A Work Project, presented as part of the requirements for the Award of a Master's degree /Management from the Nova School of Business and Economics.

Does transparency pay? The influence of the Nutri-Score on consumers' purchase intention, attitude towards brand, and green perceived value

Paul Niklas Pape

Work project carried out under the supervision of:

Professor Catherine da Silveira

17-12-2021

Acknowledgments

This is my Master Thesis, which investigates the influence of the Nutri-Score on consumers' attitudes, purchase intention and green perceived value. This research was conducted as part of a Double Degree Programme, which is a combination of a Master's degree in International Business with a specialization in Strategy and Innovation from Maastricht University and a Master's degree in Management at Nova SBE.

First and foremost, I would like to thank my supervisor from Maastricht University, Prof. Dr. Wilko Letterlie, as well as my supervisor from Nova SBE, Prof. Dr. Catherine Silveira, for the pleasant cooperation and their very valuable feedback and guidance during the writing process. Furthermore, my thanks goes to all the people who participated in or forwarded my study, as they enabled me to conduct this research.

Paul Pape
Maastricht, December 2021

Abstract

The Nutri-Score is a front-of-pack, summary nutrition label gaining momentum in Europe. Using a mainly German sample, the online experiment conducted for this study aims to investigate the effect the Nutri-Score has on consumers' purchase intention, attitude towards brand, and green perceived value, and if it differs for private label brands and manufacturer brands. The results suggest no statistically significant effect of the Nutri-Score on the mentioned constructs, but they reaffirm that manufacturer brands compared to private label brands have a **c**ompetitive advantage when it comes to consumers' perceptions.

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

Table of Contents

1 Introduction

A lot of today's consumers look for healthier and more sustainable options when shopping for groceries (Grunert, 2017). A recent McKinsey report suggests that consumers in 2021 are more health and environmentally conscious than ever, which is expressed by the fact, that they are often willing to pay more for healthy and sustainable alternatives (McKinsey, 2021). This also leads to increased consumer demand for transparency about ingredients and nutritional quality (Elliot, 2021). Nevertheless, the current reality contradicts consumer demands: since 1975, the prevalence of obesity has tripled worldwide, with 39% of the global adult population being overweight in 2016 (World Health Organization, 2021), and the trend is intensifying globally (Bordirsky et al., 2020). Several research efforts hint at the role of ultra-processed food in fueling the obesity epidemic, especially in developed countries (Machado et al., 2020; Poti et al., 2017). The consumption of ultra-processed food is rising globally, but especially in those countries hit the hardest by the obesity crisis. In reaction to the situation, governments around the globe act and put new legislation into place, which on the one hand aims to improve the product quality food producers provide (Marotta et al., 2014; Scrinis & Parker, 2016; van der Bend & Lissner, 2019; Vyth et al., 2010). Swiburn et al. (2019) show that more than 40 countries worldwide have already enacted laws that, for example, raised taxes on sugary beverages. On the other hand, the legislation aims to improve transparency about the nutritional value of food (Scrinis & Parker, 2016). An example of this type of legislation are nutrition labels, which aim to promote healthier choices by making the nutritional information easier to recognize and understand (Cowburn & Stockley; 2005; Grunert & Wills, 2007; Nestle & Jacobson, 2000). In Europe, the Nutri-Score, a front-of-packaging label first introduced in France, is becoming increasingly popular among legislators, as it is already introduced in Germany, Belgium, Luxembourg, Portugal, and Spain, and soon the Netherlands.

Most of the literature investigating the Nutri-Score, and front of packaging labels in general, is focused on consumers' perceptions of tastiness and healthfulness (Ikonen et al., 2019). Another topic dominating the current research is how effective the Nutri-score is in reducing the consumption of fat, salt, sugar, or calories (Crocker et al., 2020). Yet, there is little research about how consumers' brand and product perceptions are influenced by the presence of the Nutri-Score or other front of package labels on products (Ikonen et al., 2019). In contrast, this research investigates if increasing transparency about the nutritional profile of a product by implementing the label is beneficial for companies by analyzing how the Nutri-Score label on food products influences consumers' purchase intention, attitude towards brand, and green perceived value. This investigation seems relevant, not only because there is a research gap but also because in most European countries that pledged to support the label, among them Germany and most likely the Netherlands (European Commission, 2021), the implementation is voluntary. Furthermore, the few existing studies do not focus on German consumers, while a survey conducted among them shows that 89% support a mandatory introduction of the Nutri-Score (De Temmerman et al., 2021; Foodwatch, 2020; Folkvord et al., 2021). This leaves managers at food companies and retailers with difficult strategic decisions as front-of-pack labels might affect consumers' product attitudes (Ikonen et al., 2019). Therefore, this research effort aims to answer the question:

Is there an effect of the Nutri-Score on consumers' attitude towards the brand, purchase intention, and green perceived value, and is this effect stronger for private label brand products compared to manufacturer brand products?

This study aims to make several contributions to the current state of literature. First of all, by adding a deeper understanding of the economic consequences of a Nutri-Score introduction, especially for different brand types. This is of particular interest, as manufacturer brands, which are branded by food manufacturers (Sethuraman & Cole, 1999), tend to lose market share to

private label brands, which are branded by retailers (Sethuraman & Cole, 1999; Cuneo et al., 2015). The potentially differential effect was only recently analyzed for the first time by De Temmerman et al. (2021), who investigated the impact using a sample from the Belgian region Flanders. This research effort adds to the previous study by aiming primarily at German consumers, thereby deriving insights for the German market, which is not only the second-largest in Europe, but also unique because of its high concentration and market share of discounters (Delfman et al., 2011; Savills, 2021). Third, for the first time, this study investigates if the Nutri-Score influences consumers' perception of the brand's ecological performance, which potentially yields insights for future positioning efforts, as sustainability is a significant trend shaping the food industry (Grunert, 2017; McKinsey, 2021).

In chapter 2, current literature is reviewed to enable these contributions, and hypotheses are derived. Secondly, in chapter 3 method, the research design is outlined. Chapter 4 introduces the techniques and results of the performed data analysis in the next step. Finally, in chapter 5, the results of this study are discussed, managerial implications and the theoretical contributions of this study are summarized, and the research limitations and directions for further research are outlined.

2 Literature review and hypotheses

The first subchapter of this part focuses on front-of-pack nutrition labeling, while the following focuses on the Nutri-Score as a specific label. Subsequently, it is examined why the implementation decision can be considered a strategic management challenge. Afterward, the theoretical foundations for the hypotheses proposed are explained, starting with the hypothesized influence the Nutri-Score has on attitude towards the brand and purchase intention. The following subchapter centers on the potential impact the Nutri-Score has on

green perceived value. The final one focuses on the expected difference of the effect for private label brands and manufacturer brands.

2.1 Front-of-pack nutrition labelling

To make food choices that are in line with recommendations for healthy eating behavior, consumers must simultaneously evaluate various nutrients. However, nutritional information is in most cases present as a label on the back of food products (Feunekes et al., 2008). Those labels are often hard to read, and consumers struggle to understand the provided information because of low health literacy or because they lack motivation to use them in general (Black & Rayner, 1992; Kivetz & Simonson, 2000; Malloy-Weir & Cooper, 2017; Van Kleef et al., 2008). In reaction, legislators introduced front-of-pack nutrition labels in many countries worldwide, and several designs are used (Food and Agriculture Organization of the United Nations, 2016). L'Abbe et al. (2012, p. 8) define front-of-pack labels as "simplified information about the most important nutritional aspects and characteristics of food". Grunert and Wills (2007) distinct between two types of front-of-pack labels. Nutrient-specific indicators, which provide detailed information, on the one hand, and summary indicators, which provide one overall score for the nutritional quality of a food product, on the other hand (Grunert & Wills, 2007; Ikonen et al., 2019). The following section focuses on the Nutri-Score, as this study investigates the label.

2.2 The Nutri-Score label

The Nutri-Score is a graded, front-of-packaging label that summarizes nutritional information (Grunert & Willis, 2007). It combines positive traits food products (e.g., protein and fiber) with negative characteristics (e.g., total sugar or saturated fatty acids) to achieve a score that is reduced to a letter (A to E) and a color (dark green to red) (Julia & Hercberg, 2017a). *Figure 1*

shows the score for a product in the C category. A is the category that reflects the highest nutritional quality, while the E category corresponds to the lowest nutritional value (Julia & Hercberg, 2017b). Thereby, the Nutri-Score allows consumers to recognize nutritional information concisely (World Health Organization, 2017b), and in addition, steers consumers towards buying healthier food products (Julia & Hercberg, 2017b). Moreover, the Nutri-Score is an incentive for companies in the food industry to improve the nutritional value of their products (Vyrth et al., 2010). The European Commission embraces a voluntary introduction (Julia & Hercberg, 2017b), and several national governments (e.g., Belgium, France, Germany, Spain) already introduced the score (De Temmerman et al., 2021). However, several food and retail industry companies have voiced support for a legal standard that would excel the Nutri-Score to the standard label used in the entire European Union (The European Consumer Organisation, 2020).

Figure 1

Nutri-Score label for a food product in category C

A lot of research focuses on comparing the Nutri-Score with other front-of-pack nutrition labels, and there is evidence that the Nutri-Score works comparably well (Ikonen et al., 2019). It is not only the easiest one to identify but also demands the least amount of time to be understood by consumers (Ducrot et al., 2015a; Egnell et al., 2018) while simultaneously being the label consumers prefer the most (Julia et al., 2017) and the one with the highest effect on consumers with low nutritional knowledge (Ducrot et al., 2015b). However, the impact of the

Nutri-Score on brand and product perceptions is under-researched (Ikonen et al., 2019). Studies exploring its influence on constructs like purchase intention were conducted only recently and are still very rare. In addition, the few existing studies have mixed results. Folkvord et al. (2021) found no effect of the Nutri-Score on purchase intention, attitude towards the brand, and tastiness perception. In contrast, De Temmerman et al. (2021) found an impact of the Nutri-Score on purchase intention, but only for healthy food products that belong to categories A and B. Therefore, managers at food companies and retailers alike face a challenging decision with incomplete information, which is described in the following subchapter.

2.3 Purchase intention and attitude towards brand

Grunert (2017) argues that advancing technology and changing customer needs are most influential in shaping the future of the food industry. A lot of consumers demand healthier food options, while more and more also demand more sustainable food options (Grunert, 2017; McKinsey, 2021). This leads to new brand positioning demands, which also have implications for product packaging. Packaging is of special importance for the purchasing process, as consumers are exposed to it at the point of purchase (De Pelsmacker et al., 2017), at which more than 70% of final purchase decisions happen (Nielsen, 2016). As its central aim is to convince consumers to buy food products that are healthier because of their better nutritional quality (De Temmerman et al., 2021), the Nutri-Score could influence consumers in their decision, as sustainability and health information can influence consumers' purchase intention (O'Rourke & Ringer, 2016). Nutrition labels exert their influence at the point of purchase, stimulating consumers to consider nutritional information before choosing (Gomez et al., 2017). Therefore, one can argue that the Nutri-Score tries to raise consumers' purchase intentions for healthier food. *Purchase intention*, per Spears and Singh (2004), can be defined as "an individual's conscious plan to make an effort to purchase a brand.". Schlosser et al. (2006)

describe purchase intention as the probability a customer will purchase a product from a company without considering his or her purchase history with different firms.

Huang & Lu (2016) suggest that the role of marketing activities aiming to influence customers in the purchasing process is more important than ever before. Their findings reveal that consumers consider nutritional quality to be a crucial factor that influences purchase intention. In addition, consumers' attitudes and beliefs, for example regarding the healthiness or quality of a product, affect them when they choose food (Sheperd et al., 1995). Mainly consumers' beliefs regarding nutritional quality could be influenced by labels like the Nutri-Score and therewith play a role in the purchasing process by allowing people to assess the nutritional quality of different products conveniently and make a consumption choice based on this assessment (Egnell et al., 2018; Sheperd et al., 1995). Therefore, it is predicted that:

Hypothesis 1 (H1): Consumers exposed to a food product with the Nutri-Score label have a more positive purchase intention towards the product than those exposed to a food product without the Nutri-Score.

Moreover, the Nutri-Score might influence consumers' attitudes towards the product's brand.

Attitude toward the brand can be defined as an "individual's internal evaluation of the brand" (Mitchell & Olson, 1981, p. 318). Today, most consumers have access to a broad range of food products, which means choices are becoming increasingly complex (Neumark-Sztainer et al., 1999). If products are indistinguishable based on their core attributes, producers must attract consumers' attention using different features (Clement et al., 2013). One example is packaging, which is a critical element of customers' purchasing process. It exerts its influence at the point of purchase (De Pesmacker et al., 2017), where over 70% of purchase decisions are made (Nielsen, 2016). There is evidence that especially decisions about healthy food choices can be majorly influenced by packaging (Gutjar et al., 2014; Hallez et al., 2020). Furthermore, even though attitudes can be considered comparably long-lasting, marketing actions highlighting a

product's specific attributes can influence them (Olsen et al., 2014). More specifically, favorable nutritional declarations can enhance attitudes toward the product (Berry et al., 2017; Grunert & Wills, 2007; Kozup et al., 2003; Olsen et al., 2014). Therefore, it is predicted that: **Hypothesis 2** (H2): Consumers exposed to food products with a Nutri-Score label will have a more positive attitude towards the brand than consumers exposed to food products without the Nutri-Score.

2.4 Green perceived value

This study also investigates if the presence of the Nutri-Score might influence consumers' green perceived value. In general, perceived value as a concept relates to a consumer's evaluation of the net benefit of a service or product, with consumer appraisal shaping the evaluation (Bolton & Drew, 1991; Patterson & Spreng 1997). Perceived value is important, as there is evidence that it not only has a positive influence on marketing performance (Sweeney et al., 1999) but also influences consumers' purchase intention (Steenkamp & Geyskens, 2006; Zeithaml, 1988; Zhuang et al., 2010). Because of increasing environmental consciousness, Zhen and Chang (2011) argue that a new concept is needed to capture the perceived environmental value of a product, which these authors call green perceived value and define, following Peterson and Spreng (1997), as "a consumer's overall appraisal of the net benefit of a product or service between what is received and what is given based on the consumer's environmental desires, sustainable expectations, and green needs" (Zhen & Chang, 2012 p. 505).

Perceived green value might influence the Nutri-Score because of a halo effect. To evaluate how environmentally friendly a food product poses a challenge to consumers because they need to consider a variety of product characteristics, which are often conflicting (Tobler et al., 2011). Moreover, Alvarado-Herrera et al. (2017) not only argue that consumers use basic decision rules and heuristics when they think about a company's corporate social responsibility (CSR)

efforts, but also that a lack of information about efforts in one CSR dimension might evoke a halo effect (Nisbett & Wilson, 1977), whereby the knowledge about one CSR dimension affects consumer's judgment regarding other CSR dimensions. Inferences based on a halo effect often occur when consumers face situations characterized by incomplete information (Burton et al., 2014). This is in line with Siegrist et al. (2015), whose results suggest that consumers' lack of knowledge about the environmental performance of food products evoke a halo effect. Furthermore, as only a tiny percentage of the food products available to customers currently features the Nutri-Score label, companies who adopt the score are likely to be perceived as early adopters of this CSR practice, which best fits into the social dimension of CSR (Alvarado-Herrera et al. 2017; Frynas, 2015;). The early adopter status, in combination with customers wide-ranging approval of the score (Foodwatch, 2020) and the described potential halo effect, leads to the prediction that:

Hypothesis 3 (H3): Consumers who see a food product with the Nutri-Score label on it have a higher perceived green value, compared to those who see a food product without the Nutri-Score on it.

2.5 Manufacturer brands and private label brands

As there are different types of brands, the Nutri-score might have different effects for distinct brand types. Sethuraman and Cole (1999, p. 340) define *private label brands* as "brands owned, controlled, and sold exclusively by retailers". In contrast, *manufacturer brands* can be defined as "products that are owned and branded by manufacturers" (Chimhundu, 2018, p. 80). In line with its continuing implementation across Europe, private label brands and manufacturer brands have already added the Nutri-score to their packaging. This includes industry leaders like *Danone*, *Nestlé*, *McCain*, and *Bonduelle* on the manufacturer brand side and prominent retailers like *Auchan*, *Intermache*, *Carrefour* in France, *Colruyt* and *Delhaize* in Belgium, and

recently *REWE* in Germany on the retailer or private label brand side (De Temmerman et al., 2021; REWE, 2021). There is evidence that consumers have a higher level of confidence regarding manufacturer brands when compared to private label brands (Underwood & Klein, 2002). The prediction of potentially differing effects of the Nutri-Score on distinct brand types is supported by the fact that consumers who predominately buy manufacturer brands have a very high level of brand awareness, which leads them to maximize the share of branded products in their shopping cart, as they appreciate them more (Goldsmith et al., 2010). In contrast, consumers of private label brands are more price-sensitive and more often switch to alternatives when prices increase compared to consumers who mainly buy manufacturer brands, which hints at lower brand loyalty (Goldsmith et al., 2010). Furthermore, studies investigating health claims have found that familiarity with a brand restricts the effect of those on consumers (Aschemann-Witzel et al., 2013; Moon et al., 2011).

The described findings of previous studies lead to the prediction that consumers, due to lower brand awareness and loyalty, might react stronger to the Nutri-Score on the packaging of private label brand products. Therefore, it is predicted that:

Hypothesis 4 (H4): The effect of the Nutri-Score on brand perception, purchase intention, and perceived green value are stronger for private label brand products than for manufacturer brand products.

3 Method

This part first outlines the research design, then elaborates on the sample choice, and afterward describes the procedure of the study. In a final step, the measures used are assessed in detail.

3.1 Research design

A 2 x 2 between-groups design (with Nutri-Score vs. without Nutri-Score and manufacturer brand vs. private label brand) was used to test the hypothesis proposed. The first independent variable was the presence of the Nutri-Score, with the levels with Nutri-Score and without Nutri-Score. In combination with the control variables, this variable was used to test H1, H2, and H3. The second independent variable used to test H4 was manufacturer brand, with the levels manufacturer brand product and private label brand product. The dependent variables were attitude towards the brand, purchase intention of the food product, and perceived green value of the food product. As the survey primarily aimed at respondents in Germany and the Netherlands, three existing ketchup bottles were used, all of which received an accurate Nutri-Score label. Ketchup was chosen as a stimulus because it is an ultra-processed food product and, according to the Nutri-Score classification, comparably unhealthy, as all kinds of ketchup used are in the C category. Furthermore, it is a vegan product, which is relevant, as 2% of the German population are vegan and 10% are vegetarian (Forsa, 2021). In addition, the brand Heinz is an iconic manufacturer brand that a high share of consumers should recognize.

To ensure that participants can make a distinction between the private label brand and manufacturer brand products, different stimuli were used for Dutch and German participants. Based on the answer to the question regarding their primary living location, Dutch and participants from other European countries were shown the ketchup of ah, the private label brand of Dutch supermarket chain Albert Hjein. In contrast, German participants were shown the ketchup of ja!, which is the private label brand of the German supermarket chain REWE.

For both groups, the branded product used was the Heinz ketchup, which is sold in similar packing at Albert Hjein in the Netherlands and REWE in Germany. Participants were randomly assigned to one of the four conditions: manufacturer brand with Nutri-Score, manufacturer brand without Nutri-Score, private label brand with Nutri-Score, and private label brand without Nutri-Score, each of them exclusively exposed to one condition. This creates the possibility to analyze differences between the groups (Burns & Burns, 2008). *Figure 2* depicts the stimuli without the Nutri Score label, while *Figure 3* shows the stimuli with the label.

Figure 2

Stimuli without Nutri-Score label

Figure 3

Stimuli with Nutri-Score label

Note. Yellow circles were added to increase readability but were not part of the stimulus used in the experiment.

3.2 Sample

The data for this research effort was gathered using the online survey tool Qualtrics. The main targets of this research were Dutch and German consumers above the age of 18, with everyone who goes grocery shopping being part of the target group. This study used a convenience sampling approach to gather respondents, which has the downside that not every consumer group has the same chance to appear in the sample (Mutz, 2011). Nonetheless, this approach enables quick data collection, which was necessary due to the limited time frame available for this investigation. Participants were recruited using the snowball sampling method (Ghaljaie et al., 2017), with the survey being distributed via WhatsApp, Facebook, LinkedIn, Instagram, and Email to sample a wide variety regarding age, educational level, and gender. A donation pledge of 50 cents per participant for the United Nations World Food Programme was made as an incentive to participate, as the total number of participants strongly depends on peoples' willingness to fill in the questionnaire. All respondents participated voluntarily and gave their consent to participate in the study.

Moreover, it is crucial to determine how large the sample needs to be for robust statistical testing (Field, 2012). In this study, ANOVA, ANCOVA, unpaired t-tests, and Wilcoxon tests are used, to determine whether groups differ (VanVoorhis & Morgan, 2007). Cohen (1998) states that a minimum of 30 participants per cell is required for such analysis, given a medium to large effect size. As the two-way ANOVAs conducted to test H4 have four cells, the required number of participants is 4*30 = 120. However, if the effect expected effect size is small, more observations are needed (Aron & Aron, 1999). As the potential effect size is hard to approximate because of the limited availability of prior research, 120 participants should be considered the minimum.

Furthermore, to increase the robustness of the results, the survey included questions to check if respondents pay attention (Kung et al., 2018) and ensure they do reject ketchup. Rejection was

measured on a 5-point Likert scale with the item “I like ketchup.”, with a strongly disagree or disagree answer being considered rejection. This enables to exclude participants who either fail the attention or the rejection check from further analysis, as their answers might bias the findings.

3.3 Procedure

At the beginning of the survey, demographic questions about primarily living location, age, education level, gender, household composition, and attitude towards healthy eating were asked. Afterward, the participants were introduced to the scenario and were shown the image of the product. All participants were randomly assigned to the different stimuli. Next, the participants were asked questions about their attitude towards the brand, purchase intention, and green perceived value. Following, a manipulation check question was asked, and finally, respondents were thanked for their participation. The whole questionnaire used in this study is shown in Appendix A.

3.4 Measures

The constructs, purchase intention of the food product, attitude towards the brand, and green perceived value, were developed to measure the effect of the Nutri-Score label. In accordance with Folkvord et. al (2021), purchase intention was measured with five items based on the purchase intention scale of Baker and Churchill (1977). Respondents had to answer the following questions: “I would like to try this product”, “I would like to buy this product if I see it in a supermarket”, “I would actively seek out to buy this product in the supermarket”, “I would recommend this product to others”, and “I would be willing to buy this product”. All five items were answered on a seven-point Likert scale ranging from strongly disagree to strongly agree.

The second dependent variable, attitude towards the brand, was, per Spears and Singh (2004) and, based on Folkvord et al. (2021), operationalized using a seven-point semantic differential scale with four items. Participants had to answer the statements “I find this brand…” appealing/unappealing, likable/unlikable, bad/good, favourable/unfavourable.

The final construct assessed was green perceived value (Chen & Chang, 2012), which was measured using five items, each of which was rated on a seven-point Likert scale ranging from strongly disagree to strongly agree. The five included are: “This product’s environmental functions provide very good value for me.”, “This product’s environmental performance meets my expectations.”, “I would purchase this product because it has more environmental concern than other products.”, “I would purchase this product because it is environmental friendly.”, and “I would purchase this product because it is environmental friendly.”.

3.5 Control variables

A variety of control variables was included in the study. Besides demographics (age, gender, primary living location, education), taste perception, household composition, and dieting regime were included. First, taste perception is highly influential in the decision process for food products (Connors et al., 2001) and was observed to be opposed to consumers' thoughts regarding health (Folkvord et al., 2021). Furthermore, consumers tend to be less satisfied with the taste of healthier products purchased (Connors et al., 2001), and health claims indicated by front-of-pack labeling are often perceived as ambivalent to taste perception (Liem et al., 2012). Taste perception was measured using the item "This product seems tasty.", which could be answered on a five-point Likert scale ranging from strongly disagree to strongly agree.

Besides, participants' attitude towards healthy eating was included as a control variable (Feunekes et al., 2008), as consumers who control their food selection are more prone to use nutrition labels (Ollberding et al., 2011; Soederberg Miller et al., 2015). Participants were asked

the question, "Which one of the following statements do you think best describes your personal attitude towards healthy eating?". Respondents could choose one of the following statements as an answer: "Have to follow a special diet because of a specific health need", "Eat a healthy diet because it helps keep me fit and well", "Try to eat a healthy diet but find it hard to stick to" or "Eat what I like and do not worry about how healthy it is".

Finally, the household composition was added as a control variable (Feunekes et al., 2008). Participants were asked the question "Do you live in a household with your kids?" and could answer with one of the following statements: "Yes, and they are below the age of 12", "Yes and they are between 12 and 18", "Yes and they are above 18", "No, but I have kids", and "No, I don't have kids".

3.6 Manipulation check

A manipulation check question was included in the survey to measure whether the manipulation with the Nutri-Score was effective (Folkvord et al., 2021). Participants were asked: “Did you see any additional labels on the food product?”, which could be answered with “yes” or “no”. If participants answered “yes”, the follow-up question “Please describe what the additional label looked like” was answered using a text box.

4 Data analysis and results

This chapter presents the results of the data analysis performed. The first subchapter outlines the analysis strategy, while the second focuses on the characteristics of the sample. Afterward, the results of scale reliability analysis are presented. Subsequently, the hypotheses are tested using different statistical tests. Unless stated otherwise, a significance level of $\alpha = 0.05$ is used for all tests conducted.

4.1 Analysis strategy

The data gathered in the online experiment was analyzed using the statistical program R. In a first step, the data was prepared by renaming variables and removing 41 incomplete responses and respondents who failed the attention or rejection check. Afterward, unpaired two samples t-tests, unpaired two-sample Wilcoxon tests, and type III sum of squares ANCOVA were used to test hypotheses 1, 2, and 3, with one of the latter being conducted for every dependent variable (Field et al., 2012; Flora 2018). Moreover, type III sum of squares two-way ANOVA was used to test hypothesis 4 (Field et al., 2012; Flora 2018).

4.2 Sample characteristics

In total, 354 people opened the link to the survey and took part in the conducted online experiment, while 313 people (59% female, M_{age} = 26.32, SD = 6.75) completed the whole survey. Of those 313 participants, 52 failed the attention check and were removed from the sample. Of the remaining 261 respondents, 45 rejected ketchup and were eliminated for further analysis, whereby a strongly disagree or disagree answer to the rejection check item "I like ketchup." was considered a rejection. Therefore, the final sample for further analysis contained 216 observations (61% female, M_{age} = 25.95, SD = 5.62). Of those, 111 belonged to the experimental group (with Nutri-Score) and 105 to the control group (without Nutri-Score). Besides, 181 (84%) of the responses came from participants who lived in Germany during the last year, and the sample mainly consisted of highly educated people, as 166 (76%) of the respondents got at least a bachelor's degree, and only four participants just attended secondary school. Therefore, the binary variable *Location b* was created, indicating whether the participant was based in Germany during the last year. Moreover, no more than ten people (4.5%) in the sample got kids, and the majority, 166 participants (77%), eat healthily or try to do so.

Furthermore, a manipulation check was included to inspect if the manipulation had the intended effect. To achieve this, it was examined if the participants who were part of the experimental group recognized the Nutri-Score. Of the 111 people in the final sample who were exposed to a food product with the Nutri-Score, 82 (74%) indicated that they saw an additional label. Qualitative analysis of the text entries made by respondents who answered "yes" showed that 77 (94%) of them typed in answers that match the characteristics Nutri-Score as defined in the literature review section of this study. Therefore, one can consider the manipulation of the different stimuli to be effective (Folkvord et al., 2021).

4.3 Scale reliability

As the validity of the measurement scales was already proven by previous Studies (Baker & Churchill, 1977; Spears & Singh, 2004; Folkvord et al., 2021; De Temmerman et al., 2021), only reliability analysis was conducted. Reliability of scales should be analyzed for constructs composed of more than two items (Field et al., 2012), which is the case for *purchase intention*, *attitude towards brand*, *green perceived value*. Internal consistency of the scales was analyzed using Cronbach's alpha, and Appendix B depicts the results of the performed reliability analysis in detail. In summary, all constructs had good scale reliability, with Cronbach Alpha values ranging from 0.84 to 0.93

4.4 Unpaired sample tests

The hypotheses were tested using a variety of statistical tests. *Table 1* depicts the measured variables for the experimental (with Nutri-Score on the product) and control group (without Nutri-Score on the product).

Table 1

Variables measured for the without Nutri-Score and with Nutri-Score Condition (n = 216).

Variable	Without Nutri-Score (*n* = 105) Mean (*SD*)	With Nutri-Score (*n* = 111) Mean (SD)
Age	26.28 (5.88)	25.64 (5.37)
Gender (female)	61.0%	60.4%
Location (Germany)	84.8%	82.9%
Education (Bachelor)	60.0%	54.1%
Attitude towards healthy eating (Sticks to healthy diet / tries to)	83.8%	70.3%
Tastiness	3.51 (0.82)	3.49 (0.89)
Manufacturer Brand (present)	59.1%	47.8%
Purchase Intention	4.10 (1.42)	4.02 (1.54)
Attitude Towards Brand	4.65 (1.17)	4.60 (1.23)
Green Perceived Value	2.87 (1.17)	2.87 (1.29)

Note. For categorical variables, the category with the highest share of the sample is shown as a percentage, while for continuous variables, mean and standard deviation are depicted.

Table 1 shows that the means of *purchase intention* and *attitude towards brand* are marginally higher for the control than for the experimental group. At the same time, *green perceived value* is equal in both groups, contrary to the stated hypothesis H1, H2, and H3, as the expectation was that the means of all three dependent variables would be higher in the experimental group. To test if the marginal difference in the means is significant, the first three unpaired two samples *t*-tests were conducted to compare the means of *purchase intention*, *attitude towards brand*, and *green perceived value* between the control and the experimental condition (Field et al., 2012).The *t*-tests for *purchase intention*, $t(214) = -0.40$, p 0.69, *attitude towards brand*, $t(214) = -0.30$, p 0.77), and *green perceived value*, $t(214) = 0.04$, p 0.97), revealed no statistical significant difference between the groups.

To assess the robustness of the results, it is essential to check if the assumptions for the conducted statistical tests are met (Field et al., 2012). First, the dependent variable should be

measured on at least an interval scale (Field et al., 2012), which is the case for all three dependent variables, as they are measured on a 7-point Likert scale. Second, the between-subjects factor must consist of two independent groups (Field et al., 2012), which is valid for the between-subjects factor *Nutri-Score*, as each participant was randomly distributed to only one condition. Third, the data should be checked for outliers (Field et al., 2012; Flora, 2018). As no extreme outliers were detected, all observations remained in the sample for further analysis. Fourth, the variance in both groups should be the same for every dependent variable under investigation (Field et al., 2012; Flora, 2018). To asses this, a F-test was conducted for each dependent variable to test for homogeneity in variances. The results for *purchase intention*, $F(104,110) = 1.18$, $p = 0.40$), *attitude towards brand* $F(104,110) = 1.11$, $p = 0.59$), and *green perceived value* $F(104,110) = 1.2$, $p = 0.35$), indicate that the homogeneity of variance assumption was met. Fourth, the dependent variables should follow a normal distribution within the groups (Field et al., 2012). Thus, normality was checked six times using Shapiro-Wilk tests (Field et al., 2012). The results show, that the distribution of *purchase intention* in the with Nutri-Score condition ($W = 0.97$, $p = 0.03$) and in the without Nutri-Score condition ($W = 0.97$, $p = 0.01$) depart significantly from normality. The same is true for the distribution of *green perceived value* in the with Nutri-Score ($W = 0.95$, $p < 0.01$) and in the without Nutri-Score condition ($W = 0.96$, $p < 0.01$). In contrast, the results of the Shapiro-Wilk tests conducted for the distributions of *attitude towards brand* in the without Nutri-Score condition ($W = 0.98$, $p = 0.06$), and in the with Nutri-Score condition ($W = 0.99$, $p = 0.25$) did not show evidence of non-normality. However, it must be considered that the p-value of the test conducted for the without condition exceeded alpha only by a tiny margin.

Because of the violated normality assumption, additional non-parametric tests were conducted (Field et al., 2012). More specifically, a Wilcoxon rank-sum test with continuity correction was conducted for every dependent variable. The results of the Wilcoxon tests conducted for

purchase intention (W = 5598, p = 0.62), *attitude towards brand* (W = 5710, p = 0.80), and *green perceived value* (W = 5756, p = 0.88) indicate, that there is no statistically significant difference between the with and without Nutri-Score condition regarding the dependent variables, and therewith support the previous findings.

4.5 ANCOVAs

Three ANCOVAs were conducted to check the influence of covariates on all three dependent variables (Field et al., 2012; Flora, 2018). To ensure robustness of the result, additional assumptions need to be checked when conducting an ANCOVA (Field et al., 2012; Flora, 2018). First, the assumption of independence of covariate and treatment was checked by conducting ANOVAs with *Nutri-Score* as the independent variable and the covariates as dependent variables (Field, 2013; Flora, 2018). The results for *Age*, $F(1,214) = 0.69$, $p = 0.41$, *Gender*, $F(1,214) = 0.30$, $p = 0.58$, *Location,* $F(1,214) = 0.03$, $p = 0.87$, *Education*, $F(1,214) = 0.003$, $p = 0.96$, *Attitude towards healthy eating,* $F(1,214) = 2.72$, $p = 0.10$, *Tastiness*, $F(1,214) = 0.06$ $p = 0.8$, and *Manufacturer brand*, , $F(1,214) = 2.78$, $p = 0.10$, indicate, that the assumption is met, as no main effect of *Nutri-Score* on a covariate was significant.

Second, the homogeneity of regression slopes assumption was checked by conducting seven ANOVAs, for each combination between the depended variables *purchase intention*, *attitude towards brand*, and *green perceived value*. Those ANOVAs included the interaction effect of *Nutri-Score* and the covariates, to see if there is a significant interaction between any of the covariates and the grouping variable *Nutri-Score* (Field et al., 2012; Flora, 2018). The results of those ANOVAs are shown in *Table 2*.

Table 2

Results of ANOVAs examining the interaction effect between Nutri-Score and covariates

Dependent Variable / Covariate	*F* Statistic	p-value
Purchase intention		
Nutri-Score * Age	F (1,212) = 0.75	0.39
Nutri-Score * Gender	F (1,212) = 1.28	0.26
Nutri-Score * Location	F (1,212) = 0.53	0.47
Nutri-Score * Education	F (1,212) = 0.01	0.99
Nutri-Score *Attitude towards healthy eating	F (1,212) = 0.01	0.91
Nutri Score *Tastiness	F (1,212) = 0.73	0.39
Nutri-Score *Manufacturer brand	F (1,212) = 0.93	0.34
Attitude towards brand		
Nutri-Score * Age	F (1,212) = 0.83	0.37
Nutri-Score * Gender	F (1,212) = 2.28	0.13
Nutri-Score * Location	F (1,212) = 0.19	0.67
Nutri-Score * Education	F (1,212) = 0.01	0.92
Nutri-Score *Attitude towards healthy eating	F (1,212) = 0.03	0.87
Nutri Score *Tastiness	F (1,212) = 0.01	0.97
Nutri-Score *Manufacturer Brand	F (1,212) = 1.87	0.17
Green perceived value		
Nutri-Score * Age	F (1,212) = 0.07	0.78
Nutri-Score * Gender	F (1,212) = 0.18	0.68
Nutri-Score * Location	F (1,212) = 1.10	0.30
Nutri-Score * Education	F (1,212) = 0.02	0.89
Nutri-Score *Attitude towards healthy eating	F (1,212) = 0.27	0.60
Nutri Score *Tastiness	F (1,212) = 0.46	0.50
Nutri-Score *Manufacturer brand	F (1,212) = 0.01	0.99

Note. All ANOVAs were conducted using a significance level of 0.05

As the results presented in *Table 2* indicate, there was no significant interaction effect between Nutri-Score and any covariates. Therefore, the homogeneity of regression slopes and the additional assumptions required for ANCOVA were met.

he unequal number of cases in each group, due to the removal of respondents who failed the attention check or rejected ketchup, indicates, that the design is unbalanced. As in addition the normality assumption was violated, three type III sum of squares ANCOVAs were run. The results are provided in Appendix C and summarized below.

Purchase intention. To check whether the presence of the Nutri-Score influences purchase intention a between-subjects ANCOVA with *Age*, *Gender*, *Location_b, Education, Healthy_eating, Tastiness*, and *Manufacturer brand* as covariates was conducted. No significant main effect of *Nutri-Score* was found ($F(1,207) = 0.02$, $p = 0.89$), and *Gender*

F(1,207) = 0.19, *p* = 0.67, *Location b F*(1,207) = 0.16 , *p* = 0.69, *Education F*(1,207) = 1.41, *p* = 0.24, also had no significant effect on *purchase intention*. However, *Age F*(1,207) = 4.21, *p* = 0.04, *Healthy eating F*(1,207) = 7.90, *p* = 0.04*, Tastiness*, *F*(1,207) = 90.02, *p* < 0.01*,* and *Manufacturer brand*, *F*(1,207) = 33.76, *p* < 0.01*,* all had an significant effect on *purchase intention*.

Attitude towards brand. To check whether the presence of the Nutri-Score influences *Attitude towards brand* a between-subjects ANCOVA with *Age*, *Gender*, *Location b*, *Education*, *Healthy eating, Tastiness*, and *Manufacturer brand* as covariates was run. No significant main effect of *Nutri-Score* was found (*F*(1,207) = 0.17, *p* = 0.68), and *Gender* (*F*(1,207) = 0.28, *p* = 0.60), *Location b F*(1,207) = 0.22, *p* = 0.64, *Education F*(1,207) = 0.00, *p* = 0.99, and *Healthy eating F*(1,207) = 1.19, *p* = 0.28, also had no statistically significant influence. In contrast, the covariates *Age*, *F*(1,207) = 4.30 , *p* = 0.04, *Tastiness F*(1,207) = 66.88, *p* < 0.01, and *Manufacturer brand, F*(1,207) = 62.44, *p* < 0.01, had a statistically significant influence on *attitude towards brand.*

Green perceived value. To check whether the presence of the Nutri-Score influences *Green perceived value*, a between-subjects ANCOVA with *Age*, *Gender*, *Location b*, *Education, Healthy eating, Tastiness*, and *Manufacturer brand* as covariates was conducted. There was no significant main effect of *Nutri-Score* (*F*(1,207) = 0.01, *p* = 0.92), and *Age, F*(1,207) = 0.14, *p* = 0.70, *Gender , F*(1,207) = 0.03, *p* = 0.86, *Education , F*(1,207) = 0.10, *p* = 0.74*, Healthy eating , F*(1,207) = 0.35, *p* = 0.56*,* and *Manufacturer brand, F*(1,207) = 2.99, *p* = 0.09, did not influence *Green perceived value* in a statically significant way. Nevertheless, *Location b*, F(1,207) = 13.75, *p* < 0.01, and *Tastiness , F*(1,207) = 5.39, *p* = 0.02, had an significant influence on *green perceived value*.

In summary, the results of all statistical tests conducted yield no support for the hypotheses that purchase intention (H1), attitude towards brand (H2), and green perceived value (H3) are higher

for products with a Nutri-Score on them compared to products without the label being present, with the means of purchase intention and attitude towards brand even being marginally higher for the control group.

4.6 Two-way ANOVAs

Even though the previous results do not indicate statistically significant differences between the control and experimental group, three two-way type III ANOVAs (Field et al., 2012; Flora, 2018) were used to finally determine if the interaction effect between Nutri-Score and Manufacturer brand is significant, and therewith if the effect of the Nutri-Score was stronger for the private label brands than for the manufacturer brand (H4). *Table 3* provides an overview about the product related variables for manufacturer brand and private label brand products.

Table 3

Variables measured for manufacturer and private label brand products (n = 220).

Variable	**Manufacturer Brand (*n* = 115) Mean (*SD*)**	**Private Label Brand (*n* = 101) Mean (SD)**
Tastiness	3.82 (0.68)	3.14 (0.89)
Purchase Intention	4.77 (1.27)	3.25 (1.27)
Attitude Towards Brand	5.28 (0.89)	3.87 (1.06)
Green Perceived Value	3.09 (1.28)	2.62 (1.12)

Table 3 displays that consumers favored the manufacturer brand product compared to the private label brand product, as the averages for each variable are higher for the manufacturer brand. This is underlined by the results of the conducted two-way ANCOVAs, which are shown in Appendix D and summarized below.

Purchase intention. While the effect main effect of *Manufacturer brand* was statistically significant, $F(1,212) = 45.83$, $p < 0.01$, neither the main effect of *Nutri-Score*, $F(1,212) = 0.89$,

$p = 0.35$, nor the interaction effect between *Nutri-Score* and *Manufacturer brand*, $F(1,212) = 1.87$, $p = 0.17$, are.

Attitude towards brand. The main effect of *Manufacturer brand* was statistically significant, $F(1,212) = 70.24$, $p < 0.01$, the main effect of *Nutri-Score*, $F(1,212) = 0.89$, $p = 0.35$, and the interaction effect between *Manufacturer brand* and *Nutri-Score*, $F(1,212) = 1.87$, $p = 0.17$, were not.

Green perceived value. Again, the main effect of *Manufacturer brand* was significant, $F(1,212) = 4.01$, $p = 0.04$, while neither the main effect of *Nutri-Score*, $F(1,212) = 0.14$, $p = 0.71$, nor the interaction effect between *Nutri-Score* and *Manufacturer brand*, $F(1,212) = 0.01$, $p = 0.99$, were.

In conclusion, Nutri-Score does not differently effect consumers' *purchase intention*, *attitude towards brand*, and *green perceived value*, when placed on a private label brand or manufacturer brand product (H4), as none of the interaction effects was statically significant, therewith indicating that H4 is rejected.

5 Discussion

The conducted data analysis shows that the presence of the Nutri-Score on a food product does not increase purchase intention, attitude towards brand, and green perceived value of participants, and that there is no difference in the effect for manufacturer and private label brands. Due to this evidence, all four of the proposed hypothesis are rejected. These findings are in line with those of Folkvord et al. (2021), who also conducted an online experiment using different snack bars as stimuli and a Dutch sample and found no significant effect of the Nutri-Score on consumers' attitudes, taste perception, and purchase intention. The results also support the findings of De Temmerman et al. (2021), who, in their conducted experiments using products from different categories and a sample consisting mainly of Belgian citizens, also

found no influence of the Nutri-Score categories C, D, and E on purchase intention. Furthermore, this study reaffirmed that manufacturer brands have an advantage compared with private label brands regarding purchase intention and consumers' attitudes towards a brand.

Due to the manipulation check results, participants did clearly recognize the manipulation with the Nutri-Score, which leads to the question, what explains the non-significant effect. Ketchup is an unhealthy food product, which could explain the non-significance of the effect, as many consumers could be already aware of the low nutritional quality. But why do consumers make unhealthy choices? Unhealthy food products are an example of *virtue products* (Kivetz & Keinan, 2006; Thomas et al., 2011). Virtue products are characterized by providing immediate benefits and delayed "costs" (Yan et al., 2017). Unhealthy food products often provide immediate pleasure when consumed, such as a pleasing taste experience, but have negative long-term consequences, such as obesity or diabetes (Wertenbroch, 1998). This relates to the fact that consumers' value and quality perceptions are not driven solely by perceived healthiness but are complex constructs. Customers do not always care if a product is healthy, and especially unhealthy food can have a high hedonistic value, which refers to a high consumption pleasure (Sethuraman & Cole, 1999; Yim et al., 2014).

In addition, the sample was young and very well educated, which hints at a high nutrition literacy (Svendsen et al., 2021; Taylor et al., 2019). Therefore, especially the sample group should be able to assess if the product is healthy or not, thereby making the information provided by the Nutri-Score ubiquitous. In summary, one could assume that the effect was non-significant because of the characteristics of the food product (stimulus) and the sample. Additional possible explanations are discussed in the limitations section.

5.1 Theoretical contributions

This study mainly adds to the current academic discourse in three ways. First, it contributes to the research strain into packaging. This research goes beyond previously conducted research by focusing on the effects of a single front-of-pack label, the Nutri-Score, instead of comparing several ones regarding their effectiveness (Julia et al., 2017; Ikonen et al., 2019; Talati et al., 2019). In addition, this research effort fills a gap by investigating how the Nutri-Score influences critical consumer responses like purchase intention while simultaneously expanding the research field to a new geography, as the study is the first to use a predominately German sample.

Second, this investigation reaffirms the results of previous research regarding private label and manufacturer brands. This is especially relevant, as retailers drove the implementation of the Nutri-Score in France (Hieschler, 2019), and there are first signs of a similar development in Germany (REWE, 2021). Several studies previously investigated the competition between the two types of brands (Cotterill et al., 2000; Hultman et al., 2008; Miranda & Joshi 2003; Sethuraman & Cole, 1999; Verhoef et al., 2002) and found a competitive advantage of manufacturer brands, which can be summarized as an overall more positive consumer perception resulting in, for example, a higher willingness to pay price premiums. This is supported by participants' higher purchase intention, attitude towards brand, and taste perception towards the manufacturer brand product in this study.

Third, sustainability is one of the major trends shaping the food industry (Grunert, 2017; McKinsey, 2021). The number of consumers who focus on sustainability is rising in major European markets, and consumers are willing to pay more for sustainable products (Delfman, 2011; McKinsey, 2021). Therefore, this study opened a new research perspective on the Nutri-Score as it, for the first time, analyzed the potential existence of a halo effect that might influence consumers' sustainability perception.

5.2 Managerial implications

This study has a range of implications, with some of them being relevant for retailers and manufacturers alike and some of them being specific to either one. In addition, it provides insights for public policymakers. For them, the results of this research effort can be considered a base to argue against obligations of companies focused on producing unhealthy snacks or candy, as the results support the finding that the Nutri-Score enhances sales of healthy products but does not directly hurt sales of unhealthy food products (De Temmerman et al., 2021). This is the case, as this study revealed no negative influence of the C category of the Nutri-Score on purchase intention, attitude towards brand, and green perceived value. This supports previous findings by De Temermann et al. (2021) that consumers' purchase intention does not decrease due to an unfavorable Nutri-Score rating. This also implicates, that public policy makers might have to think about additional policy measures to effectively combat the obesity crisis. For instance, they could incentivize brands to adapt their formulas by taxing unfavorable nutrients like sugar, especially as there are hints that it increases welfare (Allcott et al., 2019).

The results in general suggest that manufacturer brands and private label brands alike can use the score without lowering consumers' purchase intentions and thereby hurting their sales and the specific implications for retailers are twofold. First, as the results showed no significant effect, but there might be one for different products from different categories, retailers are in a good position to test the effect of the Nutri-Score in a real-life setting. Today, retailers can track sales in every store in a detailed manner. This creates the opportunity to experiment with the introduction of the Nutri-Score in some stores and then use others with a comparable customer structure as a control group to investigate the effect of the label on actual sales. Hereby the optimal but possibly hard to implement operationalization would be to provide the Nutri-Score on the product packaging. An alternative would be to attach the rating to the price tags on the shelves. An example of this kind of operationalization is the study of Kiesel and Villas-Boas

(2013), who analyzed the effect of health claims on microwave popcorn on actual sales. Second, this study reaffirmed that manufacturer brands still evoke higher purchase intentions, and consumers have a more positive attitude towards them than private label brands. Therefore, retailers should aim to further develop their private-label portfolio by adding product lines or private-label brands in the premium tier (Chimhundu, 2018). Introducing a premium private label brand that focuses on health-conscious customers that features good nutritional values could be a good use case for a Nutri-Score implementation, as this segment has promising growth opportunities (Biscotti, 2019; McKinsey, 2021).

The implications for managers at food companies differ from those for retailers. The results of the conducted experiment reveal that manufacturer brands outperform private labels regarding attitudes towards brand, tastiness perception, and purchase intention. Food manufacturers should keep this competitive advantage by strengthening their brands' innovation and marketing efforts. Multinational manufacturers could utilize economies of scale to capture the benefits of the technology trend in food manufacturing, including improvements to production processes and ingredients due to innovation (Grunert, 2017). A possible example is Nestlé, which spends considerable amounts on research and development (Ewing, 2019), and developed a new sugar, which can reduce the amount of sugar needed for similar sweetness by 40% compared to regular sugar (Nestlé, 2016). Sticking to the product used in this study, ketchup, using alternative sugar could move a product from the C to the B category, thereby distinguishing it from the others, primarily when the Nutri-Score is widely implemented.

5.3 Limitations and further research

This study has limitations, which can simultaneously serve as directions for future research efforts. The first limitation stems from the nature of the conducted experiment. Consumers did not see the product in a real-life setting but in an online environment. Even though this study

aimed to ensure a realistic experience by providing the Nutri-Score on the product packaging in its real size, this potentially problematic, as the possibility to touch a product leads to more informed evaluations of products by consumers (Peck & Childers, 2003). Therefore, offline studies where participants can visually and haptically explore the products could yield more robust results. Studies comparable to the one of Kiesel and Villas-Boas (2013), which was conducted in real supermarkets, could provide even more insights, as they take place in consumers' natural shopping environment. In addition, they can determine the effect on actual sales instead of self-reported measures (De Temmerman et al., 2021).

Second, the conducted experiment only featured one product, ketchup, from one product category, which means that the results strongly depend on the stimulus. This lowers the ability to generalize the findings to other categories. In addition, featuring only ketchup allowed to only include one Nutri-Score rating. However, it also allowed maintaining a large sample size, even though this research effort got a limited timeframe, and controlled for rejection of the product and attention of the participants. Further research should expand the design to more Nutri-Score and product categories alike to better understand the effects.

Third, the sampling method and the sample characteristics pose a limitation to the findings. This study uses a convenience sample, which has the disadvantage of not being representative (Babie, 2015). The sample analyzed in this study was young and highly educated, with a majority of the participants being female. Nutrition literacy is higher for younger, female, and more educated people (Taylor et al., 2019; Svendsen et al., 2021), which could hint at an influence of the sample characteristics on the effect of the Nutri-Score on the dependent variables. Therefore, future research efforts should aim to generate more representative samples of the general population, especially including families, the elderly, and a balanced number of males and females.

Fourth, the clear majority of participants came from Germany, which poses a limitation to the transferability of the results to other countries, as not only purchase intentions, attitudes towards different brand types, and importance of sustainability, but also nutritional knowledge and familiarity with the Nutri-Score most likely differ across European countries. In conclusion, research that aims to replicate the results in different countries and favorably applies one robust research design to several European countries at once, to make the effects of the score comparable across European geographies, is needed, as today's research only explored the effects in Germany, the Netherlands (Folkvord et al., 2021), France (Julia & Hercberg, 2017b) and Belgium (Temmerman et al., 2021).

Fifth, the prevalence of the manufacturer brand and private label brand stimuli was not balanced in the control and experimental group, and the control and experimental group differed in size. This was the case, as responses of participants who failed the attention or rejection check were eliminated from the sample to increase the robustness of the results. Furthermore, non-parametric tests were used to ensure a robust statistical analysis, and the results confirmed the non-significance of the effects under investigation.

Sixth, this study only captures a single moment in time, which means only one-time evaluations are measured. Future research could explore long-term effects and persistence after the Nutri-Score label was widely implemented. An excellent opportunity to conduct such research and measure the effect on actual sales could be the implementation of the Nutri-Score like the one executed by REWE (REWE, 2021).

Seventh, the study only investigated only private label brand products from one quality-price tier, as the shown private label brand products belonged to the economy tier (Chimhundu, 2018). This might lower the generalizability of the results, as many retailers have developed a complete private label brand portfolio, with possible distinct effects of the Nutri-Score on the

different brands from the different quality-price tiers. Therefore, additional research should consider the variety of private label brand types.

5.4 Conclusion

This study aimed to fill a research gap regarding the influence of the Nutri-Score on consumers' purchase intention and attitude towards brand (De Temmerman et al., 2021; Ikonen et al., 2019) while being the first analyzing a sample mainly composed of German consumers. In addition, it tested for the first time if a halo effect arises when the Nutri-Score is present, potentially influencing consumers' sustainability perceptions, which were measured using green perceived value. However, the results show no effect of the Nutri-Score on the constructs mentioned above. In conclusion, the results of this study suggest that transparency does not pay but also does not hurt for the product category under investigation. Nevertheless, the results show that manufacturer brands still have a competitive advantage compared to private label brands regarding consumers' perceptions.

Nonetheless, this study has some limitations, and more research is needed to fully understand the potential effect of the Nutri-Score on consumers' purchase intentions and brand perceptions. This research should be conducted in a real-life setting, include as many countries as possible that already introduced the score, and feature a variety of categories alongside a representative sample of participants, as all current research efforts face the issue of an above-average share of highly educated, female, and young participants (De Temmernmans et al., 2021; Folkvord et al., 2021). At best, it would take place in real supermarkets and investigate the effect of a Nutri-Score introduction on actual sales for various products from different categories by analyzing scanner data.

6 References

Allcott, H., Lockwood, B. B., & Taubinsky, D. (2019). Should we tax sugar-sweetened beverages? An overview of theory and evidence. Journal of Economic Perspectives, 33(3), 202-27.

Alvarado-Herrera, A., Bigne, E., Aldas-Manzano, J. et al. (2017). A Scale for Measuring Consumer Perceptions of Corporate Social Responsibility Following the Sustainable Development Paradigm. *Journal of Business Ethics* 140, 243–262.

Aron, A., & Aron, E. N. (1999). *Statistics for psychology* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Aschemann-Witzel, J., Maroscheck, N., & Hamm, U. (2013). Are organic consumers preferring or avoiding foods with nutrition and health claims? *Food Quality and Preference*, 30(1), 68–76.

Baker, M. J., & Churchill Jr, G. A. (1977). The impact of physically attractive models on advertising evaluations. *Journal of Marketing research*, 14(4), 538-555.

Babbie, E. R. (2015). *The practice of social research*. Nelson Education.

Berry, C., Burton, S., & Howlett, E. (2017). It's only natural: the mediating impact of consumers' attribute inferences on the relationships between product claims, perceived product healthfulness, and purchase intentions. *Journal of the Academy of Marketing Science*, 45(5), 698-719.

Black, A., & Rayner, M. (1992). *Just read the label*. London: The Stationary Office.

Bodirsky, B.L., Dietrich, J.P., Martinelli, E. et al. (2020). The ongoing nutrition transition thwarts long-term targets for food security, public health and environmental protection. Sci Rep 10, 19778.

Bolton, R. N., & Drew, J. H. (1991). A multistage model of customers' assessments of service quality and value. *Journal of consumer research*, 17(4), 375-384.

Burns, R. P., & Burns, R. (2008). *Business research methods and statistics using SPSS*. Sage.

Burton, S., Cook, L., Howlett E. & Newman, C. L. (2014). Broken halos and shattered horns: overcoming the biasing effects of prior expectations through objective information disclosure. *Journal of the Academy of Marketing Science*, 43(2), 240–256.

Chen, Y. & Chang, C. (2012). Enhance green purchase intentions: The roles of green perceived value, green perceived risk, and green trust. *Management Decision*, Vol. 50 No. 3, pp. 502-520.

Chimhundu, R. (2018). Private Label and Manufacturer Brand Coexistence. In *Marketing Food Brands* (pp. 79-106). Palgrave Macmillan, Cham.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Connors, M., Bisogni, C. A., Sobal, J., & Devine, C. M. (2001). Managing values in personal food systems. *Appetite*, 36(3), 189-200.

Cotterill, R. W., Putsis, W. P., Jr., & Dhar, R. (2000). Assessing the competitive interaction between private labels and national brands. *The Journal of Business*, 73(1), 109-137.

Cowburn, G., & Stockley, L. (2005). Consumer understanding and use of nutrition labelling: a systematic review. *Public health nutrition*, 8(1), 21-28.

Clement, J., Kristensen, T., & Grønhaug, K. (2013). Understanding consumers' in-store visual perception: The influence of package design features on visual attention. *Journal of Retailing and Consumer Services*, 20(2), 234–239.

Cuneo, A., Milberg, S. J., Benavente, J. M., & Palacios-Fenech, J. (2015). The growth of private label brands: a worldwide phenomenon?. *Journal of International Marketing*, 23(1), 72-90.

Croker, H., Packer, J., Russell, S. J., Stansfield, C., & Viner, R. M. (2020). Front of pack nutritional labelling schemes: a systematic review and meta-analysis of recent evidence relating to objectively measured consumption and purchasing. *Journal of Human Nutrition and Dietetics*, 33(4), 518-537.

Delfmann, W., Albers, S., Müßig, R., Becker, F., Harung, F. K., Schöneseiffen, H., ... & Vogelpohl, N. (2011). *Concepts, challenges and market potential for online food retailing in Germany* (No. 108). Working Paper.

De Pelsmacker, P., Geuens, M., & Van den Bergh, J. (2007). *Marketing communications: A European perspective*. Pearson education.

De Temmerman, J., Heeremans, E., Slabbinck, H., & Vermeir, I. (2021). The impact of the Nutri-Score nutrition label on perceived healthiness and purchase intentions. *Appetite*, 157, 104995.

Ducrot, P., Méjean, C., Julia, C., Kesse-Guyot, E., Touvier, M., Fezeu, L., ... & Péneau, S. (2015a). Effectiveness of front-of-pack nutrition labels in French adults: results from the NutriNet-Sante cohort study. *PLoS One*, 10(10), e0140898.

Ducrot, P., Méjean, C., Julia, C., Kesse-Guyot, E., Touvier, M., Fezeu, L. K., ... & Péneau, S. (2015b). Objective understanding of front-of-package nutrition labels among nutritionally at-risk individuals. *Nutrients*, 7(8), 7106-7125.

Egnell, M., Talati, Z., Hercberg, S., Pettigrew, S., & Julia, C. (2018). Objective understanding of front-of-package nutrition labels: an international comparative experimental study across 12 countries. *Nutrients*, 10(10), 1542.

Elliott, C. (2021). Radical transparency: food labeling, taste, and the food citizen. *The Senses and Society*, 16(1), 80-88.

European Comission (2021). Regulation of the Minister for Medical Care, designating Nutri-Score as a food choice logo and its conditions of use (Regulation on the designation of food choice logo). https://ec.europa.eu/growth/tools-databases/tris/index.cfm/en/search/?trisaction=search.detail&year=2021&num=530&mLang=EN

European Consumer Organisation (2020). Joint letter to the European commission re: Mandatory nutri-score. https://www.beuc.eu/publications/beuc-x-2020-029_joint_letter_to_the_european_commission_re_mandatory_nutri-score.pdf

Ewing, J. (2019, November 15). Nestlé Says It Can Be Virtuous and Profitable. Is That Even Possible? *The New York Times*. https://www.nytimes.com/2019/11/15/business/nestle-environment-sustainability.html

Feunekes, G. I., Gortemaker, I. A., Willems, A. A., Lion, R., & Van Den Kommer, M. (2008). Front-of-pack nutrition labelling: testing effectiveness of different nutrition labelling formats front-of-pack in four European countries. *Appetite*, 50(1), 57-70.

Field, A., Miles, J., & Field, Z. (2012). *Discovering statistics using R*. Sage publications.

Flora, D. B. (2017). *Statistical methods for the social and behavioural sciences: A model-based approach*. Sage.

Folkvord, F., Bergmans, N., & Pabian, S. (2021). The effect of the nutri-score label on consumer's attitudes, taste perception and purchase intention: An experimental pilot study. *Food Quality and Preference*, 94, 104303.

Food and Agriculture Organization of the United Nation. (2016). *Handbook on food labelling to protect consumers.* http://www.fao.org/3/a-i6575e.pdf

Foodwatch (2020). *Umfrage: Neun von zehn Verbrauchern für Nutri-Score*. https://www.foodwatch.org/de/aktuelle-nachrichten/2020/neun-von-zehn-verbrauchern-fuer-nutri-score/

Forsa (2021). *Ernährungsreport 2021*. https://www.bmel.de/SharedDocs/Downloads/DE/_Ernaehrung/forsa-ernaehrungsreport-2021tabellen.pdf;jsessionid=5DE8D7DAE201E80C0C1050F0995C3CE3.live841?__blob=publicationFile&v=2

Frynas, J. G. (2015). Strategic CSR, value creation and competitive advantage. In *The Routledge companion to non-market strategy* (pp. 267-284). Routledge.

Ghaljaie, F., Naderifar, M., & Goli, H. (2017). Snowball sampling: A purposeful method of sampling in qualitative research. *Strides in Development of Medical Education*, 14(3).

Goldsmith, R. E., Flynn, L. R., Goldsmith, E., & Stacey, E. C. (2010). Consumer attitudes and loyalty towards private brands. *International Journal of Consumer Studies*, 34(3), 339-348.

Gomez, P., Werle, C. O., & Corneille, O. (2017). The pitfall of nutrition facts label fluency: easier-to-process nutrition information enhances purchase intentions for unhealthy food products. *Marketing Letters*, 28(1), 15-27.

Grunert, Klaus G., ed. (2017). *Consumer trends and new product opportunities in the food sector*. Wageningen Academic Publishers.

Grunert, K. G., & Wills, J. M. (2007). A review of European research on consumer response to nutrition information on food labels. *Journal of public health*, 15(5), 385-399.

Gutjar, S., Graaf, C. de, Palascha, A., & Jager, G. (2014). Food choice: The battle between package, taste and consumption situation. *Appetite*, 80, 109–113.

Hallez, L., Qutteina, Y., Raedschelders, M., Boen, F., & Smits, T. (2020). That's my cue to eat: A systematic review of the persuasiveness of front-of-pack cues on food packages for children vs. adults. *Nutrients*, 12(4), 1062.

Hielscher, H. (2019, March 29). Aldi, Lidl & Co. verändern die Rezepte hunderter Eigenmarken. *Wirtschaftswoche*. https://www.wiwo.de/unternehmen/handel/zuckergehalt-in-lebensmitteln-aldi-lidl-und-co-veraendern-die-rezepte-hunderter-eigenmarken/24128938.html

Hultman, M., Opoku, R. A., Salehi-Shangari, E., Oghazi, P., & Bui, Q. T. (2008). Private label competition: The perspective of Swedish branded goods manufacturers. *Management Research News*, 31(2), 125–141.

Ikonen, I., Sotgiu, F., Aydinli, A. et al. (2019). Consumer effects of front-of-package nutrition labeling: an interdisciplinary meta-analysis. *Journal of the Academy of Marketing Science* 48, 360–383.

Julia, C., Hercberg, S., & World Health Organization. (2017a). Development of a new front-of-pack nutrition label in France: the five-colour Nutri-Score. *Public Health Panorama*, 3(04), 712-725.

Julia, C., & Hercberg, S. (2017b). Nutri-Score: Evidence of the effectiveness of the French front-of-pack nutrition label. *Ernährungs Umschau*, 64(12), 181-187.

Julia, C., Péneau, S., Buscail, C., Gonzalez, R., Touvier, M., Hercberg, S., & Kesse-Guyot, E. (2017). Perception of different formats of front-of-pack nutrition labels according to sociodemographic, lifestyle and dietary factors in a French population: Cross-sectional study among the NutriNet-Santé cohort participants. *BMJ open*, 7(6), e016108.

Kiesel, K., & Villas-Boas, S. B. (2013). Can information costs affect consumer choice? Nutritional labels in a supermarket experiment. *International Journal of Industrial Organization*, 31(2), 153-163.

Kivetz, R., & Keinan, A. (2006). Repenting hyperopia: An analysis of self-control regrets. *Journal of Consumer Research*, 33(2), 273–282.

Kivetz, R., & Simonson, I. (2000). The effects of incomplete information on consumer choice. *Journal of marketing research*, 37(4), 427-448.

Kozup, J. C., Creyer, E. H., & Burton, S. (2003). Making healthful food choices: the influence of health claims and nutrition information on consumers' evaluations of packaged food products and restaurant menu items. *Journal of Marketing*, 67(2), 19-34.

Kung, F. Y., Kwok, N., & Brown, D. J. (2018). Are attention check questions a threat to scale validity?. *Applied Psychology*, 67(2), 264-283.

L'Abbé, M. R. L., McHenry, E. W., & Emrich, T. (2012). What is front-of-pack labelling? Codex committee on food labelling, FAO/WHO information meeting on front-of-pack nutrition labelling.

Liem, D. G., Aydin, N. T., & Zandstra, E. H. (2012). Effects of health labels on expected and actual taste perception of soup. *Food Quality and Preference*, 25(2), 192-197.

Malloy-Weir, L., & Cooper, M. (2017). Health literacy, literacy, numeracy and nutrition label understanding and use: a scoping review of the literature. *Journal of Human Nutrition and Dietetics*, 30(3), 309-325.

Marotta, G., Simeone, M., & Nazzaro, C. (2014). Product reformulation in the food system to improve food safety. Evaluation of policy interventions. *Appetite*, 74, 107-115.

McKinsey (2021). Disruption and Uncertainty – The State of Grocery Retail 2021: Europe. https://www.mckinsey.com/~/media/mckinsey/industries/retail/our%20insights/a%20year%20like%20no%20other%20for%20european%20grocery%20retailers/disruption-and-uncertainty-the-state-of-grocery-retail-2021-europe-full-report.pdf

Medina-Molina, C., Rey-Moreno, M., & Periáñez-Cristóbal, R. (2021). Analysis of the moderating effect of front-of-pack labelling on the relation between brand attitude and purchasing intention. *Journal of Business Research*, 122, 304-310.

Miller, L. M. S., Cassady, D. L., Applegate, E. A., Beckett, L. A., Wilson, M. D., Gibson, T. N., & Ellwood, K. (2015). Relationships among food label use, motivation, and dietary quality. *Nutrients*, 7(2), 1068-1080.

Miranda, M. J., & Joshi, M. (2003). Australian retailers need to engage with private labels to achieve competitive difference. *Asia Pacific Journal of Marketing and Logistics*, 15(3), 34–47.

Mitchell, Andrew A. & Jerry C. Olson (1981), "Are Product Beliefs the Only Mediator of Advertising Effect on Brand Attitude?" *Journal of Marketing Research*, 18 (August), 318-32.

Moon, W., Balasubramanian, S. K., & Rimal, A. (2011). Health claims and consumers' behavioral intentions: The case of soy-based food. *Food Policy*, 36(4), 480–489.

Mutz, D. C. (2011). *Population-based survey experiments*. Princeton University Press.

Nestle, M., & Jacobson, M. F. (2000). Halting the obesity epidemic: a public health policy approach. *Public health reports*, 115(1), 12.

Nestlé (2016, November 30). *Nestlé's groundbreaking material science makes less sugar taste just as good* [Press release]. https://www.nestle.com/randd/news/allfeatures/nestle-research-discovery-sugar-reduction

Neumark-Sztainer, D., Story, M., Perry, C., & Casey, M. A. (1999). Factors influencing food choices of adolescents: findings from focus-group discussions with adolescents. *Journal of the American dietetic association*, 99(8), 929-937.

Nielsen. (2016). It's not about the shelf: Creating the ideal in-store experience. https://www.nielsen.com/us/en/insights/article/2016/its-not-just-about-the-shelf-creating-the-ideal-in-store-experience/

Nisbett, R. E., & Wilson, T. D. (1977). The halo effect: Evidence for unconscious alteration of judgments. *Journal of Personality and Social Psychology*, 35(4), 250–256.

Olsen, M. C., Slotegraaf, R. J., & Chandukala, S. R. (2014). Green claims and message frames: how green new products change brand attitude. *Journal of Marke*ting, 78(5), 119-137.

Ollberding, N. J., Wolf, R. L., & Contento, I. (2011). Food label use and its relation to dietary intake among US adults. *Journal of the American Dietetic association*, 111(5), S47-S51.

Patterson, P. G., & Spreng, R. A. (1997). Modelling the relationship between perceived value, satisfaction and repurchase intentions in a business-to-business, services context: an empirical examination. *International Journal of service Industry management*.

Peck, J., & Childers, T. L. (2003). To have and to hold: The influence of haptic information on product judgments. *Journal of Marketing*, 67(2), 35-48.

Poti, J. M., Braga, B., & Qin, B. (2017). Ultra-processed Food Intake and Obesity: What Really Matters for Health-Processing or Nutrient Content? *Current obesity reports*, 6(4), 420–431.

Quelch, J. A., & Harding, D. (1996). "Brands versus Private labels - Fighting to win".

REWE. (2021, January 18). REWE: Nutri-Score ab sofort für alle Eigenmarken-Produkte verfügbar [Press Release]. https://mediacenter.rewe.de/pressemitteilungen/rewe-nuti-score-fuer-alle-eigenmarken

Schlosser, A. E., White, T. B., & Lloyd, S. M. (2006). Converting web site visitors into buyers: How web site investment increases consumer trusting beliefs and online purchase intentions. *Journal of Marketing*, 70(2), 133-148.

Scrinis, G., & Parker, C. (2016). Front-of-pack food labeling and the politics of nutritional nudges. *Law & Policy*, 38(3), 234-249.

Sethuraman, R., & Cole, C. (1999). Factors influencing the price premiums that consumers pay for national brands over store brands. *Journal of Product & Brand Management*, 8 (4), 340-351.

Shepherd, R., Sparks, P., & Guthrie, C. A. (1995). The application of the theory of planned behaviour to consumer food choice. *ACR European Advances*.

Siegrist, M., Visschers, V. H., & Hartmann, C. (2015). Factors influencing changes in sustainability perception of various food behaviors: Results of a longitudinal study. *Food Quality and Preference*, 46, 33-39.

Spears, N., & Singh, S. N. (2004). Measuring attitude toward the brand and purchase intentions. *Journal of current issues & research in advertising*, 26(2), 53-66.

Steenkamp, J. B. E., & Geyskens, I. (2006). How country characteristics affect the perceived value of web sites. *Journal of marketing,* 70(3), 136-150.

Svendsen, K., Torheim, L. E., Fjelberg, V., Sorprud, A., Narverud, I., Retterstøl, K., ... & Telle-Hansen, V. H. (2021). Gender differences in nutrition literacy levels among

university students and employees: a descriptive study. *Journal of Nutritional Science*, 10.

Talati, Z., Egnell, M., Hercberg, S., Julia, C., & Pettigrew, S. (2019). Consumers' perceptions of five front-of-package nutrition labels: An experimental study across 12 countries. *Nutrients*, 11(8), 1934.

Taylor, M. K., Sullivan, D. K., Ellerbeck, E. F., Gajewski, B. J., & Gibbs, H. D. (2019). Nutrition literacy predicts adherence to healthy/unhealthy diet patterns in adults with a nutrition-related chronic condition. *Public health nutrition*, 22(12), 2157-2169.

Thomas, M., Desai, K. K., & Seenivasan, S. (2011). How credit card payments increase unhealthy food purchases: Visceral regulation of vices. *Journal of Consumer Research*, 38(1), 126–139.

Tobler, C.; Visschers, V. H. M.; Siegrist, M. (2011). Organic Tomatoes Versus Canned Beans: How Do Consumers Assess the Environmental Friendliness of Vegetables?. *Environment and Behavior*, 43(5), 591–611.

Underwood, R. L., & Klein, N. M. (2002). Packaging as brand communication: effects of product pictures on consumer responses to the package and brand. *Journal of Marketing Theory and Practice,* 10(4), 58-68.

van der Bend, D. L., & Lissner, L. (2019). Differences and similarities between front-of-pack nutrition labels in Europe: A comparison of functional and visual aspects. *Nutrients,* 11(3), 626.

Van Kleef, E., Van Trijp, H., Paeps, F., & Fernández-Celemín, L. (2008). Consumer preferences for front-of-pack calories labelling. *Public Health Nutrition*, 11(2), 203–213.

VanVoorhis, C. W., & Morgan, B. L. (2007). Understanding power and rules of thumb for determining sample sizes. *Tutorials in quantitative methods for psychology*, 3(2), 43-50.

Verhoef, P. C., Nijssen, E. J., & Sloot, L. M. (2002). Strategic reactions of national brand manufacturers towards private labels: An empirical study in The Netherlands. *European Journal of Marketing*, 36(11/12), 1309–1326.

Vyth, E. L., Steenhuis, I. H., Roodenburg, A. J., Brug, J., & Seidell, J. C. (2010). Front-of-pack nutrition label stimulates healthier product development: a quantitative analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 7(1), 1-7.

Wertenbroch, K. (1998). Consumption self-control by rationing purchase quantities of virtue and vice. *Marketing Science*, 17(4), 317–337.

World Health Organization (2017). *France becomes one of the first countries in Region to recommend colour-coded front-of-pack nutrition labelling system*. http://www.euro.who.int/en/countries/france/news/news/2017/03/france-becomes-one-of-the-first-countries-in-region-to-recommend-colour-coded-front-of-pack-nutrition-labelling-system

World Health Organization (2021). Obesity and overweight [Fact sheet]. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

Yan, J., Tian, K., Heravi, S., & Morgan, P. (2017). The vices and virtues of consumption choices: price promotion and consumer decision making. Marketing Letters, 28(3), 461-475.

Yim, M. Y. C., Yoo, S. C., Sauer, P. L., & Seo, J. H. (2014). Hedonic shopping motivation and co-shopper influence on utilitarian grocery shopping in superstores. *Journal of the Academy of Marketing Science*, 42(5), 528-544.

Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of marketing*, 52(3), 2-22.

Zhuang, W., Cumiskey, K. J., Xiao, Q., & Alford, B. L. (2010). The impact of perceived value on behavior intention: an empirical study. *Journal of Global Business Management*, 6(2), 1.

7 Appendices

Appendix A: Questionnaire

Customer Perception of Food Products

Informed Consent

Dear participant,
my name is Paul Pape, and I am studying Management and International Business at Maastricht University and Nova SBE in Lisbon. For my master thesis, I am conducting this research study about customer perception of food products.

Participation in this study is voluntary. If you agree to participate in this study, you can expect to need 5 minutes of your time to answer. You may end the interview at any time. If you participate in this study, the information you share will be kept confidential to the full extent of the law and will not be shared with third parties. All your answers will remain anonymous. For each completed participation 50 cent will be donated to the United Nations World Food Programme.

I would really appreciate your help and would like to thank you in advance for your participation.

Please, read the questions carefully and answer them honestly. It will not be possible to trace your answers back to you.

If you have any questions about this study, please contact (p.pape@student.maastrichtuniversity.nl.).
By clicking the orange button in the bottom right corner and completing this survey, you consent to participate in this study.

Please note: You must be 18 or older to participate in this study.

First, we would like to ask you to answer some demographic questions. All answers will remain anonymous, be treated confidentially, and only used for the scientific purpose of this study.

What gender do you identify as?

Answers: 1 = Male; 2 =Female; 3 = Non-binary / third gender; 4 = Prefer not to say

What is your age?

What is the highest degree or level of education you have completed?
Answers: 1 = No degree; 2 = Secondary School; 3 = High School; 4 = Bachelor's Degree; 5 = Master's Degree or comparable (e.g. Diploma); 6 = PhD; 7 = Other

Do you live in a household with your kids?
Answers: 1 = Yes and they are below the age of 12; 2 = Yes and they are between 12 and 18; 3 = Yes and they are above 18; 4 = No, but I have kids; 5 = No, I don't Have kids

Which one of the following statements do you think best describes your personal attitude towards healthy eating?
Answers: 1 = Have to follow a special diet because of a specific health need; 2 = Eat a healthy diet because it helps keep me fit and well; 3 = Try to at a healthy diet but find it hard to stick to; 4 = Eat what I like and do not worry about how healthy it is

Which country do you primarily live in?
Answers: 1 = Germany; 2 = Netherlands; 3 = Other:

Next, a food product will be displayed. Please look carefully at the displayed product and try to memorize everything that you see in detail.

Stimulus image depending on primary living location
Please look carefully at the displayed product. You can continue the survey in 15 seconds.

Next, several statements about the food product you just saw and its brand are provided. Please be honest while answering the statements according to your perception.

Please indicate how much you agree with the shown statement

Answers: 1 = Strongly disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

1. This product seems tasty
2. I like ketchup

I find this brand…

Answers: 1 = Very unappealing; 2 = Unappealing; 3 = Somewhat unappealing; 4 = Neither unappealing nor appealing; 5 = Somewhat appealing; 6 = Appealing; 7 = Very appealing

I find this brand…

Answers: 1 = Very bad; 2 = Bad; 3 = Somewhat bad; 4 = Neither bad nor good; 5 = Somewhat good; 6 = Good; 7 = Very good

I find this brand…

Answers: 1 = Very unlikeable; 2 = Unlikeable; 3 = Somewhat unlikeable; 4 = Neither unlikeable nor likeable; 5 = Somewhat likeable; 6 = Likeable; 7 = Very Likeable

I find this brand…

Answers: 1 = Very unfavourable; 2 = Unfavourable; 3 = Somewhat unfavourable; 4 = Neither unfavourable nor favourable; 5 = Somewhat favourable; 6 = Favourable; 7 = Very favourable

---

In addition, this study wants to investigate your purchase intention and green perceived value, which is a construct that measures how well a product fits consumers' environmental desires, sustainable expectations, and green needs. Therefore, the following two questions will provide you with related statements and allow you to choose how much you agree with them. Again, please read carefully and answer the questions honestly - your answers will remain anonymous.

Purchase Intention

Answers: 1 = Strongly disagree; 2 = Somewhat disagree; 3 = Disagree; 4 = Neither agree nor disagree; 5 = Somewhat agree; 6 = Agree; 7 = Strongly agree

1. I would like to try this product
2. I would like to buy this product if I see it in a supermarket
3. I would actively seek out to buy this product in the supermarket
4. If you're paying attention please select "strongly agree"
5. I would recommend this product to others
6. I would be willing to buy this product

Green Perceived Value

Answers: 1 = Strongly disagree; 2 = Somewhat disagree; 3 = Disagree; 4 = Neither agree nor disagree; 5 = Somewhat agree; 6 = Agree; 7 = Strongly agree

1. This product's environmental functions provide very good value for me
2. This product's environmental performance meets my expectations
3. I would purchase this product because it has more environmental concern than other products
4. I would purchase this product because it is environmentally friendly
5. I would purchase this product because it has more environmental benefit than other products

---

Did you see any additional labels on the food product?

Answers: 1 = Yes; 2 = No

Follow up triggered if answer was yes

Please explain what the additional label looked like

Thank you for your time spent taking this survey.

Your response has been recorded.

If you have any additional questions you can contact me via
p.pape@student.maastrichtuniversity.nl

Appendix B: Results of reliability testing

Reliability of purchase intention, attitude towards brand, and green perceived value by product and condition

Measurement scale	**Cronbach's alpha**
Purchase Intention	
Heinz (without Nutri-Score)	0.88
Heinz (with Nutri-Score)	0.93
Ja! (without Nutri-Score)	0.84
Ja! (with Nutri-Score)	0.93
Ah (without Nutri-Score)	0.85
Ah (with Nutri-Score)	0.86
Attitude Towards Brand	
Heinz (without Nutri-Score)	0.90
Heinz (with Nutri-Score)	0.90
Ja! (without Nutri-Score)	0.89
Ja! (with Nutri-Score)	0.93
Ah (without Nutri-Score)	0.84
Ah (with Nutri-Score)	0.86
Green Perceived Value	
Heinz (without Nutri-Score)	0.93
Heinz (with Nutri-Score)	0.93
Ja! (without Nutri-Score)	0.84
Ja! (with Nutri-Score)	0.90
Ah (without Nutri-Score)	0.90
Ah (with Nutri-Score)	0.88

Appendix C: Results of the three conducted ANCOVAs

Table C1

ANCOVA with purchase intention as dependent variable

Dependent variable: purchase intention	**Sum of Squares**	**Degrees of Freedom**	***F* Statistic**	**p-value**
Intercept	0.09	1	0.08	0.78
Nutri-Score	0.02	1	0.02	0.89
Age	4.45	1	4.21	0.04 *
Gender	0.20	1	0.19	0.67
Education	1.50	1	1.41	0.24
Location b	0.17	1	0.16	0.69
Healthy eating	8.44	1	7.90	0.006 **
Tastiness	96.17	1	90.02	$p < 0.001$ ***
Manufacturer brand	36.07	1	33.76	$p < 0.001$ ***
Residuals	221.15	207		

Note: Significance codes: p<0.001 = *** p<0.01 = ** p<0.05 = * p<0.10 = .

Table C2

ANCOVA with attitude towards brand as dependent variable

Dependent variable: attitude towards brand	**Sum of Squares**	**Degrees of Freedom**	***F* Statistic**	**p-value**
Intercept	19.04	1	27.23	$p < 0.001$ ***
Nutri-Score	0.12	1	0.17	0.68
Age	3.00	1	4.29	0.04 *
Gender	0.19	1	0.28	0.60
Education	0.00	1	0.00	0.99
Location b	0.16	1	0.22	0.64
Healthy eating	0.83	1	1.19	0.28
Tastiness	46.76	1	66.88	$p < 0.001$ ***
Manufacturer brand	43.66	1	62.44	$p < 0.001$ ***
Residuals	144.73	207		

Note: Significance codes: p<0.001 = *** p<0.01 = ** p<0.05 = * p<0.10 = .

Table C3

ANCOVA with green perceived value as dependent variable

Dependent variable: attitude towards brand	Sum of Squares	Degrees of Freedom	*F* Statistic	p-value
Intercept	23.55	1	17.13	$p < 0.001$ ***
Nutri-Score	0.02	1	0.01	0.92
Age	0.20	1	0.14	0.70
Gender	0.04	1	0.03	0.86
Education	0.15	1	0.11	0.74
Location b	18.90	1	13.75	$p < 0.001$ ***
Healthy eating	0.48	1	0.35	0.56
Tastiness	7.41	1	5.39	0.02 *
Manufacturer brand	4.11	1	2.99	0.09 .
Residuals	284.58	207		

Note: Significance codes: p<0.001 = *** p<0.01 = ** p<0.05 = * p<0.10 = .

Appendix D: Results of the three conducted two-way ANOVAs

Table D1

Two-way ANOVA with purchase intention as dependent variable

Dependent variable: purchase intention	Sum of Squares	Degrees of Freedom	*F* Statistic	p-value
Intercept	1581.82	1	979.80	$p < 0.001$ ***
Nutri-Score	0.57	1	0.36	0.55
Manufacturer Brand	73.98	1	45.83	$p < 0.001$ ***
Nutri-Score * Manufacturer Brand	1.50	1	0.93	0.34
Residuals	342.26	212		

Note: Significance codes: p<0.001 = *** p<0.01 = ** p<0.05 = * p<0.10 = .

Table D2

Two-way ANOVA with Attitude towards brand as dependent variable

Dependent variable: attitude towards brand	**Sum of Squares**	**Degrees of Freedom**	***F* Statistic**	**p-value**
Intercept	2055.86	1	2181.59	$p < 0.001$ ***
Nutri-Score	0.84	1	0.89	0.35
Manufacturer Brand	66.19	1	70.24	$p < 0.001$ ***
Nutri-Score * Manufacturer Brand	1.76	1	1.87	0.17
Residuals	199.78	212		

Note: Significance codes: p<0.001 = *** p<0.01 = ** p<0.05 = * p<0.10 = .

Table D3

Two-way ANOVA with green perceived value as dependent variable

Dependent variable: green perceived value	**Sum of Squares**	**Degrees of Freedom**	***F* Statistic**	**p-value**
Intercept	809.35	1	547.30	$p < 0.001$ ***
Nutri-Score	0.20	1	0.14	0.71
Manufacturer Brand	5.93	1	4.01	0.047 *
Nutri-Score * Manufacturer Brand	0.00	1	0.00	0.99
Residuals	313.51	212		

Note: Significance codes: p<0.001 = *** p<0.01 = ** p<0.05 = * p<0.10 = .