognitive inconsistency avoidance, adaption of behavior and self-deception, usually come with a lower level of cognitive dissonance, but with decreased material utility or higher psychological costs. Whether participants decide to bear cognitive inconsistency, accept lower material utility, or bear the psychological costs of self-deception depends on the relative costs of each option.<sup>1</sup>

Based on our theoretical model, which is outlined in detail in Appendix A, and the experimental design, we pursue two major lines of investigation. First, we aim at measuring the effect of information that increases the salience of cognitive inconsistency on behavior, here on the choice of either kind of voucher. Second, we investigate the impact of this kind of information on two forms of self-deception: attitude adaptation and knowledge denial.

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<sup>1</sup>We pre-specified all of the following hypotheses in the AEA RCT Registry, Trial number: AEARCTR-0007882, but deviated slightly from our pre-analysis plan to increase statistical power and allow the estimation of causal effects.



For each of the two lines of investigation, we establish two hypotheses, yielding four hypotheses altogether.<sup>2</sup> To investigate the effect of reminding respondents of their attitude on their behavior, we compare the voucher choice of group ReminderBC, whose subjects are asked to confirm or revoke their previously stated attitudes before the voucher choice, with that of the groups ReminderSD and InformationSD, in which subjects do not receive any information before their voucher choice (Figure 2). Both these groups thus form the control group for the first hypothesis.<sup>3</sup>

**Figure 2:** Treatment and Control Groups used for Hypotheses Testing

	Group ReminderBC	Group InformationBC	Group ReminderSD	Group InformationSD
BC1	Treatment Group		Control Group	
BC2		Treatment Group	Control Group	
SD1	Control Group		Treatment Group	
SD2		Control Group		Treatment Group

By reminding respondents of their previously stated attitude immediately before their voucher choice, we increase the salience of moral concerns. This increase in salience enhances the awareness of the cognitive inconsistency and raises the level of cognitive dissonance that respondents experience when not acting in accordance with these concerns. Therefore, we expect that respondents with a positive attitude toward sustainable production who are reminded of these attitudes will be more likely than subjects of the control group to choose the sustainable voucher to avoid cognitive in-

<sup>2</sup>In our pre-analysis plan, we pre-specified two further hypotheses on the relation between uncertainty regarding one's attitudes and voucher choice, as well as on the heterogeneity of the effects with respect to uncertainty. For the presentation of these hypotheses and the respective results, see Supplementary Materials, Section 1.

<sup>3</sup>Here, we deviate from our pre-analysis plan in that we expand the control group to increase the statistical power of our analysis (see Supplementary Materials, Section 7 for our power analyses): Instead of taking ReminderSD as control group alone, we combine the groups ReminderSD and InformationSD to form the control group, because subjects of both groups do not receive any information or reminder before the voucher choice. To check the robustness of the empirical results and stick to our pre-analysis plan, we only take ReminderSD as control group, finding that the results only change marginally (see Supplementary Materials, Section 4, Table 13).

consistency and the potentially resulting cognitive dissonance (Proposition 1). Note that while we expect that participants with a positive attitude may change their behavior, the behavior of participants with a neutral or negative attitude should remain unchanged due to a lack of cognitive inconsistency.

**Hypothesis BC1:** The share of individuals who choose a sustainable voucher is higher in group ReminderBC than in the control group, consisting of the groups ReminderSD and InformationSD.<sup>4</sup>

Next, we focus on the effect of information about the criticism of conventional online shopping, which is presented to the subjects of group InformationBC prior to the voucher choice. By increasing the salience of true knowledge, this information enhances the awareness of cognitive inconsistency among individuals with a positive attitude when choosing the conventional voucher. This is because the information increases the awareness that choosing the conventional voucher conflicts with favoring sustainable production. Thus, we expect that respondents with a positive attitude towards sustainable production will be more likely to choose the sustainable voucher after receiving the information than subjects of the control group, here consisting of the groups InformationSD and ReminderSD (Proposition 2).<sup>5</sup> Again, while we expect that participants with a positive attitude will change their behavior, the behavior of participants with a neutral or negative attitude should remain unchanged due to a lack of cognitive inconsistency.

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<sup>4</sup>Note that according to Proposition 1, this pre-decision reminder also increases the likelihood that individuals adapt their beliefs about their knowledge of the morality of each action. However, this implication cannot be tested empirically in our setting.

<sup>5</sup>As with *Hypothesis BC1*, we deviate from the pre-analysis plan in that we combine Group InformationSD and Group ReminderSD to a larger control group. Again, results only change marginally if we stick to the pre-analysis plan (see Supplementary Materials, Section 4, Table 14.)

**Hypothesis BC2:** The share of individuals who choose a voucher for sustainable online shopping is higher in group InformationBC than in the control group, consisting of the groups InformationSD and ReminderSD.<sup>6</sup>

While voucher choice is the outcome that is relevant for the first two hypotheses, we now turn to self-deception and examine whether selecting a voucher prior to receiving a reminder results in self-deception through the retraction of the previously stated attitude. To this end, we compare the share of participants confirming their attitude in the post-decision reminder for group ReminderSD with the share in group ReminderBC, which now serves as the control group.

**Hypothesis SD1:** Respondents are less likely to confirm their attitude in the post-decision reminder in group ReminderSD compared to the pre-decision reminder in group ReminderBC.<sup>7</sup>

Lastly, we examine whether choosing the voucher before receiving the information leads to the denial of knowledge about the negative aspects of conventional production and online shopping. To this end, we compare the stated knowledge of group InformationSD with that of InformationBC, being the natural control group.

**Hypothesis SD2:** Respondents of group InformationSD are less likely to state that they have heard about any criticism of conventional online shopping compared to subjects of InformationBC.

Both hypotheses on self-deception, *SD1* and *SD2*, are based on the following reasoning (Proposition 3): In groups ReminderSD and InformationSD, subjects choose

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<sup>6</sup>The pre-decision information about the negative aspects of conventional production also increases the likelihood of self-deception through manipulation of beliefs about true moral values which can, however, not be measured empirically in our setting.

<sup>7</sup>To be able to estimate the causal effect of choosing a voucher on confirmation of attitudes, we look at the whole sample in our main regression. In Table 15 in the Supplementary Materials, Section 4, we show results for participants with a positive attitude only, as pre-specified. Restricting the sample does not change our results.

a voucher right before they have to confirm or revoke their attitude or knowledge. This increases the salience of the voucher choice relative to ReminderBC and InformationBC, where subjects are not yet aware of the upcoming choice when they confirm or revoke their attitude or knowledge. Therefore, participants of the self-deception groups may become more aware of their cognitive inconsistency and thus experience a higher level of cognitive dissonance when confirming their attitude or knowledge after having chosen a voucher that is not in line with these. This increases the likelihood of self-deception.<sup>8</sup>

Although our theoretical model suggests that the hypothesized behavioral effects of the reminder and information treatments are due to the cognitive dissonance of individuals who do not act in line with their attitudes, it bears noting that in our experiment, it remains unclear whether individuals experience cognitive dissonance as a result of the treatments. After all, this sentiment depends on whether individuals' awareness of their cognitive inconsistency actually arouses psychological discomfort. Clearly, though, the discrepancy between attitude and behavior, that is, cognitive inconsistency is a necessary precondition for whether individuals experience cognitive dissonance.

## 5 Data

For our empirical analysis, we rely on data collected in a survey that was conducted from June 11 to June 30, 2021, in collaboration with forsa. forsa is a survey institute that maintains a panel of more than 100,000 individuals who are representative of the German-speaking internet users aged 14 and older in Germany – see [www.forsa.com](http://www.forsa.com). Panel members are recruited offline, with each individual of the population hav-

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<sup>8</sup>Proposition 3 additionally states that increased salience of the action of voucher choice increases the likelihood to choose the morally superior action, that is, the sustainable voucher. In group InformationSD, though, the voucher has already been chosen at this stage, such that adapting behavior to true moral values is not a feasible strategy for the avoidance of cognitive dissonance.

ing the same probability to become a panel member. Registration for the panel without being actively invited to participate by forsa is impossible.

The present study was part of a larger survey to which 12,625 adult panel members were invited to participate. In the end, 8,026 participants completed the questionnaire, resulting in a response rate of 63.4 %. 4,009 participants, that is, about half of those who completed the questionnaire, were randomly assigned to take part in our experiment. Of these, we dropped 506 participants who did not answer the questions that are essential for our experiment, that is, they either did not choose any voucher, did not state their attitude towards sustainable production, or did not answer the reminder or criticism questions. We also excluded the responses of approximately 50 participants who did not answer all questions regarding the importance of sustainability aspects, approximately 500 individuals who did not specify their socioeconomic characteristics, primarily income, and roughly 200 participants due to missing environmental attitudes or psychological characteristics, yielding a sample of 2,994 observations that build the basis for the subsequent analysis.

Data was collected by forsa using a state-of-the-art tool that allows panelists to fill out the questionnaire online (for an extract, see Appendix B). Participants could retrieve and return the questionnaire from home or from mobile devices connected to the internet. While respondents could interrupt and resume the survey at any time, the median duration for completing the entire questionnaire was 20.9 minutes for the 2,994 sample individuals.

In addition to information needed for the experiment, such as the attitude towards sustainable production, we requested participants to provide us with standard socioeconomic and demographic characteristics – see Table C.1 in Appendix C for the descriptive statistics. Compared with the German population, on average, survey participants are somewhat older, better educated, and have higher incomes (Table C.2). The mean age is about 55 years and nearly 56 % of all participants are male. More than 41 % of the respondents have a (technical) college degree, about 55 % are employed

either full- or part-time. Net monthly household income is measured in intervals of 500 euros, starting at 700 euros and top-coded at an income of 5,700 euros. For our analysis, we define four net income categories (see Table C.1 in appendix A), ranging from the low income of less than 1,200 euros to the very high income of above 4,200 euros. Around 6 % of the sample households have a net monthly household income of below 1,200 euros, while sample splits roughly equally across the remaining three income categories.

We randomly assigned respondents to four experimental groups such that they are roughly equally split, with sample sizes varying between 740 and 757 participants (Table 1). Except for small differences in monthly income, the experimental groups do not differ systematically with respect to their socioeconomic and demographic characteristics, their attitudes towards sustainable production, and their psychological characteristics (see Table C.1 in the appendix).

To prepare our experiment, we informed participants that for some years now, more and more ecologically sustainable and fairly produced goods have been on offer. It is reported that in their manufacture, consideration is given to the environment and value is placed on occupational safety and fair payment. Using a 5-point Likert scale, we then asked whether respondents are in favor of sustainable products (see Question ExpA1 in Appendix B, for the exact wording). Overall, a large majority of about 91 % of respondents indicates to have a (very) positive attitude towards sustainable products (Table 1).

Based on this question, we define the categorical variable *attitude sustainable production*, which equals 1 for respondents with a (very) negative attitude towards sustainable production, 2 for those with a neutral attitude, and 3 for those with a (very) positive attitude. Additionally, we define the three binary variables *negative attitude*, *neutral attitude*, and *positive attitude*, which are equal to 1 for respondents who have reported the respective attitude and 0 otherwise.

**Table 1:** Attitudes towards Sustainable Production measured on a 5-Point Likert Scale

	ReminderBC	InformationBC	ReminderSD	InformationSD	Total
Very negative	0.3 %	1.2 %	0.5 %	0.7 %	0.7 %
Negative	1.5 %	0.8 %	0.4 %	1.1 %	0.9 %
Neutral	6.6 %	7.7 %	8.5 %	8.9 %	7.9 %
Positive	36.3 %	32.7 %	36.5 %	33.5 %	34.7 %
Very positive	55.4 %	57.6 %	54.1 %	56.0 %	55.7 %
Total	757	740	741	756	2994

Moreover, we asked – see Question ExpA2 – whether it is important to respondents that (a) no animal habitats are destroyed in the production of goods, (b) attempts are made to repair damaged products instead of immediately throwing them away and replacing them with new products, (c) when packaging products, care is taken to ensure that the material used is recyclable and that as little packaging material as possible is used overall, (d) the people who make the products they buy can live well on their wages, and (e) they can understand where and under what conditions the goods they buy were produced. Finally, we asked (f) whether the price is first and foremost important to them when making purchase decisions.

Responses to all these questions are again measured on a 5-point Likert scale. Combining the two response options “rather” and “fully agree”, between 85 and 90 % of the respondents believe that it is crucial that production processes do not harm animal habitats, products can be repaired, packaging is reduced and recyclable, and workers receive fair compensation (see Table 2). Additionally, 77 % of the respondents express agreement on the importance of traceability of production in their purchasing decisions. By contrast, only about 36 % of the respondents indicate the price to be their primary consideration.

By calculating the mean response value of items (a) to (e) of Question ExpA2, we construct the index variable *importance of sustainable aspects* (Cronbach’s  $\alpha = 0.81$ ) to capture respondents’ attitude towards the respective aspects of sustainable production, which is used as a covariate in our analyses. Correspondingly, we define the

**Table 2:** Share of Participants who stated that the respective aspect of Sustainable Production is (very) Important for them

	ReminderBC	InformationBC	ReminderSD	InformationSD	Total
Non-destruction of habitats	85.1 %	83.5 %	85.1 %	85.4 %	84.8 %
Repair	90.8 %	88.0 %	93.2 %	89.9 %	90.5 %
Little and recycable packaging	86.8 %	87.7 %	87.4 %	87.6 %	87.4 %
Living wage	86.9 %	86.6 %	87.4 %	88.6 %	87.4 %
Traceability of production	73.8 %	78.1 %	76.8 %	78.6 %	76.8 %
Price	36.1 %	34.5 %	38.2 %	33.2 %	35.5 %

Note: For the exact wording of the questions, see Appendix B.

variable *importance of price*, which captures the importance of the product price on a 5-point Likert scale, where a higher value indicates higher importance.<sup>9</sup>

In addition, we asked whether participants have *shopped at the sustainable market place* before their participation in the survey and collected data on two psychological characteristics: First, we asked participants about their preference for internal consistency (von Collani & Blank, 2007) in their attitudes and behavior (Question PK6), which is a sub-scale of the scale for the preference for consistency developed by Cialdini et al. (1995). We define the index variable *internal consistency* by calculating the mean response value of all items for each participant.<sup>10</sup> Second, we elicited the locus of control, that is, the degree to which respondents believe that they have control over the outcome of events in their lives (Question PK4) (Gatz & Karel, 1993; Rotter, 1966; Pearlin & Schooler, 1978), and defined the index variable *locus of control* by calculating the mean response value of all items of that question (see Supplementary Materials, Section 6 for more details on the measurement of preference for consistency and locus of control).

As a higher preference for consistency may lead to a higher degree of cognitive dissonance avoidance, and a higher internal locus of control may be positively correlated

<sup>9</sup>Since including the importance of price reduces  $\alpha$  and due to the low factor loading of *importance of price*, we decided to not include this item in the index. This is also intuitive, because the price affects material utility, while all other items affect affective utility.

<sup>10</sup>Since the Cronbach's alpha for the preference for internal consistency is low ( $\alpha=0.31$ ), we checked whether our regression results change when including all three items separately instead of an index. However, results with respect to our hypotheses remain unchanged.



with sustainable behavior (Andor et al., 2022), we include both psychological characteristics as control variables in our analyses. Similarly, because a positive environmental attitude may lead to more sustainable behavior, we define the index variable *environmental attitude*, which is based on the four items on environmental attitudes of Question PK2, serving as an indicator of whether participants are aware of environmental problems (Cronbach's  $\alpha = 0.81$ ). The scale is a shorter variant of the original Diekmann & Preisendörfer scale (2003) and covers all its three spheres – affective, cognitive, and conative.

To test the four hypotheses presented in the previous section, we define three outcome variables. First, for *Hypothesis BC1* and *Hypothesis BC2*, the outcome measure of interest is the share of sustainable vouchers chosen in the discrete-choice task. Accordingly, we define the variable *sustainable voucher* to equal unity if participants chose the sustainable voucher and zero if the conventional voucher was chosen. Those participants who did not choose any voucher are excluded from our analysis. Overall, a share of almost 49 % of the respondents chose the sustainable voucher, with a range of 44.7 % in group ReminderSD to 53.8 % in group InformationBC (Table 3).

Second, to examine *Hypothesis SD1*, we define the indicator variable *confirm*, which indicates whether participants confirmed the previously stated attitude (*confirm* = 1) towards sustainable production (Question ExpA1). *confirm* equals zero if participants revoked their attitudes or preferred not to answer. With a share of more than 95 %, almost all participants confirmed their previously stated attitude. Third, to verify *Hypothesis SD2*, we define the binary variable *criticism*, equalling unity if participants stated to have heard about the criticism of conventional online shopping and zero otherwise. A share of almost 98 % respondents stated to have already heard about the criticism.

**Table 3:** Descriptive Results on the Outcome Variables

	ReminderBC	InformationBC	ReminderSD	InformationSD
Sustainable voucher	50.3 %	53.8 %	44.7 %	45.8 %
Attitudes confirmed	95.2 %	–	96.5 %	–
Informed about criticism	–	97.3 %	–	98.1 %
Number of observations	757	740	741	756

Note: The weighted average of the proportion of sustainable vouchers when combining the ReminderSD and InformationSD groups is 45.3%.

## 6 Empirical Results

To test the hypotheses presented in Section 4, it suffices to simply compare the means of the three outcome variables across groups, as study participants were randomly assigned to either of the four experimental groups. To check the robustness of the empirical results, in addition to comparing means across experimental groups, we estimate Linear Probability Models where the outcome variables are regressed on the respective treatment group indicator. In alternative specifications, we add a variety of control variables, such as socioeconomic and psychological characteristics, as well as interaction terms of the treatment group indicator and the attitude variables.<sup>11</sup>

As expected, in what follows, we obtain only minor differences in the coefficient estimates of interest across specifications, leaving the key results virtually unchanged. To also check the robustness with respect to the method employed, we conduct probit regressions, rather than estimating Linear Probability Models. The results, presented in Tables 16 - 19 in the Supplementary Materials, Section 5, confirm the estimates from the Linear Probability Models.

<sup>11</sup>For all hypotheses, we report the results for two-tailed, rather than one-sided tests, as exceeding the critical value for a two-tailed test implies that the critical value for the respective one-sided test is exceeded, leading to the rejection of the null hypotheses, instead providing support for our four hypotheses.

## 6.1 Key Results

Starting with the first hypothesis, we find that in line with *Hypothesis BC1*, relative to the control group, the share of 50.3 % sustainable vouchers is 5.0 percentage points higher in group ReminderBC, in which respondents were reminded of their previously stated attitude immediately before having to choose a voucher. In the control group, consisting of the groups ReminderSD and InformationSD, this share amounts to 45.3 % (Table 3).

The difference in the shares of the treatment and the control group is confirmed by the coefficient estimate resulting from the most simple regression model of the voucher choice on the treatment group indicator and a constant (Table 4, Model I). The corresponding estimate is statistically different from zero at the 5 % significance level, thereby confirming *Hypothesis BC1*. Including control variables hardly changes the estimate on the coefficient corresponding to the treatment indicator. Interestingly, the reminder treatment has a stronger impact on male participants than on females – see Table D.1 in Appendix D). Thus, the effectiveness of the reminder seems to be driven by male participants.<sup>12</sup>

In addition, we find heterogeneity with respect to the participants' attitude towards sustainable production: While the reminder increases the sustainable voucher share by about 6 percentage points for respondents with a positive attitude, there is a decrease of about 30 percentage points for those with a negative attitude (Table 4, Model III). This backfire result indicates that reminding individuals of their negative attitudes towards sustainable production may increase the share of conventional vouchers – a result that is based on only 33 observations, though, and therefore should be viewed with caution.

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<sup>12</sup>This heterogeneity may be due to the higher proportion of women (53 %) compared to men (39 %) choosing the sustainable voucher in the control group, leaving more room for this proportion to increase among men.

**Table 4:** Hypothesis BC1: Effect of Reminder Treatment on Voucher Choice

	Model I		Model II		Model III	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
ReminderBC	0.051*	(0.022)	0.047*	(0.020)	0.058**	(0.022)
Shopped at sust. marketplace	–	–	0.270***	(0.082)	0.271**	(0.083)
Age	–	–	0.001	(0.001)	0.001	(0.001)
Male	–	–	-0.056**	(0.020)	-0.056**	(0.020)
College	–	–	0.054**	(0.020)	0.054**	(0.020)
Medium income	–	–	-0.014	(0.044)	-0.013	(0.044)
High income	–	–	-0.016	(0.044)	-0.014	(0.044)
Very high income	–	–	0.007	(0.046)	0.008	(0.046)
Children	–	–	-0.013	(0.021)	-0.014	(0.021)
Negative attitude	–	–	-0.011	(0.069)	0.131	(0.095)
Neutral attitude	–	–	-0.133***	(0.030)	-0.109**	(0.034)
Importance sust. aspects	–	–	0.088***	(0.017)	0.087***	(0.017)
Importance price	–	–	-0.076***	(0.010)	-0.076***	(0.010)
Environmental attitude	–	–	0.116***	(0.012)	0.116***	(0.012)
Internal consistency	–	–	0.010	(0.016)	0.010	(0.016)
Locus of control	–	–	0.026**	(0.010)	0.026**	(0.010)
ReminderBC x negative attitude	–	–	–	–	-0.361***	(0.106)
ReminderBC x neutral attitude	–	–	–	–	-0.083	(0.058)
Constant	0.453***	(0.013)	-0.310*	(0.123)	-0.309*	(0.123)
# Observations	2253		2253		2253	
R-Squared	0.00		0.19		0.19	
Adjusted R-Squared	0.00		0.18		0.18	
F-Statistic: p-value	0.02		0.00		0.00	

Note: Control group: ReminderSD + InformationSD; \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

Claiming that the sustainable voucher share is higher in group InformationBC than in the control group, *Hypothesis BC2* is confirmed by the data as well: Asking participants whether they are aware of the criticism regarding conventional online shopping increases the sustainable voucher share by roughly 9 percentage points (Table 3): This share amounts to 53.8 % for InformationBC, compared to 45.3 % in the control group, which consists of the groups InformationSD and ReminderSD.

Again, the discrepancy in the voucher shares of the treatment and control group is precisely reconfirmed by the coefficient estimate resulting from the most simple regression model of the voucher choice on the treatment group indicator and a constant

(Table 5, Model I). The coefficient estimate only slightly changes upon inclusion of a large suite of socioeconomic and attitudinal control variables. Similar to *Hypothesis BC1*, the information treatment is more effective among male participants, and it seems to backfire among participants with a negative attitude towards sustainable production (Tables D.2 & 5).

Comparing the reminder and the provision of information about criticism shows that the latter is more effective in increasing the share of sustainable vouchers by about 4 percentage points. This difference is, however, only significant at the 10 % level.

**Table 5:** Hypothesis BC2: Effect of Information on Voucher Choice

	Model I		Model II		Model III	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
InformationBC	0.086***	(0.022)	0.087***	(0.020)	0.093***	(0.021)
Shopped at sust. marketplace	–	–	0.191**	(0.067)	0.191**	(0.068)
Age	–	–	0.000	(0.001)	0.000	(0.001)
Male	–	–	-0.073***	(0.020)	-0.073***	(0.020)
College	–	–	0.094***	(0.020)	0.093***	(0.020)
Medium income	–	–	-0.009	(0.044)	-0.010	(0.044)
High income	–	–	-0.012	(0.045)	-0.012	(0.045)
Very high income	–	–	-0.035	(0.046)	-0.035	(0.046)
Children	–	–	0.009	(0.021)	0.009	(0.021)
Negative attitude	–	–	0.030	(0.069)	0.144	(0.097)
Neutral attitude	–	–	-0.087**	(0.031)	-0.085*	(0.035)
Importance sust. aspects	–	–	0.082***	(0.017)	0.080***	(0.018)
Importance price	–	–	-0.076***	(0.010)	-0.076***	(0.010)
Environmental attitude	–	–	0.129***	(0.012)	0.129***	(0.012)
Internal consistency	–	–	0.015	(0.015)	0.017	(0.016)
Locus of control	–	–	0.037***	(0.010)	0.037***	(0.010)
InformationBC x negative attitude	–	–	–	–	-0.272*	(0.115)
InformationBC x neutral attitude	–	–	–	–	-0.009	(0.060)
Constant	0.453***	(0.013)	-0.385**	(0.122)	-0.383**	(0.122)
# Observations	2237		2237		2237	
R-Squared	0.01		0.21		0.22	
Adjusted R-Squared	0.01		0.21		0.21	
F-Statistic: p-value	0.00		0.00		0.00	

Note: Control group: ReminderSD + InformationSD; \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

Assuming that attitudes are adapted to behavior, self-deception *Hypothesis SD1* is not supported by the data: There is no evidence that subjects are less likely to confirm their previously stated attitudes towards sustainable production after having chosen a voucher (Table 6). Note that there is no heterogeneity with respect to voucher choice (Table 6, Model III), gender and attitudes (Tables D.3 & D.5 in Appendix D).<sup>13</sup>

**Table 6:** Hypothesis SD1: Effect of Voucher Choice on Confirmation of Attitude

	Model I		Model II		Model III	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
ReminderSD	0.012	(0.010)	0.009	(0.009)	0.016	(0.017)
Age	–	–	-0.000	(0.000)	-0.000	(0.000)
Male	–	–	0.011	(0.009)	0.011	(0.009)
College	–	–	0.004	(0.009)	0.004	(0.009)
Medium income	–	–	0.009	(0.023)	0.009	(0.023)
High income	–	–	0.020	(0.022)	0.020	(0.022)
Very high income	–	–	0.019	(0.023)	0.018	(0.023)
Children	–	–	-0.012	(0.011)	-0.012	(0.011)
Negative attitude	–	–	-0.604***	(0.108)	-0.602***	(0.108)
Neutral attitude	–	–	-0.041	(0.035)	-0.042	(0.035)
Importance sust. aspects	–	–	0.042**	(0.015)	0.042**	(0.015)
Importance price	–	–	-0.010*	(0.005)	-0.010*	(0.005)
Environmental attitude	–	–	0.011	(0.007)	0.011	(0.007)
Internal consistency	–	–	0.003	(0.007)	0.003	(0.007)
Locus of control	–	–	0.001	(0.005)	0.001	(0.005)
Sustainable voucher	–	–	0.018*	(0.007)	0.026*	(0.013)
ReminderSD x sustainable voucher	–	–	–	–	-0.016	(0.018)
Constant	0.952***	(0.008)	0.757***	(0.074)	0.755***	(0.075)
# Observations	1497		1497		1497	
R-Squared	0.00		0.20		0.20	
Adjusted R-Squared	0.00		0.19		0.19	
F-Statistic: p-value	0.23		0.00		0.00	

Note: Control group: ReminderBC; \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

As with *Hypothesis SD1*, there is no confirming evidence for *Hypothesis SD2*, which states that people tend to deny their knowledge about the criticism of conventional online shopping after having chosen one of the vouchers (Table 7). Contrasting with

<sup>13</sup>Results do not change when we exclude those participants from the regression who preferred not to answer the question, that is, when we compare those who confirmed their previously stated attitudes to those who actively revoked their attitudes instead of to those who simply did not confirm their attitudes (see Table 26 in the Supplementary Materials).

*Hypothesis SD2*, with 98.1 %, the share of respondents who state to know this criticism is higher in group InformationSD than in the control group, albeit only marginally: In group InformationBC, this share amounts to 97.3 % (Table 3).

The coefficient estimate of 0.008 on the treatment group indicator that results from the Linear Probability Model I exactly mimics the difference in the descriptive shares 98.1 % and 97.3 % (Table 7). It virtually remains unchanged when including control variables and when excluding participants who preferred not to answer the question (see Table 26 in the Supplementary Materials, Section 5). There is again no heterogeneity with respect to gender, attitude and voucher choice (Tables D.4 & D.5 in Appendix D, Table 7, Model III).

**Table 7:** Hypothesis SD2: Effect of Voucher Choice on Stated Knowledge

	Model I		Model II		Model III	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
InformationSD	0.008	(0.008)	0.011	(0.008)	0.018	(0.014)
Age	–	–	0.000	(0.000)	0.000	(0.000)
Male	–	–	0.017	(0.009)	0.017	(0.009)
College	–	–	0.009	(0.007)	0.009	(0.008)
Medium income	–	–	-0.009	(0.014)	-0.009	(0.014)
High income	–	–	-0.019	(0.015)	-0.019	(0.015)
Very high income	–	–	-0.025	(0.016)	-0.025	(0.016)
Children	–	–	-0.007	(0.008)	-0.007	(0.008)
Negative attitude	–	–	0.058***	(0.016)	0.060***	(0.016)
Neutral attitude	–	–	0.016	(0.019)	0.016	(0.019)
Importance sust. aspects	–	–	0.013	(0.009)	0.013	(0.008)
Importance price	–	–	-0.009	(0.005)	-0.009	(0.005)
Environmental attitude	–	–	0.001	(0.005)	0.001	(0.005)
Internal consistency	–	–	0.015*	(0.006)	0.015*	(0.006)
Locus of control	–	–	0.006	(0.004)	0.006	(0.004)
Sustainable voucher	–	–	0.017*	(0.007)	0.024	(0.012)
InformationSD x sustainable voucher	–	–	–	–	-0.015	(0.016)
Constant	0.973***	(0.006)	0.836***	(0.060)	0.834***	(0.061)
# Observations	1497		1497		1497	
R-Squared	0.00		0.03		0.03	
Adjusted R-Squared	0.00		0.02		0.02	
F-Statistic: p-value	0.27		0.03		0.04	

Note: Control group: InformationBC; \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

After the examination of the hypotheses, we finally have a look at socioeconomic and demographic characteristics and attitudes. Individuals who have shopped at the sustainable market place before, as well as those who have a stronger environmental attitude and consider sustainability aspects as more important for their consumption decision, are more likely to choose the sustainable voucher, while those ascribing a higher importance to the price of goods are less likely to prefer a sustainable voucher (Tables 4 & 5). A higher level of internal locus of control is related to a higher probability of choosing the sustainable voucher, while the internal preference for consistency seems to be unrelated to voucher choice.

According to our regression results, female participants, as well as those having obtained a college degree, are more likely to choose the sustainable voucher. With respect to the relationship between the confirmation of one's previously stated positive attitude and covariates, we find that confirmation is positively related to having chosen the sustainable voucher, having a strong environmental attitude, and ascribing high importance to sustainability aspects, while there is a negative relationship with the importance of product prices (Table 6). Choosing the sustainable voucher as well as having a higher preference for internal consistency are positively related to admitting to have known about the negative aspects of online shopping (Table 7).

## **6.2 Average Treatment Effects**

The random assignment to the four experimental groups allows us to identify the causal average treatment effect (ATE) of the reminder and the information treatment on voucher choice, for example. In our theoretical model, we argue that these effects are mediated by cognitive inconsistency and the resulting cognitive dissonance. Yet: Whether individuals experience cognitive dissonance when receiving the reminder or information treatment depends on their behavior and attitudes. In particular, the reminder and information treatment do not induce cognitive dissonance if there is no inconsistency between attitudes and behavior. Therefore, with the above analyses, we



cannot identify the causal ATE of enhancing the salience of cognitive inconsistency on behavior and attitudes, but only the ATE of providing the reminder and the information, being equivalent to the intention-to-treat effect (ITT) of cognitive inconsistency.

To further investigate whether there is an effect of increasing the awareness of cognitive inconsistency for those who really experienced cognitive inconsistency, we use a matching approach, which allows us to identify the ATE of experiencing cognitive inconsistency in terms of a discrepancy between attitude, knowledge, and behavior (see Section 3 in the Supplementary Materials). It turns out that the effects estimated with the matching approach differ only marginally from those presented above (Tables 11 & 12 in Section 3 in the Supplementary Materials).

### **6.3 Discussion and Caveats**

Our results suggest that study participants are more likely to make sustainable consumption decisions when the consequences of their decisions are more salient. This evidence confirms results by Flörchinger et al. (2024), who find similar, but slightly lower effects of reminding respondents of their attitude towards an environmentalist movement on their likelihood to choose a voucher for a train ride instead of a flight. In line with the theory of cognitive dissonance, as well as according to our model and the results of the matching approach, the effects of the reminder and information treatments on voucher choice are mediated by cognitive inconsistency and the resulting psychological discomfort of cognitive dissonance. At least for about 5 to 9 percent of respondents, adjusting their behavior to match their attitudes appears to be less costly than enduring the psychological costs of self-deception or cognitive inconsistency. Consequently, our results suggest that, in the context of (sustainable) online shopping, individuals tend to avoid cognitive inconsistency and the resulting cognitive dissonance by changing their behavior if possible. These results are consistent with the literature showing that highlighting cognitive inconsistencies can foster prosocial behavior (e.g., Kessler & Milkman, 2018; Gosnell, 2018; Flörchinger et al.,

2024; Dickerson et al., 1992; Pelt et al., 2020; Stone et al., 1994). However, it is important to note that we did not measure cognitive dissonance directly, and can only speculate about the underlying mechanisms of the identified effects.

A potential concern with respect to our results on behavioral change may be the presence of experimenter demand effects: Participants may be more likely to choose the sustainable voucher when receiving the reminder or information because they think the experimenter expects them to do so (Zizzo, 2010). Yet, experimenter demand effects are usually small (de Quidt et al., 2018), and play a negligible role in online surveys (Mummolo & Peterson, 2019).

Similarly, there could be a bias toward the socially desirable option when selecting the voucher. Since this bias should be equally present among all experimental groups, though, it is unlikely to impact our results. Another concern may be that participants who hurried through the questionnaire bias our results. We thus checked the robustness of our results when those 31 respondents with a survey response time below 1/2 of the median response time, i.e., those with a response time of less than 10.5 minutes, are excluded from the estimation sample. This does not change our results (see Table 27 in the Supplementary Materials).

Regarding self-deception, our results suggest that participants did not deceive themselves by aligning their beliefs with their behavior. In other words, enduring cognitive inconsistency appears to be less costly than self-deception. This result contrasts with previous research showing that individuals adjust or deny their attitudes when they are found to be inconsistent with their behavior (e.g., Fried, 1998; Artiga González et al., 2022; McKimmie et al., 2003; Beasley & Joslyn, 2001)

Not least, it is possible that the experimental design has influenced our findings: First, the result that individuals do not seem to deceive themselves when being asked to confirm or revoke their attitudes may be due to the fact that the time span between

reporting one's attitudes and the reminder is rather short. Thus, the previously stated attitudes may still be very salient, which leads to high costs of self-deception.

A second reason for the ineffectiveness of both the reminder and the information may be that choosing the voucher in advance does not increase the salience of cognitive inconsistency and the potentially resulting cognitive dissonance enough to exceed the cost of self-deception. With respect to the reminder, one reason for this may be that although Amazon is not known for offering or promoting sustainable products, in addition to conventional products, consumers can also purchase sustainably produced products on this platform. Thus, individuals with positive attitudes towards sustainable production may not consider the voucher for the conventional market place to be in conflict with their attitudes, so there is no need for self-deception. Furthermore, the lack of self-deception may be attributed to a potential defiant response from participants who understand our intentions.

Overall, we find evidence that reminding individuals of their pro-environmental attitudes and informing them about the potential negative consequences of their behavior increased the likelihood of sustainable consumption choices. As the interventions increase the salience of an existing attitude-behavior gap, the underlying mechanism of this result may be cognitive dissonance avoidance. However, we do not find any evidence for self-deception as a means of cognitive dissonance avoidance. Therefore, while we can demonstrate that emphasizing the discrepancy between individuals' attitudes and behaviors can enhance sustainable consumption choices, there is no clear evidence that cognitive dissonance is the primary factor driving this change in consumption.

For policymakers, our findings imply that information campaigns about sustainable online shopping and highlighting people's sustainable attitudes may have the potential to increase the market share of sustainable online shopping. Our results also suggest backfire effects for individuals who oppose sustainable consumption. Such backfire effects are worth to be further investigated in future studies.

## 7 Summary and Conclusion

Cognitive dissonance as a result of individual behavior that is not in line with own moral attitudes is a widely recognized phenomenon (Festinger, 1962; Aronson, 1969; Rabin, 1994), not least in the context of prosocial and sustainable behavior (e.g. Dickerson et al., 1992; Edenbrandt et al., 2021; Gosnell, 2018; Matthey & Regner, 2011). Investigating whether compliance with own moral standards can be achieved through increasing the salience of cognitive inconsistency, thereby potentially raising the level of cognitive dissonance, this paper has explored cognitive inconsistency avoidance by (a) a change in behavior to comply with the own attitudes and by (b) self-deception.

To this end, we embedded an incentivized discrete-choice task in a large-scale survey conducted in Germany in 2021, with the choice being between a voucher for either a conventional or a sustainable online market place. With our experimental setting, we aimed to increase participants' awareness of their cognitive inconsistency by either randomly reminding them of their previously stated attitude towards sustainable production or by informing them about the negative aspects of conventional online shopping. Participants received one of these interventions either prior to or after their voucher decision, yielding four experimental groups altogether: two pre-decision groups and two post-decision groups.

In the two pre-decision groups, increasing the salience of cognitive inconsistency is effective in triggering behavioral change: The reminder increases the share of sustainable vouchers by about 5 percentage points and information provision leads to an increase of about 9 percentage points, indicating that information provision is somewhat more effective in increasing the share of sustainable vouchers. Our empirical results further indicate that when being reminded of their previously stated positive attitude towards sustainable production or when being informed about the common

criticism on conventional online shopping, male study participants are more likely to adapt their behavior to their attitudes than females.

If a change in behavior is impossible, as for the two post-decision groups, individuals might nonetheless try to avoid cognitive inconsistency by denying either their positive attitude towards sustainable production or their knowledge about the criticism of conventional online shopping. However, we do not find any evidence for such self-deception.

We thus conclude that, in the context of our study, individuals do not appear to engage in self-deception when presented with information that may induce cognitive dissonance. On the other hand, if possible, as for the two pre-decision groups, individuals tend to change their behavior when receiving such information.

From a policy perspective, our results suggest that policymakers can improve social outcomes by increasing compliance with personal moral standards through increasing the awareness of a discrepancy between individuals' attitude and behavior. Reminding individuals of their positive attitudes toward sustainable production, as well as informing them about the negative aspects of conventional online shopping, can encourage them to choose sustainable alternatives.

# Appendices

## A Formal Rational Choice Model

In the following, we set up the formal model and derive the propositions on which we base the hypotheses of this study.

### A.1 Setup

In our model, individuals can choose between a purely selfish and a prosocial action  $a \in \{0, 1\}$ , where 0 denotes the selfish action and 1 the prosocial action. Individuals derive material utility  $U(a)$  from both actions, but it is assumed that the material utility of the selfish action exceeds that of the prosocial action:  $U(0) > U(1)$ , for instance, because the selfish action is cheaper. Therefore, if individuals only consider the material utility, they choose the selfish activity.

However, individuals also hold moral values, which are their own norms of right and wrong. Examples of moral values include refraining from causing harm to others or from inflicting pain on animals. These values may be inconsistent with a decision that is based exclusively on material utility. This inconsistency can cause cognitive dissonance and, hence, affective disutility. For example, if individuals have to choose between a sustainable and a less costly non-sustainable action, the sustainable action yields lower material utility due to higher costs, so that the individuals will only have an incentive to prefer the sustainable action if they expect less affective disutility due to avoided cognitive dissonance.

A central element of the model is that we follow Rabin (1994) and Konow (2000) in assuming that individuals are able to hold beliefs about their moral values that differ from their true values. At first glance, one might expect that beliefs about moral

values should always be equal to the true values. However, if individuals experience cognitive dissonance because their chosen action is not in line with their true values, they might lie to themselves about their values to fit them to their action. For instance, people who actually value sustainable production because it prevents harm to other people and the environment, but who still purchase conventional products may tell themselves that they are against sustainable production because it increases product prices, or they may convince themselves that sustainability is not a priority in their current situation.

This modification of beliefs represents a form of self-deception and, therefore, entails psychological costs  $C_v$  (Rabin, 1994). These costs depend on the moral values  $v$ , individuals' beliefs  $\hat{v}$  about these values, and on the importance or salience  $s_v$  of moral concerns. Salience may be interpreted as the extent to which individuals are aware of their moral concerns in a given situation.

$$C_v(v, \hat{v}, s_v) = |v - \hat{v}| \cdot c_v(s_v), \quad (1)$$

where  $v, \hat{v} \in \{0, 1\}$  equal 1 if individuals have high moral values or pretend to have high moral values, respectively, and zero otherwise. If the beliefs about the moral values are consistent with true values, there is no need for self-deception and, hence, the cost of self-deception is zero; otherwise these costs are greater than zero. It seems natural to assume that the cost of self-deception increases in the salience or awareness of moral concerns, that is, for the function  $c_v(s_v)$  of salience, it is  $\frac{\partial c_v}{\partial s_v} > 0$ .

Likewise, individuals may or may not know whether an action is consistent with their own moral standards. As with the beliefs about moral values, to avoid cognitive dissonance, individuals may willfully deny their knowledge about whether an action is in line with their moral standards. This manipulation of beliefs about knowledge results in psychological costs  $C_k$  due to self-deception.

These costs depend on the true knowledge, denoted by  $k$ , as well as on the beliefs about this knowledge, denoted by  $\hat{k}$ , and on the salience of the true knowledge,  $s_k$ :

$$C_k(k, \hat{k}, s_k) = |k - \hat{k}| \cdot c_k(s_k), \quad (2)$$

where  $k, \hat{k} \in \{0, 1\}$  take on the value one if individuals know about the moral value of their actions or admit to know about it, respectively, and zero otherwise. In other words,  $k = 1$  ( $k = 0$ ) if individuals know (do not know) whether the chosen action matches their attitudes. Similarly,  $\hat{k} = 1$  ( $\hat{k} = 0$ ) if individuals admit (deny) to know whether the chosen action matches their attitudes. The costs of self-deception are equal to zero if beliefs about knowledge are in line with true knowledge and larger than zero otherwise. Again,  $c_k(s_k)$  is a function of salience, with  $\frac{\partial c_k}{\partial s_k} > 0$ .

Concerning cognitive dissonance, we follow Rabin (1994) and Konow (2000) in assuming that cognitive dissonance depends on individuals' actions and their beliefs about what is morally legitimate. However, in our model we add beliefs about knowledge and several salience parameters. That is, we assume that the experienced degree of cognitive dissonance,  $D$ , depends on the chosen action,  $a$ , the salience of this action,  $s_a$ , the individuals' beliefs about their values and knowledge,  $\hat{v}$  and  $\hat{k}$ , as well as the salience of moral concerns and the true knowledge,  $s_v$  and  $s_k$ :

$$D(a, \hat{v}, \hat{k}, s_a, s_v, s_k) = |a - \hat{v}| \cdot \hat{k} \cdot d(s_a, s_v, s_k). \quad (3)$$

From Definition (3) follows that individuals do not experience cognitive dissonance if the chosen action is in line with their beliefs about their moral values, that is, if  $a = \hat{v}$ , or if they deny to know about the morality of their actions, that is, if  $\hat{k} = 0$ .  $d(s_a, s_v, s_k)$  is a function of all salience parameters for which it is assumed that  $\frac{\partial d}{\partial s_a} > 0$ ,  $\frac{\partial d}{\partial s_v} > 0$ , and  $\frac{\partial d}{\partial s_k} > 0$ . That is, cognitive dissonance increases with the salience of the action, the salience of moral concerns and the salience of true knowledge. All salience



parameters are assumed to be situation-dependent and can be varied, for example, through the provision of information, as in our experiment.

Combining material and affective utility and taking account of cognitive dissonance and psychological costs of self-deception yields the following utility function  $\tilde{W}$ :

$$\tilde{W}(a, v, \hat{v}, k, \hat{k}, s_a, s_v, s_k) := U(a) - D(a, \hat{v}, \hat{k}, s_a, s_v, s_k) - C_v(v, \hat{v}, s_v) - C_k(k, \hat{k}, s_k), \quad (4)$$

where cognitive dissonance and psychological costs diminish the utility  $\tilde{W}(a)$  derived from action  $a$ .

## A.2 Behavior

Throughout, we assume that individuals have prosocial values, i.e.,  $v = 1$ , and are informed about the morality of the selfish and the prosocial action, i.e.,  $k = 1$ . Abbreviating  $\tilde{W}(a, v = 1, \hat{v}, k = 1, \hat{k}, s_a, s_v, s_k)$  by  $W(a, \hat{v}, \hat{k}, s_a, s_v, s_k)$ , rational individuals maximize their utility by solving the maximization problem

$$\max_{a, \hat{v}, \hat{k}} W(a, \hat{v}, \hat{k}, s_a, s_v, s_k). \quad (5)$$

The salience parameters  $s_a, s_v$ , and  $s_k$  are presumed to be exogenous and, thus, cannot be changed by individuals. Moral values and knowledge about the morality of an action are assumed to be fixed in the short-run. Therefore, individuals can adapt either their actions  $a$ , their beliefs  $\hat{v}$  about their values, or the beliefs  $\hat{k}$  about their knowledge, so that maximization problem (5) is solved for the following variables:  $a$ ,  $\hat{v}$ , and  $\hat{k}$ .

There is often a gap between individuals' attitudes and their actual behaviors (Nyborg et al., 2006; Rothgerber & Rosenfeld, 2021). Given this empirical fact, as our baseline, we take the situation in which individuals admit to have a positive attitude towards prosocial behavior and hold congruent beliefs about the morality of each ac-

tion, but still behave selfishly:  $a = 0, \hat{v} = 1, \hat{k} = 1$ . We now analyze the incentives to deviate from this baseline situation.

For the three binary variables  $a$ ,  $\hat{v}$ , and  $\hat{k}$ , there are  $2^3 = 8$  combinations, one of which describes the baseline situation:  $(a, \hat{v}, \hat{k}) = (0, 1, 1)$ . From these 8 combinations, only the 4 combinations presented below are relevant for our further analysis. One of these four combinations is  $(a, \hat{v}, \hat{k}) = (1, 1, 1)$ , i.e., individuals choose the prosocial action, admit to have high moral values, and admit to be informed about the morality of their actions. As can be seen from Definition (4), this combination strictly dominates all combinations in which individuals choose the prosocial action ( $a = 1$ ) and at the same time deceive themselves by choosing either  $\hat{v} = 0$  or  $\hat{k} = 0$ , or both. This is because material utility is the same in all combinations  $(a, \hat{v}, \hat{k}) = (1, 0, 1)$ ,  $(a, \hat{v}, \hat{k}) = (1, 1, 0)$ , and  $(a, \hat{v}, \hat{k}) = (1, 0, 0)$ , whereas psychological costs,  $C_v + C_k$ , are smaller for  $(a, \hat{v}, \hat{k}) = (1, 1, 1)$ . Moreover, from Definition (4), it follows that it would be irrational to choose the combination  $(a, \hat{v}, \hat{k}) = (0, 0, 0)$ . This combination implies higher psychological costs,  $C_v + C_k$ , compared to a situation in which either  $\hat{v} = 1$  or  $\hat{k} = 1$ , as with the combinations  $(a, \hat{v}, \hat{k}) = (0, 1, 0)$  and  $(a, \hat{v}, \hat{k}) = (0, 0, 1)$ . Cognitive dissonance and the material utility, however, are the same in all these situations. Thus,  $(a, \hat{v}, \hat{k}) = (0, 0, 0)$  is strictly dominated by both,  $(a, \hat{v}, \hat{k}) = (0, 1, 0)$  and  $(a, \hat{v}, \hat{k}) = (0, 0, 1)$ .

Therefore, the only rational combinations are

$$(a, \hat{v}, \hat{k}) \in \{(0, 1, 1), (1, 1, 1), (0, 0, 1), (0, 1, 0)\},$$

for which we now report the utilities  $W(a, \hat{v}, \hat{k}, s_a, s_v, s_k)$ . First, for the baseline situation,  $(a, \hat{v}, \hat{k}) = (0, 1, 1)$ ,  $W$  reads:

$$\begin{aligned} W(a = 0, \hat{v} = 1, \hat{k} = 1, s_a, s_v, s_k) \\ &= U(0) - D(0, 1, 1, s_a, s_v, s_k) - C_v(1, 1, s_v) - C_k(1, 1, s_k) \\ &= U(0) - d(s_a, s_v, s_k), \end{aligned} \tag{6}$$

as  $C_v(1, 1, s_v) = 0$  because  $v = \hat{v} = 1$ ,  $C_k(1, 1, s_k) = 0$ , since  $k = \hat{k} = 1$ , and  $D(0, 1, 1, s_a, s_v, s_k) = d(s_a, s_v, s_k)$ , since  $|a - \hat{v}| = |0 - 1| = 1$ .

Second, for similar reasons, when  $(a, \hat{v}, \hat{k}) = (1, 1, 1)$ , it is:

$$\begin{aligned} W(a = 1, \hat{v} = 1, \hat{k} = 1, s_a, s_v, s_k) \\ &= U(1) - D(1, 1, 1, s_a, s_v, s_k) - C_v(1, 1, s_v) - C_k(1, 1, s_k) \\ &= U(1). \end{aligned} \tag{7}$$

Third, when  $(a, \hat{v}, \hat{k}) = (0, 0, 1)$ , it is

$$\begin{aligned} W(a = 0, \hat{v} = 0, \hat{k} = 1, s_a, s_v, s_k) \\ &= U(0) - D(0, 0, 1, s_a, s_v, s_k) - C_v(1, 0, s_v) - C_k(1, 1, s_k) \\ &= U(0) - c_v(s_v), \end{aligned} \tag{8}$$

as  $C_v(1, 0, s_v) = |1 - 0| \cdot c_v(s_v) = c_v(s_v)$ .

Fourth, in a similar vein, when  $(a, \hat{v}, \hat{k}) = (0, 1, 0)$ , it is:

$$\begin{aligned} W(a = 0, \hat{v} = 1, \hat{k} = 0, s_a, s_v, s_k) \\ &= U(0) - D(0, 1, 0, s_a, s_v, s_k) - C_v(1, 1, s_v) - C_k(1, 0, s_k) \\ &= U(0) - c_k(s_k). \end{aligned} \tag{9}$$

In the baseline situation, individuals experience cognitive dissonance because they are aware of their cognitive inconsistencies, that is, they are aware that their behavior is not in line with their moral values. Starting from this baseline, it is straightforward to see that individuals are more likely to choose the prosocial action, i.e., to adapt their behavior to their values, the larger is the material utility from this action (see Expressions (6) and (7)). Furthermore, their choice depends on the salience of the action,  $s_a$ , the salience of moral concerns,  $s_v$ , and the salience of their knowledge,  $s_k$ .

In what follows, we separately analyze the implications of increases in each of the salience parameters  $s_a, s_v, s_k$ , starting with parameter  $s_v$ .

**Proposition 1:** Departing from the baseline situation  $(a, \hat{v}, \hat{k}) = (0, 1, 1)$ , individuals are more likely to either adapt their behavior to their values, i.e., to switch to  $(a, \hat{v}, \hat{k}) = (1, 1, 1)$ , or to deceive themselves by pretending not to be informed about the morality of each action, i.e., to switch to  $(a, \hat{v}, \hat{k}) = (0, 1, 0)$ , when moral concerns are more salient, i.e., when  $s_v$  increases.

*Proof:* We now demonstrate that an increase in the salience parameter  $s_v$  decreases the utility obtained from the baseline combination  $(a, \hat{v}, \hat{k}) = (0, 1, 1)$  relative to the utility obtained from  $(a, \hat{v}, \hat{k}) = (1, 1, 1)$  and  $(a, \hat{v}, \hat{k}) = (0, 1, 0)$ . In fact, from Expression (6) follows that

$$\frac{\partial W(a = 0, \hat{v} = 1, \hat{k} = 1, s_a, s_v, s_k)}{\partial s_v} = -\frac{\partial d(s_a, s_v, s_k)}{\partial s_v} < 0, \quad (10)$$

whereas from Expressions (7) and (9) it follows:

$$\begin{aligned} \frac{\partial W(a = 1, \hat{v} = 1, \hat{k} = 1, s_a, s_v, s_k)}{\partial s_v} &= 0, \\ \frac{\partial W(a = 0, \hat{v} = 1, \hat{k} = 0, s_a, s_v, s_k)}{\partial s_v} &= 0, \end{aligned}$$

as  $W(a = 1, \hat{v} = 1, \hat{k} = 1, s_a, s_v, s_k) = U(1)$  and  $W(a = 0, \hat{v} = 1, \hat{k} = 0, s_a, s_v, s_k) = U(0) - c_k(s_k)$ , which is independent of  $s_v$ .  $\square$

**Proposition 2:** Departing from the baseline situation  $(a, \hat{v}, \hat{k}) = (0, 1, 1)$ , individuals are more likely to either adapt their behavior to their values, i.e., to switch to  $(a, \hat{v}, \hat{k}) = (1, 1, 1)$ , or to deceive themselves by modifying their beliefs about their values, i.e., to switch to  $(a, \hat{v}, \hat{k}) = (0, 0, 1)$ , when their knowledge about the morality of each action is more salient, i.e., when  $s_k$  increases.

*Proof:* We now show that an increase in  $s_k$  decreases the utility obtained from  $(a, \hat{v}, \hat{k}) = (0, 1, 1)$  relative to the utility obtained from  $(a, \hat{v}, \hat{k}) = (1, 1, 1)$  and  $(a, \hat{v}, \hat{k}) = (0, 0, 1)$ . In fact, from Expressions (6) and (9) follows that

$$\frac{\partial W(a = 0, \hat{v} = 1, \hat{k} = 1, s_a, s_v, s_k)}{\partial s_k} = -\frac{\partial d(s_a, s_v, s_k)}{\partial s_k} < 0, \quad (11)$$

whereas from Expressions (7) and (8) follows

$$\begin{aligned} \frac{\partial W(a = 1, \hat{v} = 1, \hat{k} = 1, s_a, s_v, s_k)}{\partial s_k} &= 0, \\ \frac{\partial W(a = 0, \hat{v} = 0, \hat{k} = 1, s_a, s_v, s_k)}{\partial s_k} &= 0. \end{aligned}$$

□

**Proposition 3:** Departing from the baseline scenario, individuals are less likely to choose  $(a, \hat{v}, \hat{k}) = (0, 1, 1)$  relative to all other possible choices when  $s_a$  is larger.

*Proof:* We now show that an increase in  $s_a$  decreases the utility obtained from  $(a, \hat{v}, \hat{k}) = (0, 1, 1)$  relative to the utility obtained from all other possible choices. In fact, from Expression (6), it follows that

$$\frac{\partial W(a = 0, \hat{v} = 1, \hat{k} = 1, s_a, s_v, s_k)}{\partial s_a} = -\frac{\partial d(s_a, s_v, s_k)}{\partial s_a} < 0,$$

whereas from Expressions (7), (8), and (9) follows

$$\begin{aligned} \frac{\partial W(a = 1, \hat{v} = 1, \hat{k} = 1, s_a, s_v, s_k)}{\partial s_a} &= 0, \\ \frac{\partial W(a = 0, \hat{v} = 0, \hat{k} = 1, s_a, s_v, s_k)}{\partial s_a} &= 0, \\ \frac{\partial W(a = 0, \hat{v} = 1, \hat{k} = 0, s_a, s_v, s_k)}{\partial s_a} &= 0. \end{aligned}$$

□

## B Questionnaire

In the following we report all survey questions that are relevant for our analyses. The original questionnaire is in German.

### A. General

First of all, we would like to ask you to answer some general questions about your household.

**A2:** Do you have one or more children, regardless of how old they are or whether they are already adults, and whether they live with you in the household?

- Yes
- No
- No answer

Now the topic is shopping.

**ExpA1:** For some years now, more and more ecologically sustainable and fairly produced goods have been on offer, in the manufacture of which consideration is given to the environment and value is placed on occupational safety and fair payment. What is your attitude towards such sustainable products?

- I'm not at all in favor
- I'm rather not in favor
- Neither
- I'm rather in favor
- I'm totally in favor
- Don't know / No answer

**ExpA2:** Now we would like to know from you what is important to you when shopping. On a scale of 1 to 5, to what extent do the following statements apply to you?

Scale:

- Not at all true
- Rather not true
- Neither
- Somewhat true
- Totally true
- Don't know / No answer

Items:

- (a) It is important to me that no animal habitats are destroyed in the production of goods.
- (b) It is important to me that first attempts are made to repair damaged products instead of immediately throwing them away and replacing them with new ones.

- (c) It is important to me that when packaging products, care is taken to ensure that the material used is recyclable and that as little packaging material as possible is used overall.
- (d) It is important to me that the people who make the products I buy can live well on their wages.
- (e) It is important to me that I can understand where and under what conditions the goods I buy were produced.
- (f) When making purchasing decisions, the price is important to me first and foremost.

[Questions unrelated to the experiment]

We now come back to the topic of shopping.

*If Group ReminderBC*

**ExpA3:**

*If ExpA1=I'm not at all in favor/I'm rather not in favor*

Would you agree that you are opposed to environmentally sustainable and fair production?

- Yes
- No
- Don't know / No answer

*If ExpA1=Neither*

Would you agree that you are neutral towards environmentally sustainable and fair production?

- Yes
- No
- Don't know / No answer

*If ExpA1=I'm totally in favor/I'm rather in favor*

Would you agree that you support environmentally sustainable and fair production?

- Yes
- No
- Don't know / No answer

*If Group InformationBC*

**ExpA4:** Online retail is becoming increasingly popular. One of the reasons for this is that it offers many advantages over on-site retailing in the current pandemic situation. However, online retailing also comes in for criticism time and again. Common problems are, for example, that returned goods are systematically destroyed and packaging waste ends up in the sea. The high pressure to perform and the poor payment of the workforce are also repeatedly pointed out. Have you heard of this criticism?

- Yes
- No
- Don't know / No answer

#### *Everyone*

In the following you can win a voucher worth 20 euros for your next online purchase. The winners will be selected at random. Out of 20 respondents, one will receive a voucher. You can choose beforehand whether you would prefer to receive a voucher for amazon or a voucher for memolife (<https://www.memolife.de/>) if you are one of the winners. memolife offers products that have been manufactured in an environmentally friendly way and under fair working conditions. In addition, for example, used but still functional smartphones or laptops are offered, through the reuse of which fewer raw materials have to be mined for the production of new devices.

**ExpA5:** If you were one of the winners, which voucher would you choose?

- Amazon voucher (20 Euro)
- memolife voucher (20 Euro)
- Don't know / No answer

#### *If Group ReminderSD*

**ExpA3:**

*If ExpA1=I'm not at all in favor/I'm rather not in favor*

Would you agree that you are opposed to environmentally sustainable and fair production?

- Yes
- No
- Don't know / No answer

*If ExpA1=Neither*

Would you agree that you are neutral towards environmentally sustainable and fair production?

- Yes
- No
- Don't know / No answer

*If ExpA1=I'm totally in favor/I'm rather in favor*

Would you agree that you support environmentally sustainable and fair production?

- Yes
- No
- Don't know / No answer



*If Group InformationSD*

**ExpA4:** Online retail is becoming increasingly popular. One of the reasons for this is that it offers many advantages over on-site retailing in the current pandemic situation. However, online retailing also comes in for criticism time and again. Common problems are, for example, that returned goods are systematically destroyed and packaging waste ends up in the sea. The high pressure to perform and the poor payment of the workforce are also repeatedly pointed out. Have you heard of this criticism?

- Yes
- No
- Don't know / No answer

**ExpA6:** Did you know the sustainable online store memolife before taking part in this survey?

- Yes, I had heard about it before
- Yes, I had already shopped there
- No
- Don't know / No answer

**PV: Psychological control variables**

*The order of questions in this block was randomized.*

Now we would like to ask you some questions about politics and your personality.

**PK2:** To what extent do you personally agree with the following statements?

Scale:

- Totally disagree
- Rather disagree
- Neither
- Rather agree
- Totally agree
- Don't know / No answer

Items:

- (a) It worries me to think about the environmental conditions our children and grandchildren will probably have to live in.
- (b) There are natural limits to growth that our industrialized world has long since reached or exceeded.
- (c) Environmental protection should be a priority for Germany, even if it interferes with economic growth.
- (d) In order to preserve our natural livelihoods, we must all be prepared to limit our standard of living.

**PK4:** In the following section, we would like you to indicate the extent to which you agree with the statements on a scale from 1 (Totally disagree) to 7 (Totally agree).

Scale:

- Totally disagree
- Rather disagree
- Neither
- Agree rather
- Totally agree
- Don't know / No answer

Items (in randomized order):

- (a) I have little control over the things that happen to me.
- (b) There is no solution at all to some of my problems.
- (c) There is little I can do to change the many important things in my life.
- (d) I often feel helpless in dealing with life's problems.
- (e) Sometimes I feel that I am being pushed around in life.
- (f) What happens to me in the future is largely up to me.
- (g) I can do everything that I really want to do.

**PK6:** The following are some statements that relate to personal beliefs. Please tick one of the answer alternatives in each case according to your agreement or disagreement with the statement. Always think of the general tendency that would correspond to your personality, not to exceptional situations. Try to answer spontaneously and not to ponder too long!

Scale:

- Totally disagree
- Rather disagree
- Neither
- Rather agree
- Totally agree
- Don't know / No answer

Items:

- (a) It is important to me that my actions are consistent with my beliefs.
- (b) I think it is important that people who know me can predict my behavior.
- (c) I feel uncomfortable when I hold two beliefs that do not match.
- (d) I don't care if I appear contradictory to others.
- (e) I don't mind if my actions are inconsistent with each other.
- (f) I don't care if my close friends are predictable.
- (g) I don't like people who constantly change their minds.

### **SOE. Socio-economic information**

Finally, please answer a few questions about yourself. Your data will be treated with absolute confidentiality in accordance with data protection regulations.

**SO2:** What is your highest professional training or (technical) college degree?

- No degree
- Apprenticeship or vocational internship of at least 12 months
- Vocational preparation year
- Apprenticeship, vocational training in the dual system
- Preparatory service for the intermediate civil service in public administration
- Vocational qualification from a vocational school/college, completion of a 1-year school in the healthcare sector
- 2- or 3-year school of health care (e.g. nursing, PTA, MTA)
- Technical college degree (master craftsman, technician or equivalent degree)
- Vocational academy, technical academy
- University of applied sciences for administration
- University of applied sciences degree, also engineering degree
- University, scientific college, art college
- Doctorate
- No answer

**SO3:** Which predominantly applies to you? Please select only one answer option.

- I am employed or working (incl. trainees, persons on parental leave or partial retirement)
- I am a pupil
- I am a student
- I am a pensioner or retiree
- I live from income from capital assets, renting or leasing
- I receive maintenance/allowances from my spouse, partner, parents, relatives or other persons - including persons from outside the household.
- I am a housewife/ husband or take care of children and/or persons in need of care.
- I receive unemployment benefit I
- I receive unemployment benefit II or social benefits (Hartz IV benefits)
- I receive social welfare or basic income support in old age or in case of reduced earning capacity
- None of the above options applies to me
- No answer

**SO5:** What is the total monthly net income of your household? This means the sum resulting from wages, salary, income from self-employment, pension or annuity, in each case after deduction of taxes and social security contributions. Please also include income from public assistance, income from renting, leasing, housing allowance, child benefit and other income.

- under 700 Euro
- 700 to under 1,200 Euro
- 1,200 to under 1,700 Euro
- 1,700 to under 2,200 Euro
- 2,200 to under 2,700 Euro
- 2,700 to under 3,200 Euro
- 3,200 to under 3,700 Euro

- 3,700 to under 4,200 Euro
- 4,200 to under 4,700 Euro
- 4,700 to under 5,200 Euro
- 5,200 to under 5,700 Euro
- 5,700 Euro and more
- No answer

## C Descriptive Statistics

**Table C.1: Balance Table**

	RemBC (1)	RemSD (2)	InfBC (3)	InfSD (4)	Total	1 vs 2 (p)	3 vs 4 (p)	1 vs 2&4 (p)	3 vs 2&4 (p)
Male	0.546	0.574	0.541	0.557	0.554	0.263	0.541	0.368	0.275
Age	55.210	54.642	55.557	55.243	55.164	0.486	0.703	0.709	0.393
At least technical college	0.420	0.430	0.408	0.390	0.412	0.706	0.493	0.639	0.921
Employed	0.537	0.560	0.552	0.559	0.552	0.368	0.781	0.309	0.730
Has children	0.631	0.607	0.592	0.620	0.613	0.326	0.269	0.411	0.334
Monthly income									
<1,200 Euro	0.070	0.053	0.062	0.053	0.059	0.163	0.446	0.101	0.369
1,200 - 2,700 Euro	0.255	0.327	0.316	0.299	0.299	0.002	0.480	0.004	0.887
2,700 - 4,200 Euro	0.358	0.301	0.344	0.339	0.336	0.020	0.822	0.072	0.257
> 4,200 Euro	0.317	0.319	0.278	0.310	0.306	0.938	0.181	0.890	0.080
Attitude sust. production									
Positive attitude	0.017	0.009	0.020	0.017	0.016	0.194	0.664	0.478	0.218
Neutral attitude	0.066	0.085	0.077	0.089	0.079	0.162	0.412	0.085	0.423
Positive attitude	0.917	0.905	0.903	0.894	0.905	0.440	0.580	0.192	0.817
Mean	2.900	2.896	2.883	2.877	2.889	0.837	0.775	0.404	0.818
Importance sust. aspects									
Non-destruction of habitats	0.851	0.851	0.835	0.854	0.848	0.973	0.307	0.889	0.277
Repair	0.908	0.932	0.880	0.899	0.905	0.076	0.227	0.512	0.007
Little & recyclable packaging	0.868	0.874	0.877	0.876	0.874	0.711	0.928	0.633	0.882
Living wage	0.869	0.874	0.866	0.886	0.874	0.768	0.244	0.448	0.347
Traceability of production	0.738	0.768	0.781	0.786	0.768	0.192	0.839	0.043	0.804
Mean of Index	4.206	4.221	4.195	4.213	4.209	0.653	0.596	0.697	0.454
Importance of price	0.361	0.382	0.345	0.332	0.355	0.383	0.582	0.863	0.593
Insecurity	0.003	-0.016	0.037	-0.023	0.000	0.715	0.248	0.611	0.214
Shopped at sust. marketplace	0.009	0.008	0.011	0.011	0.010	0.812	0.968	0.979	0.746
Commitment to environment	0.139	0.124	0.129	0.139	0.133	0.400	0.544	0.632	0.823
Environmental attitude	3.739	3.706	3.697	3.729	3.718	0.474	0.486	0.595	0.600
Pref. for internal consistency	3.720	3.716	3.778	3.718	3.733	0.906	0.065	0.922	0.031
Locus of control	5.109	5.144	5.135	5.159	5.137	0.498	0.655	0.348	0.716
Number of observations	757	740	741	756	2994	1497	1497	2253	2237

**Table C.2: Socioeconomic Characteristics**

	Sample	Microcensus 2021
Male	55 %	50 %
Age		
< 25	2 %	24 %
25 – 34	11 %	13 %
35 – 44	14 %	13 %
45 – 54	19 %	14 %
55 – 64	22 %	15 %
65 – 74	20 %	11 %
75 – 84	11 %	8 %
> 84	1 %	3 %
At least technical college	41 %	36 %
Net monthly household income in Euro		
Low income	6 % (< 1,200)	15 % (< 1,250)
Medium income	30 % (1,200 – 2,700)	33 % (1,250 – 2,500)
High income	50 % (2,700 – 5,200)	37 % (2,500 – 5,000)
Very high income	15 % (> 5,200)	15 % (> 5,000)

Source of German Microcensus data: Destatis (2021)

Note: In order to facilitate a more accurate comparison between the income levels observed in our sample and those reported in the micro census, we have opted to utilize different income categories in this comparison than those employed in our previous analyses.

## D Heterogeneity Analyses

**Table D.1:** Hypothesis BC1: Effect of the Reminder Treatment on Voucher Choice - Heterogeneity with respect to gender

	Male		Female		Comparison	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
ReminderBC	0.090***	(0.027)	-0.008	(0.031)	-0.007	(0.030)
Male	–	–	–	–	-0.089***	(0.025)
ReminderBC x male	–	–	–	–	0.097*	(0.041)
Constant	-0.468**	(0.159)	-0.166	(0.199)	-0.277*	(0.124)
Control variables	YES		YES		YES	
# Observations	1259		994		2253	
R-Squared	0.18		0.19		0.19	
Adjusted R-Squared	0.17		0.17		0.18	
F-Statistic: p-value	0.00		0.00		0.00	

Note: Control group: ReminderSD + InformationSD. Control variables are socioeconomic characteristics, attitudes toward sustainable production, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table D.2:** Hypothesis BC2: Effect of Information on Voucher Choice - Heterogeneity with respect to gender

	Male		Female		Comparison	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
Group InformationBC	0.101***	(0.027)	0.066*	(0.029)	0.069*	(0.029)
Male	–	–	–	–	-0.084***	(0.025)
Group InformationBC x male	–	–	–	–	0.033	(0.040)
Constant	-0.601***	(0.152)	-0.189	(0.208)	-0.375**	(0.123)
Control variables	YES		YES		YES	
Observations	1247		990		2237	
R-Squared	0.20		0.20		0.21	
Adjusted R-Squared	0.19		0.19		0.21	
F-Statistic: p-value	0.00		0.00		0.00	

Note: The control group is Group InformationSD + Group ReminderSD. Control variables are socioeconomic characteristics, attitudes toward sustainable production, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table D.3:** Hypothesis SD1: Effect of voucher choice on confirmation of attitudes - Heterogeneity with respect to Gender

	Male		Female		Comparison	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
ReminderSD	0.019	(0.014)	-0.003	(0.012)	-0.003	(0.012)
Male	–	–	–	–	0.001	(0.014)
ReminderSD x male	–	–	–	–	0.021	(0.019)
Constant	0.705***	(0.097)	0.787***	(0.111)	0.760***	(0.074)
Control variables	YES		YES		YES	
# Observations	838		659		1497	
R-Squared	0.17		0.30		0.20	
Adjusted R-Squared	0.16		0.28		0.19	
F-Statistic: p-value	0.00		0.00		0.00	

Note: Control group: ReminderBC. Control variables are socioeconomic characteristics, attitudes toward sustainable production, environmental attitude, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table D.4:** Hypothesis SD2: Effect of voucher choice on stated knowledge - Heterogeneity with respect to Gender

	Male		Female		Comparison	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
InformationSD	0.003	(0.010)	0.020	(0.013)	0.021	(0.013)
Male	–	–	–	–	0.026*	(0.013)
InformationSD x male	–	–	–	–	-0.019	(0.015)
Constant	0.806***	(0.071)	0.906***	(0.112)	0.833***	(0.061)
Control variables	YES		YES		YES	
# Observations	822		675		1497	
R-Squared	0.04		0.05		0.03	
Adjusted R-Squared	0.02		0.03		0.02	
F-Statistic: p-value	0.44		0.30		0.04	

Note: Control group: InformationBC. Control variables are socioeconomic characteristics, attitudes toward sustainable production, environmental attitude, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.



**Table D.5:** Hypotheses SD1 & SD2: Effect of voucher choice on stated knowledge - Heterogeneity with respect to Attitudes

	Hypothesis SD1		Hypothesis SD2	
	Coeff.	Std. error	Coeff.	Std. error
ReminderSD	0.013	(0.008)	–	–
InformationSD	–	–	0.008	(0.008)
Negative attitude	-0.502***	(0.140)	0.068***	(0.018)
Neutral attitude	-0.034	(0.049)	-0.001	(0.031)
ReminderSD x negative attitude	-0.288	(0.200)	–	–
ReminderSD x neutral attitude	-0.012	(0.064)	–	–
InformationSD x negative attitude	–	–	-0.021	(0.014)
InformationSD x neutral attitude	–	–	0.032	(0.034)
Constant	0.753***	(0.074)	0.839***	(0.061)
Control variables	YES		YES	
# Observations	1497		1497	
R-Squared	0.21		0.03	
Adjusted R-Squared	0.20		0.02	
F-Statistic: p-value	0.00		0.05	

Note: Control group: ReminderBC for Hypothesis SD1 and InformationBC for Hypothesis SD2. Control variables are socioeconomic characteristics, attitudes toward sustainable production, environmental attitude, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

## References

- Andor, M. A., Cox, J., Gerster, A., Price, M., Sommer, S., & Tomberg, L. (2022). Locus of control and prosocial behavior. *NBER Working Paper*, 30359.
- Aronson, E. (1969). The theory of cognitive dissonance: A current perspective. In *Advances in Experimental Social Psychology*, volume 4 (pp. 1–34). Elsevier.
- Artiga González, T., Capozza, F., & Granic, G. D. (2022). Political support, cognitive dissonance and political preferences. *CESifo Working Paper No. 9549*.
- Beasley, R. K. & Joslyn, M. R. (2001). Cognitive dissonance and post-decision attitude change in six presidential elections. *Political Psychology*, 22(3), 521–540.
- Bénabou, R. & Tirole, J. (2011). Identity, morals, and taboos: Beliefs as assets. *The Quarterly Journal of Economics*, 126(2), 805–855.
- Cialdini, R. B., Trost, M. R., & Newsom, J. T. (1995). Preference for consistency: The development of a valid measure and the discovery of surprising behavioral implications. *Journal of Personality and Social Psychology*, 69(2), 318.
- Dana, J., Weber, R. A., & Kuang, J. X. (2007). Exploiting moral wiggle room: experiments demonstrating an illusory preference for fairness. *Economic Theory*, 33(1), 67–80.
- de Quidt, J., Haushofer, J., & Roth, C. (2018). Measuring and bounding experimenter demand. *American Economic Review*, 108(11), 3266–3302.
- Destatis (2021). Bevölkerung und Erwerbstätigkeit. Haushalte und Familien – Ergebnisse des Mikrozensus. *Fachserie 1 Reihe 3 – 2021*, [https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Haushalte-Familien/Publikationen/Downloads-Haushalte/haushalte-familien-2010300217004.pdf?\\_\\_blob=publicationFile](https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Haushalte-Familien/Publikationen/Downloads-Haushalte/haushalte-familien-2010300217004.pdf?__blob=publicationFile).
- Dickerson, C. A., Thibodeau, R., Aronson, E., & Miller, D. (1992). Using cognitive dissonance to encourage water conservation. *Journal of Applied Social Psychology*, 22(11), 841–854.
- Diekmann, A. & Preisendörfer, P. (2003). Green and greenback: The behavioral effects of environmental attitudes in low-cost and high-cost situations. *Rationality and Society*, 15(4), 441–472.
- Edenbrandt, A. K., Lagerkvist, C. J., & Nordström, J. (2021). Interested, indifferent or active information avoiders of carbon labels: Cognitive dissonance and ascription of responsibility as motivating factors. *Food Policy*, 101, 102036.

- Festinger, L. (1962). Cognitive dissonance. *Scientific American*, 207(4), 93–106.
- Flörchinger, D., Frondel, M., Sommer, S., & Andor, M. (2024). Pro-environmental behavior and environmentalist movements: Evidence from the identification with Fridays for Future. *Ruhr Economic Papers* 1077.
- Forbes (2020). Amazon faces a crucible moment with employees. <https://www.forbes.com/sites/deniselyohn/2020/06/02/amazon-faces-a-crucible-moment-with-employees/?sh=310d56353822>, last access: January 10, 2024.
- Fried, C. B. (1998). Hypocrisy and identification with transgressions: A case of undetected dissonance. *Basic and Applied Social Psychology*, 20(2), 144–154.
- Gatz, M. & Karel, M. J. (1993). Individual change in perceived control over 20 years. *International Journal of Behavioral Development*, 16(2), 305–322.
- Gosnell, G. K. (2018). Communicating resourcefully: a natural field experiment on environmental framing and cognitive dissonance in going paperless. *Ecological Economics*, 154, 128–144.
- Harmon-Jones, E. & Mills, J. (2019). *An introduction to cognitive dissonance theory and an overview of current perspectives on the theory*. American Psychological Association.
- Kessler, J. B. & Milkman, K. L. (2018). Identity in charitable giving. *Management Science*, 64(2), 845–859.
- Konow, J. (2000). Fair shares: Accountability and cognitive dissonance in allocation decisions. *American Economic Review*, 90(4), 1072–1091.
- Matthey, A. & Regner, T. (2011). Do I really want to know? A cognitive dissonance-based explanation of other-regarding behavior. *Games*, 2(1), 114–135.
- McKimmie, B. M., Terry, D. J., Hogg, M. A., Manstead, A. S., Spears, R., & Doosje, B. (2003). I’m a hypocrite, but so is everyone else: Group support and the reduction of cognitive dissonance. *Group Dynamics: Theory, Research, and Practice*, 7(3), 214–224.
- Momsen, K. & Ohndorf, M. (2023). Expressive voting versus information avoidance: experimental evidence in the context of climate change mitigation. *Public Choice*, 194(1), 45–74.
- Mummolo, J. & Peterson, E. (2019). Demand effects in survey experiments: An empirical assessment. *American Political Science Review*, 113(2), 517–529.

- Murphy, J. J., Allen, P. G., Stevens, T. H., & Weatherhead, D. (2005). A meta-analysis of hypothetical bias in stated preference valuation. *Environmental and Resource Economics*, 30(3), 313–325.
- Nyborg, K., Howarth, R. B., & Brekke, K. A. (2006). Green consumers and public policy: On socially contingent moral motivation. *Resource and Energy Economics*, 28(4), 351–366.
- Oceana (2020). Amazon’s plastic problem revealed. <https://oceana.org/reports/amazons-plastic-problem-revealed/>, last access: January 10, 2024.
- Onwezen, M. C. & van der Weele, C. N. (2016). When indifference is ambivalence: Strategic ignorance about meat consumption. *Food Quality and Preference*, 52, 96–105.
- Pearlin, L. I. & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior*, 19(1), 2–21.
- Pelt, A., Saint-Bauzel, R., Barbier, L., & Fointiat, V. (2020). Food waste: Disapproving, but still doing. An evidence-based intervention to reduce waste at household. *Resources, Conservation and Recycling*, 162, 105059.
- Rabin, M. (1994). Cognitive dissonance and social change. *Journal of Economic Behavior & Organization*, 23(2), 177–194.
- Rothgerber, H. & Rosenfeld, D. L. (2021). Meat-related cognitive dissonance: The social psychology of eating animals. *Social and Personality Psychology Compass*, 15(5), e12592.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1), 1–28.
- Stone, J., Aronson, E., Crain, A. L., Winslow, M. P., & Fried, C. B. (1994). Inducing hypocrisy as a means of encouraging young adults to use condoms. *Personality and Social Psychology Bulletin*, 20(1), 116–128.
- Stone, J. & Fernandez, N. C. (2008). To practice what we preach: The use of hypocrisy and cognitive dissonance to motivate behavior change. *Social and Personality Psychology Compass*, 2(2), 1024–1051.
- von Collani, G. & Blank, H. (2007). Konsistenzstreben. *Zusammenstellung sozialwissenschaftlicher Items und Skalen (ZIS)*. <https://zis.gesis.org/DoiId/zis48>.

Zizzo, D. J. (2010). Experimenter demand effects in economic experiments. *Experimental Economics*, 13(1), 75–98.

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# **Avoiding Cognitive Inconsistency: Evidence on Sustainable Consumptiong**

## **Supplementary Materials**

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# 1 Analysis of *Hypotheses SS1 and SS2*

According to Bénabou & Tirole (2011), there is a specific mechanism to avoid the cognitive dissonance resulting from a potential discrepancy between moral identity and one's desired self-view that is based on self-signaling: While individuals are not always aware of their true moral identity and use their past actions as a signal based on which they can judge themselves and infer their identity, they take into account whether their behavior is in line with their desired self-image when making a decision. In the three-period model, agents are not fully aware of their true type when deciding on whether to behave pro-socially in the first and second period. Only in Period 3, agents learn about their true type and, dependent on their type, derive utility from their former pro-social behavior. Instead, in Period 1, agents receive a signal of their true type and choose their action based on this signal. In Period 2, agents remember, or are reminded of, their true type only with a certain probability. The lower this probability, the more malleable are their beliefs, and the more agents infer their true type from their past actions. Accordingly, the action chosen in Period 1 not only affects agents' utility in Period 3, but also serves as a signal about their type in Period 2.

Based on this model, Bénabou & Tirole (2011) argue that, in Period 1, agents "take into account what kind of a person each alternative would 'make them' and the desirability of those self-views" (Bénabou & Tirole, 2011, p. 807). This behavior can be interpreted as a form of cognitive dissonance avoidance: agents choose an action that is in line with their desired self-view so that there is no conflict between actions and self-image. Therefore, we are interested in whether individuals exhibit moral behavior to establish a positive self-image and analyze the relationship between insecurity with respect to one's attitudes, as an empirical analogue to malleability of the agents' beliefs about their true type, and voucher choice, as well as heterogeneity in the treatment effects with respect to this uncertainty. Based on Bénabou & Tirole's (2011) concept of self-signaling (SS), we hypothesize that

**Hypothesis SS1:** Uncertain study participants, that is, those with high variation in their stated attitudes towards different aspects of sustainable production, are more likely to choose the sustainable voucher.

**Hypothesis SS2:** Uncertain study participants react more strongly to the treatments compared to participants who are more certain about their identity.

We only analyze Hypothesis SS2 for the effects of the reminder and the information treatment on behavior, as it is not sensible to do so for the effects of voucher choice on attitude and denial of knowledge, which are part of one's identity.

To construct the insecurity measure, we take the standard deviation of a respondent's attitudes towards sustainable production in general as well as towards the importance of several aspects of sustainable production (Question ExpA1 and items a) to e) of Question ExpA2) and then standardize this insecurity measure – for details see Questions ExpA1 and ExpA2 as well as the description of the construction of this measure in the Supplementary Materials, Sections B and 2, respectively. Due to this standardization, we are able to interpret the corresponding regression coefficient in terms of standard deviations of insecurity.

Results do neither indicate that insecure participants are more likely to choose the sustainable voucher, nor that treatment effects are stronger for these participants. Thus, *Hypothesis SS1* and *Hypothesis SS2* cannot be confirmed.

Specifically, when investigating the relationship between the two variables using a regression of voucher choice on insecurity in which we control for several socioeconomic and psychological characteristics, we find no statistically significant relationship between insecurity and voucher choice (Table 1, Model II). Therefore, our results do not show that a higher insecurity in attitudes towards different aspects of sustainable production is related to the likelihood of choosing the more sustainable voucher (*Hypothesis SS1*). An exploratory analysis shows that this is true for both male and non-male participants (Table 4).



Regarding heterogeneous treatment effects for participants with different levels of insecurity about their attitude towards sustainable production (*Hypothesis SS2*), we observe that, in contrast to our hypothesis, the effect of the reminder on voucher choice is significantly weaker for participants with high insecurity. An increase in insecurity by one standard deviation decreases the treatment effect by 4 percentage points (Table 2). This heterogeneity is driven by the female participants for whom the treatment effect decreases by 10 percentage points, while there is no significant interaction between receiving the reminder and participants' insecurity for the sub-sample of male participants (Table 5). For the effect of informing participants about the negative aspects of conventional online shopping on voucher choice we find no heterogeneity with respect to insecurity (Table 3, Model II). There is no significant effect, either, when we look at the sub-samples of male and non-male participants (Table 6). *Hypothesis SS2* can thus not be confirmed. Our results do not change when using a probit regression as a robustness check (Table 20 - 24).

These results suggest that participants who were rather unsure about their attitude towards sustainable production did not try to self-signal a sustainable identity by choosing the more sustainable voucher in order to avoid cognitive dissonance. However, it may also be the case that our insecurity scale was not appropriate to measure the construct of insecurity.

**Table 1:** Hypothesis SS1: Effect heterogeneity with respect to insecurity - LPM

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Insecurity	-0.093***	(0.008)	-0.014	(0.009)
Constant	0.487***	(0.009)	-0.147	(0.094)
Control variables	NO		YES	
Observations	2994		2994	
R-Squared	0.03		0.19	
Adjusted R-Squared	0.03		0.18	
F-Statistic: p-value	0.00		0.00	

Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table 2:** Hypothesis SS2(BC1): Interaction between insecurity and effect of reminder on voucher choice - LPM

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Insecurity	-0.071***	(0.012)	-0.001	(0.012)
Group ReminderBC	0.052*	(0.022)	0.048*	(0.020)
Group ReminderBC x insecurity	-0.049*	(0.021)	-0.040*	(0.020)
Constant	0.451***	(0.013)	-0.074	(0.111)
Control variables	NO		YES	
Observations	2253		2253	
R-Squared	0.03		0.17	
Adjusted R-Squared	0.03		0.17	
F-Statistic: p-value	0.00		0.00	

Note: The control groups of the interaction effect are Group ReminderSD + Group InformationSD. Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table 3:** Hypothesis SS2(BC2): Interaction between insecurity and effect of information on voucher choice - LPM

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Insecurity	-0.071***	(0.012)	0.003	(0.012)
Group InformationBC	0.092***	(0.022)	0.087***	(0.020)
Group InformationBC x insecurity	-0.043*	(0.020)	-0.027	(0.018)
Constant	0.451***	(0.013)	-0.176	(0.109)
Control variables	NO		YES	
Observations	2237		2237	
R-Squared	0.04		0.20	
Adjusted R-Squared	0.04		0.20	
F-Statistic: p-value	0.00		0.00	

Note: The control groups of the interaction effect are Group InformationSD + Group ReminderSD. Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table 4:** Hypothesis SS1: Effect heterogeneity with respect to insecurity (by gender) - LPM

	Male		Female		Comparison	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Insecurity	-0.006	(0.011)	-0.023	(0.014)	-0.029*	(0.013)
Male	—	—	—	—	-0.065***	(0.017)
Male x insecurity	—	—	—	—	0.025	(0.016)
Constant	-0.300*	(0.125)	-0.070	(0.147)	-0.153	(0.094)
Control variables	YES		YES		YES	
Observations	1660		1334		2994	
R-Squared	0.17		0.18		0.19	
Adjusted R-Squared	0.17		0.17		0.18	
F-Statistic: p-value	0.00		0.00		0.00	

Note: Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table 5:** Hypothesis SS2(BC1): Interaction between insecurity and effect of reminder on voucher choice (by gender) - LPM

	Male		Female		Comparison	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Insecurity	-0.002	(0.015)	0.009	(0.020)	0.003	(0.019)
Group ReminderBC	0.093***	(0.028)	-0.021	(0.031)	-0.021	(0.031)
Group ReminderBC x insecurity	-0.013	(0.027)	-0.099***	(0.030)	-0.096**	(0.030)
Male	–	–	–	–	-0.105***	(0.025)
Male x insecurity	–	–	–	–	-0.002	(0.024)
Group ReminderBC x male	–	–	–	–	0.115**	(0.041)
Group RemBC x male x insecurity	–	–	–	–	0.086*	(0.040)
Constant	-0.228	(0.149)	0.056	(0.173)	-0.030	(0.113)
Control variables	YES		YES		YES	
Observations	1259		994		2253	
R-Squared	0.16		0.18		0.18	
Adjusted R-Squared	0.15		0.16		0.17	
F-Statistic: p-value	0.00		0.00		0.00	

Note: The control groups of the interaction effect are Group ReminderSD + Group InformationSD. Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table 6:** Hypothesis SS2(BC2): Interaction between insecurity and effect of information on voucher choice (by gender) - LPM

	Male		Female		Comparison	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Insecurity	0.001	(0.015)	0.014	(0.020)	0.006	(0.019)
Group InformationBC	0.101***	(0.027)	0.065*	(0.030)	0.066*	(0.030)
Group InformationBC x insecurity	-0.022	(0.023)	-0.041	(0.029)	-0.041	(0.029)
Male	–	–	–	–	-0.097***	(0.025)
Male x insecurity	–	–	–	–	-0.003	(0.024)
Group InformationBC x male	–	–	–	–	0.036	(0.041)
Group InfoBC x male x insecurity	–	–	–	–	0.020	(0.037)
Constant	-0.405**	(0.142)	0.008	(0.177)	-0.166	(0.110)
Control variables	YES		YES		YES	
Observations	1247		990		2237	
R-Squared	0.19		0.19		0.20	
Adjusted R-Squared	0.18		0.17		0.20	
F-Statistic: p-value	0.00		0.00		0.00	

Note: The control groups of the interaction effect are Group InformationSD + Group ReminderSD. Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively

## 2 Definition of insecurity measure

Question ExpA1 elicited respondents' general attitude towards sustainable production and items a) to e) of Question ExpA2 asked for their attitude towards five different aspects of sustainable production. We coded the answers to all these items on a 5-point Likert scale, such that higher values on the scale imply greater support of sustainable production. The measure of the insecurity of a respondent's attitude towards sustainable production was then calculated as follows: First, we took the standard deviation of an individual's answers to Question ExpA1 and items a) to e) of Question ExpA2 to obtain a variable measuring the heterogeneity of the respondent's support for different aspects of sustainable production. Second, we standardized the obtained variable by subtracting its mean value across all respondents and dividing by its standard deviation.

Thus, we obtain a standardized insecurity measure, enabling us to interpret the corresponding regression coefficients in terms of standard deviations of insecurity.

### 3 Matching

In the main analyses we focused on the effect of reminding participants of their previously stated attitudes or providing them with information on the consequences of their behavior on their voucher choice and their stated beliefs about their attitudes and knowledge. Due to random assignment, we can identify the causal average treatment effect (ATE) of the reminder and the information on voucher choice, as well as the causal ATE of choosing a voucher on beliefs. Based on our theoretical model, we argue that these effects are mediated by cognitive dissonance. However, whether individuals experience cognitive inconsistency, which may then result in cognitive dissonance, when receiving the reminder or information, before or after choosing a voucher, depends on their behavior and attitudes. That is, the reminder and the information provided do not necessarily enhance cognitive inconsistency and thereby induce cognitive dissonance because there may be no discrepancy between attitudes and behavior. Therefore, with our previous analyses, we cannot identify the causal ATE of cognitive inconsistency on behavior and beliefs, but only the ATE of providing the reminder and the information. This is equivalent to the intention-to-treat effect (ITT) of cognitive inconsistency on behavior and beliefs. To further investigate whether there is an effect of cognitive inconsistency on behavior and beliefs for those who really experienced cognitive inconsistency, we use a matching approach. Due to the high common support of treated and untreated individuals, this approach allows us to identify the ATE of experiencing cognitive inconsistency in terms of a discrepancy between attitude, knowledge, and behavior. That is, it allows us to compare those who experience cognitive inconsistency when confronted with the reminder or the information to those for whom this would be true if they were treated.

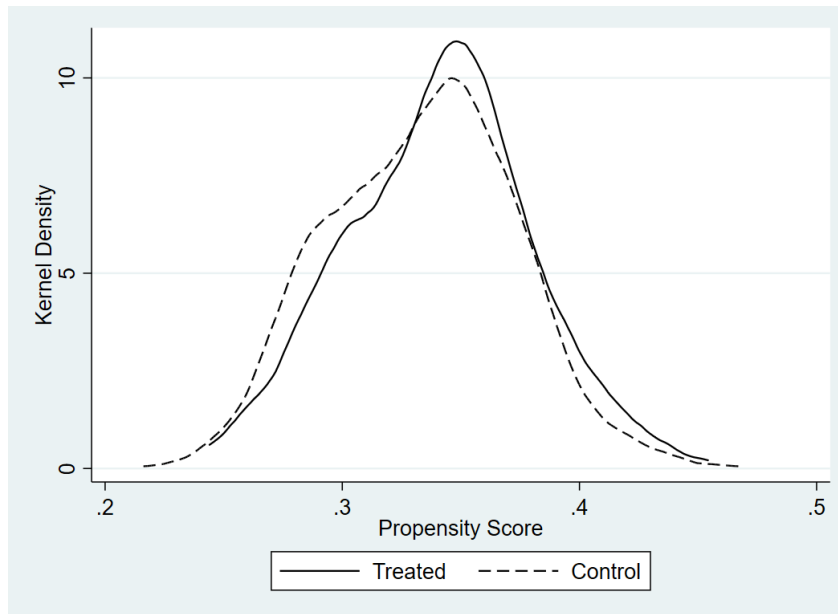
In the two behavior change groups participants may experience cognitive inconsistency if they are reminded of their positive attitude towards sustainable production or have a positive attitude and are informed about the criticism of conventional online shopping but plan to choose the conventional voucher. Similarly, they may ex-

perience cognitive inconsistency if they are reminded of their negative attitude but plan to choose the sustainable voucher. In the two self-deception groups participants with a positive attitude may experience cognitive inconsistency if they choose the conventional voucher and afterwards are reminded of their positive attitude or informed about the criticism. Similarly, respondents with a negative attitude may experience cognitive inconsistency if they choose the sustainable voucher and afterwards are reminded of their negative attitude. To identify the effect of this cognitive inconsistency on voucher choice and beliefs, we need to compare individuals in the respective control groups to those in the treatment groups who would have behaved the same in a counterfactual scenario without treatment. To this end, we match participants of the control and treatment groups based on their socioeconomic characteristics, attitudes, and psychological characteristics.

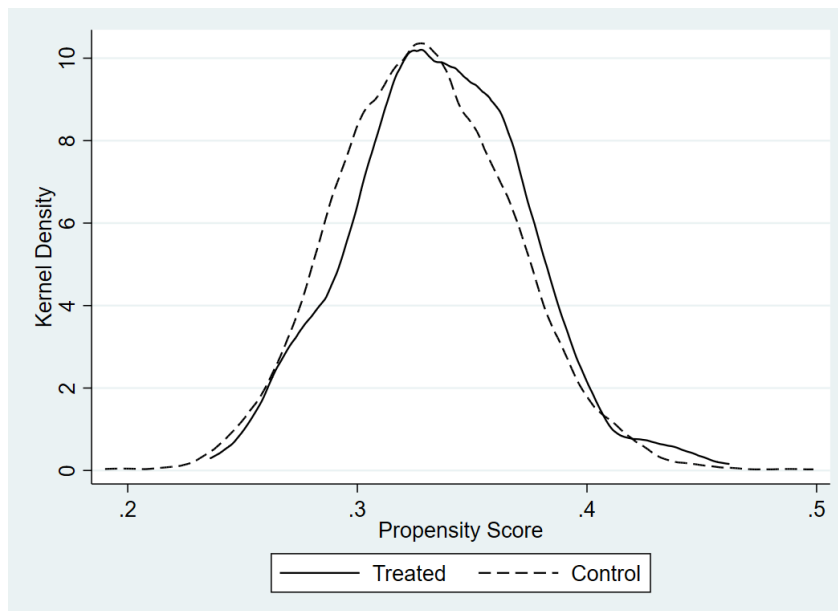
We compare several matching methods and specifications including radius matching on the propensity score using the Stata commands *psmatch2* and *pstest* (Leuven & Sianesi, 2018), and a logit model to estimate the propensity score. There is a very high common support (see Figures 1 - 4, and matching leads to a substantial reduction in the standardized bias of the covariates (Tables 7 - 10). Results are very robust across all specifications and barely differ from our key results presented in section 6.1. With respect to behavior change, results of propensity score matching indicate a positive effect of 5.0 percentage points of cognitive inconsistency on the share of sustainable vouchers after receiving the reminder (Table 11). The salience of cognitive inconsistency that was enhanced by the information increases the share of sustainable vouchers by 8.9 percentage points. These results suggest that the information is more effective in increasing the salience of cognitive inconsistency and causes a higher level of cognitive dissonance compared to the reminder, and that this inconsistency causes changes in behavior. Regarding self-deception, matching results show no effect of cognitive inconsistency on beliefs (Table 12). Since we do not measure the degree of cognitive dissonance participants experience, it remains unclear whether this null effect indicates that individuals do not deceive themselves in order to avoid cognitive

dissonance, whether our treatments were not successful in increasing the salience of an existing cognitive inconsistency, or whether inconsistencies just do not cause psychological discomfort in the participants.

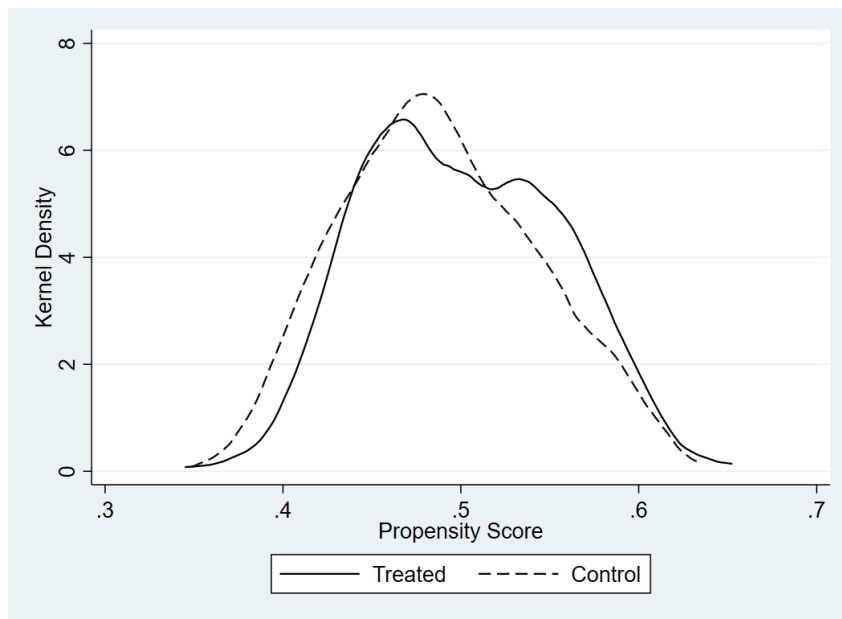
**Figure 1:** Common support for analysis of *Hypothesis BC1* based on propensity score matching



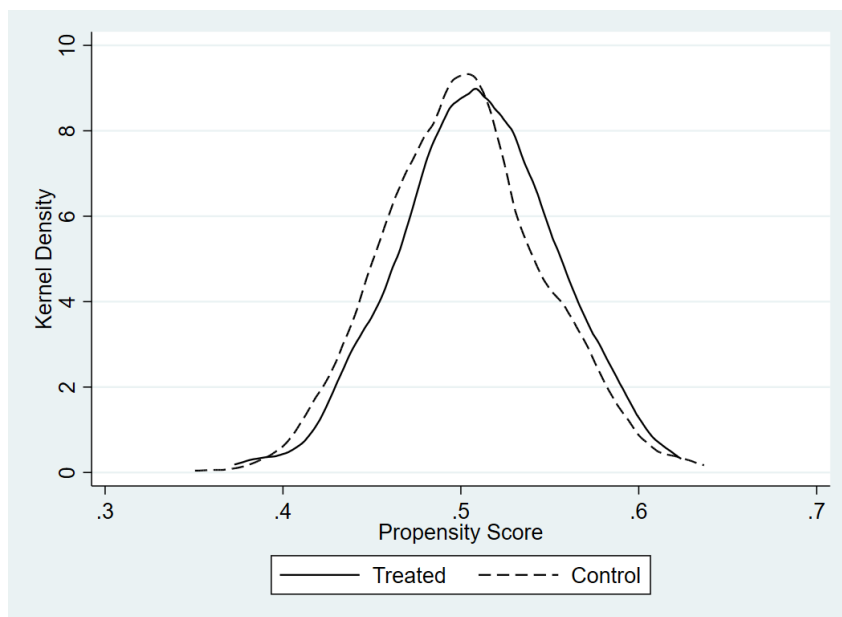
**Figure 2:** Common support for analysis of *Hypothesis BC2* based on propensity score matching



**Figure 3:** Common support for analysis of *Hypothesis SD1* based on propensity score matching



**Figure 4:** Common support for analysis of *Hypothesis SD2* based on propensity score matching





**Table 7:** Test statistics for success of radius matching on the propensity score (*caliper* =  $0.2 * SD$ ) for *Hypothesis BC1*

Variable		Means		Bias		t-test		Variance ratio
		Treated	Control	%bias	%reduct  bias	t	p> t	V(T)/V(C)
Shopped at sust. Marketplace	Unmatched	0.01	0.01	-0.1		-0.03	0.979	.
	Matched	0.01	0.01	0.1	5.1	0.02	0.983	.
Age	Unmatched	55.21	54.95	1.7		0.37	0.709	0.94
	Matched	55.21	55.20	0.1	95.7	0.01	0.989	0.95
Male	Unmatched	0.55	0.57	-4.0		-0.90	0.368	.
	Matched	0.55	0.55	-1.6	61.3	-0.30	0.763	.
College	Unmatched	0.42	0.41	2.1		0.47	0.639	.
	Matched	0.42	0.42	-0.5	74.6	-0.10	0.918	.
Medium income	Unmatched	0.25	0.31	-12.9		-2.85	0.004	.
	Matched	0.25	0.25	0.9	92.7	0.19	0.849	.
High income	Unmatched	0.36	0.32	8.0		1.80	0.072	.
	Matched	0.36	0.36	0.6	93.0	0.11	0.915	.
Very high income	Unmatched	0.32	0.31	0.6		0.14	0.890	.
	Matched	0.32	0.32	-1.5	-141.5	-0.29	0.773	.
Children	Unmatched	0.63	0.61	3.7		0.82	0.411	.
	Matched	0.63	0.63	0.0	99.5	0.00	0.997	.
Attitude sust. prod.	Unmatched	2.90	2.89	3.7		0.83	0.404	0.98
	Matched	2.90	2.90	0.2	93.8	0.05	0.963	1.11
Importance sust. aspects	Unmatched	4.21	4.22	-1.7		-0.39	0.697	1.08
	Matched	4.21	4.21	0.1	94.1	0.02	0.984	1.05
Importance price	Unmatched	3.02	3.01	1.1		0.25	0.799	1.04
	Matched	3.02	3.02	0.4	61.2	0.09	0.932	1.04
Environmental attitude	Unmatched	3.74	3.72	2.4		0.53	0.595	1.00
	Matched	3.74	3.74	0.4	81.4	0.09	0.931	1.03
Pref. internal consistency	Unmatched	3.72	3.72	0.4		0.10	0.922	0.91
	Matched	3.72	3.72	0.5	-10.1	0.09	0.924	0.92
Locus of control	Unmatched	5.11	5.15	-4.2		-0.94	0.348	0.95
	Matched	5.11	5.11	-0.1	96.7	-0.03	0.978	0.94

Note: %bias refers to the standardized percentage bias, which is the difference of the sample means of treated and non-treated individuals in percent for the matched and unmatched sub-samples as a percentage of the average standard deviation over both groups (Rosenbaum and Rubin, 1985). The achieved percentage bias reduction in absolute values is denoted by |bias|. \* indicates if variance ratio lies outside the interval [0.87; 1.15]

**Table 8:** Test statistics for success of radius matching on the propensity score ( $caliper = 0.2 * SD$ ) for *Hypothesis BC2*

Variable		Means		Bias		t-test		Variance ratio
		Treated	Control	%bias	%reduct  bias	t	p> t	V(T)/V(C)
Shopped at sust. Marketplace	Unmatched	0.01	0.01	1.4		0.32	0.746	.
	Matched	0.01	0.01	-0.5	67.7	-0.09	0.932	.
Age	Unmatched	55.56	54.95	3.9		0.85	0.393	0.96
	Matched	55.56	55.64	-0.5	87.4	-0.09	0.926	0.95
Male	Unmatched	0.54	0.57	-4.9		-1.09	0.275	.
	Matched	0.54	0.54	0.2	96.0	0.04	0.970	.
College	Unmatched	0.41	0.41	-0.4		-0.10	0.921	.
	Matched	0.41	0.40	0.7	-47.2	0.13	0.899	.
Medium income	Unmatched	0.32	0.31	0.6		0.14	0.887	.
	Matched	0.32	0.32	-0.2	67.2	-0.04	0.968	.
High income	Unmatched	0.34	0.32	5.1		1.13	0.257	.
	Matched	0.34	0.34	0.2	96.5	0.03	0.973	.
Very high income	Unmatched	0.28	0.31	-7.9		-1.75	0.080	.
	Matched	0.28	0.28	0.3	96.7	0.05	0.959	.
Children	Unmatched	0.59	0.61	-4.3		-0.97	0.334	.
	Matched	0.59	0.59	0.3	92.4	0.06	0.950	.
Attitude sust. prod.	Unmatched	2.88	2.89	-1.0		-0.23	0.818	1.13
	Matched	2.88	2.88	-0.2	85.1	-0.03	0.977	1.11
Importance sust. aspects	Unmatched	4.20	4.22	-3.3		-0.75	0.454	1.21*
	Matched	4.20	4.20	-0.4	89.0	-0.07	0.945	1.16*
Importance price	Unmatched	3.02	3.01	1.3		0.29	0.771	1.01
	Matched	3.02	3.03	-1.0	23.4	-0.19	0.847	1.00
Environmental attitude	Unmatched	3.70	3.72	-2.3		-0.52	0.600	1.08
	Matched	3.70	3.71	-1.0	56.9	-0.19	0.846	1.08
Pref. internal consistency	Unmatched	3.78	3.72	9.7		2.16	0.031	0.99
	Matched	3.78	3.77	0.5	94.9	0.10	0.923	1.03
Locus of control	Unmatched	5.13	5.15	-1.6		-0.36	0.716	0.98
	Matched	5.13	5.13	0.8	51.3	0.15	0.879	0.96

Note: %bias refers to the standardized percentage bias, which is the difference of the sample means of treated and non-treated individuals in percent for the matched and unmatched sub-samples as a percentage of the average standard deviation over both groups (Rosenbaum and Rubin, 1985). The achieved percentage bias reduction in absolute values is denoted by |bias|. \* indicates if variance ratio lies outside the interval [0.87; 1.16]

**Table 9:** Test statistics for success of radius matching on the propensity score (*caliper* = 0.2 \* *SD*) for *Hypothesis SD1*

Variable		Means		Bias		t-test		Variance ratio
		Treated	Control	%bias	%reduct  bias	t	p> t	V(T)/V(C)
Age	Unmatched	54.64	55.21	-3.6		-0.70	0.486	1.05
	Matched	54.72	54.55	1.1	69.4	0.21	0.833	1.02
Male	Unmatched	0.57	0.55	5.8		1.12	0.263	.
	Matched	0.57	0.58	-0.5	91.6	-0.09	0.925	.
College	Unmatched	0.43	0.42	2.0		0.38	0.706	.
	Matched	0.43	0.43	-0.2	87.6	-0.05	0.963	.
Medium income	Unmatched	0.33	0.25	15.9		3.08	0.002	.
	Matched	0.32	0.32	1.0	94.0	0.18	0.860	.
High income	Unmatched	0.30	0.36	-12.1		-2.33	0.020	.
	Matched	0.30	0.32	-2.6	78.4	-0.51	0.611	.
Very high income	Unmatched	0.32	0.32	0.4		0.08	0.938	.
	Matched	0.32	0.32	0.9	-114.7	0.17	0.868	.
Children	Unmatched	0.61	0.63	-5.1		-0.98	0.326	.
	Matched	0.61	0.61	0.6	87.8	0.12	0.906	.
Attitude sust. prod.	Unmatched	2.90	2.90	-1.1		-0.21	0.837	0.90
	Matched	2.90	2.90	-1.0	6.7	-0.19	0.849	0.89
Importance sus. aspects	Unmatched	4.22	4.21	2.3		0.45	0.653	0.87
	Matched	4.22	4.23	-1.1	53.8	-0.21	0.833	0.94
Importance price	Unmatched	3.03	3.02	1.1		0.21	0.837	1.01
	Matched	3.03	3.04	-1.2	-11.5	-0.23	0.819	1.01
Environmental attitude	Unmatched	3.71	3.74	-3.7		-0.72	0.474	0.99
	Matched	3.71	3.72	-1.0	71.7	-0.20	0.841	0.98
Pref. internal consistency	Unmatched	3.72	3.72	-0.6		-0.12	0.906	1.10
	Matched	3.71	3.72	-0.6	-5.1	-0.12	0.902	1.10
Locus of control	Unmatched	5.14	5.11	3.5		0.68	0.498	1.05
	Matched	5.14	5.15	-0.5	86.5	-0.09	0.927	1.05

Note: %bias refers to the standardized percentage bias, which is the difference of the sample means of treated and non-treated individuals in percent for the matched and unmatched sub-samples as a percentage of the average standard deviation over both groups (Rosenbaum and Rubin, 1985). The achieved percentage bias reduction in absolute values is denoted by |bias|. \* indicates if variance ratio lies outside the interval [0.87; 1.16]

**Table 10:** Test statistics for success of radius matching on the propensity score (*caliper* = 0.2 \* *SD*) for *Hypothesis SD2*

Variable		Means		Bias		t-test		Variance ratio
		Treated	Control	%bias	%reduct  bias	t	p> t	V(T)/V(C)
Age	Unmatched	55.24	55.56	-2		-0.38	0.703	1.06
	Matched	55.24	55.34	-0.6	70.8	-0.11	0.910	1.08
Male	Unmatched	0.56	0.54	3.2		0.61	0.541	.
	Matched	0.56	0.56	-0.2	94.6	-0.03	0.973	.
College	Unmatched	0.39	0.41	-3.5		-0.68	0.493	.
	Matched	0.39	0.39	-0.7	79.6	-0.14	0.888	.
Medium income	Unmatched	0.30	0.32	-3.6		-0.71	0.480	.
	Matched	0.30	0.29	1.4	60.4	0.28	0.777	.
High income	Unmatched	0.34	0.34	-1.2		-0.22	0.822	.
	Matched	0.34	0.34	-0.9	24.6	-0.17	0.865	.
Very high income	Unmatched	0.31	0.28	6.9		1.34	0.181	.
	Matched	0.31	0.31	-0.5	92.9	-0.09	0.925	.
Children	Unmatched	0.62	0.59	5.7		1.11	0.269	.
	Matched	0.62	0.63	-2.1	62.5	-0.42	0.674	.
Attitude sust. prod.	Unmatched	2.88	2.88	-1.5		-0.29	0.775	0.99
	Matched	2.88	2.88	-1.3	11.3	-0.26	0.797	1.02
Importance sus. Aspects	Unmatched	4.21	4.20	2.7		0.53	0.596	0.88
	Matched	4.21	4.22	-0.7	72.6	-0.15	0.883	0.92
Importance price	Unmatched	2.99	3.02	-3.5		-0.68	0.495	0.94
	Matched	2.99	2.98	0.2	94	0.04	0.967	0.95
Environmental attitude	Unmatched	3.73	3.70	3.6		0.70	0.486	0.93
	Matched	3.73	3.72	1.1	69.2	0.22	0.830	0.93
Pref. internal consistency	Unmatched	3.72	3.78	-9.6		-1.85	0.065	1.01
	Matched	3.72	3.72	-0.5	94.4	-0.10	0.917	0.99
Locus of control	Unmatched	5.16	5.13	2.3		0.45	0.655	1.02
	Matched	5.16	5.16	-0.4	80.8	-0.09	0.931	1.05

Note: %bias refers to the standardized percentage bias, which is the difference of the sample means of treated and non-treated individuals in percent for the matched and unmatched sub-samples as a percentage of the average standard deviation over both groups (Rosenbaum and Rubin, 1985). The achieved percentage bias reduction in absolute values is denoted by |bias|. \* indicates if variance ratio lies outside the interval [0.87; 1.15]

**Table 11:** ATE based on radius matching on the propensity score (*caliper* = 0.2)

Hypothesis	Treated	Controls	Difference	S.E.	T-stat
BC1	0.503	0.454	0.050*	0.023	2.21
BC2	0.539	0.450	0.089***	0.023	3.91

Note: \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table 12:** ATE based on radius matching on the propensity score (*caliper* = 0.2)

Hypothesis	Treated	Controls	Difference	S.E.	T-stat
SD1	0.965	0.953	0.012	0.011	1.13
SD2	0.982	0.971	0.011	0.008	1.34

Note: \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

## 4 Pre-Specified Analyses

**Table 13:** Hypothesis BC1: Effect of reminder on voucher choice - Pre-specified analysis - LPM

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Group ReminderBC	0.056*	(0.026)	0.051*	(0.024)
Constant	0.447***	(0.018)	-0.302*	(0.153)
Control variables	NO		YES	
Observations	1497		1497	
R-Squared	0.00		0.20	
Adjusted R-Squared	0.00		0.19	
F-Statistic: p-value	0.03		0.00	

Note: The control group is Group ReminderSD. Control variables are socioeconomic characteristics, attitudes towards sustainable production, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table 14:** Hypothesis BC2: Effect of information on voucher choice - LPM

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Group InformationBC	0.081**	(0.026)	0.086***	(0.023)
Constant	0.458***	(0.018)	-0.488***	(0.145)
Control variables	NO		YES	
Observations	1497		1497	
R-Squared	0.01		0.22	
Adjusted R-Squared	0.01		0.22	
F-Statistic: p-value	0.00		0.00	

Note: The control group is Group InformationSD. Control variables are socioeconomic characteristics, attitudes towards sustainable production, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table 15:** Hypothesis SD1: Effect of voucher choice on confirmation of attitudes - LPM

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Group ReminderSD	0.014	(0.008)	0.014	(0.008)
Constant	0.968***	(0.007)	0.720***	(0.068)
Control variables	NO		YES	
Observations	1364		1364	
R-Squared	0.00		0.09	
Adjusted R-Squared	0.00		0.08	
F-Statistic: p-value	0.10		0.00	

Note: The control group is Group ReminderBC. Control variables are socioeconomic characteristics, attitudes towards sustainable production, environmental attitude, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

## 5 Robustness checks

**Table 16:** Hypothesis BC1 - Probit model (AME)

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Group ReminderBC	0.051*	(0.022)	0.047*	(0.020)
Control variables	NO		YES	
Observations	2253		2253	
Log Likelihood	-1554.89		-1315.00	
Pseudo-R-Squared	0.00		0.16	
Chi-Squared: p-value	0.02		0.00	

Note: The control group is Group ReminderSD. Control variables are socioeconomic characteristics, attitudes towards sustainable production, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively. Reported test statistics refer to the probit regression.

**Table 17:** Hypothesis BC2 - Probit model (AME)

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Group InformationBC	0.086***	(0.022)	0.087***	(0.020)
Control variables	NO		YES	
Observations	2237		2237	
Log Likelihood	-1541.63		-1272.79	
Pseudo-R-Squared	0.00		0.18	
Chi-Squared: p-value	0.00		0.00	

Note: The control group is Group InformationSD. Control variables are socioeconomic characteristics, attitudes towards sustainable production, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively. Reported test statistics refer to the probit regression.

**Table 18:** Hypothesis SD1 - Probit model (AME)

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Group ReminderSD	0.012	(0.010)	0.010	(0.009)
Control variables	NO		YES	
Observations	1497		1497	
Log Likelihood	-257.38		-177.77	
Pseudo-R-Squared	0.00		0.31	
Chi-Squared: p-value	0.23		0.00	

Note: The control group is Group ReminderBC. Control variables are socioeconomic characteristics, attitudes towards sustainable production, environmental attitude, voucher choice, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively. Reported test statistics refer to the probit regression.

**Table 19:** Hypothesis SD2 - Probit model (AME)

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Group InformationSD	0.008	(0.008)	0.009	(0.007)
Control variables	NO		YES	
Observations	1497		1469	
Log Likelihood	-161.69		-138.87	
Pseudo-R-Squared	0.00		0.14	
Chi-Squared: p-value	0.27		0.00	

Note: The control group is Group InformationBC. Control variables are socioeconomic characteristics, attitudes towards sustainable production, environmental attitude, voucher choice, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively. Reported test statistics refer to the probit regression.

**Table 20:** Hypothesis SS1 - Probit model (AME)

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Insecurity	-0.095***	(0.009)	-0.016	(0.009)
Control variables	NO		YES	
Observations	2994		2994	
Log Likelihood	-2020.49		-1759.34	
Pseudo-R-Squared	0.03		0.15	
Chi-Squared: p-value	0.00		0.00	

Note: Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively. Reported test statistics refer to the probit regression.

**Table 21:** Hypothesis SS2(BC1) - Probit model (Marginal treatment effects at different levels of insecurity)

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
<b>Group ReminderBC</b>				
Very low insecurity	0.098**	(0.030)	0.085**	(0.028)
Low to median insecurity	0.059**	(0.023)	0.054*	(0.021)
High insecurity	0.043	(0.023)	0.041	(0.022)
Very high insecurity	-0.014	(0.036)	-0.008	(0.032)
Control variables	NO		YES	
Observations	2253		2253	

Note: The control groups are Group ReminderSD + Group InformationSD. Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively. Very low, low to median, high and very high insecurity means that the respective participants belong to the first, second, third and fourth quartile of insecurity, respectively. Reported test statistics refer to the probit regression.



**Table 22:** Hypothesis SS2(BC1) - Probit model  
(Comparison of marginal treatment effects at different levels of insecurity)

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Low to median vs very low	-0.038*	0.018	-0.031*	0.017
High vs very low	-0.055*	0.026	-0.045*	0.024
Very high vs low	-0.112*	0.050	-0.093*	0.046
High vs low to median	-0.016*	0.007	-0.014*	0.007
Very high vs low to median	-0.074*	0.032	-0.062*	0.029
Very high vs high	-0.057*	0.025	-0.049*	0.022
Control variables	NO		YES	

Note: Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively. Very low, low to median, high and very high insecurity means that the respective participants belong to the first, second, third and fourth quartile of insecurity, respectively.

**Table 23:** Hypothesis SS2(BC2) - Probit model  
(Marginal treatment effects at different levels of insecurity)

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
<b>Group InformationBC</b>				
Very low insecurity	0.131***	(0.030)	0.111***	(0.026)
Low to median insecurity	0.099***	(0.023)	0.093***	(0.021)
High insecurity	0.085***	(0.023)	0.084***	(0.021)
Very high insecurity	0.027	(0.035)	0.042	(0.031)
Control variables	NO		YES	
Observations	2237		2237	

Note: The control groups are Group InformationSD + ReminderSD. Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively. Very low, low to median, high and very high insecurity means that the respective participants belong to the first, second, third and fourth quartile of insecurity, respectively. Reported test statistics refer to the probit regression.

**Table 24:** Hypothesis SS2(BC2) - Probit model  
(Comparison of marginal treatment effects at different levels of insecurity)

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Low to median vs very low	-0.032	0.017	-0.018	0.016
High vs very low	-0.046	0.023	-0.027	0.022
Very high vs low	-0.104*	0.049	-0.070	0.043
High vs low to median	-0.014*	0.007	-0.009	0.006
Very high vs low to median	-0.072*	0.032	-0.052	0.028
Very high vs high	-0.058*	0.025	-0.043	0.022
Control variables	NO		YES	

Note: Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively. Very low, low to median, high and very high insecurity means that the respective participants belong to the first, second, third and fourth quartile of insecurity, respectively.

**Table 25:** Hypothesis SD1 - Exclusion of response 'Don't know/No answer' - LPM

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Group ReminderSD	0.010	(0.009)	0.005	(0.008)
Constant	0.965***	(0.007)	0.806***	(0.070)
Control variables	NO		YES	
Observations	1479		1479	
R-Squared	0.00		0.23	
Adjusted R-Squared	0.00		0.22	
F-Statistic: p-value	0.25		0.00	

Note: The control group is Group ReminderBC. Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table 26:** Hypothesis SD2 - Exclusion of response 'Don't know/No answer' LPM

	Model I		Model II	
	Coeff.	SE	Coeff.	SE
Group InformationSD	0.007	(0.007)	0.009	(0.008)
Constant	0.976***	(0.006)	0.836***	(0.059)
Control variables	NO		YES	
Observations	1494		1494	
R-Squared	0.00		0.03	
Adjusted R-Squared	-0.00		0.02	
F-Statistic: p-value	0.33		0.04	

Note: The control group is Group InformationBC. Control variables are socioeconomic characteristics, importance of price, environmental attitude, whether one has shopped at the sustainable market place before, preference for internal consistency and locus of control. \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

**Table 27:** All hypotheses - Exclusion of participants with low response time

	Coeff.	SE
Group ReminderBC	0.048*	(0.020)
Group ReminderSD	0.010	(0.009)
Group InformationBC	0.087***	(0.020)
Group InformationSD	0.011	(0.008)
Control variables	YES	

Note: \*, \*\* and \*\*\* indicate statistical significance at the 5 %, 1 % and 0.1 % level, respectively.

## 6 Definition of psychological characteristics

### 6.1 Locus of Control

To measure the locus of control, that is, the extent to which an individual believes that events in life are shaped by own actions (Gatz & Karel, 1993; Rotter, 1966), we use the original items from the Psychological Coping Resources component of the Mastery Module by Pearlin & Schooler (1978). While individuals with an internal locus of control tend to believe that they have control over the outcome of events in their lives, those with an external locus of control tend to believe that much of what happens is beyond their control. Life's outcomes are thus attributed to external forces, like fate, luck, or other people (Caliendo et al., 2015). In contrast, people with an internal locus of control see future outcomes as being contingent on their own decisions and behavior. It seems sensible to expect that the locus of control will have a notable effect on many economic outcomes.

Similar to Cobb-Clark & Schurer (2013) and accounting for the distinction between internal and external locus of control, the locus of control (LOC) index employed for our analysis is computed as follows:

$$LOC_i = (40 - \sum_{j=1}^5 ELOC_{ij} + \sum_{j=6}^7 ILOC_{ij}) / 7, \quad (1)$$

where *ELOC* and *ILOC* refer to the items of the questionnaire with which the external and internal locus of control is elicited, respectively – see Appendix B, PK4 for the detailed presentation of the items.

The first five out of seven items serve to elicit the external locus of control, the remaining two aim at capturing the internal locus of control. Responses to each item are coded on a 7-point scale, ranging from 1: "I strongly disagree" to 7: "I strongly agree". The lowest value of the index, which is 1, represents the polar case in which

a respondent strongly agrees with the five items on the external locus of control, but strongly disagrees with the two items of the internal locus of control, thus indicating strong external self-control. The opposite holds true if the index equals 7, indicating an internal locus of control.

## **6.2 Preference for Consistency**

Preference for consistency can be defined as the preference for aligning one's attitudes with each other as well as with one's behavior (internal consistency), for appearing consistent to others (public consistency), and the desire of consistency of important social partners (consistency of others) (?). To measure the preference for consistency, we use a sub-scale of the scale developed by ?. The scale comprises three items for internal consistency as well as two items for each public consistency and consistency of others, each measured on a 5-Point Likert scale. See Appendix B, PK6 for a detailed presentation of the items. For our analysis, we only use the sub-scale on internal consistency (items (a), (c), (e)), because we do not consider public consistency and the consistency of others to be relevant to the decision task. We compute the index by reversing items four to six such that a value of 1 indicates the lowest and a value of 5 the highest possible preference for consistency for all items. We then sum up all items which yields an index ranging from 7 to 35 with 7 indicating a low and 35 a high preference for consistency.

## 7 Power analysis

### 7.1 Ex-ante power analysis

The following power analysis was pre-specified in a pre-analysis plan. Names of hypotheses and experimental groups were adopted to those used in this paper.

For our power analysis, we use the following formula proposed by Djimeu & Houndolo (2016) for single-level trials with binary outcomes:

$$\delta = (t_1 + t_2) \sqrt{\frac{P(1 - P)}{T(1 - T)n}}, \quad (2)$$

where  $\delta$  is the minimum detectable effect (MDE). Parameters  $t_1$  and  $t_2$  are the t values corresponding to the desired significance level of the test ( $\alpha$ ) and the desired power of the design ( $\beta$ ), respectively,  $P$  is the proportion of the study population that has a value of 1 for the outcome in the absence of the treatment,  $T$  is the proportion of individuals randomly assigned to the treatment group, and  $n$  is the sample size.

In our experiment, 4,000 respondents are randomly split into four experimental groups. For each of our four main analyses, we compare two of these groups, such that the sample size is 2,000 for all our main analyses except for analysis SD1, in which we focus on the subsample of respondents with a positive attitude towards sustainable production. Following the convention in economics, we stipulate a statistical significance at the 5 % level ( $t_1 = 1.96$  for a two-sided test,  $t_1 = 1.65$  for a one-sided test) and a power of 80 % ( $t_2 = 0.84$ ) in all our analyses.

Based on the KPMG's (2020) consumer barometer, we assume that  $P = 10.75$  % of consumers mainly buy sustainable products (including clothing and shoes, consumer electronics, drugstore products and household appliances) already without the treatment. Using a two-sided test and a sample size of  $n = 2,000$ , where  $T = 50$  % are

assigned to the treatment group, the minimum detectable effect for hypotheses BC1 and BC2 is 3.9 percentage points.

For hypothesis SD1, based on a consumer survey by VuMA (2021), we assume that 56 % consider social and ecological sustainability important for their consumption decision and, therefore, have a positive attitude towards sustainable production. This results in an expected sample of 1,124 participants for our analysis of attitude change. Furthermore, we assume that nearly all respondents ( $P = 99\%$ ) of Group ReminderBC who report a positive attitude towards sustainable production in the beginning of the experiment confirm their positive attitude in the reminder question, as we believe that there is no reason to not confirm a positive attitude. Thus, we assume that it is not possible to increase the share of confirmations and decide to use a one-sided test for this analysis. Given a significance level of 5 %, a power-level of 80 % and a one-sided test, the minimum detectable effect is 1.5 percentage points.

As we are unaware of any published figures about how spread the criticism of conventional online shopping is, we calculate the MDE for several values for the analysis of hypothesis SD2. Specifically, we assume that  $P = 90\%$  (50 %, 30 %) of the respondents have heard about the criticism of conventional online shopping. Therefore, given a two-sided test, a sample size of  $n = 2,000$  and  $T = 0.5$ , the MDE is 3.8 (6.3, 5.8) percentage points.

## Assumptions and MDE in ex-ante power analysis

### ***Hypotheses BC1 & BC2: Behavioral change***

*n*: 2,000  
*P*: 10.75 % of consumers mainly buy sustainable products (KPMG, 2020, p. 13; average over all categories except foods)  
*T*: 0.5  
*δ*: 0.039

### ***Hypothesis SD1: Self-deception – Attitude change***

*n*: 1,124  
= 2,000 \* 56.2 %: expected share of participants with a positive attitude towards sustainable products according to VuMA (2021, p. 6: participants who fully or partly agree that for their consumption decision it is important that the firm acts socially and ecologically responsible)  
*P*: 99 %  
*T*: 0.5  
*δ*: 0.015

### ***Hypothesis SD2: Self-deception – Denial of knowledge***

*n*: 2,000  
*P*: 90 % (80 %, 50 %) of sample is aware of criticism  
*T*: 0.5  
*δ*: 0.038 (0.05, 0.063)

## 7.2 Ex-post power analysis

Since our assumptions for the ex-ante power analysis are not in line with the respective true sample sizes and shares, and because we decided to use a larger control group for hypotheses *BC1* and *BC2* to increase power, we conduct an ex-post power analysis to verify whether our results are well powered. Like in the ex-ante power analysis, we use the formula by Djimeu & Houndolo (2016) and stipulate a statistical significance at the 5 % level ( $t_1 = 1.96$  for a two-sided test) and a power of 80 % ( $t_2 = 0.84$ ) in all our analyses. Since we conduct regression analyses for all our hypotheses, we do not use a one-sided test for *Hypothesis SD1* in our ex-post power analysis. Based on the true sample sizes and shares of participants who choose the sustainable voucher, confirm their positive attitude, or state to have heard about the criticism of conventional online shopping, respectively, the MDE amounts to  $\delta = 0.063$  for *Hypotheses BC1* and *BC2*, respectively,  $\delta = 0.031$  for *Hypothesis SD1*, and  $\delta = 0.023$  for *Hypothesis SD2*.



### Values for ex-post power analysis

#### ***Hypotheses BC1: Behavioral change - Reminder***

*n*: 2,243  
*P*: 45.3 %  
*T*: 0.33  
 $\delta$ : 0.063

#### ***Hypotheses BC2: Behavioral change - Criticism***

*n*: 2,237  
*P*: 45.3 %  
*T*: 0.33  
 $\delta$ : 0.063

#### ***Hypothesis SD1: Self-deception – Attitude change***

*n*: 1,497  
*P*: 95.2 %  
*T*: 0.5  
 $\delta$ : 0.031

#### ***Hypothesis SD2: Self-deception – Denial of knowledge***

*n*: 1,497  
*P*: 97.3 %  
*T*: 0.5  
 $\delta$ : 0.023

## References

- Bénabou, R. & Tirole, J. (2011). Identity, morals, and taboos: Beliefs as assets. *The Quarterly Journal of Economics*, 126(2), 805–855.
- Caliendo, M., Cobb-Clark, D. A., & Uhlendorff, A. (2015). Locus of control and job search strategies. *Review of Economics and Statistics*, 97(1), 88–103.
- Cobb-Clark, D. A. & Schurer, S. (2013). Two economists' musings on the stability of locus of control. *The Economic Journal*, 123(570), F358–F400.
- Djimeu, E. W. & Houndolo, D.-G. (2016). Power calculation for causal inference in social science: sample size and minimum detectable effect determination. *Journal of Development Effectiveness*, 8(4), 508–527.
- Gatz, M. & Karel, M. J. (1993). Individual change in perceived control over 20 years. *International Journal of Behavioral Development*, 16(2), 305–322.
- KPMG (2020). Consumer Barometer 1/20. [https://hub.kpmg.de/hubfs/KPMG-Newsletter/Consumer%20Barometer/PDF/Consumer\\_Barometer\\_01\\_2021\\_BF\\_sec.pdf](https://hub.kpmg.de/hubfs/KPMG-Newsletter/Consumer%20Barometer/PDF/Consumer_Barometer_01_2021_BF_sec.pdf), last access: June 19, 2023.
- Leuven, E. & Sianesi, B. (2018). Psmatch2: Stata module to perform full mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing.
- Pearlin, L. I. & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior*, 19(1), 2–21.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1), 1–28.
- VuMA (2021). Konsumenten im Fokus. Basisinformationen für fundierte Medienentscheidungen. [https://www.ard-media.de/fileadmin/user\\_upload/Wissen\\_und\\_Forschung/Zielgruppen/VuMA\\_Berichtsband\\_2021.pdf](https://www.ard-media.de/fileadmin/user_upload/Wissen_und_Forschung/Zielgruppen/VuMA_Berichtsband_2021.pdf), last access: June 19, 2023.