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Reverse labeling

Does framing labels as losses promote more ethical, more eco-friendly, and healthier choices?

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Abstract

The purpose of this thesis is to investigate the effects of replacing standard labels (labels framed as gains) with reverse labels (labels framed as losses) on making more ethical, more eco-friendly, and healthier consumer choices. Previous literature suggests that standard labels improve both the producer and consumer surplus. However, based on the concepts of loss aversion and contextual inference, we predicted that reverse labels increase the fraction of people that make more sustainable choices.

To test this prediction, we conducted a choice experiment randomly assigning respondents to a control group exposed to standard labels or to a treatment group exposed to reverse labels. Using OLS estimation, our analysis concluded that the students exposed to reverse labeling had a higher probability of 32.8 percentage points of selecting the more ethical option and 19.6 percentage points of selecting the more eco-friendly option than the students exposed to standard labeling. Further, the ones without strong opinions towards sustainability were most influenced by reverse labeling. When exposed to reverse labeling, they were on average 25 percentage points more likely to choose the sustainable option than those who consider sustainability important to them. Interestingly, reverse labeling did not have a differential impact on how the products were perceived in terms of quality or sustainability. Therefore, the findings suggest that loss aversion may be the primary driver of the change in decisions: people use the unlabeled product as the reference point and are less willing to gain an attribute than lose the same attribute. The current findings imply that there could be substantial gains from reversing the process of sustainable labeling. However, further research on a more representative consumer sample is needed prior to enforcing a new policy.

Keywords – Behavior Economics, Nudging, Framing, Labels, Consumer Decisions, Loss aversion

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1 Introduction

The modern global society is faced with a wide range of issues, from human rights breaches to environmental crises, to increasing public health concerns. These issues are largely driven by human decisions. The Intergovernmental Panel on Climate Change IPCC (2021), recently addressed one impact of human decisions directly:

"Climate change is already affecting every inhabited region across the globe with human influence contributing to many observed changes in weather and climate extremes"

Statements such as this one raise the question of how able humans are at making good decisions.

In one single day, we make tens of thousands of decisions, from whether to hold the coffee cup with your right or left hand, or what to wear that day, to turning off the lights when leaving a room. To get through the day, many of these choices are made subconsciously or with the help of mental shortcuts.

One area where individuals make a considerable amount of decisions, both conscious and subconscious, is in the grocery store (Soars, 2003). As a consumer, it is easy to be overwhelmed by all the available information. There are countless brands of coffee, types of bread, and beverages to choose from. Information overload, combined with numerous alternatives of each product, does not make decisions any easier. Accordingly, this paper will concentrate on consumers' decision-making in the grocery store.

In stores today, we often have to decide between fairly similar products catering to the same need. For instance, in need of laundry detergent, the selection seems endless - differing in effectiveness, eco-friendliness, and scent, to name a few. However, various types of labels are intended to ease the decision-making process. Examples of such labels are *30 percent LESS sugar* and the use of *Fair Trade* and ecolabels. These labels, referred to as standard labels from now on, provide salient information about a product attribute so that consumers efficiently can distinguish the product alternatives from one another.

Standard labels often highlight a positive feature of the product to catch our attention so that we purchase said product. From a producer's point of view, the purpose of a label is to create a higher willingness to pay for the product and increase sales prices. For the

consumer, on the other hand, labels offer easy-to-understand information, which could increase their consumer surplus.

A specific example of a type of label you find in Norwegian grocery stores is *The Bread Scale*[1]. This label was introduced to help consumers understand the degree of whole wheat the bread contains (Baker- og Konditorbransjens Landsforening, 2021). The label consists of a pie chart placed saliently on the front of the packaging, making it easy to process the percentage of whole wheat in the bread. Without the label, people may choose bread solely based on color, as reading the nutrition label on the back may take too much time and effort. Consequently, this may result in less informed and less healthy choices than a situation with labels.

This reasoning can further be transferred to ethical and environmental labeling, where a lack of easily accessible and trustworthy information might pose an even greater challenge. That is, even though you intend to buy an ethically produced product, you fail to do so because of the unavailable information. An experiment by Hainmueller et al. (2015) concludes that third-party certifications and labeling, such as *Fair Trade*, can be seen as a tool to remove a market inefficiency. With said labels, consumers have more information and can increase their utility due to the fulfillment of social preferences.

Empirical evidence on the subject suggests that these labels achieve many of their intended objectives. On average, *Fair Trade* farmers are more likely to use environmentally friendly farming practices, receive higher prices, and have a more stable economic environment (Dragusanu et al., 2014). Other studies found that consumers were willing to pay more for *Fair Trade* labeled products and that the overall liking of products increased when using *Fair Trade* - compared to a conventional label (Schouteten et al., 2021). Regarding environmental labels, a study by Potter et al. (2021) found that the use of ecolabels had a positive effect on the consumption or purchase of more environmentally sustainable food and drink products. Another study found that there is a positive relationship between ecolabels and green product purchase behavior if the ecolabel is credible (Riskos et al., 2021).

[1] Brødskala'n

As consumers, our decisions affect ourselves and often come with externalities that impact others. For instance, purchasing products that are not ethically produced supports unjust industries. Moreover, purchasing more eco-friendly products leaves a smaller carbon footprint. Externalities such as these are highly relevant, as stories from inhumane working conditions and worldwide environmental crises are countless. Furthermore, when individuals purchase increasing amounts of unhealthy products, it could put a strain on the Norwegian health care system. Consequently, it is critical for the whole society to minimize the negative externalities of consumer behavior.

The introduction of standard labels most likely altered individuals' decisions since they now have more salient information. Consumers can make more informed decisions that improve their utility and the society they live in. Considering the adverse global development of the environment, the state of health, and ethical production, there is still room for further improvement.

In Norway, various measures are put in place to better ethical-, environmental- and health conditions. The government recently implemented the *Transparency Act* (Stortinget, 2021; Lovdata, 2021). The purpose of the new act is to promote fundamental human rights and decent working conditions. Another policy implemented by the government is the *Sugar tax*. The tax was introduced to, amongst other things, reduce the intake of products with a high sugar content (Finansdepartementet, 2019). One motivation behind this thesis is to investigate whether a policy measure can be set in place to improve consumer decision-making.

Using insights from behavioral economics, we investigate whether reversing the standard labels can help people make more ethical, more eco-friendly, and healthier decisions. That is, instead of using the previously mentioned examples of standard labels, the reversed labels are *30 percent MORE sugar*, *NOT Fair Trade* and *NOT eco-certified*.

Our thesis is structured as follows: Relevant literature is provided in the second chapter before the hypotheses are presented in chapter 3. In chapter 4, the experiment is described in detail, followed by chapter 5, providing background for the methodology. In chapter 6, the methodology is applied to analyze of the hypotheses. In chapter 7, the results from the analysis are interpreted and discussed before finally providing a conclusion in chapter 8.

2 Literature review

This chapter provides an overview of relevant literature to provide a theoretical background for this study. As aforementioned, the purpose of our research is to examine the effect of reverse labeling on sustainable decision-making. We find that previous literature on reverse labeling is limited. However, there is extensive literature on the behavioral mechanisms behind decision-making, which provides a better understanding of the relationship we are examining. We first present relevant literature on nudging before framing, prospect theory, and contextual inference is considered.

2.1 Nudging

In standard economic theory, individuals make decisions to maximize their utility function, using all available information and processing this correctly (DellaVigna, 2009). These individuals are *perfectly rational* and make unbiased choices (Wilkinson and Klaes, 2018, p. 118; Thaler and Sunstein, 2009, p.6-7). However, people do not always make the optimal decisions that standard theory predicts (Thaler and Sunstein, 2003; DellaVigna, 2009; Kahneman and Tversky, 1981). They can be affected by, amongst other things, a lack of consistent preferences (Wilkinson and Klaes, 2018, p.78). Thaler and Sunstein (2009) argue that nudging can improve people's decisions while still insisting on freedom of choice. In their book *Nudge: Improving Decisions about Health, Wealth, and Happiness*, they provide the following definition of nudging:

" ...any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid." (Thaler and Sunstein, 2009, p.6).

In this definition, *choice architecture* refers to designing and arranging the choice setting (Thaler and Sunstein, 2009, p.3). Given the fact that people make sub-optimal decisions, Thaler and Sunstein (2009) argue that policy-makers (choice architects) can use nudging to create better policy outcomes.

Nudges can take many forms, such as changing the default option, highlighting a specific piece of information, or changing the frame of a choice set (Thaler and Sunstein, 2009). A study by Johnson and Goldstein (2004) compared countries with opt-out (presumed consent) and opt-in (explicit consent) defaults for organ donations. They found that countries with opt-out had a higher rate of organ donation. Another study found that, on average, nudging initiatives have a positive impact on dietary choices and that nudging increased healthier choices by approximately 15 percent (Arno and Thomas, 2016).

Even though many studies find positive outcomes of nudging, some criticism has been directed. A question has been raised as to what counts as a successful nudge: is it the isolated effect on a particular good or an overall change in the bigger picture (Marlow, 2017). For instance, Marlow (2017) suggests that the measurement of success should not be restricted to reducing the consumption of one specific food item but take the overall health benefits into account. Moreover, some argue that it is not realistic to obtain all the information a successful nudge policy requires (Rizzo and Whitman, 2009). Others argue that some types of nudging do not support freedom of choice and that some individuals may not want their decisions to be influenced by nudging (Grüne-Yanoff, 2012; Sugden, 2017).

Despite these critiques, several governments use nudging as a tool for policy-making. Governments use so-called Nudge units as policy tools, such as the Behavioural Insights Team[2] in the UK and the Behavioural Economics Unit in Ireland (Behavioral Insights Team, 2021; Sustainable Energy Authority of Ireland, 2021). The forthcoming sections present specific nudging methods, focusing on labels and framing.

2.1.1 Labeling

One way of practicing nudging is by labeling products with information highlighting specific aspects of the product. This paper refers to the term standard labels as front-of-package (FOP) labels highlighting qualities or attributes of the product. Examples of said labels are *30 percent LESS sugar* or third-party certification labels, such as *Fair Trade*.

The WHO (2019) states that FOP labels can be used as a tool to provide information and further aid consumers in obtaining a healthier diet. One study concluded that a variety of

[2]BIT in the UK is now an independent company, still partly owned by the government

FOP labels, in comparison to no labels, help consumers in their decision-making process (Watson et al., 2014). They found evidence suggesting that individuals are able to classify the healthier option to a more considerable extent with such labels.

The Bread Scale is an example of an FOP label that provides easy-to-understand information. Evidence suggests that in-depth information has a lower impact on individuals' purchase decisions compared to the easy-to-understand labels (Karevold et al., 2017, p. 53). A study by Vyth et al. (2010) shows that health-related FOP labeling has a more substantial impact on the purchase decisions of health-conscious consumers. Our study complements this literature by investigating if other designs of FOP labels attract consumer segments that are less concerned about health in their decision-making.

Further, FOP labeling can be useful for domains other than health. For instance, a study in the US suggests that *Fair Trade* labeling coffee increases the sales of both low- and high price options (Hainmueller et al., 2015). A different study using the *Nordic Swan* ecolabel found mixed results, from strong to little support, that the label increases the willingness to pay (Bjørner et al., 2003).

The literature on labeling exhibits some of the effects standard labeling has on behavior. This paper aims to determine the effects of replacing standard labels with reversed labels. Put differently, the paper examines the impact of changing the frame of the decision problem.

2.2 Framing

A central concept in decision-making is framing. A decision problem can be framed in more ways than one, and the frame shapes how the options are perceived (Kahneman and Tversky, 1981; Hallahan, 1999). According to standard economic theory, the change of framing should not reverse the preference between options (Kahneman and Tversky, 1981). However, variations in framing often change preferences due to imperfections of human decision-making.

The study by Kahneman and Tversky (1981) illustrated the effect of variations in framing in two problems. In problem 1, they asked participants which program they favored to combat an Asian disease expected to kill 600 people. In program A, 200 people will be

saved, whereas in program B, 600 will be saved with 1/3 probability and 0 people with 2/3 probability. The majority of the participants chose program A as the prospect of certainly saving 200 people is more attractive than a risky prospect of an equal expected value. They asked the same question in the second problem as in the first, now with two different programs. If program C is chosen, 400 people will die. If program D is chosen, there is a 1/3 probability that nobody will die and a 2/3 probability that 600 people will die. The majority choice in this problem was program D, as the prospect of 400 certain deaths is less acceptable than the 2/3 probability that 600 will die. Hence, the participants were risk averse when the question was framed as saving lives (gains), and risk taking when framed as lives lost (losses).

A study by Levin (1987) found similar results. The study investigated whether positively framing a stimulus was more likely to lead to favorable associations than negatively framing the same stimulus. The participants were presented with one of two framing conditions of meat, either a positive framing condition – 75 percent lean, or a negative framing condition – 25 percent fat. In the positive framing condition, Levin found that the responses had more favorable associations than in the negative framing condition. More specifically, the participants responded that the 75 percent lean meat was leaner, of higher quality, less greasy, and better tasting than the 25 percent fat meat. In this study, the participants did not taste the meat.

The study by Levin (1987) is an example of valence framing of attributes (Levin et al., 1998). Valence framing presents information that is framed either positively or negatively (Hallahan, 1999). Another study, by Kuvaas and Selart (2004), researched the effects of attribute framing on cognitive processing. They found that negative framing induced a better recall of information than positive framing. Our study adds to the literature on valence-based attribute framing by investigating the effect of reversing the frame of labels on decision behavior. Instead of changing the frame of one particular product as done in the study by Levin (1987), we study the effects of reversing the frame of labels on the relationship between two products.

As presented, the work by Kahneman and Tversky (1981) explains framing using prospect theory. The theory suggests that people perceive losses as more significant and more critical to avoid than an equivalent gain. Framing the decision as a potential loss could nudge individuals to change their decision. Prospect theory will be further presented in the next section.

2.2.1 Prospect Theory

Kahneman and Tversky (1979) introduced prospect theory as a model for making decisions under risk. The authors propose a reference-dependent model of preferences. This part will focus on reference dependence, and loss aversion explained in prospect theory.

Prospect theory is a theory of choices where value is regarded as gains and losses instead of final assets and where decision weights replace probabilities (Kahneman and Tversky, 1979). The value function is defined over differences from a reference point reflecting reference dependence. Furthermore, the value function displays loss aversion as the function is steeper for losses than gains. Loss aversion is illustrated by a kink in the value function at the reference point, as seen in figure 2.1. The reference point is at the origin.

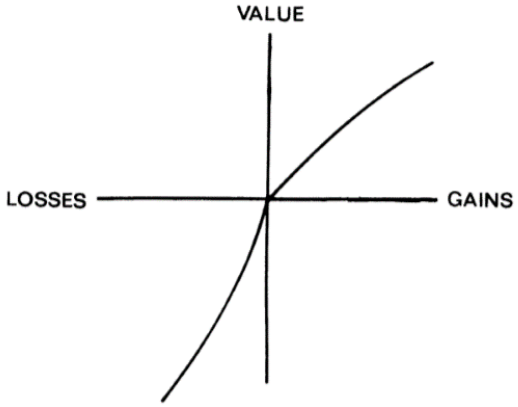


FIGURE 3.—A hypothetical value function.

Figure 2.1: Value function: figure adopted from Kahneman and Tversky (1979)

To illustrate how choices change by varying the reference point, Kahneman and Tversky (1979) performed an experiment where they asked a group of subjects to evaluate the following situation: "In addition to what you own, you are given 1000. You can now choose between; A: 1000 with 0.5 chance and 0 with 0.5 chance and B: 500 with certainty".

Another group was faced with the following situation: "In addition to what you own, you are given 2000. You can now choose between; C: -1000 with 0.5 chance and 0 with 0.5 chance and D: -500 with certainty". The majority of the participants chose B in the first situation and C in the second one. These preferences align with the reflection effect, which shows risk aversion for positive prospects and risk seeking for negative ones. The two problems share identical final states, which are:

$$\text{A} = (2000,\, 0.5;\, 1000,\, 0.5) = \text{C}, \qquad \text{and B} = (1{,}500) = \text{D}$$

By altering the reference point, and therefore framing the decision in terms of losses instead of gains, the participants' decisions changed.

Another concept that can be explained from Prospect theory is status quo bias (Samuelson and Zeckhauser, 1988). This bias presents a tendency of individuals to choose the status quo, which is defined as: *"doing nothing or maintaining one's current or previous decision"* (Samuelson and Zeckhauser, 1988). In terms of labeling, one can think of the original unlabeled product as the status quo and the standard labeled product as a potential gain. The fact that the unlabeled product is likely to be interpreted as the original product leads us to another aspect of labeling, namely quality and attribute inference.

2.2.2 Contextual inference

This section seeks to present literature on how the perception of a product is affected by labeling, focusing on research addressing ethics, eco-friendliness, and health. A study by Skard et al. (2021) shows that the effect ecolabels have on the perception of a product varies with product traits. For *softer* products, such as body lotion, sustainable labeling positively affects the perception of quality. However, for *harder* products such as drain opener, sustainable labeling affects the perception of both the attribute and quality in a negative manner. Teisl et al. (2008) find evidence suggesting that labeling a car with an ecolabel has a more substantial impact on how green the consumers perceive the car to be, compared to more in-depth information. They argue that perception is expected to affect the purchasing behavior of consumers.

Further, Schouteten et al. (2021) found that products labeled *Fair Trade* are more liked compared to the products without the said label. As aforementioned, Levin (1987) studied the effects of positively versus negatively framing an attribute. The research showed that

the positive frame induced an enhanced perception of taste, quality, and how lean the meat was. Hence, there seems to be an effect on both the perception of quality and attributes. Last, concerning valence framing, Levin et al. (1998) suggest that negatively framing one attribute results in a decrease in the overall perception of the product, compared to positively framed attributes. Thus, negatively framing an attribute might reduce the perception of the quality of the given product.

Overall, evidence suggests that framing, both framed positively and negatively, affects how products in multiple domains are perceived. In this paper, we seek to analyze if a change in labeling affects the relative perception between two products.

3 Hypotheses

Based upon the literature review and the aim of our study, the following chapter will present our hypotheses. First, we present the main hypothesis regarding the effect of reverse labeling. Second, we present the subsidiary hypothesis concerning sub-groups of the population before introducing hypotheses addressing possible underlying mechanisms behind product decisions.

3.1 Hypothesis 1

The main hypothesis of this study is based upon studies on the effect of labels and the literature on nudging, framing, and loss aversion. When encountering two options of a product: one without a label and one alternative with a label, we believe that the unlabeled option is regarded as a reference point. Consequently, we suspect that the reference point changes when replacing standard labels with reversed labels. Due to loss aversion, we expect reverse labeling to increase the share of individuals who make more ethical-, eco-friendly-, and healthier choices than standard labeling. We expect this to be the results across multiple domains, but test this for three important areas. The main hypothesis and adjacent sub-hypotheses are:

Hypothesis 1 Reverse labeling promotes more ethical, more eco-friendly and healthier choices than standard labeling

H1.A: Reverse labeling promotes more ethical choices than standard labeling

H1.B: Reverse labeling promotes more eco-friendly choices than standard labeling

H1.C: Reverse labeling promotes healthier choices than standard labeling

3.2 Hypothesis 2

Further, we believe that individuals with different perspectives will be affected differently by reverse labeling. Individuals who find ethics, eco-friendliness, and health important, will often make the ethical, eco-friendly, and healthy choice, regardless of the frame of labels. In other words, reverse labeling will most likely not substantially impact this group. Moreover, we suspect that individuals who do not find ethics, eco-friendliness, and health of products important, might pay less attention to the frame of labels and more attention to the price. The effect of reverse labeling is expected to be limited in this group. Lastly, we suspect that people who are intermediate between those who find these features important and those who do not find them important are the most likely to be affected by reverse labeling. With no strong preferences for ethical, eco-friendly, or healthy products, this particular group could be more susceptible to the frame of labels. Based on this reasoning, the second hypothesis and adjacent sub-hypothesis are:

Hypothesis 2 Reverse labeling has a larger effect on decision behavior for individuals with no strong preferences for ethical trade, eco-friendliness, and health in their product choices.

H2.A: Reverse labeling has a larger effect on decision behavior for individuals with no strong preferences for ethical trade in their product choices.

H2.B: Reverse labeling has a larger effect on decision behavior for individuals with no strong preferences for eco-friendliness in their product choices.

H2.C: Reverse labeling has a larger effect on decision behavior for individuals with no strong preferences for health in their product choices.

3.3 Hypotheses 3 and 4

Lastly, we want to investigate possible underlying mechanisms of how reverse labeling affects choices compared to standard labels. We suspect that reverse labeling alters the contextual inference, namely the perception of quality and the attribute framed in the label. In the remainder of the paper, *quality* is referred to as how good the product performs, for instance, in terms of taste and effectiveness. In addition, *attribute* is referred

to as characteristics of the product - such as ethics, eco-friendliness, and health.

As mentioned, we expect that reverse labeling will induce more people to choose the more ethical, more eco-friendly, and healthier option compared to standard labeling. We suspect the underlying mechanisms to be (1) an increased difference in perception of quality for the options and (2) an increased difference in perception of the attribute for the options. In particular, reverse labeling will have a more considerable impact on the perception of quality and attribute for the less ethical, less eco-friendly, and less healthy option, compared to the alternative option. Based on this, the two final hypotheses are:

Hypothesis 3 Reverse labeling alters the perception of product quality in favor of the more ethical, more eco-friendly, and healthier option

Hypothesis 4 Reverse labeling alters the perception of the product attribute framed in the label in favor of the more ethical, more eco-friendly, and healthier option

4 Data

In this chapter, we present the data used to investigate the effect of reverse labeling. We explain how the data was collected, the design of the choice experiment, and the variables in the data set.

4.1 Data collection

In order to identify the effect of reverse labeling, we conducted a choice experiment where N = 393 responses were collected. The survey was distributed by email to all the Norwegian students at a business graduate school. All responses were anonymous - neither IP addresses nor personal information was collected. The incentive to participate in the choice experiment was the possibility of winning a headset from Sony.

4.1.1 Experiment design

The purpose of the experiment is to isolate the effect of reverse labeling by only changing the labels, holding all other factors constant. The choice experiment consisted of three sections[3]: (1) product decisions and follow-up questions, (2) filler questions, and (3) a section containing control questions.

In the introduction of the experiment, the respondents were told to envision themselves in a grocery store. In the store, they were met with various products - each with two versions, options A and B. Designing the decision problem as such brings out the core of the choice in a real context. Usually, one encounters a choice between an unlabeled original product and a labeled alternative product in grocery stores. The unlabeled original product could then be considered as the reference point, whereas the alternative product has a quality or attribute differentiating it from the original. The respondents were instructed to select the one option they would choose, given that they intended to purchase this particular product.

The respondents were randomly assigned treatment status to find an effect of reverse labeling compared to standard labeling. The control group was exposed to standard labels,

[3]The survey questions are included in the appendix

where option A was unlabeled and option B had a label framed as a gain - illustrated in figures 4.1, 4.3, and 4.5 below. The treatment group was exposed to reverse labels, where option A had a label framed as a loss and B was unlabeled - illustrated in figures 4.2, 4.4, and 4.6 below. Option A was identical in both the control- and treatment groups, except for the labeling. The same applied to option B. In addition, the filler- and control questions were identical for both groups.

Product decisions

The three main product categories were filter coffee, laundry detergent, and jam. Within each product category, the package designs for options A and B were slightly different for the respondents to differentiate the two alternative products. Moreover, option A had the same price across the control and treatment groups, presented with a price tag. The same applied to option B. The price of option A was lower than for option B, for both coffee and laundry detergent. The price difference was included because certified products often have a higher price, making the decisions more realistic. There was no price difference between the two options of jam because the actual price level is similar. In addition, it allowed us to investigate a case without a price difference.

In the filtered coffee category, the control group was exposed standard labels, whereas the treatment group was exposed to reversed labels. More specifically, the more ethical choice in the control group is labeled *Ethically certified*, which can be thought of as gaining an ethical aspect, compared to the less ethical choice without a label, as shown in figure 4.1. In the treatment group, the ethical option is not labeled, and the less ethical option is labeled *NOT ethically certified*, as shown in figure 4.2. The purpose of this design is to change the reference point from option A in the control group to option B in the treatment group. One loses the ethical aspect when deviating from the unlabeled original option in the treatment group. Option A is the less ethical option for both groups, and option B is the more ethical one.

A: 39.60 NOK **B:** 43.50 NOK

Figure 4.1: Filtered coffee control group

A: 39.60 NOK **B:** 43.50 NOK

Figure 4.2: Filtered coffee treatment group

The second product category is laundry detergent. Similar to the previous category, the control group was exposed to standard labels and the treatment group was exposed to reversed labels. The participants in the control group chose between option A with no label and option B labeled *Eco-certified*, as presented in figure 4.3. Moreover, the treatment group was presented with option A labeled *NOT eco-certified* and option B with no label, as shown in figure 4.4. Option B is likely to be thought of as the original product in the treatment group because it is unlabeled. In that case, option B would also be regarded as the reference point. Deviating from this option means losing the environmental aspect of the product. Option A is less eco-friendly, and option B is more

eco-friendly in both the control- and treatment groups.

A: 61.50 NOK **B:** 64.50 NOK

Figure 4.3: Laundry detergent control group

A: 61.50 NOK **B:** 64.50 NOK

Figure 4.4: Laundry detergent treatment group

The third product category is jam. The participants in the control group chose between option A without a label, and option B labeled *30 percent LESS sugar* as pictured in figure 4.5. The treatment group chose between option A labeled *30 percent MORE sugar*, and option B without a label as illustrated in figure 4.6. The intention of reversing the labels is to change the reference point from option A to option B. The reverse labels are designed so that individuals will experience a loss when choosing the option with more sugar due to *30 percent MORE sugar* being thought of as too sweet or too unhealthy.

A: 29.90 NOK **B:** 29.90 NOK

Figure 4.5: Jam control group

A: 29.90 NOK **B:** 29.90 NOK

Figure 4.6: Jam treatment group

Follow-up questions

After each product decision, the participants were asked how they perceived the quality and attributes of the products. The answers were distributed on a Likert scale from 1 to 7, where 1 is the worst possible perception, and 7 is the best possible perception. Regarding quality, the participants were asked about taste (coffee and jam) and effectiveness (detergent). Regarding attributes, the subjects were asked to what extent they thought each of the two options was ethical (coffee), eco-friendly (detergent), and healthy (jam). These questions will be described in detail in chapter 6.

Filler questions

The experiment included two filler questions. The responses were not added to the data set. The questions were simply included so that the core objective of the experiment was not given away, reducing response biases. The two questions were designed in the same manner as in the three main product categories - coffee, detergent, and jam. Both the control and treatment groups were given identical filler questions. The participants were asked to choose between (1) a bar of plain chocolate and a bar of Daim chocolate and (2) a regular sour cream and a lactose-free sour cream.

Control questions

In the last part of the experiment, the respondents were asked several control questions, such as age, gender, year of studies, and their most frequently visited grocery store. Table A4.1 in the appendix, provides descriptive statistics for these variables. They were further asked how important ethical trade, eco-friendliness, and sugar content, are to them when purchasing products. The answers were distributed on a Likert scale from 1 to 7, where 1 is the least important, and 7 is the most important.

4.2 Dependent variables

In our analysis, we have included several dependent variables. The treatment effect of reverse labeling is investigated on choosing a more ethical, more eco-friendly, and healthier product. Therefore, we regress choosing option B on treatment in all three categories. The dependent variables are explained in the following segments. Table A4.1 in the appendix provides descriptive statistics for all the dependent variables.

Choose option B for filter coffee

This variable is a dummy variable for choosing option B - the ethical product, in the filter coffee category, where 1 equals choosing option B and 0 equals choosing option A.

Choose option B for laundry detergent

Similar to the variable above, this is a dummy variable for choosing option B - the eco-friendly product. The variable equals 1 if option B is chosen and 0 if option A is chosen.

Choose option B for jam

This variable is a dummy variable for choosing option B - the product with less sugar in the jam category. The variable equals 1 if option B is chosen and 0 if option A is chosen.

Several B

This is a dummy variable for choosing option B in more than one product decision. It takes the value 0 if an individual has chosen option B in zero or one product decision and equals 1 if they choose option B in two or three decisions. Each individual is faced with three product decisions and can therefore choose option B zero, one, two, or three times. The reason for not using number of B's as a categorical dependent variable ranging from zero to three is the preference for having dummy variables in all four regressions testing H1 in chapter 6. The regressions and adjacent coefficients will have a more similar and intuitive interpretation.

Perception of qualities

Within the perception of qualities, there are three dependent variables: $Taste_{coffe}$ - taste in the coffee category, $Efficiency_{Detergent}$ - efficiency in the detergent category, and $Taste_{Jam}$ - taste in the jam category. The variables are ordinal, ranging from 1 to 7 - depending on the respondents' selected option on a Likert scale.

Perception of attributes

Within the perception of attributes, there are three dependent variables: $Ethical_{Coffee}$ - ethics in the coffee category, $Environmental_{Detergent}$ - eco-friendliness in the detergent category, and $Health_{Jam}$ - health in the jam category. The variables are ordinal, ranging from 1 to 7 - depending on the selected option on a Likert scale.

4.3 Independent variables

The main independent variable of interest in our data is the *Treatment* variable. This dummy variable indicates treatment status and equals 1 in the treatment group and 0 in the control group.

Three other independent variables are used in the analysis. The $Importance_{ethicaltrade}$ variable is an ordinal variable, determined by how important the participants view ethical trade. $Importance_{eco-friendliness}$ and $Importance_{sugarcontent}$ are also ordinal variables, determined by how important the participants view eco-friendliness and sugar content. Last, the independent variable $ProductB$ is a dummy variable, taking the value 1 if the follow-up question is for option B and 0 if the follow-up question is for option A. Table A4.1 in the appendix provides a descriptive summary of the independent variables.

5 Methodology

In this chapter, we present the estimation method used to investigate the effect of reverse labeling. The method is explained and justified for testing each hypothesis.

5.1 OLS estimation method

Ordinary Least Squares (OLS) estimation is a vastly used method of estimation in econometrics. This method chooses estimates to minimize the sum of squared residuals (Wooldridge, 2016, p.95). It produces the best linear unbiased estimator (BLUE), given that the assumptions behind the method are satisfied. The general linear regression model is as follows:

$$y = \beta_0 + \beta_1 x + u \tag{5.1}$$

The OLS estimation method is used to estimate the relationship between reverse labeling and choosing option B in the three product categories, as seen in the generalized regression equation 5.2 below. The regressions used to test hypotheses H1 and H2 in the next chapter have a binary dependent variable and a binary independent variable. A linear probability model (LPM) is created since the OLS method is used on regressions with a binary dependent variable. One could argue for using a Logit- or Probit model in the case of binary dependent variables. However, we prefer estimating a linear probability model due to the simple interpretation of the coefficients. Further, regressing the dependent variable on reverse labeling with a Logit model yielded similar results to OLS estimation. In addition, the results from the regressions in the next chapter are reasonable since the coefficients do not exceed rational probabilities, supporting the use of OLS estimation[4].

$$Option\ B = \beta_0 + \beta_1\ reverse\ labeling + u \tag{5.2}$$

[4]Further backed by Hellevik (2009) suggesting that Logit-models and LPMs have nearly identical results and more intuitive interpretation of the latter.

Testing hypothesis H3, the perception of a product quality is used as the dependent variable, and treatment as the independent variable, as seen in the generalized equation 5.3 below. Testing H4, the perception of a product attribute is used as the dependent variable, and treatment as the independent variable, as seen in the generalized equation 5.4 below. The dependent variables are ordinal, on a Likert scale from 1 to 7, meaning that the distance between them is not equal in a numerical sense. As a result, the use of OLS may be problematic. However, Kromrey and Rendina-Gobioff (2002) suggest that OLS is a sufficient tool also when applied to ordinal data, and state in their conclusion; "Finally, the surprisingly good performance of the OLS approach suggests that researchers who approach the analysis of discrete ordinal data (such as individual Likert items) with OLS tools should feel no guilt in such a tactic" (Kromrey and Rendina-Gobioff, 2002). Thus, this supports the further use of OLS estimation.

$$Quality\ of\ option\ A\ or\ B = \beta_0 + \beta_1\ reverse\ labeling + u \tag{5.3}$$

$$Attribute\ of\ option\ A\ or\ B = \beta_0 + \beta_1\ reverse\ labeling + u \tag{5.4}$$

5.1.1 Assumptions behind the OLS estimator

The OLS estimator is an unbiased- and efficient estimator under the following set of assumptions (Wooldridge, 2016). The assumptions are presented below and discussed in relation to the data from the experiment.

Linear in parameters

The first assumption states that the model has to be linear in parameters (Wooldridge, 2016, p.80). In other words, the dependent variable is related to the independent variables and the error term. This assumption is fulfilled.

Random Sampling

The random sampling assumption implies that the data is drawn from a random sample of the population (Wooldridge, 2016, p.8). The experiment used a sample of students at a Norwegian business school. The student sample is not a random sample of the Norwegian population. However, the sample still yields unbiased estimates due to randomization

within the sample. The students who participated in the experiment were randomly assigned treatment status. Therefore, we view this assumption as fulfilled.

No perfect collinearity

The no perfect collinearity assumption states that the independent variables cannot be constant and that there is no exact linear relationship among them (Wooldridge, 2016, p.8). The independent variables used in our data are not constant and are not perfectly correlated. Therefore, we assume this assumption is satisfied.

Zero conditional mean

The zero conditional mean assumption is the most critical one, and it implies that the error term, has an expected value of zero given any value of the explanatory variable (Wooldridge, 2016, p.82). The zero conditional mean is violated in the presence of endogeneity, caused by omitted variable bias, reverse causality, and measurement errors.

There is no reason to suspect omitted variable bias in this study. It is not likely that an omitted variable correlates with the treatment status and is a determinant of the dependent variables. Further, the dependent variables do not affect the treatment status as it is randomly assigned. Therefore, reverse causality is not present. Contrary, measurement errors could be a source of endogeneity in the study. Measurement errors could occur due to poor survey questions or questionnaire design. However, the results give no reason to believe this is a significant issue.

Homoskedasticity

This assumption implies that for any given value of the explanatory variables, the error term u has the same variance (Wooldridge, 2016, p.88). Since we are estimating a linear probability model, we know that the error term is heteroskedastic because the variance is not constant. However, we use robust standard errors to obtain unbiased standard errors.

The OLS estimator is unbiased if the first four assumptions above are fulfilled. Additionally, if the fifth assumption is satisfied, the estimator is efficient. In other words, under these five assumptions, the OLS estimator is the best linear unbiased estimator (Wooldridge, 2016, p.95).

To investigate the true treatment effect, the assignment of treatment needs to be randomized. The experiment was designed to assign one half of the participants to the control group and the other half to the treatment group. Testing for covariate balance, the results indicate successful randomization as there is not a significant difference in variance between the two groups[5].

[5]Results found in table A4.2 in the appendix

6 Analysis

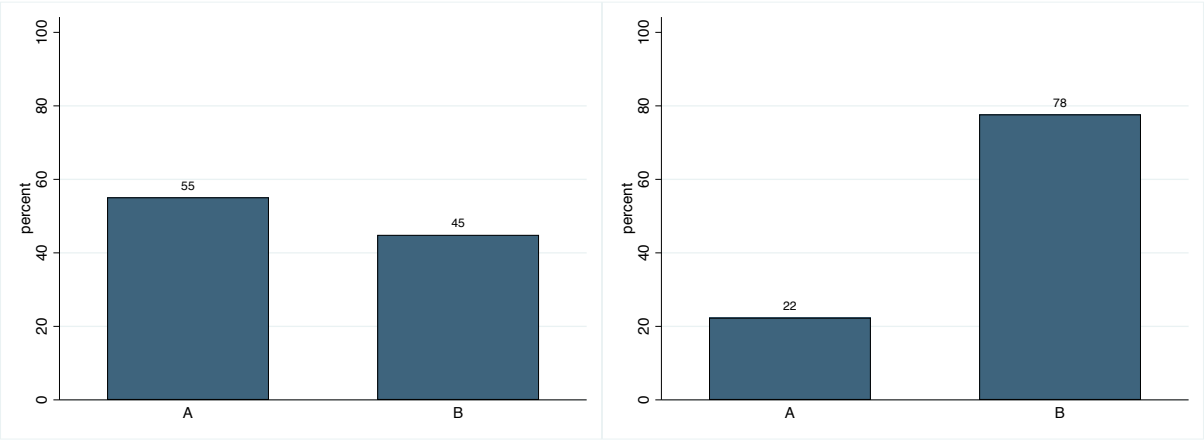
In the following chapter, the methodology is applied to investigate the effect of replacing standard labels with reverse labels. Second, we analyze whether the impact of reverse labeling differs between different groups of individuals before we lastly explore possible underlying mechanisms as to why the particular decisions were made.

6.1 Reverse labeling and product choices

This section investigates whether reverse labeling has a more substantial effect on making more sustainable choices compared to standard labeling. Our hypothesis H1 is that reverse labeling promotes more ethical, more eco-friendly, and healthier choices than standard labeling.

As previously stated, the respondents choose between options A and B for each product. The following figures show the distribution of these choices in percentages. The figures provide a graphical illustration of the effect of replacing standard labels with reversed labels.

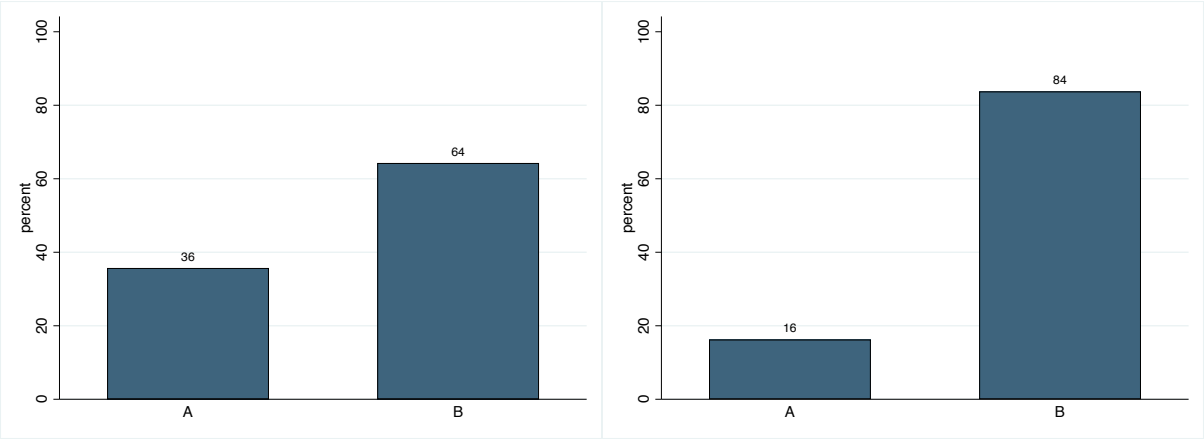
Figure 6.1 illustrates the distribution of choices in the coffee category. In the control group, 45 percent of the respondents choose option B versus 78 percent in the treatment group. It appears to be a substantial difference in choices between the two groups.



(a) Control group **(b)** Treatment group

Figure 6.1: Distribution of choices coffee

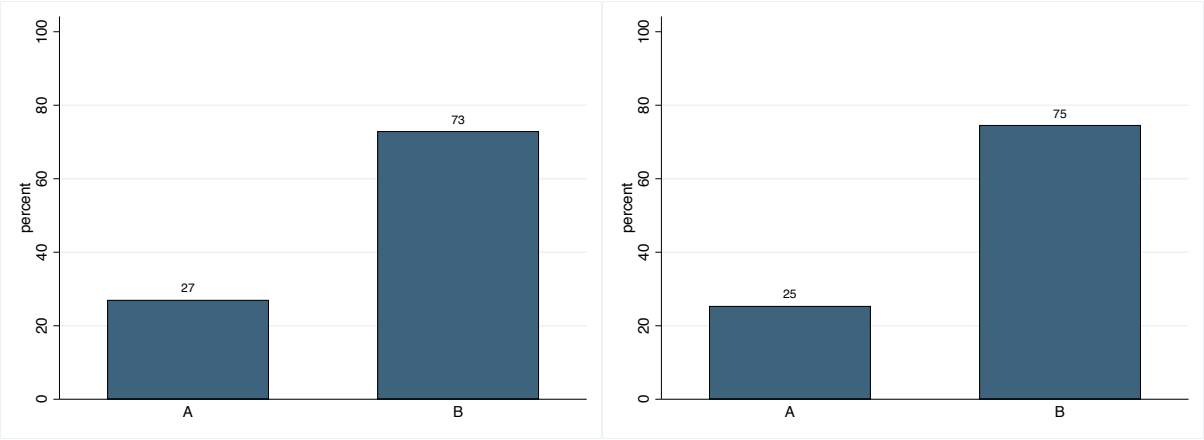
The distribution of choices in the laundry detergent category is illustrated in figure 6.2. The figure displays that 64 percent of the control group chooses option B versus 84 percent in the treatment group. Similar to the coffee category, the difference between the two groups seems to be substantial.



(a) Control group **(b)** Treatment group

Figure 6.2: Distribution of choices laundry detergent

Lastly, the responses in the jam category are illustrated in figure 6.3. Graphically, the product choices in the two groups seem to be similar to one another. In the control group, 73 percent chooses option B versus 75 percent in the treatment group.



(a) Control group **(b)** Treatment group

Figure 6.3: Distribution of choices Jam

The first impression from the graphical illustrations is that more respondents in the treatment group choose option B in the coffee- and detergent category than in the control group. Further, there is seemingly no difference in the number of respondents choosing option B between the control- and treatment group for jam.

In the next part, regression analysis examines whether the first impression holds. The first regression investigates the treatment effect of choosing B in the coffee category. The regression equation is as follows:

$$Choose\ B_{coffee} = \beta_0 + \beta_1\, treatment \tag{6.1}$$

From the regression results in table 6.1 column 1, we find that individuals in the control group choose option B with a probability of 0.449. In contrast, those in the treatment group choose option B with a probability of 0.777. Hence, individuals exposed to the treatment have an increased probability of choosing the more ethical option by 32.8 percentage points. The treatment effect has a p-value < 0.01 and has a strong statistical significance.

The second regression investigates the treatment effect of choosing option B in the laundry detergent category, with the following equation:

$$Choose\ B_{detergent} = \beta_0 + \beta_1\, treatment \tag{6.2}$$

The regression results in table 6.1 column 2 show that individuals in the control group choose option B with a probability of 0.643. In contrast, those in the treatment group choose option B with a probability of 0.838. Individuals exposed to reverse labeling have an increased probability of 19.5 percentage points of selecting the more eco-friendly option. The treatment effect is strongly significant with a p-value < 0.01.

Similar to the two regressions above, choosing option B is regressed on treatment in the jam category. The following equation is estimated:

$$Choose\ B_{jam} = \beta_0 + \beta_1\, treatment \tag{6.3}$$

The results are shown in table 6.1 in column 3. In contrast to the two previous regressions, there is no significant treatment effect in this category. The constant β_0 implies that the control group chooses the option with less sugar with a probability of 0.73. Due to the lack of significance of β_1, it seems as the probability in the treatment group does not significantly differ from 0.73. This aligns with the graphical illustration in figure 6.3.

In the fourth regression, we regress *Several B* on treatment to investigate if there is an overall effect across multiple domains, estimating the following equation:

$$Several\ B = \beta_0 + \beta_1\, treatment \tag{6.4}$$

The regression in column 4 estimates that the control group chooses option B in two or three decisions with a probability of 0.607 versus 0.848 in the treatment group. Hence, individuals exposed to the treatment have an increased probability of 24.1 percentage points choosing option B in more than one product decision. The treatment effect has a p-value < 0.01 and is therefore strongly significant.

Table 6.1: Estimation results of the OLS regressions

	(1)	(2)	(3)	(4)
	B_{Coffee}	$B_{Detergent}$	B_{Jam}	Several B
treatment	0.328***	0.195***	0.0166	0.241***
	(0.0464)	(0.0433)	(0.0445)	(0.0434)
Constant	0.449***	0.643***	0.730***	0.607***
	(0.0356)	(0.0343)	(0.0318)	(0.0350)
R^2	0.113	0.049	0.000	0.073
Observations	393	393	393	393

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The main findings from these regressions suggest that the probability of choosing the more ethical and the more eco-friendly option is higher in the treatment group than in the control group[6]. However, no significant treatment effect is found on choosing the option with less sugar. Thereby, the first impression from the graphical analysis holds. In addition, it seems as if choosing option B for several products is more probable when

[6] A regression table with additional control variables is found in table A4.3 in the appendix, showing that the results from table 6.1 still holds

in the treatment group than in the control group. These findings support hypotheses H1.A and H1.B, stating that reverse labeling promotes more ethical and more eco-friendly choices. The analysis found no evidence supporting hypothesis H1.C, stating that reverse labeling promotes healthier choices.

6.2 Reverse labeling on different sub-samples

This section analyzes if separate sub-samples are affected differently by reverse labeling. Our hypothesis H2 is that the treatment effect will be larger for individuals with no strong preferences for ethical trade, eco-friendliness, or sugar content, in their decision making. In the analysis, the sample is divided into three sub-samples - those who find these features important, those who do not find them important, and those who are intermediate.

The sub-samples are determined by the respondents answers to the following questions:[7]

How important is ethical trade for you in your choice of products?

How important is eco-friendliness for you in your choice of products?

How important is sugar content for you in your choice of products?

Filter coffee and importance of ethical trade

The treatment effect is investigated separately for the three sub-samples, found in columns 1, 2, and 3 in table 6.2. The first column estimates the treatment effect on the *important* sub-sample. The respondents assigned to treatment in this column have an increased probability of choosing option B of 13.3 percentage points, compared to the control group. In sharp contrast, the treatment effect is 48.7 percentage points in the *intermediate* sub-sample and 34.6 percentage points in the *non-important* sub-sample. All three treatment effects are statistically significant, where the *important* group has a p-value < 0.05 and the other two groups have a p-value < 0.01.

[7]The response distributions are found in A5.1a, A5.1b, A5.1c

The preceding treatment effects indicate a stronger effect on the *intermediate* sub-sample compared to the other two. However, an additional regression is needed to compare the treatment effects across sub-samples. The combined regression in column 4 in table 6.2 is estimated by:

$$\begin{aligned}\text{Choose B}_{coffee} = \beta_0 &+ \beta_1 \text{ treatment} \\ &+ \beta_2 \text{ treatment} * \text{intermediate}_{\text{ethics}} \\ &+ \beta_3 \text{ treatment} * \text{non-important}_{\text{ethics}} \\ &+ \beta_4 \text{ intermediate}_{\text{ethics}} \\ &+ \beta_5 \text{ non-important}_{\text{ethics}}\end{aligned}$$

The reference group in this regression is the *important* sub-sample. Thus, the constant is the predicted probability of choosing option B in the control group for this sub-sample. The results show a higher likelihood of choosing option B in the control group for the *important* sub-sample, given by the negative coefficients β_4 and β_5. As expected, those who find ethics least important are the least likely to choose the ethically certified product in the control group.

Further, the coefficient β_1 is the increased probability of choosing option B for the treatment group in the *important* sub-sample and is significant with a p-value < 0.05. The treatment effects for the *intermediate*- and *non-important* sub-samples are significantly larger than the effect on the *important* sub-sample. The treatment effect on the *intermediate* group is seemingly largest; however, the 95 percent confidence intervals for β_2 and β_3 suggest that the two coefficients are not significantly different from each other. This is formally confirmed by performing a t-test[8].

We notice that people in the *intermediate* group exposed to reverse labels are (almost) as likely to choose the ethically certified product as the people in the *important* group exposed to standard labels. Hence, one way to interpret the effect is that reverse labeling transforms the average consumer to behave as the most ethically concerned consumer.

[8] $Pr(|T| > |t|) = 0.7221$

Table 6.2: Estimation results of treatment on coffee with different sub-samples

	(1)	(2)	(3)	(4)
	$B_{Important}$	$B_{Intermediate}$	$B_{Non-important}$	$B_{combined}$
treatment	0.133**	0.487***	0.346***	0.133**
	(0.0601)	(0.0784)	(0.0759)	(0.0676)
treat*intermediate				0.354***
				(0.101)
treat*non-important				0.213**
				(0.0958)
$intermediate_{ethics}$				-0.368***
				(0.0730)
$non\text{-}important_{ethics}$				-0.620***
				(0.0669)
Constant	0.783***	0.415***	0.162***	0.783***
	(0.0500)	(0.0683)	(0.0432)	(0.0481)
R^2	0.035	0.269	0.136	0.337
Observations	140	114	139	393

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In conclusion, the findings indicate a larger treatment effect on both the *intermediate*- and *non-important* sub-samples, compared to the *important* sub-sample. Thus, we find evidence which partly supports hypothesis *H2.A: Reverse labeling has a larger effect on decision behavior for individuals with no strong preferences for ethical trade in their product choices.*

Laundry detergent and importance of eco-friendliness

Similar to the analysis above, the treatment effect is investigated separately for the three sub-samples, found in columns 1, 2, and 3 in table 6.3. The first column predicts the treatment effect on the *important* sub-sample. The respondents assigned to treatment in this column have an increased probability of choosing option B of 7.97 percentage points, compared to the control group. In sharp contrast, the treatment effect is 26.9 percentage points in the *intermediate* sub-sample and 30.2 percentage points in the *non-important* sub-sample. All three treatment effects are statistically significant. However, the effect in the *important* group is only marginally significant, whereas the effects in the other two

groups have strong statistical significance[9].

In contrast to the coffee category, it seems as if the treatment effect is strongest on the *non-important* sub-sample. Once more, an additional regression is included to compare the treatment effects across sub-samples. The combined regression in column 4 in table 6.3 is estimated by the following equation:

$$\begin{aligned}\text{Choose B}_{detergent} = \beta_0 &+ \beta_1 \text{ treatment} \\ &+ \beta_2 \text{ treatment} * \text{intermediate}_{\text{eco}} \\ &+ \beta_3 \text{ treatment} * \text{non-important}_{\text{eco}} \\ &+ \beta_4 \text{ intermediate}_{\text{eco}} \\ &+ \beta_5 \text{ non-important}_{\text{eco}}\end{aligned}$$

The omitted group in this regression is the *important* sub-sample, giving it the same interpretation of the constant and treatment coefficient β_1 as in the previous category. The predictions indicate a higher probability of choosing option B in the control group for the *important* sub-sample, given by the negative coefficients β_4 and β_5.

The treatment effect on the *intermediate-* and *non-important* sub-samples is significantly larger than for the *important* sub-sample. The coefficients β_2 and β_3 suggest a slightly stronger effect on the *non-important* group, yet there is no significant difference between the two coefficients[10]. The *intermediate* group chooses B with probability 0.804, if exposed to reverse labeling. Put differently, it seems as if reverse labeling transforms the average consumer to behave as the most eco-friendly concerned consumer.

[9] p-value < 0.01.
[10] $Pr(|T| > |t|) = 0.5109$

Table 6.3: Estimation results of treatment on laundry detergent with different sub-samples

	(1) $B_{Important}$	(2) $B_{Intermediate}$	(3) $B_{Non-important}$	(4) $B_{Combined}$
treatment	0.0797*	0.269***	0.302***	0.0797
	(0.0480)	(0.0773)	(0.0935)	(0.0606)
treat*intermediate				0.190**
				(0.0949)
treat*non-important				0.222**
				(0.0978)
$intermediate_{eco}$				-0.235***
				(0.0675)
$non\text{-}important_{eco}$				-0.509***
				(0.0690)
Constant	0.849***	0.614***	0.340***	0.849***
	(0.0389)	(0.0650)	(0.0657)	(0.0426)
R^2	0.016	0.097	0.091	0.201
Observations	170	117	106	393

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In conclusion, the evidence from table 6.3 suggests that the *intermediate* sub-sample has a stronger treatment effect than the *important* sub-sample. However, it is not possible to differentiate the treatment effects between the *intermediate*- and *non-important* groups. Consequently, the findings partially support hypothesis *H2.B: Reverse labeling has a larger effect on decision behavior for individuals with no strong preferences for eco-friendliness in their product choices.*

Jam and importance of sugar content

Lastly, we run regressions of choosing option B on treatment in the jam category. The importance of sugar content is used to set the sub-samples. As seen in table 6.4, there are no significant treatment effects for any of the sub-samples. However, the constants suggest that the baseline for choosing option B is the highest for the *important* sub-sample and the lowest for the *non-important* sub-sample.

Similar to the two previous categories, the *important* sub-sample is the reference group in the fourth column. There are no significant effects of reverse labeling in this regression. Consequently, no evidence is found to support hypothesis *H2.C: Reverse labeling has a larger effect on decision behavior for individuals with no strong preferences for health in their product choices.*

Table 6.4: Estimation results of treatment on jam with different sub-samples

	(1)	(2)	(3)	(4)
	$B_{Important}$	$B_{Intermediate}$	$B_{Non-important}$	$B_{Combined}$
treatment	0.0375	0.0577	0.0122	0.0375
	(0.0498)	(0.101)	(0.109)	(0.0571)
treat*intermediate				0.0203
				(0.109)
treat*non-important				-0.0253
				(0.107)
$intermediate_{sugar}$				-0.123
				(0.0826)
$non\text{-}important_{sugar}$				-0.332***
				(0.0760)
Constant	0.820***	0.697***	0.488***	0.820***
	(0.0350)	(0.0809)	(0.0790)	(0.0381)
R^2	0.003	0.004	0.000	0.098
Observations	220	86	87	393

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6.3 Effects of contextual inference

This section aims to investigate the two following hypotheses: *H3: Reverse labeling alters the perception of product quality in favor of the more ethical, more eco-friendly, and healthier option* and *H4: Reverse labeling alters the perception of the product attribute framed in the label in favor of the more ethical, more eco-friendly and, healthier option.* Since reverse labeling highlights negative aspects (of one product), as opposed to positive aspects (of one product) in standard labeling, one could expect that both quality perceptions and perceptions of the specific attribute highlighted in the label are lower in the treatment group. Moreover, the possibility that the two products are differently affected along these dimensions could explain the increased popularity of product B in the treatment group.

First, we examine if the perception of options A and B differ within the control- or treatment group. Second, we examine if the perception of either option A or option B differs between these groups.

Filter coffee

First, the analysis investigates if reverse labeling affects the perception of a quality (taste) and an attribute (ethics) for coffee. The respondents answered two follow-up questions for both options A and B of coffee, as follows:

Question 1: How good do you think the products taste?

Question 2: How ethical do you think the products are?

The mean value of the answers to these questions is presented in figure 6.4, suggesting that the perception of quality differs slightly between options A and B within the control- and treatment group. The participants appear to believe that options A and B are similar in taste. Moreover, it seems as if reverse labeling has no impact on the perception of quality since the average perception of the taste of options A and B are pretty similar in the two groups.

There is a more apparent difference between the average perception of the attribute of the ethically certified coffee and non-ethically-certified coffee within both the control and

treatment groups. As expected, the ethically certified option scores higher in ethics, both in the standard label control group and in the reversed label treatment group. However, options A and B reduce their mean scores in the reverse label treatment group compared to the control group. This difference seems larger for option A than for option B, indicating that the reverse labeling affects option A more in terms of how ethical the option is perceived.

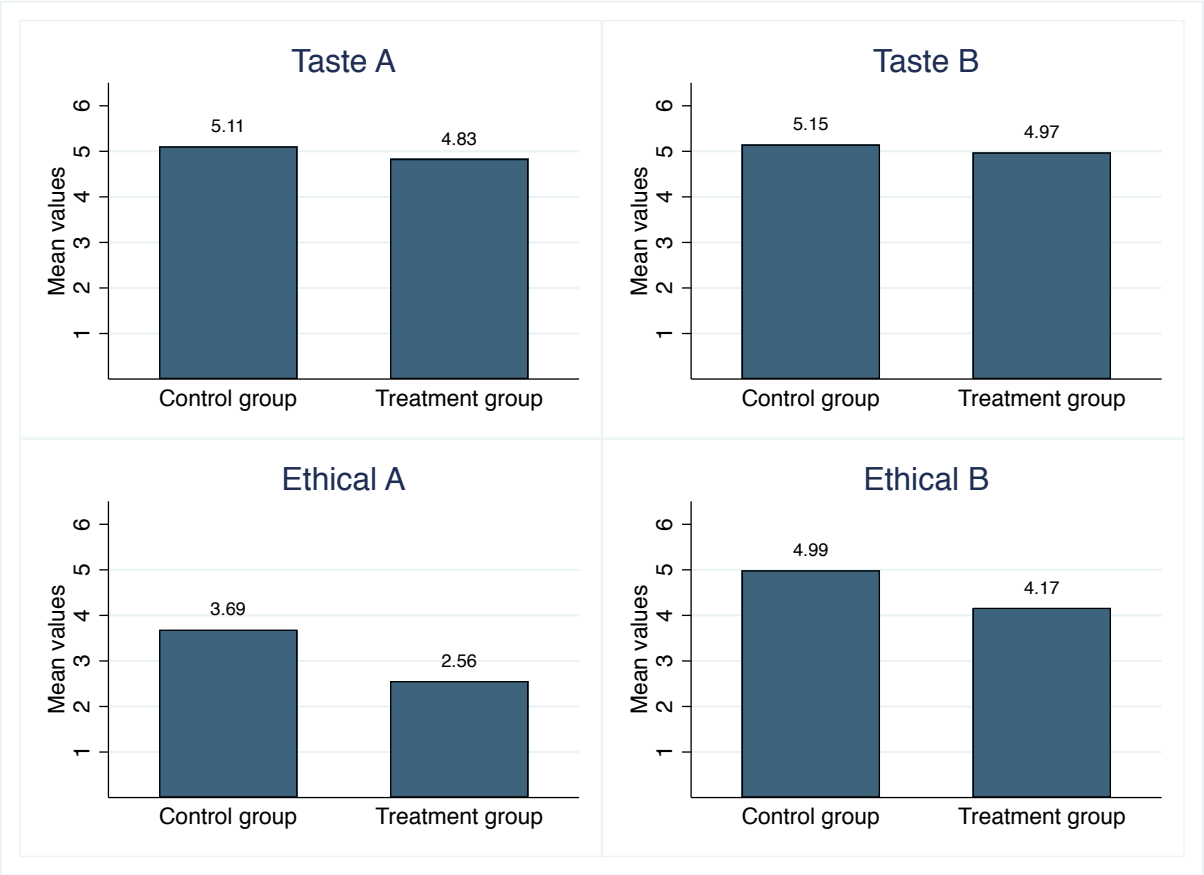


Figure 6.4: Mean values coffee

Regression equations 6.5 and 6.6 are used to further analyze the effect reverse labels have on the perception of the quality and the attribute, compared to the baseline of standard labels.

$$Taste_{coffee} = \beta_0 + \beta_1\, productB + \beta_2\, treatment\ + \beta_3\, productB * treatment \tag{6.5}$$

$$Ethics_{coffee} = \beta_0 + \beta_1\, productB + \beta_2\, treatment\ + \beta_3\, productB * treatment \tag{6.6}$$

The results from these regressions are presented in table 6.5. Column 1 shows the regression for the perception of quality, while column 2 shows the regression for the perception of the attribute.

The baseline for the first regression is how the control group, on average, perceives the quality of product A, shown by β_0, which is 5.107 points out of 7. Further, β_1 and β_3 are not statistically significant, suggesting that there is no difference in perception of options A and B in the control group and that the perception of option B is not different between the control and treatment group. Last, β_2 indicates that the treatment group perceives the taste of option A to be 0.275 points less than in the control group. The reduction in perception of quality is expected but is only marginally significant. These findings support the interpretation of figure 6.4 in terms of the taste of the coffee.

The regression in column 2 in table 6.5 has a similar interpretation of the constant β_0, namely the average value for the perception of the attribute of product A in the control group. Thus, the value for the perception of ethics is 3.689 points out of 7. In addition, β_1 suggests that product B is regarded as 1.301 points more ethical than option A in the control group. Further, by replacing standard labels with reverse labels, one reduces the average perception of how ethical option A is by 1.130 points, as shown by β_2. The interaction term β_3 estimates that the treatment group scores option B 0.308 points higher than option A in the control group. However, the coefficient is only significant at a 10 percent level.

The effects shown in column 2 were as anticipated. First, there is an apparent difference between options A and B within the control- and treatment group since one option is labeled while the other is not. Moreover, between the control- and treatment group, the labels shift from *Ethically certified* in the control group to *NOT ethically certified* in the treatment group. Thus, shifting the focus from the certified to the non-certified option may further reduce the perception of ethics for the treatment group compared to the control group.

Table 6.5: Regression coffee

	(1) Taste	(2) Ethical
productB	0.0408	1.301**
	(0.131)	(0.117)
treatment	-0.275*	-1.130**
	(0.135)	(0.120)
productB*treatment	0.101	0.308*
	(0.188)	(0.170)
Constant	5.107**	3.689**
	(0.0916)	(0.0786)
R^2	0.009	0.354
Observations	786	786

Standard errors in parentheses

* $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Laundry detergent

The analysis investigates whether the perception of the quality (efficiency) and the attribute (eco-friendliness) differs between standard labeling and reverse labeling. To do so, the participants answered the two following questions for options A and B:

Question 1: How efficient do you think the laundry detergent is?

Question 2: How eco-friendly do you think the products are?

Figure 6.5 visualizes the mean values of the answers to the questions presented above. First, the average perception of quality is seemingly similar for options A and B within the control- and treatment group. Moreover, the perception of quality seems almost indistinguishable between the two groups. On average, it appears as if options A and B are perceived as equally efficient. The perception of the two options does not seem affected by changing the frame of labels.

Second, the average perception of the attribute differs between options A and B. As expected, option A is perceived to be less eco-friendly in both the control and treatment groups, as the average perception of the attribute seems to be different between the two groups. The treatment group perceives options A and B as less eco-friendly than the

control group. Similar to the coffee category, this effect seems slightly larger for option A than for option B.

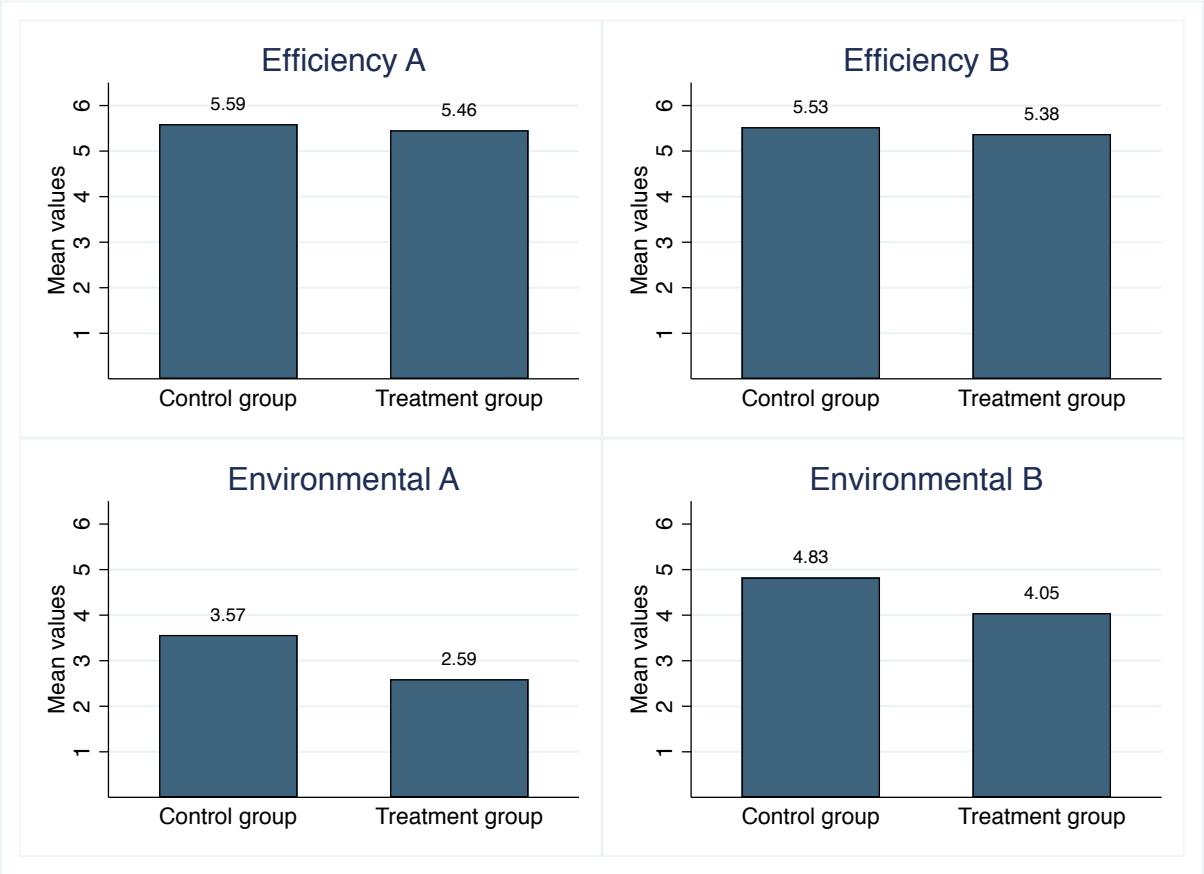


Figure 6.5: Mean values laundry detergent

Two additional regressions are run to further analyze the underlying mechanisms on the average perception of quality (efficiency) and on the average perception of the attribute (eco-friendly).

$$Efficiency_{detergent} = \beta_0 + \beta_1\, productB + \beta_2\, treatment\ + \beta_3\, productB * treatment \quad (6.7)$$

$$Eco\text{-}friendly_{detergent} = \beta_0 + \beta_1\, productB + \beta_2\, treatment\ + \beta_3\, productB * treatment \quad (6.8)$$

Table 6.6 displays the results of these regressions. Column 1 predicts the average perception of quality (efficiency), whereas column 2 estimates the average perception of the attribute (eco-friendliness).

In column 1, β_0 suggests that the control group, on average, perceives the quality of option A to be 5.592 out of 7. Furthermore, there are no significant effects of either β_1, β_2 or β_3. This finding supports the impression that there is no apparent difference in the perception of efficiency between product A and B in either the control- or treatment group, as shown in figure 6.5. Replacing standard labels with reverse labels does not seem to result in a shift in the perception of the quality.

The regression in column 2 predicts the average perception of the attribute. β_0 suggests that the control group, on average, scores the perception of eco-friendliness 3.566 out of 7. Moreover, β_1 indicates that option B is perceived to be 1.26 points more eco-friendly than option A in the control group, while β_2 estimates that option A in the treatment group is perceived 0.972 points less eco-friendly than option A in the control group. Lastly, β_3 is not statistically significant, suggesting that the perception of option B in the treatment group does not significantly differ from the perception of option A in the control group.

Table 6.6: Regression laundry detergent

	(1) Efficiency	(2) Environmental
productB	-0.0663	1.260**
	(0.110)	(0.113)
treatment	-0.135	-0.972**
	(0.115)	(0.111)
productB*treatment	-0.0149	0.192
	(0.162)	(0.163)
Constant	5.592**	3.566**
	(0.0781)	(0.0745)
R^2	0.005	0.335
Observations	786	786

Standard errors in parentheses

* $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Jam

In the third and final category, the following regressions estimate how reverse labeling affects the perception of the quality (taste) and the attribute (health) for jam, compared to standard labels. As standard- and reverse labels lead to no significant difference in choices of options A and B, this analysis is not of the greatest interest. However, the

findings from this analysis will still be presented in this section, as it may contribute to the discussion on why there is no significant treatment effect on making healthier choices. The participants in the experiment answered the two questions below for both options A and B.

Question 1: How good do you think the products taste?

Question 2: How healthy do you think the products are?

The mean values of the answers to the questions above are presented in figure 6.6. The figure suggests that the perceived quality of options A and B differ within the control and treatment groups. Within both groups, option A is perceived, on average, to taste better than option B. Moreover, figure 6.6 suggests that reverse labeling, compared to standard labeling, has a small or non-significant effect on the perception of the quality of option B. On the other hand, the average perception of the quality for option A seems to be affected to a more substantial extent than option B. That is, reverse labeling appears to reduce the perceived taste of option A more than the perceived taste of option B.

Further, the perception of the attribute seems to differ within the control and treatment groups. Option A is perceived as less healthy than option B in both groups. Moreover, figure 6.6 suggests that the perception of the attribute differs between the control and treatment groups. Namely, options A and B are perceived as less healthy when exposed to reverse labeling than to standard labeling.

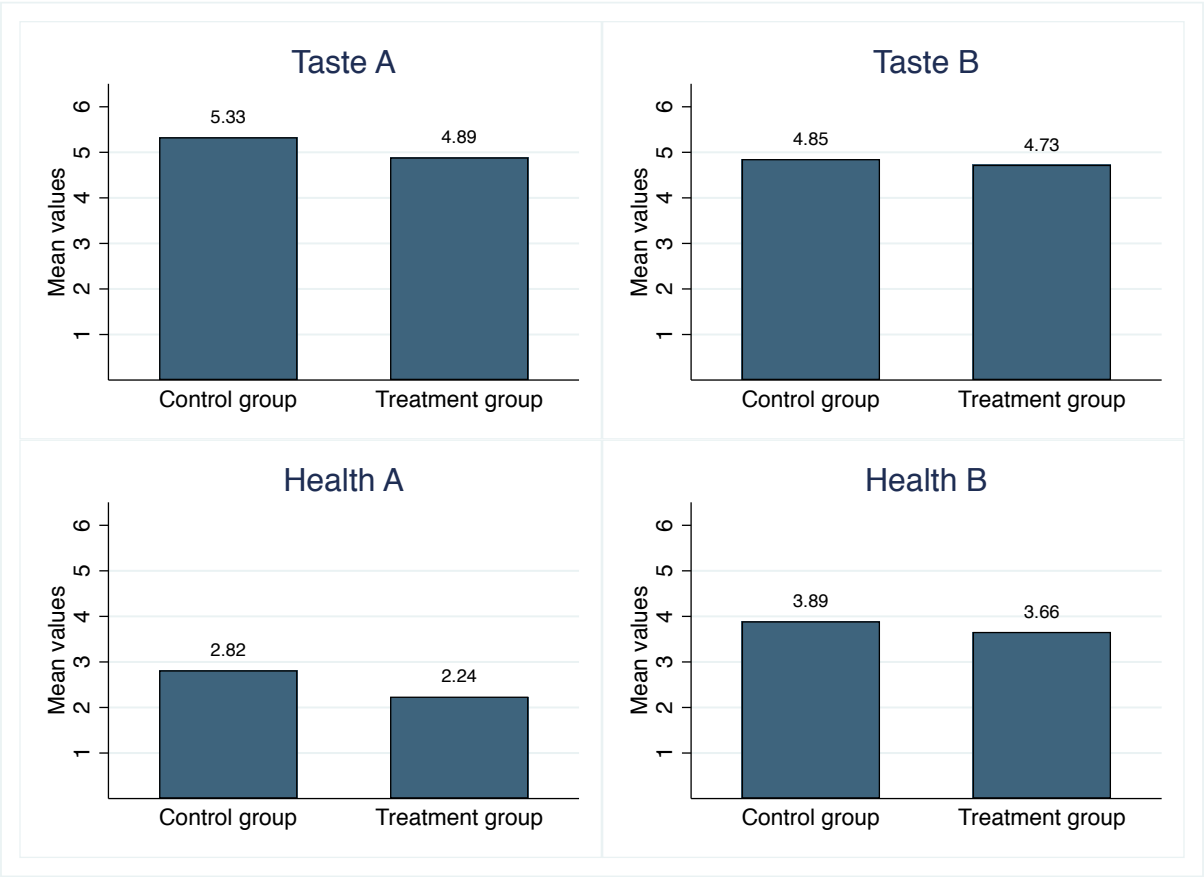


Figure 6.6: Mean values jam

Lastly, the perception of the attribute and quality is further investigated in the regressions 6.9 and 6.10.

$$Taste_{jam} = \beta_0 + \beta_1\, productB + \beta_2\, treatment \ + \beta_3\, productB * treatment \tag{6.9}$$

$$Health_{jam} = \beta_0 + \beta_1\, productB + \beta_2\, treatment \ + \beta_3\, productB * treatment \tag{6.10}$$

The results from these regressions are presented in table 6.7. The baseline in both regressions is how the control group perceives the less sustainable option, given by the constant. In column 1, β_0 shows that the control group, on average, perceives the quality to be 5.332 points out of 7. Moreover, β_1 indicates that option B in the control group is scored 0.480 points lower than option A in the control group in terms of taste. On average, the control group scores option A lower than the treatment group - given by the negative coefficient of β_2. Furthermore, the perception of the taste of option B in the treatment group is perceived to be 0.317 points higher than option A in the control group - given by

the positive coefficient β_3. However, this coefficient is only marginally significant.

In column 2, β_0 shows that the control group, on average, scores their perception of the attribute for option A 2.816 points out of 7. β_1 suggests that option B is perceived as 1.077 points more healthy than option A in the control group. Additionally, it appears as if reverse labeling reduces the perception of how healthy option A is compared to standard labeling, given by β_2. In addition, the respondents in the treatment group perceive option B as healthier than option A in the control group, given by the positive coefficient β_3. Similar to the regression for the perceived taste of jam, this coefficient is only marginally significant.

Hence, the results indicate that reverse labeling significantly impacts the perception of the quality and the attribute. However, this is not likely to change behavior, as the previous analysis on jam did not find any treatment effects. One possible explanation for this is a strong preference for healthier options. We will expand further on this issue in the discussion.

Table 6.7: Regression jam

	(1) Taste	(2) Health
productB	-0.480**	1.077**
	(0.110)	(0.111)
treatment	-0.443**	-0.578**
	(0.130)	(0.102)
productB*treatment	0.317*	0.345*
	(0.169)	(0.153)
Constant	5.332**	2.816**
	(0.0811)	(0.0761)
R^2	0.036	0.277
Observations	786	786

Standard errors in parentheses

* $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

We find evidence that supports hypothesis *H4: Reverse labeling alters the perception of the product attribute framed in the label in favor of the more ethical, more eco-friendly and, healthier option.* In all three product categories, the perception of the attributes, namely how ethical, eco-friendly and healthy the options are perceived, was affected by

reverse labeling. However, we only find evidence that weakly supports hypothesis *H3: Reverse labeling alters the perception of product quality in favor of the more ethical, more eco-friendly, and healthier option.* Overall, we cannot claim that reverse labeling has increased the perceptions of product B relative to product A. It is still believed to be of similar quality and slightly better in terms of the particular attribute framed in the label. Hence, given that perceptions are relatively unaffected, it does not seem that product inference drives the treatment effect on choice. Consistent with prospect theory, a more plausible account is that people have a lower willingness to pay to gain a product attribute relative to what they need to be compensated with to lose the same product attribute.

7 Discussion

In the previous chapter, we presented our findings on the effect of reverse labeling. In the following section, we discuss the interpretation of our analysis and its implications, focusing on the effect reverse labeling has on choices, and then discuss possible underlying mechanisms resulting in these choices. Further, we discuss to which extent the findings can be trusted before we consider policy implications and further research.

7.1 Main findings

The results from the analysis provide strong support for parts of our main hypothesis. Namely, *H1.A: Reverse labeling promotes more ethical choices* and *H1.B: Reverse labeling promotes more eco-friendly choices*. Individuals exposed to reverse labels had a higher likelihood of choosing the more ethical option by 32.8 percentage points and choosing the more eco-friendly option by 19.6 percentage points than the students exposed to standard labels.

The findings from the coffee- and laundry detergent category can partially be explained by prospect theory, particularly loss aversion. As aforementioned, the control group is exposed to standard labels, while the treatment group is exposed to reverse labels. Assuming that the products without labels are considered the status quo, it would imply that they are considered the reference point. Accordingly, the less sustainable options are the reference points in the control group, and the more sustainable options act as reference points in the treatment group. Consequently, standard labels infer a gain of sustainable aspect at the loss of a higher price. In contrast, reverse labels infer a gain of a lower price at the loss of a sustainable aspect.

Due to loss aversion, prospect theory implies that people have a higher willingness to pay to avoid losing an attribute compared to what they are willing to pay to gain the same attribute. Thus, loss aversion seems to explain the higher likelihood of choosing the more sustainable option in the treatment group. Intuitively, to get the same proportion to choose the more sustainable option in both the control and treatment groups, we would need to increase the price difference between the two products when using reverse labeling. The higher WTP for ethically- and eco-certified options is consistent with previous research

that shows a higher WTP for *Fair Trade* labeled and eco-labeled products (Garcia-Yi, 2015; Pelsmacker et al., 2005; Schouteten et al., 2021; Bjørner et al., 2003).

Another possible explanation for the increase in WTP is the inference about the attributes. The perception of product attributes is reduced when replacing standard labels with reversed labels. In the treatment group, option A is labeled *NOT ethically/eco-certified*, giving clear negative information. However, option A is not labeled in the control group and does not provide a clear negative association as in the treatment group. Conversely, the more ethical and eco-friendly option is clearly certified in the control group and lacks the positive verifying message in the treatment group. The visible information in the control and treatment groups might alter the perception of the attribute.

Further, as presented in tables 6.5, 6.6, and 6.7, reverse labeling seems to have a more substantial impact on the perception of the attribute of option A - the less sustainable, or less healthy alternatives. This finding is interpreted as the non-ethically certified or non-eco-certified option losing a relative value compared to the ethically certified or eco-certified option. The increased WTP can result from the change in perception of the aforementioned attributes. However, we find little evidence in favor of the shift in perception of attributes being the primary driver of the increased share of respondents who choose the sustainable options. The perception of the attribute for both options A and B decreases, but the relative change between the two options is not substantial enough to believe it is the main driver of the increased WTP and the change in behavior. If the shift in the perception of the attributes was the primary driver of choosing the more sustainable products, we would expect to see a larger difference in the perceptions in figures 6.4 and 6.5 in chapter 6.

Unexpectedly, we found no evidence supporting *H1.C: Reverse labeling promotes healthier choices*. There was no significant effect of reverse labeling on choosing the jam with less sugar. We discuss three possible explanations as to why there is no treatment effect. First, it is not as apparent whether deviating from the original is considered a loss or a gain compared to the two other categories. Some people might find *LESS sugar* as a gain because of health benefits, and some might view it as a loss due to loss of sweetness. Therefore, the ambiguity could partially explain why there is no treatment effect.

A second possible explanation for this result is the lack of price difference between the two

options of jam. The respondents faced no additional cost of making the healthier choice, which could explain why the control group chose the sugar-reduced jam more frequently.

The third, and what we believe to be the most likely explanation, is that the sugar content is so important to the respondents that the frame of labels will not change their decisions. The majority of the sample responded that sugar is important to them in their decision-making[11]. Therefore, individuals with such strong preferences may not be substantially affected by the treatment as they choose the healthier option regardless of the frame of the label. The data confirms this, as roughly 70 percent of the respondents chose the option with less sugar in both groups. Interestingly, the perception of quality (taste) in the jam category was affected by reverse labeling, compared to no significant effect on the perception of quality in the other two product categories. Even though the participants give a lower taste score to the sugar-reduced jam when exposed to reverse labeling, they still choose this option more frequently. Hence, it seems as their preferences are so prominent that their decision is not affected by the frame of labels. This unexpected finding begs for further research.

7.2 Limitations

In this section, we discuss the most critical limitations of our analysis. The limitations are discussed in relation to either internal- or external validity.

7.2.1 Internal validity

Internal validity means estimating the true impact of the treatment (Gertler et al., 2016). In other words, the estimated effect of the treatment is net of all other potential confounding factors. According to Gertler et al. (2016), internal validity is ensured through the process of randomizing who receives treatment. The current experiment randomly assigned the participants into either a control or a treatment group. Consequently, there are no confounding factors. On average, the participants share many of the same characteristics, such as field of education, choice of school, age group, student life-situation, and geographical area, to name a few. All conditions except for the labels across the control- and treatment groups are the same. That is, the same packaging, order, price,

[11] 56 percent of the sample responded that sugar content is important to them

and on average, the same person making the decision. Therefore, the study has strong internal validity.

However, there are some potential threats. One factor that might have influenced the true results is social desirability bias, which is the tendency to over-report socially desirable attributes and under-report less desirable ones (Latkin et al., 2017). The participants may choose the more socially desirable option as their behavior is observed, unlike their true choice under normal circumstances. This bias could be further induced because the participants do not actually pay for the products. It is easier to choose the sustainable option even though it is more expensive than the less sustainable option. However, this would equally affect the choices in the control group. Therefore, we do not consider this a significant threat to the study's internal validity.

7.2.2 External validity

The external validity of a study is essential to draw conclusions about the population based on the sample (Gertler et al., 2016). External validity is obtained when the sample precisely represents the population. The analysis is based on a student sample from a Norwegian business school. Considering that the student sample is not a random selection of the population, the external validity is somewhat weak. Therefore, the findings cannot be generalized to draw conclusions about the Norwegian population. Due to the study's internal validity, the experiment is still a sound basis for further research, using a more representative consumer sample.

Nonetheless, the findings from the analysis might be able to infer about sub-populations. As previously mentioned, standard labels provide information about the attributes of a product. People who care about ethical trade, eco-friendliness, and health, can make more informed decisions and increase their utility. However, these labels do not necessarily cater to the large mass without strong opinions on these subjects. Therefore, it is interesting to discover that reverse labeling promotes more sustainable decisions in groups with no strong preferences for these attributes. In the study, the respondents who did not have strong opinions on ethical trade and eco-friendliness were on average 0.25 percentage points more likely to choose the sustainable option than the ones who consider sustainability

important to them when exposed to reverse labeling[12].

Furthermore, the findings suggested that reverse labeling transformed the average consumer to behave as the most sustainability concerned consumers. In conclusion, one could argue that the results can be generalized for people who do not have strong opinions on sustainability. These groups may be even more prominent in the general population than in a relatively young student sample. As a result, the study could have partial external validity.

7.3 Policy implications

As mentioned in the literature review, people tend to make sub-optimal decisions. One way of improving decision-making is through nudging. Our study provides evidence that reverse labeling can nudge individuals to make more sustainable decisions, benefiting themselves and the society they live in. The following section utilizes the findings from the choice experiment to discuss possible policy implications.

Currently, most products have standard labels framed in terms of gains, where the primary purpose is to present information about qualities and attributes the given product holds. The standard labels emphasize a positive distinguishing feature of the product, which benefits the producer in terms of higher sales prices. We find it unlikely that producers voluntarily would label their products with framing in terms of losses. For instance, it is doubtful that producers would willingly label their coffee *NOT ethically certified* or *NOT Fair Trade*, even if the products are not certified. To enforce reverse labeling, we argue that a policy measure should be set in place.

One approach to implement a suitable measure, taking the findings from the experiment into account, is to change the policies on how producers label their products. Instead of applying to receive an ethical or eco-certification, such as *Fair Trade* or the *Nordic Swan*, they would have to apply to remove labels such as *NOT Fair Trade* or *NOT eco-certified* (Miljømerking Norge, 2021). That is, the original unlabeled product would be regarded as ethical or eco-friendly while its alternative would be labeled *NOT ethically/eco-certified*.

[12]The average of the treatment effects in the coffee and detergent categories, for the intermediate and non-important sub-sample, compared to the important sub-sample

One additional point is that replacing standard labels with reverse labels may incentivize producers to act and produce more ethically and eco-friendly. The incentive arises as a result of producers wanting to avoid the negatively charged label *NOT ethically-/eco-certfied*. Consequently, unethical- and environmentally harmful production might be reduced. We argue that the incentive is further amplified due to the competitive disadvantage of having a labeled product versus an unlabeled original product.

In conclusion, enforcing the proposed policy measure may reduce negative externalities that result from sub-optimal decisions. Consumers are suspected of having a higher likelihood of choosing the more ethical- and eco-friendly alternatives. Additionally, producers are incentivized to develop more sustainable products. Because the study lacks external validity, the proposed policy requires additional research prior to enforcement. However, one could argue that the policy is effective on Norwegian consumers who do not have strong preferences towards sustainability in their decision-making.

7.4 Further research

As put forth, results from this study indicate that reverse labeling promotes more sustainable choices than standard labeling. Analyzing the behavior of a representative sample of the Norwegian population will provide meaningful insights into facilitating more ethical, more eco-friendly, and healthier choices. Additionally, one could carry out an experiment in a natural environment to remove biases from participants' awareness of being a part of a study. The accuracy of the results might increase, as consumers usually choose amongst multiple varieties of a product, whereas this study is limited to two options.

It might be possible to find support for *H1.C: Reverse labeling promotes healthier choices*, using different products with more substantial trade-offs, in a supplemental experiment. People will likely face a more considerable trade-off between health and taste with products intended for moments of indulgence. More precisely, people may find it more important that chocolate or other sweets are satisfying and tasteful than the sweetness of the spread on their toast. Further, the price difference might be a deciding factor as to why there was no treatment effect for this particular choice set. Other food items might have a more significant price difference between the healthy and less healthy options, providing a more

extensive treatment effect when reverse labeling is introduced.

It would be interesting to run additional experiments to analyze how the willingness to pay and the price elasticity are affected by utilizing reverse labels. The current study suggests that there might be some effects, but the question begs for further investigation.

Lastly, the effect of nudging people to make better choices might be amplified or lessened by good or bad experiences with the given products. In a study by Levin and Gaeth (1988), the authors used two framing conditions of meat, one labeled 75 percent lean and the other labeled 25 percent fat. Further, they introduced a taste sample of the meat. The findings showed that the framing effect was most prominent when the participants did not taste the meat, lesser when the participants tasted the meat after observing the label, and smallest when the participants tasted the meat before observing the label. Thus, it can be interesting to analyze the long-term effects of reverse labeling.

8 Conclusion

The purpose of this study was to find an answer to the question: *Does framing labels as losses promote more ethical, more eco-friendly, and healthier choices?*

The findings from our study provide evidence supporting parts of the main hypothesis, *H1.A: Reverse labeling promotes more ethical choices* and *H1.B: Reverse labeling promotes more eco-friendly choices*, in particular. Our analysis concluded that the students exposed to reverse labels had a higher likelihood of choosing the more ethical option by 32.8 percentage points and choosing the more eco-friendly option by 19.6 percentage points than the students exposed to standard labels. We found no evidence supporting hypothesis *H1.C: Reverse labeling promotes healthier choices*

We analyzed two main mechanisms to describe the change in choices: loss aversion and contextual inference. Regarding loss aversion, we argue that decision-makers adapt their reference point when replacing standard labels with reversed labels. Following the theory of Kahneman and Tversky (1981), we suspect that the change in reference point, instigating loss aversion, is the primary driver of the increased number of individuals who choose the more ethical and eco-friendly option. In addition, loss aversion could further explain why there seems to be a higher WTP for sustainable products.

The second mechanism discussed is contextual inference. Interestingly, we find no differential impact on how products are perceived in terms of quality or sustainability. As expected, reverse labeling seems to have a more considerable impact on the perception of the framed attribute. Nevertheless, due to the inference of both the sustainable attributes and the non-sustainable attributes are affected negatively, we argue that the relative reduction in the perception of the attribute in the non-sustainable options is significant enough to be the primary driver of the shift in behavior.

The experiment's internal validity is strong, and the results are assumed to be trustworthy and unbiased. Therefore, the study provides a good foundation for further research. The external validity, on the other hand, is somewhat weak. The results cannot be generalized to the Norwegian consumer population. However, we believe the results can draw conclusions about people without strong preferences towards ethical trade and eco-friendliness in their product decisions.

To conclude, replacing standard labels with reversed labels appears to nudge individuals to make more sustainable choices. The current findings imply that there could be substantial gains from reversing the process of sustainable labeling. However, further research on a more representative consumer sample is needed prior to enforcing a new policy.

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Appendix

A1 Product questions

A1.1 Coffee

Figure A1.1: Choice filter coffee

Imagine that you need filter coffee and could choice between the two products below. Which one would you choose?

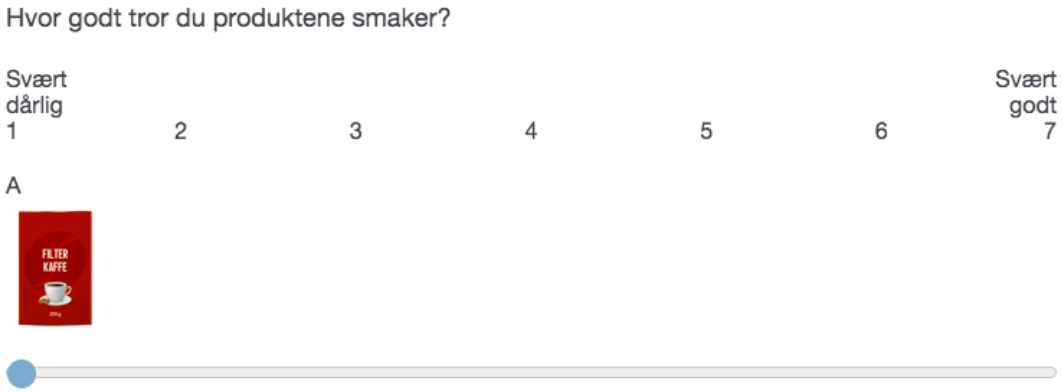
(a) Choice control group

(b) Choice treatment group

Figure A1.2: Perception of taste

How good do you think the products taste?

(a) Control group



(b) Treatment group

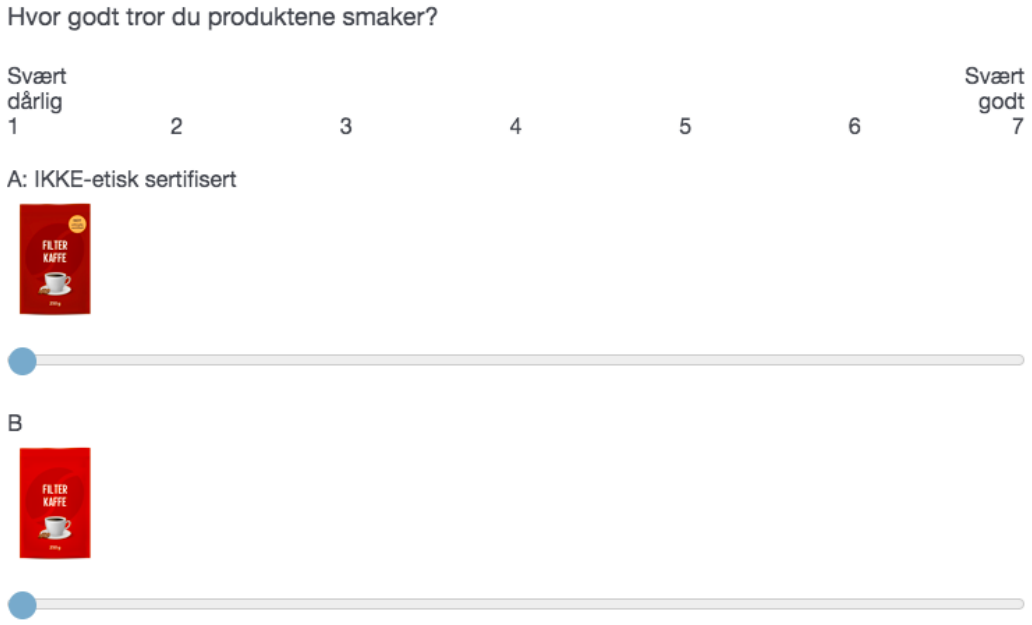
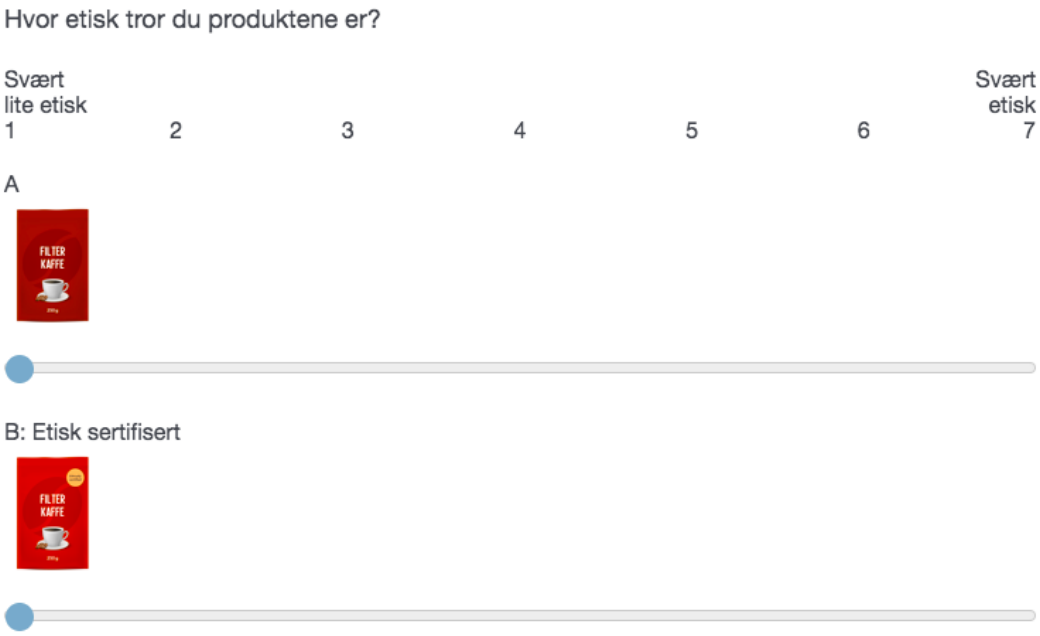


Figure A1.3: Perception of ethics

How ethical do you think the products are?

(a) Control group



(b) Treatment group

A1.2 Laundry detergent

Figure A1.4: Choice of laundry detergent

Imagine that you need laundry detergent and could choose between the two products below. Which one would you choose?

(a) Control group

(b) Treatment group

Figure A1.5: Perception of effectiveness

How efficient do you think the laundry detergent is?

(a) Control group

(b) Treatment group

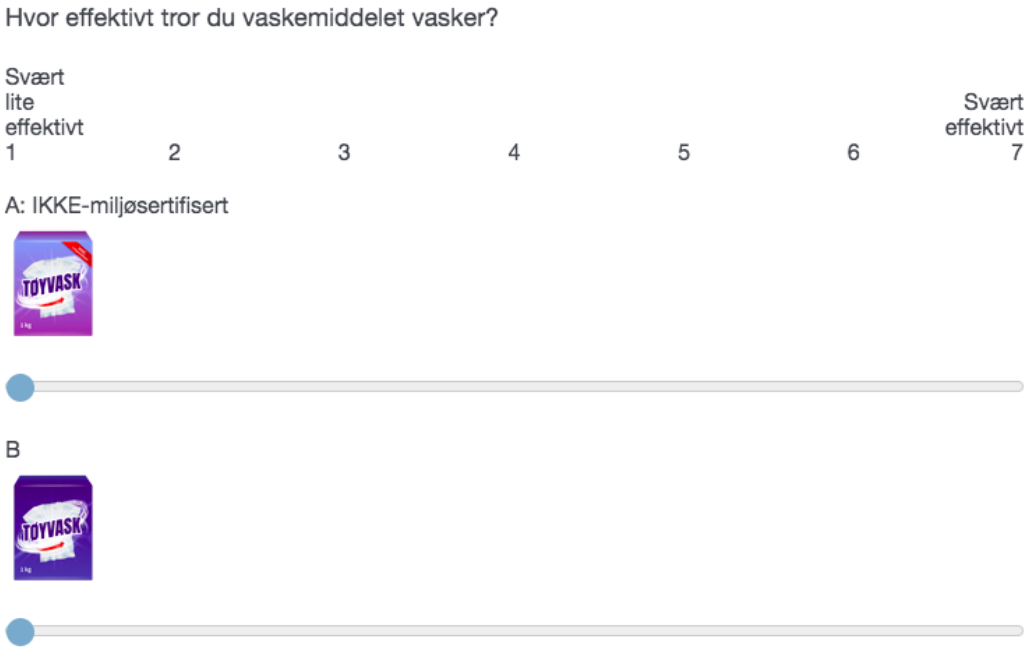
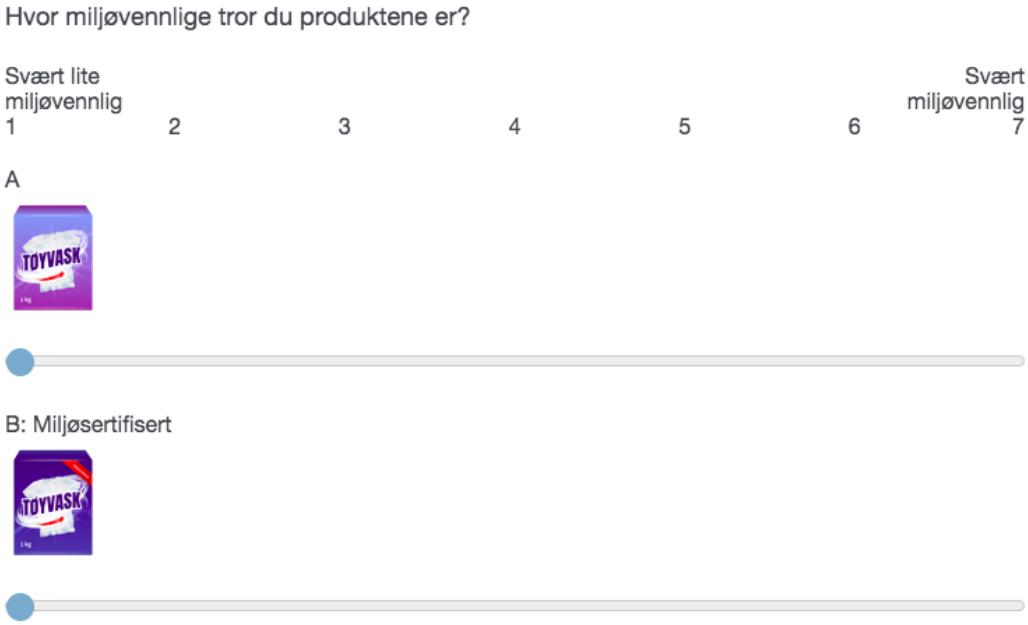


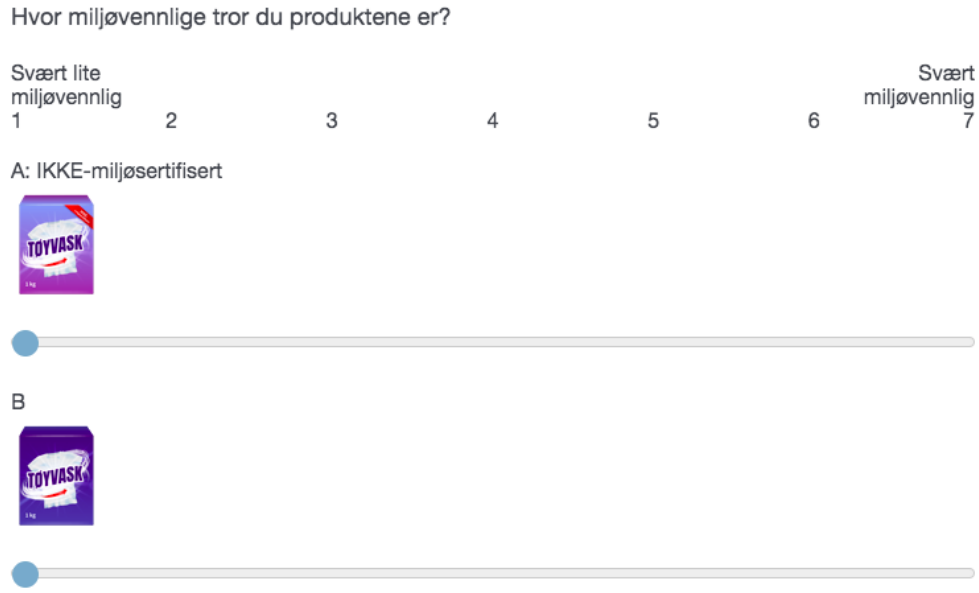
Figure A1.6: Perception of eco-friendliness

How eco-friendly do you think the products are?

(a) Control group



(b) Treatment group



A1.3 Jam

Figure A1.7: Choice of jam

Imagine that you need jam and could choose between the two products below. Which one would you choose?

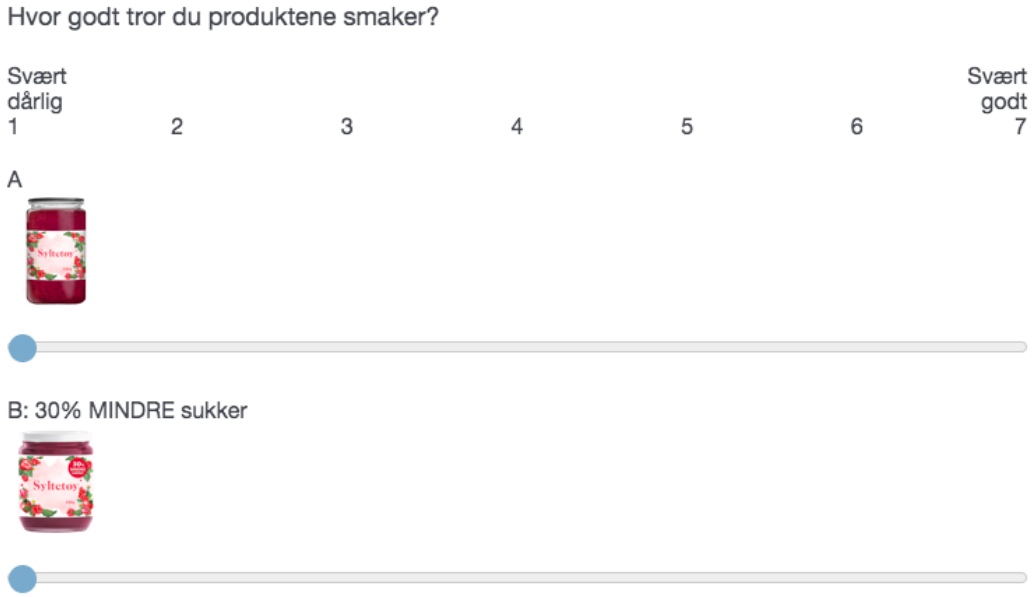
(a) Control group

(b) Treatment group

Figure A1.8: Perception of taste

How good to you think the products taste?

(a) Control group



(b) Treatment group

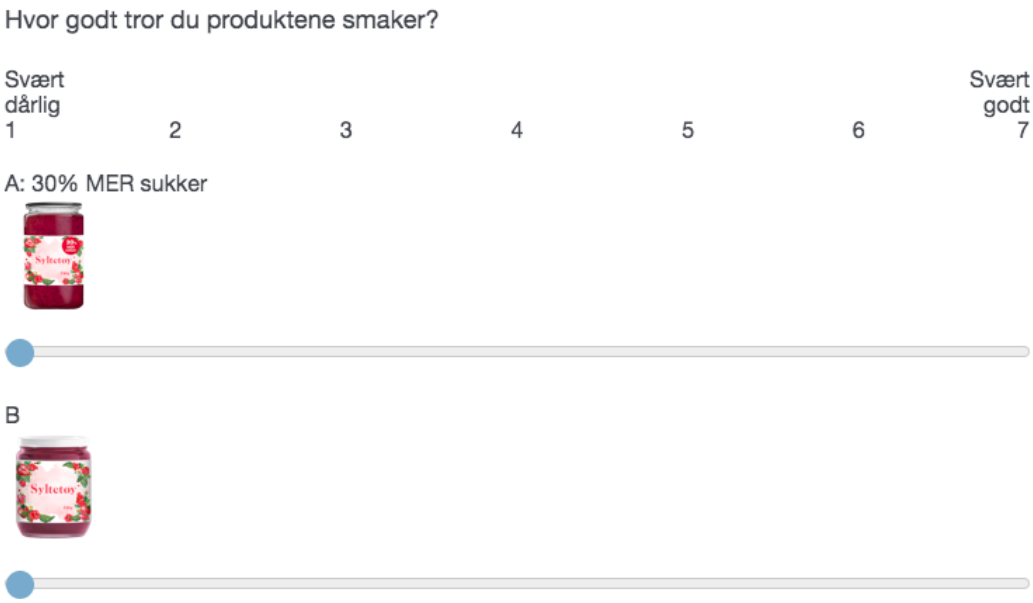
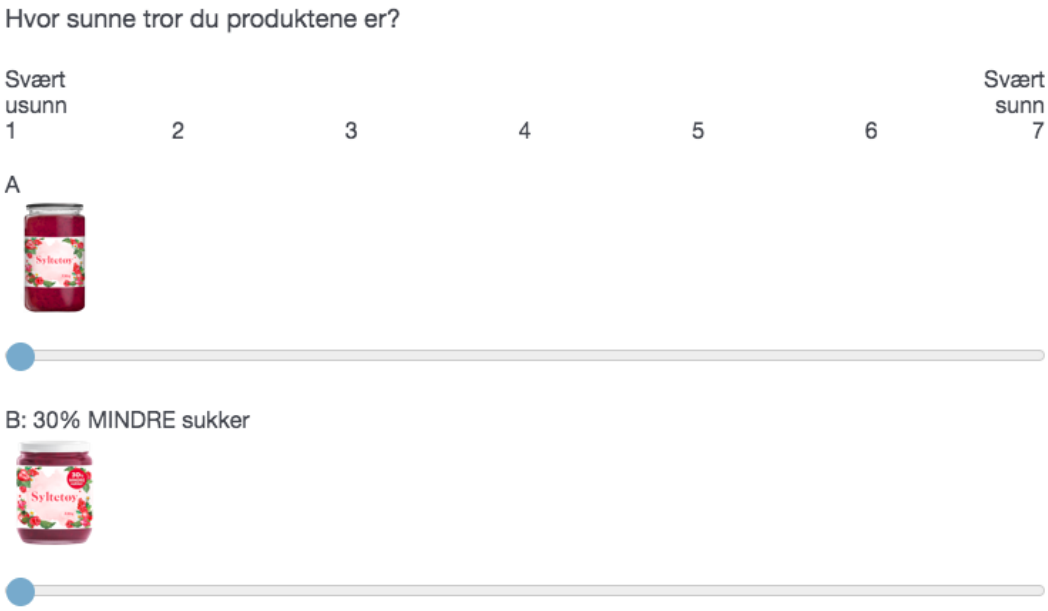


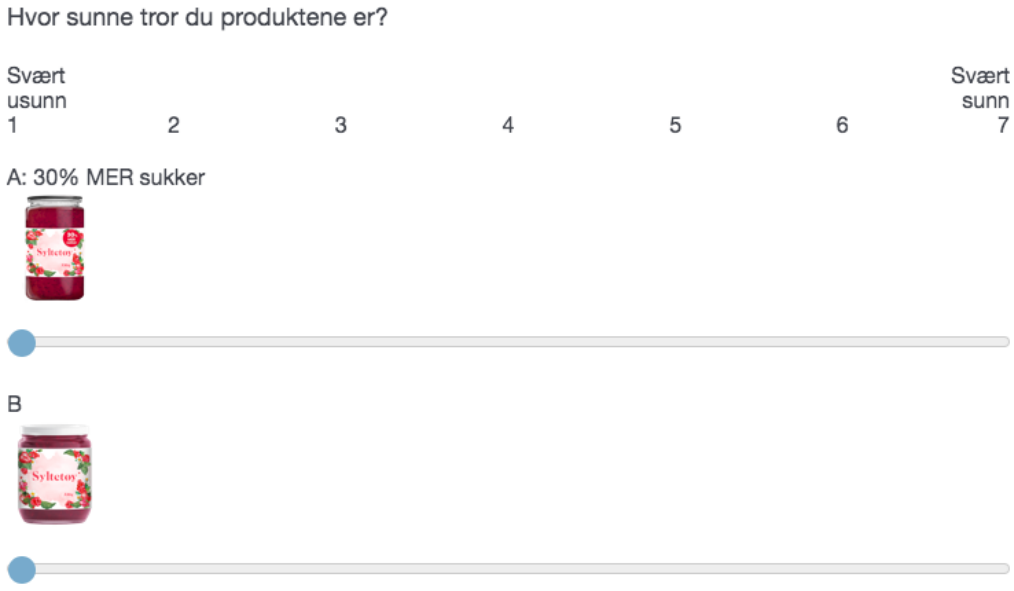
Figure A1.9: Perception of health

How healthy to you think the products are?

(a) Control group



(b) Treatment group



A2 Filler questions

A2.1 Sour cream

Figure A2.1: Choice of sour cream

Imagine that you need sour cream and could choose between the two products below. Which one would you choose?

Se for deg at du trenger rømme og du kan velge mellom de to produktene nedenfor.
Hvilket ville du ha valgt?

Figure A2.2: Taste of sour cream

How good do you think the products taste?

Hvor godt tror du produktene smaker?

Svært dårlig 1 2 3 4 5 6 Svært godt 7

A: Laktosefri

B

A2.2 Chocolate

Figure A2.3: Choice of chocolate

Imagine that you need chocolate and could choose between the two products below. Which one would you choose?

Se for deg at du trenger sjokolade og du kan velge mellom de to produktene nedenfor.
Hvilket ville du ha valgt?

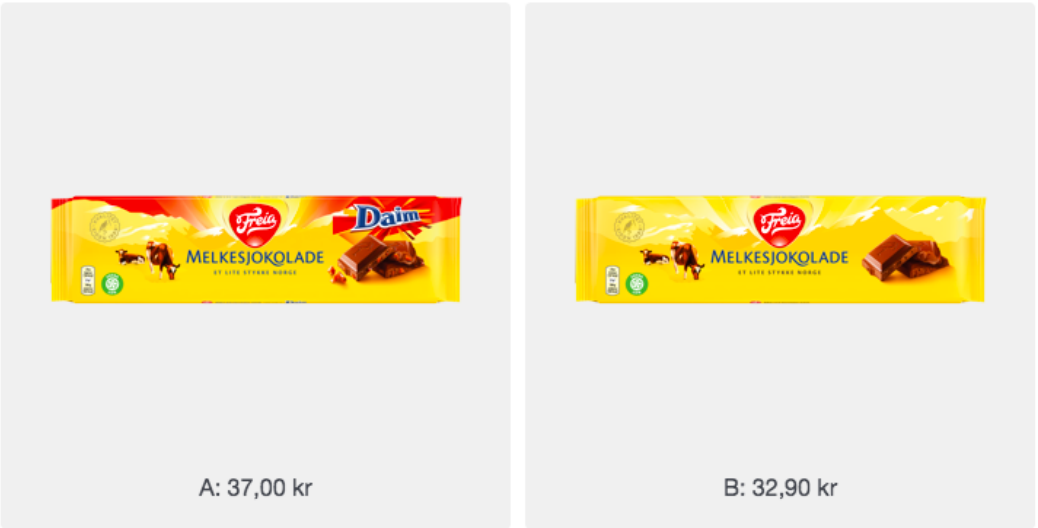


Figure A2.4: Taste of chocolate

How good do you think the products taste?

Hvor godt tror du produktene smaker?

Svært dårlig 1 2 3 4 5 6 Svært godt 7

A: Daim

B

A3 Control questions

Figure A3.1: Importance of ethical trade

How important is ethical trade for you in your choice of products?

Figure A3.2: Importance of eco- friendliness

How important eco-friendliness for you in your choice of products?

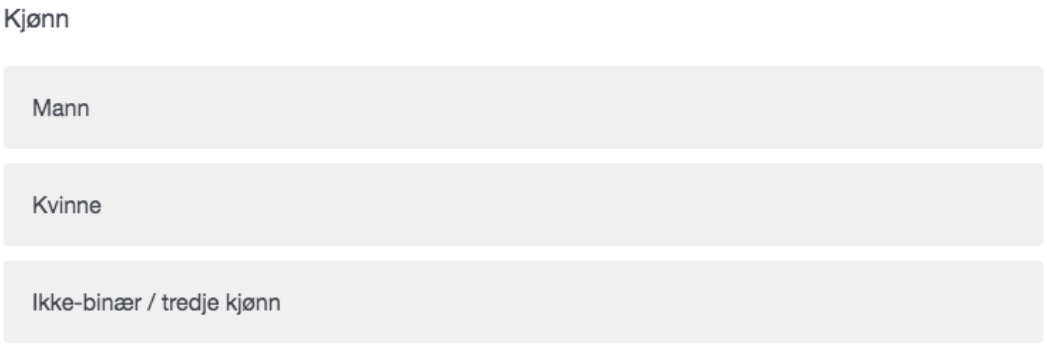
Figure A3.3: Importance of sugar

How important is sugar content for you in your choice of products?

Figure A3.4: Demographic control questions

(a) Age

(b) Gender



(c) Year of study

Figure A3.5: Grocery store

In which grocery store do you normally shop groceries?

A4 Variables and regressions

Table A4.1: Variables

Variable	Type of variable	Mean	Std. Dev	Min	Max	N
Dependent variables						
Choose B_{coffee}	Dummy	0.613	0.488	0	1	393
Choose $B_{detergent}$	Dummy	0.741	0.439	0	1	393
Choose B_{jam}	Dummy	0.738	0.440	0	1	393
Several B	Dummy	0.728	0.446	0	1	393
$Taste_{coffee}$	Ordinal	5.015	1.324	1	7	393
$Ethical_{coffee}$	Ordinal	3.850	1.480	1	7	393
$Efficiency_{detergent}$	Ordinal	5.487	1.345	1	7	393
$Environmental_{detergent}$	Ordinal	3.757	1.399	1	7	393
$Taste_{jam}$	Ordinal	4.949	1.205	1	7	393
$Health_{jam}$	Ordinal	3.151	1.258	1	7	393
Independent variables						
Treatment	Dummy	0.501	0.500	0	1	393
$Importance_{ethicaltrade}$	Ordinal	4.007	1.341	1	7	393
$Important_{ethics}$	Dummy	0.356	0.480	0	1	393
$Intermediate_{ethics}$	Dummy	0.290	0.453	0	1	393
$Non\text{-}Important_{ethics}$	Dummy	0.354	0.479	0	1	393
$Importance_{eco-friendliness}$	Ordinal	4.193	1.360	1	7	393
$Important_{eco}$	Dummy	0.433	0.496	0	1	393
$Intermediate_{eco}$	Dummy	0.280	0.458	0	1	393
$Non\text{-}Important_{eco}$	Dummy	0.270	0.458	0	1	393
$Importance_{sugarcontent}$	Ordinal	4.606	1.512	1	7	393
$Important_{sugar}$	Dummy	0.560	0.497	0	1	393
$Intermediate_{sugar}$	Dummy	0.219	0.414	0	1	393
$Non\text{-}Important_{sugar}$	Dummy	0.221	0.416	0	1	393
ProductB	Dummy	0.5	0.500	0	1	786
Control variables						
Female	Dummy	0.478	0.500	0	1	393
Age group*	Categorical	2.750	0.618	2	4	393
Year at NHH**	Categorical	3.173	1.651	1	6	393
Grocery store***	Categorical	2.830	2.024	1	7	393

*There are 4 age groups, shown in A3.4a. No participants were under 18.

**There are 5 years at NHH, and the possibility of spending an extra year.

***Grocery stores are shown in A3.5, where 1 is COOP and 7 is Other.

Table A4.2: Checking for covariate balance

	(1) Diff in means
Age group	0.0293
	(0.0624)
Gender	-0.0281
	(0.0505)
Year at NHH	0.0416
	(0.167)
$\text{Importance}_{Sugar}$	0.166
	(0.152)
$\text{Importance}_{Ethics}$	-0.0559
	(0.135)
Importance_{Eco}	-0.0804
	(0.137)
Grocery store	0.0246
	(0.204)
R^2	
Observations	393

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

None of the mean differences are statistically significant

Table A4.3: Estimation results of OLS regressions with control variables

	(1) B Coffee	(2) B Detergent	(3) B Jam	(4) Several B
treatment	0.326***	0.186***	0.0170	0.236***
	(0.0466)	(0.0437)	(0.0446)	(0.0430)
female	0.107**	0.0870**	0.147***	0.161***
	(0.0478)	(0.0439)	(0.0448)	(0.0429)
Age group=3	-0.0165	-0.0892	0.103	-0.00601
	(0.0727)	(0.0731)	(0.0674)	(0.0656)
Age group=4	0.0252	-0.0620	0.154*	0.114
	(0.104)	(0.0970)	(0.0920)	(0.0864)
Year at NHH=2	0.0298	0.0356	-0.120*	-0.00706
	(0.0764)	(0.0727)	(0.0708)	(0.0698)
Year at NHH=3	0.146	0.0486	-0.150*	0.0743
	(0.0891)	(0.0899)	(0.0858)	(0.0799)
Year at NHH=4	0.0116	0.136	-0.185**	-0.0106
	(0.105)	(0.0964)	(0.0922)	(0.0910)
Year at NHH=5	0.106	0.159*	-0.0566	0.0969
	(0.0901)	(0.0872)	(0.0787)	(0.0781)
Year at NHH=6	0.0936	0.0124	-0.183	-0.143
	(0.126)	(0.133)	(0.117)	(0.120)
Grocery store=2	-0.0802	-0.115**	-0.0341	-0.131**
	(0.0691)	(0.0562)	(0.0618)	(0.0578)
Grocery store=3	-0.0817	-0.0347	-0.0324	-0.0199
	(0.137)	(0.114)	(0.129)	(0.107)
Grocery store=4	0.0761	-0.00637	-0.923***	-0.0932
	(0.0755)	(0.0611)	(0.0746)	(0.0677)
Grocery store=5	0.269***	0.163*	-0.287	0.120
	(0.0977)	(0.0874)	(0.219)	(0.0912)
Grocery store=6	-0.103	-0.0817	-0.160	-0.246*
	(0.151)	(0.133)	(0.140)	(0.140)
Grocery store=7	-0.0120	-0.0376	-0.00225	-0.112
	(0.0832)	(0.0711)	(0.0777)	(0.0729)
Constant	0.401***	0.664***	0.712***	0.605***
	(0.0870)	(0.0726)	(0.0757)	(0.0712)
R^2	0.146	0.088	0.062	0.141
Observations	393	393	393	393

Standard errors in parentheses

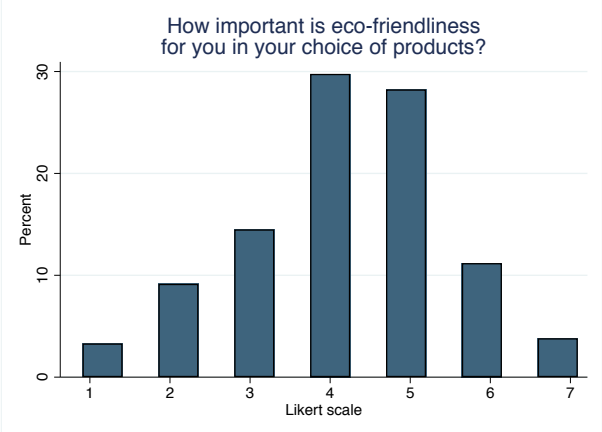
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A5 Distribution of importance questions

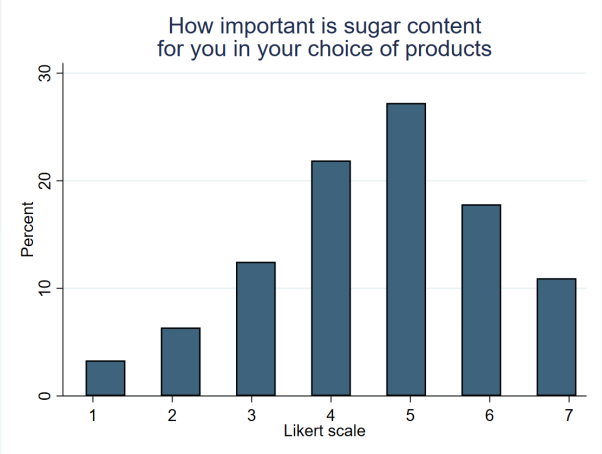
Figure A5.1: Importance of ethical trade, eco-friendliness and sugar content

(a) Ethical trade

(b) Eco-friendliness



(c) Sugar content



Sub-samples: Non-important; 1-3, Intermediate; 4, Important; 5-6