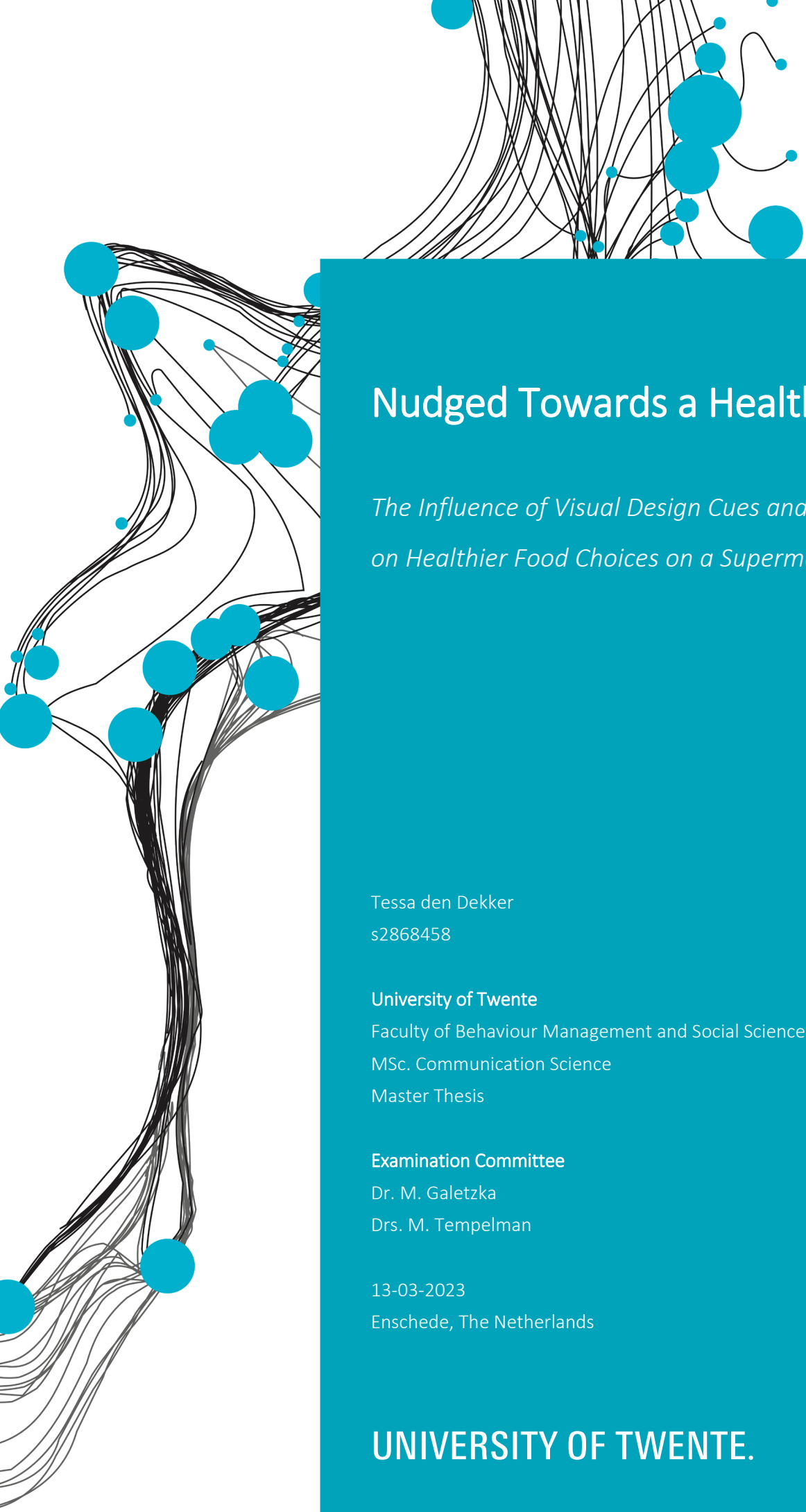

Nudged Towards a Healthier Society

The Influence of Visual Design Cues and the Decoy Effect on Healthier Food Choices on a Supermarket Website

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Abstract

Aim – Modern western society is characterised by a significant presence of unhealthy foods which can be consumed at any time, leading to overconsumption and high percentages of obesity. This is partly due to food choices that are often made mindlessly. Following a healthier diet could prevent health problems. Nudges use heuristics from the automatic decision-making process to guide consumers towards better choices. This research will examine to what extent two (combined) nudges – visual design cues and the decoy effect – can be used to positively influence the sugar content of one's snack choice on a supermarket website. Research on the combined effect of nudges regarding the healthy eating domain is lacking. This research contributes to the existing literature, as there are promising arguments for the combined nudges to have a significant effect on the healthiness of one's food choices. The moderation effect of health-related shopping goals is considered, as people may be more or less influenced by nudges depending on their goals.

Method – A supermarket website was created to conduct the 2 (visual design cue: present vs. absent) x 2 (decoy effect: present vs. absent) experimental design. Participants (N = 189) were randomly assigned to one condition where they had to fictively purchase items from a given grocery list. The effects of the nudges on food choice, convenience, attractiveness, and normality were investigated.

Results – When the visual design cue was presented, healthier snacks were purchased. This effect was greater for those with higher health-related shopping goals. This moderator was furthermore significant for both the decoy and interaction effect on food choice, meaning that people with higher health-related shopping goals chose healthier snacks more often. The visual design cue significantly made the healthier snack more convenient to see, and the decoy effect made the healthier snack significantly more attractive and normal to choose. Contrary to expectations, both the decoy effect and the interaction effect did not lead to significantly healthier food choices.

Conclusion – This research provides evidence that implementing visual design cues in a digital interface can be a quick and low-cost manner to positively affect the healthiness of one's food choice. Even though participants chose the healthier snack option over the unhealthy option in every condition, the results were not significant for the decoy effect or the interaction effect. This lack may be attributed to several reasons, including the online research environment and whether other nudges led the decision-making process instead of the decoy effect. Limitations and recommendations include the role of the textual cue within the study design and how to retain behaviour change over a longer period.

Keywords – digital nudging, visual design cues, decoy effect, healthy food choice, low-sugar products, health-related shopping goals, decision-making, online supermarket

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1. Introduction

In 2020 about 37% of the population (age 20+) in The Netherlands was classed as moderately overweight. This percentage is in line with previous years. However, the percentage of seriously overweight people in the Dutch population has grown with almost 3% since 2011 (Statista, 2022). These high rates of overweight and obesity are partly attributed to poor dietary choices, and due to a growing trend of snacking (Bellisle, 2014). Foods that combine high levels of sugar and fat particularly contribute to overconsumption of the daily intake recommendations, affecting BMI levels (Gibson, 1996) and health-related issues, such as cancer, diabetes, and heart diseases (Chu et al., 2018). Among others, following a healthier diet could prevent these problems (Flodmark et al., 2006). Although consumers have great intentions to do so, many fail to succeed in eating healthier. People often make their food choices mindlessly, making it more difficult for them to change their behaviour and buy healthier food options (e.g., Jacquier et al., 2012; Suher & Hoyer, 2020). Kroese et al. (2015) suggested that attempting people to eat healthy should aim to adjust the environment, which can be done through nudging. Consumers increasingly buy their groceries online, with an increase of 16% in 2021 compared to 2020 in The Netherlands (Ros, 2022). As buying healthier food is the first step towards consuming, the aim of this study is to use online nudges on a supermarket website to positively influence consumers' food choice for snacks.

Nudging is the integration of subtle stimuli that trigger certain behaviour unconsciously (Thaler & Sunstein, 2008). Take for example the piano stairs by The Fun Theory (2009) to make people take the stairs instead of the escalator, or "Hollebolle Gijs" in theme park De Efteling in The Netherlands to make customers separate their waste. Previous studies have already shown the effectiveness of nudge interventions within the healthy eating domain, such as the different placements of products (e.g., Kroese et al., 2015; Mikkelsen et al., 2021), default options (e.g., Hansen et al., 2021; Loeb et al., 2018), and social norms (Higgs et al., 2019). However, the positive effect of nudges on healthier food choices is not consistently present in all studies. For example, labelling products as healthy might lead to an increased calorie consumption (Lee et al., 2011). Wilson et al. (2016) therefore stated a need for research investigating which nudges can influence healthier food choices.

Most of the investigated nudges are related to the physical setting, although digital environment nudges are being studied more and more. As we are moving to a digital world, the relevance of research on digital nudging becomes essential. Digital nudging is making use of the user interface of digital products to guide people's behaviour and their decision-making process (Weinmann et al., 2016). As digital nudges can outperform nudges in the offline environment, this study will take place in a digital environment.

This research focuses on two nudges, visual design cues and the decoy effect. Visual design cues affect consumers' perceptions, attitudes, and behaviour (Vermeir, 2020). They are designed to guide the eye towards a particular area to encourage a specific behaviour. According to Cabrera and colleagues (2017), and many other researchers (e.g., Mead & Richerson, 2018; Tijssen et al., 2017; Vermeir & Roose, 2020), the perceived healthfulness of food products is significantly influenced by the colour of food labels. Research of colour cues on the decision-making process however is limited. This research will therefore investigate to what extent colour can be used as a visual design cue in the user interface of a supermarket website to encourage healthier decisions.

The decoy effect is mostly used within the marketing domain to affect consumer decision-making based on the price-quality value of services or products. However, there is a growing amount of literature that is implementing the decoy effect in alternative ways. For example, using the decoy effect to nudge users into selecting certain rewards (Tietz & Weinmann, 2016), or to increase interest in colorectal cancer screening in a hospital (Stoffel et al., 2019). Van den Enden and Geyskens (2021) are one of the few researchers who applied the decoy effect within the healthy eating domain. They investigated whether people would be more likely to choose a healthy snack over an unhealthy snack by introducing an asymmetric choice alternative. The original set of products consisted of chocolate chip cookies and white grapes, where people were more likely to choose the cookies. When carrots were added as the inferior alternative, people shifted their preferences toward grapes instead of cookies. The results therefore indicated that adding a decoy to a self-control situation can help people choose the healthier food option (van den Enden & Geyskens, 2021). As the application of the decoy effect within this healthy eating domain is quite new, this research will academically contribute to a new practice of the decoy effect and give new insights.

The research by Wilson et al. (2016) suggested that a nudging intervention combining two nudges could influence healthier food choices over a longer period. Limited research is conducted on the interaction effects of multiple nudges on healthy eating behaviours (Ensaff, 2021). Bonini and colleagues (2018) mentioned that even if the combined effect is not additive, the results could still shed light into the underlying process of the nudges working together. The nudges visual design cues and the decoy effect are promising to interact with each other due to several reasons that will be discussed in the continuation of this research. Since these nudges are not combined in already published studies, this research will further contribute to a new understanding of the dynamics between visual design cues and the decoy effect. It could shed light upon the underlying processes about which nudge intervention works better and help consumers make healthier choices.

Besides nudging, increasing the amount of health-related shopping goals consumers have is another way to increase the consumption of healthier foods. People with higher health-related shopping goals are more likely to choose healthier products compared to those with lower health-

related shopping goals (Bower et al., 2003; Van Ooijen et al., 2017). Consumers are more likely to positively respond to healthy cue nudges when they are already motivated, involved, and have goals to take care of their health (Hillhouse et al., 2017; Maheswaran & Meyers-Levy, 1990; Rothman & Salovey, 1997). It is therefore expected that a positive relationship between health-related shopping goals and healthy behaviours exist.

The food industry can learn how to use nudges to influence consumers' food choices. The societal and practical relevance of this study can be derived from the fact that nudges may change consumers' eating habits, as buying healthier food can lead to healthier food consumption. To determine what impact both nudges and health-related shopping goals have on consumers, the following research question is introduced:

RQ: *"To what extent do (the combined effects of) decoys and visual design cues have a positive effect on the low-sugar content of someone's food choice in an online supermarket environment, and what is the possible role of health-related shopping goals?"*

To answer this question, an experiment was conducted using a self-made supermarket website to test the hypotheses derived from the theoretical framework regarding visual design cues, the decoy effect, and health-related shopping goals. In the further sections of this article, the results are discussed, and implications, limitations, and future research directions are considered.

2. Theoretical Framework

2.1. Consumer Decision-Making and Food Choice

Being overweight and obese has become a major public health problem, as they often lead to various chronic diseases (Chu et al., 2018). Nowadays, healthy eating, meaning the nutritional quality of food (Mete et al., 2019), is receiving more attention. Yet, food choices are often made on the spot and based on automatic, mindless, and unconscious decisions (e.g., Furst et al., 1996; Jacquier et al., 2012; Suher & Hoyer, 2020; Wansink et al., 2014), leading to unhealthy choices. Similarly, Dijksterhuis et al. (2005) stated that consumers often make choices unconsciously while shopping for food and that these are usually guided by cues in the environment. According to W.L. Wilkie in the review of Glanz et al. (1992), the purchase of basic food is mostly planned, while snacks are predominantly impulse purchases.

The Dual Process Theory illustrates this decision-making process when grocery shopping. According to the Dual Process Theory, two kinds of processing systems drive decision-making, which are mostly referred to as System 1 and System 2 (Evans, 2008; Kahneman, 2003). System 1 is characterised as "fast, automatic, effortless, associative, implicit, and often emotionally charged" (Kahneman, 2003, p. 698). Consumers tend to make unconscious choices within this system. System 2 is characterized as "slower, serial, effortful, more likely to be consciously monitored and deliberately controlled" (Kahneman, 2003, p. 698). Typically, System 1 responds to immediate pleasure when looking at food (Chance et al., 2014). To consider future health outcomes, the consumer must engage in System 2. However, that task is complex and takes a lot of effort, often resulting in System 2 failing, leaving consumers biased towards the unhealthy options favoured by System 1 (Chance et al., 2014). On the other hand, consumers might also bypass System 2 processing, due to already-formed habits (Chance et al., 2014).

Thus, consumers often rely on System 1 processing when shopping for food, leading to unhealthy decisions. Environmental cues also influence this, such as the serving size, music in the supermarket, pantry arrangement, and people around you (Wansink, 2010). As consumers do little to no thinking while making food purchases, it makes it hard to change their behaviour. Kroese and colleagues (2015) therefore suggest adjusting the environment to direct consumers to better choices.

2.2. Nudging

Behavioural economics unconsciously trigger certain behaviour and influence the choice of consumers by using the concept of nudging. As so, when nudges are applied in the environment, people rely on their System 1 decision-making process. Thaler and Sunstein (2008, p. 6) initiated the

concept of nudging and define it as “any aspects of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives”. Nudges will guide humans towards better choices without limiting their freedom or forbidding any options. Nudges maintain people’s right to freely choose any option, but the nudge is designed to highlight a certain option that is better in a certain way. Thaler and Sunstein (2003) call this approach ‘libertarian paternalism’, which is designed to spare policymakers any ethical concerns they might face (Lin et al., 2017; Osman, 2016). The libertarian paternalism aspect of nudging is “an approach that preserves freedom of choice but that authorizes both private and public institutions to steer people in directions that will promote their welfare” (Thaler & Sunstein, 2003, p. 179).

Schmidt and Engelen (2020) noted in their overview about the ethics of nudging several arguments about why nudges should be used. First, nudges are relatively cheap and easy to implement, which are especially beneficial to promote policy outcomes. Second, nudges help to keep the freedom of choice, as they do not change or remove options. Third, citizens are more likely to accept nudges, at least when they are carried out by parties with whom they can identify. Lastly, choice architecture seems unavoidable, as decisions will always be influenced.

Nudging has the possibility to help people make healthier decisions regarding food products. According to Hummel and Maedche (2019), 39.6% of the studies regarding nudges focus on the health context. An example is from Mikkelsen and colleagues (2021). To reduce the intake of sugar-sweetened beverages by students in a school canteen, they re-arranged the beverages. Results showed that the nudge reduced the purchases of those beverages in three out of four school canteens. Going back to the concept of libertarian paternalism, this can be linked to the study just described. The beverages with a high sugar content were moved to a lower part of the cooler, where they were less visible. However, these beverages could still be chosen, which is the libertarian part. By moving the healthy beverages at eye level, and thus high visibility, the paternalistic part played a role. Therefore, the central thought of nudging is that “small and apparently insignificant details can have major impacts on people’s behaviour” (Thaler et al., 2012, p. 428).

Several frameworks have been developed to categorize different types of (healthy eating) nudges (e.g., Hollands et al., 2017; Ly et al., 2013; Sunstein, 2014). For example, Hansen and Jespersen (2013) designed a framework identifying four types of nudging as a basis for policy recommendations. They distinguish the four categories on two variables: mode of thinking and transparency. Mode of thinking refers to System 1 and System 2 processes (Kahneman, 2003). Transparency has to do with the perceivability of the meaning behind the nudge. Transparency guides this research for the distinction of the nudges. Hanks and colleagues (2012) stated that when healthier foods are more convenient in a school lunchroom, the sales of healthier foods increase by 18%. The CAN approach is in line with this research. It is an acronym for Convenience, Attractive, and Normal (Wansink, 2015).

The approach shows that almost all effective interventions on healthy food choices have three things in common; to make people consume healthy foods, you must make them more convenient, more attractive, and more normal to choose. The approach has shown to be more effective than banning or eliminating certain food products (Wansink, 2015).

In the article, Wansink (2015) describes that healthy food products need to be made the most convenient choice. Convenience in seeing, ordering, picking up, and consuming certain products. The definition of convenience is "a quality or situation that makes something easy or useful for someone by reducing the amount of work or time required to do something" (The Britannica Dictionary, 2022). When healthier food products are more convenient to see, customers are more likely to buy healthier food products, as it is the most straightforward option. The second principle of the CAN approach is that the healthy choice needs to be made more attractive relative to what else is available. For example, more attractive in name, appearance, or price. The last principle is that healthy foods should be more normal to select, as consumers prefer what is popular, and what is normal to purchase. This is in line with normative influences, as consumers change their behaviours to be accepted by others (Rimal & Real, 2005). However, according to the article of Cadario and Chandon (2020), this approach did not yet test, nor predict the effect size of the approach. The classification of this study will be based on Hansen and Jespersen (2013) to make a distinction between non-transparent and transparent nudges, and Wansink (2015) to classify the nudges on convenience, attractiveness, and normal to choose.

2.2.1. Online Nudging

In the past decade, technological developments increased tremendously. More choices are made online and there is the possibility to apply nudges in the digital environment. Weinmann et al. (2016, p. 433) define digital nudging as "the use of user-interface design elements to guide people's behaviour in digital choice environments". The implementation of digital nudges is faster and cheaper compared to nudges in the offline environment (Weinmann et al., 2016). While digital nudges have been explored in many areas already, digital nudges in online food choices are still scarce (Berger et al., 2020).

Default option nudging is one of the most commonly used digital nudge (Hummel & Maedche, 2019). The default nudge shows that making something a default option increases the likelihood that that option is chosen. The study by Coffino et al. (2020) is such a study that investigated the default option nudge to promote healthier grocery purchases, which showed a positive significant effect on the nutritional quality of food purchases. Another commonly used digital nudge is labelling. Take for example the study of Jansen et al. (2021) where they assessed the effect of Nutri-score labelling on food choices. Results showed that the labels significantly improved the nutrient profiling score. The

research on visual design cues and the decoy effect in an online environment to encourage healthy behaviours is nonetheless limited.

2.3. Visual Design Cues

When consumers enter a grocery store, either physically or online, they are exposed to a multitude of visual cues of the product, packaging, and environment (Vermeir & Roose, 2020). This makes visual cues one of the most significant communication tools (Bloch et al., 2002; Sample et al., 2020). Especially online, as there are limitations in touch and smell as information cues (Kim & Lennon, 2008). Visual design cues are transparent nudges, meaning that "the user can perceive the intentions and means behind the nudge" (Caraban et al., 2019, p. 2). Symbols, colour, highlights, and typography can serve as visual cues. These guide the eye towards a particular area to encourage a specific behaviour. The study by Bloch et al. (2002) stated that shoppers usually rely on visuals to make choices online, especially when they have no experience with a product.

Visual design cues affect consumers' perceptions, attitudes, and behaviour (Vermeir, 2020). Take for example the study from Van Ooijen et al. (2017) who demonstrated that slim packaging shapes evoke perceptions of healthy food products as opposed to wide packaging shapes. Furthermore, labels mentioning healthy ingredients also prompt positive beliefs (Vermeir, 2020). However, on an application or website, product packaging and labels are less clear than in a real supermarket, as small images are used. Consequently, nutritional labels on the packaging of products might not even be visible. There is a need to find new ways to have healthy cues stand out more, which can be done through visual design cues.

Vermeir and Roose (2020) mentioned that five cues are especially relevant for food choice, namely colour, shape, aesthetic, materiality, and the combination of text and photos. However, Roose and Mulier (2020) specified that using multi-sense cues simultaneously can trigger negative thoughts. Specifically, multi-sense cues for unhealthy food products are more effective than single-sense cues, while on the other hand for healthy food products, single-sense cues increase taste perception and buying intention. As investigated by Cabrera and colleagues (2017), the perceived healthfulness of food products is significantly influenced by the shape, colour, and textual information on food labels. From these three cues, colour has the largest contribution to perceived healthfulness (Cabrera et al., 2017). Furthermore, the effects of colour cues are more powerful for product expectations than for product evaluation (Tijssen et al., 2017). Therefore, this research will investigate to what extent colour as a visual design cue can influence food choice.

Colour consists of hue, saturation, and brightness (Sample et al., 2020; Thompson et al., 1992). Colours have metaphorical meanings that are often activated outside conscious awareness and

can have an automatic influence on responses, behaviour, and more (Elliot & Maier, 2014; Labrecque et al., 2013; Vermeir & Roose, 2020). Through mere exposure, people get certain associations with certain colours. Therefore, inappropriate colours can influence the perception of taste. This is due to incongruency with the fit of taste and colour (Vermeir & Roose, 2020). Unhealthy and sweet foods are often associated with warm colours, whereas products with cold-coloured packaging are associated with healthiness and sourness (Vermeir & Roose, 2020). Especially the colour green on a food label is associated with good taste, a healthy lifestyle, and healthiness in general (Cabrera et al., 2017). Schuldt (2013) showed similar results, conveying that green colour labels on candy bars increase perceived healthfulness compared to red or white colour labels. Mead and Richerson (2018), as well as Tijssen and colleagues (2017), stated that people implicitly and explicitly perceive products as healthier when they are packaged in less saturated colours, as opposed to highly saturated packaging. The literature on mere exposure can be linked to the Nutri-Score labelling system (IARC, 2021), ranging from the letter A to E. Without their corresponding colours, the letters do not convey much information. When the colour-range from dark green (A) to red (E) is added, people can instantly link the products to a certain healthiness-level.

Findings reflect an association between green and healthiness, possibly rooted in generic associations, that is capable of influencing health-related judgements apart from the information conveyed on the label (Schuldt, 2013). However, limited evidence is available on how colour cues can influence behavioural outcomes, and on the effect of visibility enhancements on behaviour. The study by Manasoontorn (2022) is such an available study. He investigated whether visibility enhancements, in the form of borders, have any effect on a healthy meal choice in a restaurant. Results showed that adding a border around healthier products, along with difficulty in ordering high-calorie food, could reduce calorie intake. Regarding visibility enhancements, Coucke and colleagues (2019) investigated whether they could nudge consumers towards more sustainable meat choices in an in-store environment. By increasing the display area and the number of poultry products and decreasing it for less sustainable meat options, the visibility was enhanced which shifted consumers' purchase behaviour of meat. A different study communicated the result that visual cues in an online shopping environment marginally influence the viewing duration and decision time of customers and have an impact on product choice (Beşer et al., 2022). Although these studies do not fully comply with this research, it does show that a visual cue in the form of visibility enhancements can affect the decision-making process of consumers. This research will therefore investigate whether a green colour cue enhancing visibility can translate the association of healthiness to healthier shopping behaviours. Hypothesis 1 is introduced:

H1: When a green visual cue is presented, it is expected that consumers choose a product containing less sugar more often contrary to when a green visual cue is absent.

Referring to the CAN approach (Wansink, 2015), recall that to make people consume healthy food, you must make it more convenient, attractive, and normal to choose. By implementing visual design cues in the form of colour on a food product, the visibility of that product should be enhanced encouraging its purchase. It can be hypothesised that the targeted product with a green visual design cue will be more convenient to see, filling the position of "convenience". Hypothesis 2 is introduced:

H2: When a green visual cue is presented with healthier products, it is expected that those food products are more convenient to see.

2.4. The Decoy Effect

The decoy effect is a non-transparent nudge, meaning that the consumer is not able to perceive it. The decoy effect (Huber & Puto, 1983) refers to "the phenomenon that adding an option that is dominated by one of the existing options boosts the appeal of the dominating option" (Li et al., 2019, p. 139). It is argued that when an inferior alternative product (C) is added to the original set of products (the target, A, and competitor, B), a different choice will be made by consumers. A substantial shift of preference is made from product B to A (Zhang & Zhang, 2007). The decoy is dominated by the target, so consumers will be more attracted to the target product. The decoy is not primarily meant to be sold but serves as seeking attention (Fechner & Herder, 2021). A strategically placed decoy can increase the buying intention of the target products by multiple percentage points (Kaptein et al., 2016).

Various product classes, ranging from beer to cars, have applied the decoy effect (Huber et al., 2014). Take for example the study of Josiam and Hobson (1995) who used the decoy effect to persuade consumers into buying a more expensive holiday package. The original set contained holiday packages to either Las Vegas or Disney World consisting of the competitor (low price-low value package), and the target (high price-high value package), where people tended to choose the cheapest package (the competitor). When the decoy was added (a high price-low value package), customers tended to choose the target over the competitor. Consumers indeed shifted their preference toward the higher-priced packages after the introduction of the decoy.

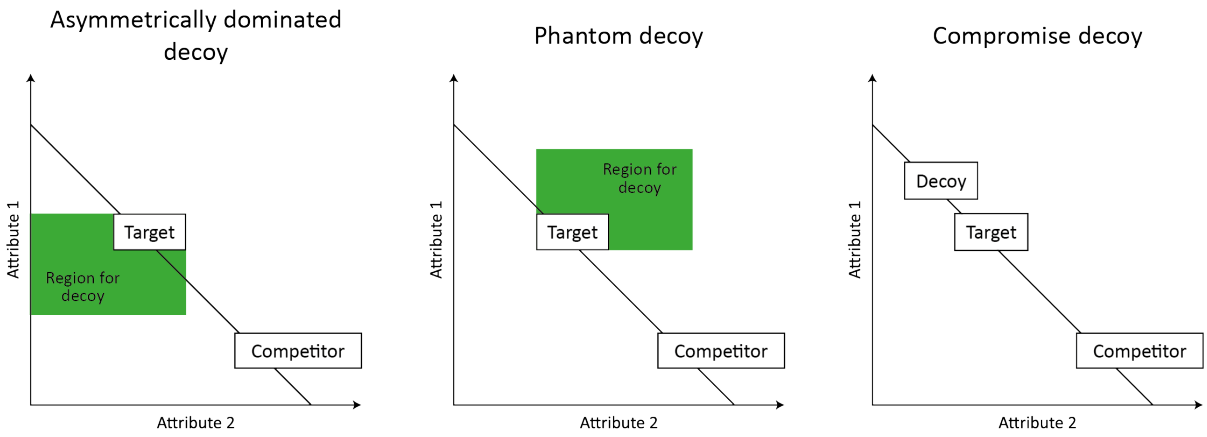
The shifting of preferences can be attributed to the attraction effect, a phenomenon introduced by Huber and colleagues (Huber et al., 1982; Huber & Puto, 1983). The attraction effect takes place when the addition of a decoy, an inferior alternative, increases consumers' preferences for

the target product. To explain, decisions depend on the starting point to which the product is compared, which is the anchoring effect. As the starting point changes due to the addition of a decoy, the preferences change too, shifting the anchoring point. In 1982, Huber and colleagues applied the decoy effect to prompt different choices among six product categories: cars, restaurants, beers, lotteries, film, and television. Students were asked to make choices involving either two or three alternatives. The study showed a positive gain in percentages for the number of times target products were chosen. In 1983, Huber and Puto (1983) tried again to understand, with three studies, what would happen if the new alternative extended the boundaries of the existing choice set by being superior on one dimension, but poor on others. They asked participants to choose a beer based on quality and price. The original set included a higher-quality (70), higher-priced ($2,10) beer, and a lower-quality (60), lower-priced ($1,90) beer. The decoy was either a slightly higher quality (80) beer with a much higher price ($2,50) or a much lower quality (40) beer with a slightly lower price ($1,70). Thus, the target product changed dependent on the decoy. The results showed that the addition of the decoy made sure that the target was significantly considered more as the preferred beer, confirming the attraction effect. To conclude, these results support that adding an inferior alternative may help the brand or product that would not have been sold otherwise (Huber & Puto, 1983).

Generally, there are three types of decoys documented in the literature, summarized by Min (2003). First, an asymmetrically dominated decoy (Heath & Chatterjee, 1995; Huber et al., 1982). Hereby, the decoy is a product alternative dominated by the target, but not the competitor. This means that the decoy is not superior to the target but has one or more attributes inferior to the target. Second, a phantom decoy. This type of decoy is unavailable for the consumer and dominates the target product but not the competitor (Highhouse, 1996; Pratkanis & Farquhar, 1992). The decoy is better on one or more attributes. The phantom decoy could be especially relevant in the digital context, as online shops do not need to produce the decoy to use the effect (Kaptein et al., 2016). Lastly, a compromise decoy (Simonson, 1989; Simonson & Tversky, 1992), which is an alternative product similar to the target product. This decoy product is superior to both the target and competitor alternatives. See Figure 1 on the following page for the three types of decoy effects.

Figure 1

Illustrations of the Three Types of Decoys in Relation to the Target and Competitor



Fechner and Herder (2021) used the decoy effect in the eating domain. They investigated how consumers can be nudged towards more ecological behaviour when using an online supermarket. Their target product was a vegetarian meat substitute, whereas the competitor was regular meat. With the introduction of the third decoy product, organic meat, participants significantly chose the vegetarian meat option over the regular meat. Looking back at the three types of decoys, it seemed like Fechner and Herder used a compromise decoy. The reasoning why consumers are more likely to choose the target, and why this type of decoy will also be used within this research, is due to two explanations: ease of justification and loss aversion. Consumers tend to make decisions that are easily justifiable to others (Simonson, 1989). As the target product does not contain inferior features, consumers will receive less criticism from others. Thus, by avoiding extreme options, consumers will feel "safer" and less criticized. Next to that, consumers tend to view the intermediate product, the target, as more attractive than alternatives with extreme values, because the product produces feelings of loss to a lesser extent (Simonson & Tversky, 1992). As the decoy effect is shown to be robust in the literature, has a wide scope, and is of practical relevance (Doyle et al., 1999), there is the possibility to also use the decoy effect to prompt healthier food choices on a supermarket website. Therefore hypothesis 3 is introduced:

H3: When an inferior alternative product (compromise decoy) is added to the original set of products, it is expected that consumers choose a product containing less sugar more often contrary to when the inferior alternative is absent.

Building on the attraction effect and referring to the CAN approach (Wansink, 2015), recall that when a decoy is added to the original set of products, it increases consumers' preferences for the target product. So, the decoy effect seems to fill the position of "attractive" of the CAN approach, as

the decoy makes the target product more attractive relative to what else is available. Many consumers prefer what is popular and what they think is normal to order (Wansink, 2015). For example, when more than 50% of milk in coolers are white, middle schoolers are nearly three times as likely to take white milk than when only 10% is white (Wansink, 2015). Additionally, Pechey and Marteau (2018) communicated that, compared to being offered two healthy and two less healthy products, choosing something healthier is two times more likely with four additional healthy products, compared to four additional less healthy products. In that case, participants were four times more likely to choose a less healthy product. Thus, it is hypothesized that when a higher percentage of healthy foods are available, the healthy foods appear to be more normal to choose. Accordingly, hypotheses 4 and 5 are introduced:

H4: When an inferior alternative product (compromise decoy) is added to the original set of products, it is expected that consumers find the target product more attractive to purchase relative to what else is available.

H5: When an inferior alternative product (compromise decoy) is added to the original set of products, it is expected that consumers find the healthier products more normal to choose relative to what else is available.

2.5. Interaction Effect: Visual Design Cues x The Decoy Effect

The systematic literature from Wilson et al. (2016) argued that combined nudges (in their case 'salience' and 'priming' nudges) could have a more sustained effect compared to one nudge. More specifically, they proposed that two complementary nudges, meaning combining nudges with different qualities so they form a complete unit, could influence healthier food choices over a longer period, ranging from 3 to 21 months. Nonetheless, so far, most research on nudging has only focused on the use of one nudge. The recent review of Ensaff (2021) concluded that there is a lack of research examining the combined effect of multiple nudges regarding healthy eating behaviours. The author mentioned that there is a need for this type of research as effects may be individualised, and for a meaningful impact, multiple nudges may be required. Similarly, Bonini et al. (2018) suggested researching whether combined nudges could aid the promotion of pro-environmental behaviour. They stated that even if the combined effect is not additive, it could still shed light on the underlying process.

An example of a study using combined nudges is from Jesse and colleagues (2021). Their results showed that a combination of a default nudge and social information significantly increases the likelihood of a healthy recipe being selected. However, they did not include an argumentation about

why the combined effect worked well. Wilson et al. (2016) mentioned that combined nudges make healthier options simpler to choose, as consumers tend to choose the easiest option. Tversky and Kahneman (1974) stated similarly, arguing that consumers tend to rely on simple heuristics and will therefore choose the easiest option, which can support the effectiveness of combined nudges.

The CAN approach (Wansink, 2015) can be linked to this reasoning, as it makes healthier options easier to choose. Combined, visual design cues (convenience) and the decoy effect (attractiveness & normal to choose) are hypothesized to cover all aspects of the CAN approach and could enhance simplicity together. As both nudges are needed to fulfil the CAN approach, it can be argued that they complement each other. There are promising reasons to amplify the effect on healthier food choices compared to a single nudge.

Mentioned earlier, Hansen and Jespersen (2013) suggested distinguishing nudges on a transparent and non-transparent level. Recall that visual design cues are transparent, whereas the decoy effect is non-transparent. As the nudges both cover different types of transparency, it could be argued that they complement each other. This is a promising aspect in the reasoning why these two nudges are promising to interact with each other and make healthier choices easier. More recently, Ingendahl et al. (2020) provided evidence that defaults and social norm nudges work individually, but that the combination of both nudges led to an even stronger effect. They speculated that the social norm nudge served as an explanation for the default, and therefore increased the effectiveness. Supporting this, research (Paunov et al., 2019, 2020) showed that default nudges are indeed more effective when they are transparent. In this line of reasoning, the decoy effect might be more effective when a visual design cue is present as well, as it increases the transparency.

Thus, two types of categorisations provide support for why the decoy effect and visual design cues combined will have a greater effect than a single nudge. First, the CAN approach, as the decoy effect and visual design cues cover all three aspects and are therefore complementary. Second, both nudges complement each other on the level of transparency, and can therefore make choices easier.

H6: When a visual design cue and the decoy effect are presented together, consumers will choose a product containing less sugar more often contrary to when one or no nudges are presented.

2.6. Moderator Effect: Health-Related Shopping Goals

The study by Van Ooijen et al. (2017) showed that packaging designs serve as a tool for communicating the healthiness of food products. However, the effects of packaging designs on healthy food choice and attitude were only present when consumers already had health-related shopping goals. The packaging shape did not affect consumers driven by hedonic shopping goals,

meaning the desire to satisfy psychological needs. They attributed this result to the fact that health cues only influence choice if they are relevant to the consumer. This concept is consistent with research on the activation of (automatic) processes, suggesting that the impact on consumers is moderated by motivations and goals (van Ooijen et al., 2017). For example, according to Bargh (1989), unintended automaticity can be target-dependent and often only emerges when the cue is target-relevant. Thus, the effects of healthy choices are dependent on the goal of the consumer in a retail context, which is in line with research on goal dependent automaticity (van Ooijen et al., 2017).

Schuldt (2013) communicated that green colour labels increase perceived healthfulness, especially among consumers who have high levels of importance on healthy eating. This effect can be attributed to the fact that consumers who are motivated to choose healthy foods, specifically look for and are influenced by health cues (Schuldt, 2013). It furthermore suggests that when cues play on one's health goal, consumers may be inclined to view those foods in an unrealistic positive light, which is consistent with the reasoning behind the halo effect (Schuldt, 2013; Thorndike, 1920).

Jansen et al. (2021) researched the effectiveness of food swaps to encourage healthier food choices online. They revealed that swap offers and Nutri-Score labelling significantly led to healthier food decisions. However, consumer health interest significantly moderated the influence of the Nutri-Score on the ease of identifying healthy food products. They therefore stated that the interest of consumers in health-related behaviour can influence the willingness to process information about healthfulness, such as cues. This increases the positive effect of various types of interventions (Drichoutis et al., 2006; Hieke & Taylor, 2012). Furthermore, when people are engaging in health-related behaviour, an intervention leads to even more motivation for health behaviours than for those with low health interests. This has to do with personal involvement (Maheswaran & Meyers-Levy, 1990; Rothman & Salovey, 1997). This reasoning from Jansen et al. (2021) is in line with and based on earlier findings that the goal of interventions should be in line with personal goals regarding healthy eating (Hillhouse et al., 2017; Maheswaran & Meyers-Levy, 1990; Rothman & Salovey, 1997). Lastly, the meta-analysis regarding nutrition label nudging by Drichoutis et al. (2006) illustrated that consumers with high health-related behaviours are more likely to use nutrition information and/or health claims.

To summarize, health-related shopping goals can strengthen the effectiveness of visual design cues and the decoy effect due to various reasons. The most prominent reason has to do with consumer motivation, interest, and goals (Hillhouse et al., 2017; Maheswaran & Meyers-Levy, 1990; Rothman & Salovey, 1997). This is part of goal dependent automaticity, researched by Bargh (1989), but also has to do with the willingness to process information (Drichoutis et al., 2006; Hieke & Taylor, 2012). Lastly, Schuldt (2013) argued that consumers with high health-related shopping goals are specifically looking for certain cues. These cues will therefore attract more attention to those with

high health-related shopping goals, as opposed to consumers with low health-related shopping goals. It is hypothesized that people with higher health-related shopping goals are more affected by the (combined) nudges than people with lower health-related shopping goals.

H7: The positive effect of a green visual cue on the healthiness of one's food choice is strengthened by health-related shopping goals.

H8: The positive effect of the decoy effect on the healthiness of one's food choice is strengthened by health-related shopping goals.

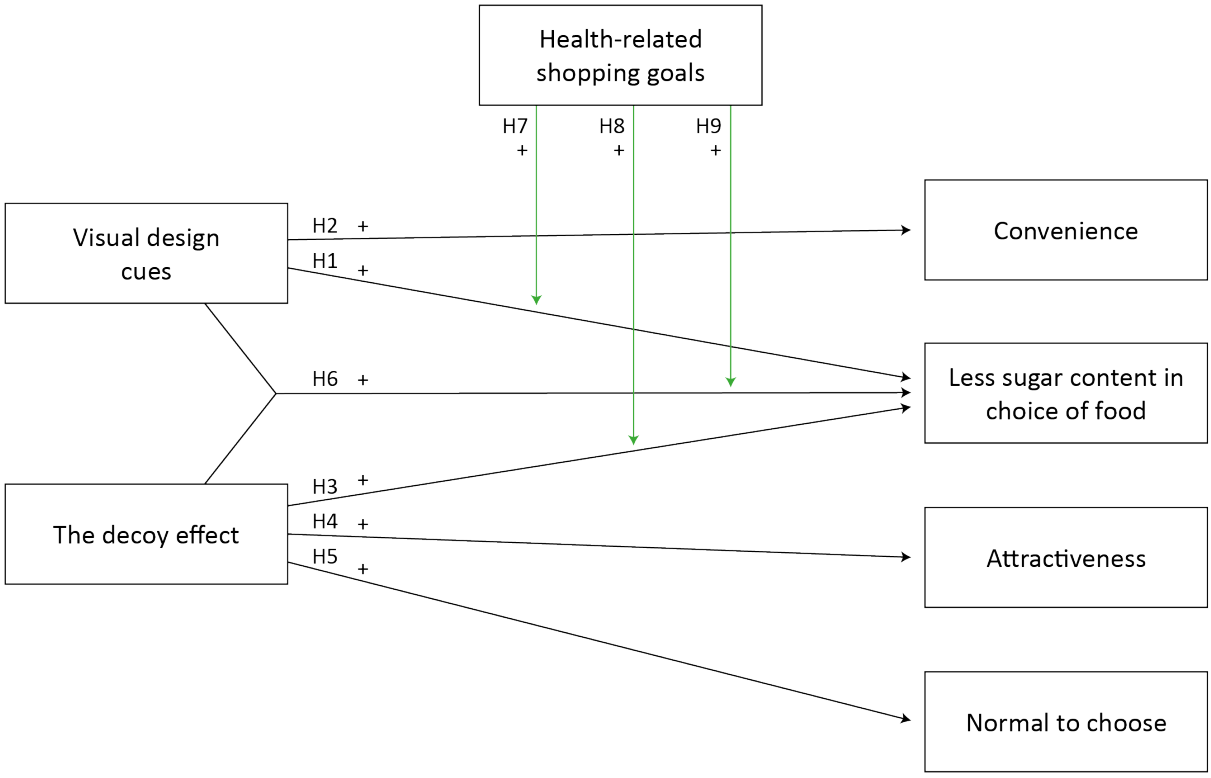
H9: The positive interaction effect of a green visual cue and the decoy effect on the healthiness of one's food choice is strengthened by health-related shopping goals.

2.7. Research Model

This research investigates the effect of green colour cues and the decoy effect on one's food choices. Within this research, visual design cues and the decoy effect are independent variables, whereas the outcome variable is food choice. Convenience, attractiveness, and normal to choose are also seen as outcome variables to measure if the nudges comply with the CAN approach. Lastly, a moderator is added to investigate the effect of health-related shopping goals on the relationship between the (combined) nudges and one's food choice. A conceptual model is visualised in Figure 2 on the next page.

Figure 2

Conceptual Research Model



3. Method

This study investigated to what extent online nudges could influence one's food choice. A 2 (visual design cue: present vs. absent) x 2 (decoy effect: present vs. absent) experimental design with a moderator variable was conducted where a realistic supermarket website was created to test the hypotheses derived from the literature review. The nudges were used to persuade participants' decision-making and guided them towards food products lower in sugar. Participants were randomly assigned to one condition (Table 1) of the supermarket website and completed the online experiment in their own environment at their own time, strengthening the external validity regarding the research context. The study has received ethical approval from the BMS ethics committee of the University of Twente (approval number 221158).

Table 1

Instrument Design Matrix

	Decoy effect present	Decoy effect not present
Visual design cue present	Condition 1	Condition 2
Visual design cue not present	Condition 3	Condition 4

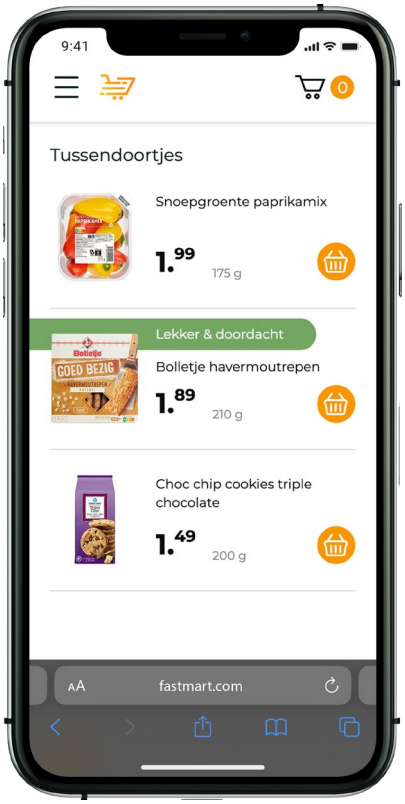
3.1. Preliminary Study

Before gathering data, a preliminary study was conducted to investigate which textual claim and design of a green visual cue would enhance the right effects. The goal was to find a cue that conveys the tastiness and healthiness of the target product. A small focus group (N = 4) was held where different claims and designs were proposed (Appendix A). Participants discussed the associations they received from the cues, what they thought the meaning was behind the cues, where their eyes were drawn to on the website, and how they felt about the cues.

All participants agreed on one design for the cue (Figure 3), as this design drew attention and was clear in its meaning. Furthermore, the textual claim "lekker & doordacht" (healthy & thought out) was decided on, as participants perceived the claim as broad in its meaning, but as soon as the green cue was added, they linked the claim to healthiness. Moreover, participants did not get a negative feeling towards healthy products when the claim was used. Other textual claims were either not clear in their meaning, or were too focused on sentences about healthy foods, causing reactance, meaning that participants would deliberately not choose the targeted product.

Figure 3

Final Design Visual Cue



3.2. Pre-test

3.2.1. The Decoy Effect

The pre-test aimed at selecting appropriate materials for the main experiment, namely which food products to use on the website for the decoy effect, and the visibility of the visual design cue. Through an online questionnaire (Appendix B), participants (N = 9) had to rate 21 randomised snacks (e.g., snack paprikas, muesli bars, strawberries, and chocolate chip cookies) on their perceived healthiness (in terms of sugar content) and attractiveness on a 5-point Likert Scale (1 = unhealthy / not attractive, 5 = very healthy / attractive. In line with van den Enden & Geyskens, 2021). For the decoy effect to work within the healthy eating domain, there are three important conditions (van den Enden & Geyskens, 2021) to be met: (1) the attractiveness of the target and competitor are not significantly different, (2) the attractiveness of the decoy is significantly lower, and (3) the competitor is significantly less healthy than both the target and decoy.

Based on the results of the pre-test, a choice set was decided on. Products were seen as healthy and/or attractive when their mean scores were above the midpoint of 3, but the higher the better. The target product is mandarins, as they scored high on perceived healthiness (M = 4.33, SD = .50) and attractiveness (M = 4.00, SD = .71). The competitor product is Maltesers, as they were

perceived significantly less healthy (M = 1.22, SD = .44) than mandarins ($t(16) = 14.00$, $p < .001$), and scored similarly on attractiveness (M = 4.11, SD = 1.27) as mandarins ($t(16) = -.23$, $p = .82$). The decoy product is oatmeal porridge, as it scored similarly high on perceived healthiness (M = 4.11, SD = .33) as the mandarins ($t(13.94) = 1.11$, $p = .29$), and significantly lower on attractiveness (M = 2.22, SD = 1.09) compared to both mandarins ($t(16) = 4.10$, $p < .001$) and Maltesers $t(16) = 3.38$, $p = .004$). Appendix C shows the descriptive statistics for all 21 products.

3.2.2. Visual Design Cues

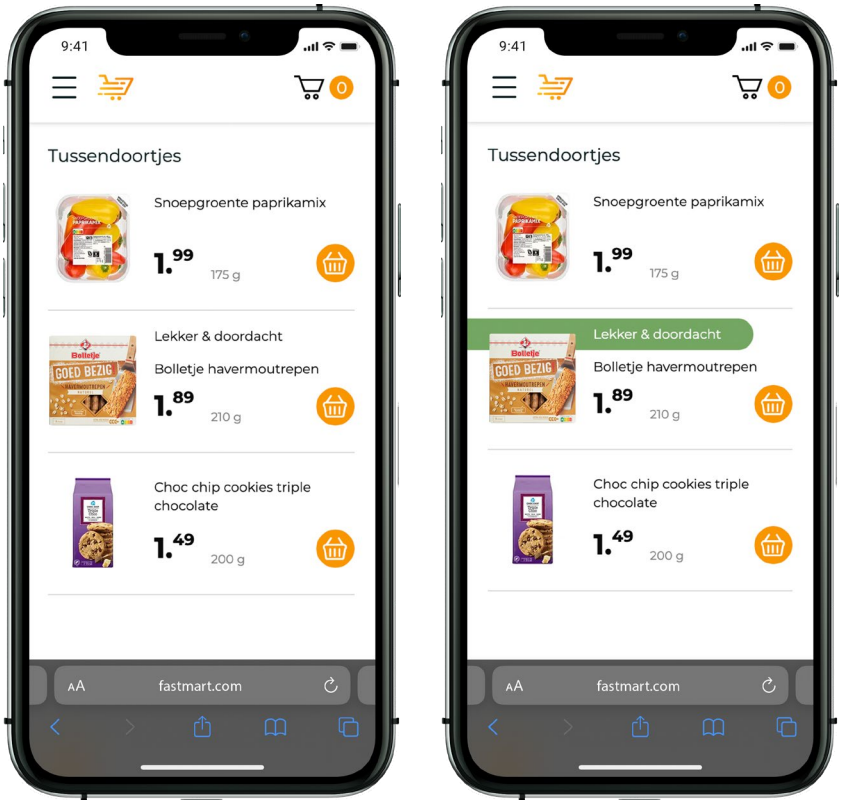
The final visual cue was tested again in the pre-test to ensure that participants perceived the cue as visually salient and understood the meaning behind the nudge. Participants (N = 9) were first exposed to the supermarket website not including the visual design cue (Figure 4) where they had to indicate which product they found most convenient to see, and what they thought the meaning was behind the textual cue "lekker & doordacht". Next, they were exposed to the website including the visual design cue (Figure 4) where they had to answer the same questions.

In absence of the visual design cue, participants primarily perceived no product as more convenient to see than another product (44.4%) or perceived the first product on the page as the most convenient to see (snack paprikas, 33.3%). When the visual design cue was present, there was a clear shift, as participants then perceived the product with the visual design cue (oatmeal bars) as most convenient (88.9%). These results support the design and the convenience of the visual cue.

Participants were asked about the meaning behind the textual cue "lekker & doordacht", presented in each condition. The textual claim intends that it has a broader and more vague definition when the green visual cue is absent, but that the claim will be linked to healthiness as soon as the green visual cue is present. As tested in the pre-test, participants mainly thought that the textual claim held the meaning of a well-considered product (55.6%) when the visual design cue was absent. When the cue was present, participants thought the meaning behind the textual claim was about the healthiness of the product (77.8%), supporting the textual claim.

Figure 4

Shown Stimuli Without the Visual Design Cue vs. With the Visual Design Cue



3.2.3. Usability of the Website

The pre-test was conducted to gain insights into the usability of the website. To make sure that a digital product is user-friendly, it is recommended to test the product with five persons, as that is enough to find up to 85% of the problems (Nielsen, 2000). Participants in the pre-test (N = 9) were asked to put products from a given grocery list in their shopping basket on the website. During this test, participants had to think aloud, as it let the researcher discover why users guess wrong about parts of the interface. Furthermore, the researcher learns about what the users really think about the design, while hearing misconceptions (Nielsen, 2012). Next to the thinking-aloud method, the researcher observed the activities of the participants to see how they used the website and to find other underlying issues. After finishing the task, participants had to rate statements from the System Usability Scale (Brooke, 1996) on a 5-point Likert ranging from “strongly disagree” to “strongly agree”.

The System Usability Scale resulted in a score of 87.5 out of 100, meaning that the usability of the website is perceived as “very good” according to its calculations. Furthermore, the statement “How realistic did you perceive the website of the online supermarket?”, measured on a unipolar Likert scale ranging from 1 (very unrealistic) to 5 (very realistic), received a mean score of 4.56 (SD = .53) meaning that participants perceived the supermarket website as realistic. No hiccups were

noticed among participants. All participants succeeded in finding the products they needed on their first try.

3.3. Stimuli Design

Four realistic supermarket websites were created on the website-creator Wix. This website was based on the Dutch supermarket "Albert Heijn", so participants would perceive the websites as more believable and realistic. Pictures of products on the website were also taken from the Albert Heijn website (2022). The landing page contained a fictive savings program for pans, seasonal-related offers, and blog posts. A link to all nineteen product categories (e.g., households, freezer, and bakery) was, among others, included in the menu. These categories subsequently linked to subcategory pages (e.g., banquet, bread, and crackers) or product pages. On the product pages, participants had to decide which product to put in their shopping baskets. The check-out page was disabled to ensure that participants were not tricked into buying the products. The website was optimised for both desktop and mobile, and participants were able to choose between a Dutch or English translation of the website.

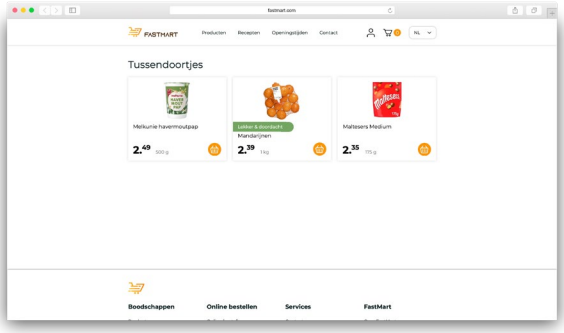
The four websites represented the four experimental conditions. The websites were completely identical, apart from the product page "snacks", as that is where the nudges were either present or absent. When the decoy effect was absent, two equally attractive pre-tested products (the target, mandarins, and the competitor, Maltesers) were available on the product page. When the nudge was present, a pre-tested asymmetric dominated alternative product (oatmeal porridge) was added to the original set of products.

For the visual design cue, the target product and its textual claim were highlighted by a dull green colour cue, as a less saturated colour green especially conveys healthiness (Mead & Richerson, 2018; Tijssen et al., 2017). The preliminary study and pre-test supported the visual salience of the food option presented with the cue. When the visual design cue was absent, no green colour cue was present. The snack products were almost equally expensive to prevent participants from choosing a snack based on its price. Figure 5 presents the stimulus materials on the "snacks" product page. Appendix D presents the supermarket website as a whole.

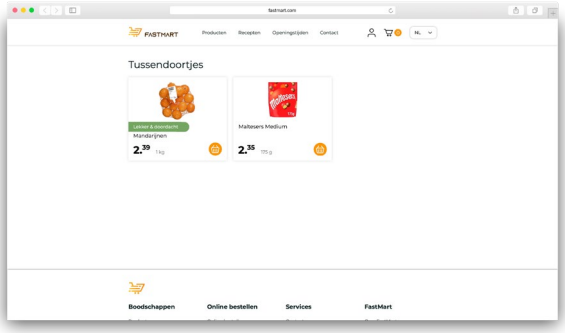
Figure 5

Stimulus Materials Desktop Design

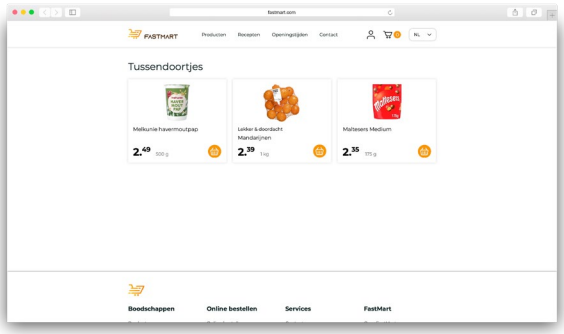
Condition 1



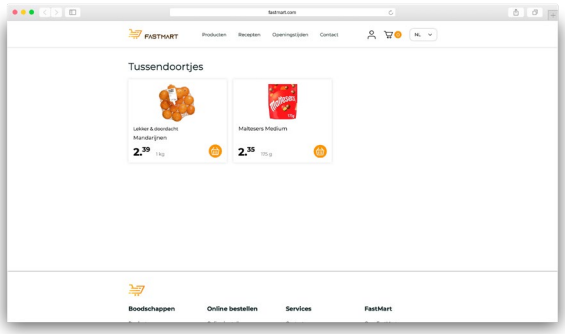
Condition 2



Condition 3



Condition 4



3.4. Experimental Procedure

The main experiment was conducted using the Qualtrics Experience Management platform and a Wix-website. A digital approach was chosen so participants would be exposed to the stimuli in their own environment, similar to when they shop for groceries online. The survey consisted of seven components (Appendix E). Prior to the survey, participants were shown the informed consent, which pointed out their rights as a participant. This form included a checkbox for consent. If participants did not agree with the experiment or the handling of the data, they were thanked for their time and directed to the end of the survey. If agreed, they were directed to the rest of the survey.

The second block collected the participant's hunger level on a 5-point Likert scale, as cravings might influence their food choice. Thirdly, statements about participants' health-related shopping goals were asked to indicate their involvement in health choices on a daily basis. The fourth component contained the main experiment. Participants were randomly assigned to one of the four conditions and instructed to put four items in their shopping basket on the supermarket website regarding the assigned condition. The item "a snack" on the shopping list was the targeted product page, where the dependent variable food choice was measured. The other three food and non-food products were added to the list to ensure a realistic shopping experience. Participants were informed

that they should choose the products they would buy as if it were a real supermarket. Once participants completed the shopping list, they had to go back to the survey and finish the remaining questions. Corresponding questions about the dependent variables convenience, attractiveness, and normality were followed.

To gain time between answering the main experiment and the manipulation check, the fifth component consisted of demographic questions, asking for gender, age, and highest degree or level of education completed. In the sixth block, participants were again exposed to the stimulus of the condition they were assigned to. Manipulation check questions were asked to ensure that participants recognised the various elements of the nudges. At the end of the survey participants were asked if all questions were clear to them, and if not, what hiccups they encountered. Finally, a closing statement showed that participants completed the survey and thanked them for their time.

3.5. Sampling Procedure and Participants

The study population consisted of residents living in The Netherlands above the age of 18. The target sample was drawn from this study population. Table 2 visualises the demographics of the participants per condition. Non-probability sampling methods (convenience and snowball sampling) were used to collect data from participants as no sampling frame was available for the researcher. Participants were recruited through the channels of social media, word of mouth, and flyers in supermarkets to ensure the best possible representative sample. The survey was active for three weeks total.

In total, data from 275 participants were collected. 6 participants did not give consent, 46 participants did not complete the survey, and 34 participants had to be discarded because they did not click on the link to the supermarket website and were therefore not exposed to the stimuli. That left 189 valid responses, of which 68 males (36%), 119 females (63%), 1 third gender (0.5%), and 1 who preferred not to say it (0.5%).

All participants were randomly and equally assigned to one of the four conditions, where no gender differences were found between the conditions ($\chi 2(9, N = 189) = 8.50$, $p = .49$). The participants ages ranged between 18 and 73 years (M = 28.54, SD = 11.47). No significant difference was found in the age distributions between the four conditions ($F(3, 185) = 1.32$, $p = .27$). Additionally, the groups did not differ in educational level ($\chi 2(21, N = 189) = 20.23$, $p = .51$). An ANOVA test showed no significant differences between the conditions regarding participants' health-related shopping goals ($F(3, 185) = .41$, $p = .75$). The insignificant differences between the randomized conditions strengthened the internal validity of the study.

Table 2

Distribution of Sample Characteristics

		Condition 1		Condition 2		Condition 3		Condition 4		Overall	
		N	%	N	%	N	%	N	%	N	%
Total		44	100%	53	100%	47	100%	45	100%	189	100%
Gender[a)]	Male	13	29.5%	23	43.4%	17	36.2%	15	33.3%	68	36.0%
	Female	29	65.9%	30	56.6%	30	63.8%	30	66.7%	119	63.0%
	Third gender	1	2.3%	0	0.0%	0	0.0%	0	0.0%	1	0.5%
	NP	1	2.3%	0	0.0%	0	0.0%	0	0.0%	1	0.5%
Education[b)]	H.S.	8	18.2%	10	18.9%	10	21.3%	8	17.8%	36	19.0%
	VET	2	4.5%	3	5.7%	4	8.5%	4	8.9%	13	6.9%
	HBO b.	13	29.5%	19	35.8%	19	40.4%	17	37.8%	68	36.0%
	HBO m.	5	11.4%	2	3.8%	2	4.3%	0	0.0%	9	4.8%
	WO b.	5	11.4%	10	18.9%	9	19.1%	10	22.2%	34	18.0%
	WO m.	10	22.7%	8	15.1%	2	4.3%	6	13.3%	26	13.8%
	Other	0	0.0%	1	1.9%	0	0.0%	0	0.0%	1	0.5%
	NP	1	2.3%	0	0.0%	1	2.1%	0	0.0%	2	1.1%
		M	SD	M	SD	M	SD	M	SD	M	SD
Age[c)]		27.5	10.6	28.2	10.8	27.1	9.8	31.4	14.2	28.5	11.5
Health R.[d)]		4.5	0.9	4.3	0.9	4.4	1.0	4.3	1.0	4.4	0.9

Note: H.S. = high school, Health R. = the moderator health-related shopping goals, and NP = not provided

[a)] (χ2(9, N = 189) = 8.50, p = .49)

[b)] (χ2(21, N = 189) = 20.23, p = .51)

[c)] (F(3, 185) = 1.32, p = .27)

[d)] (F(3, 185) = .41, p = .75)

3.6. Measures

Variables and their associated constructs were measured using 7-point Likert Scales. The statements were acquired from pre-existing scales or were constructed by the researcher. Table 3 on the following page presents an overview of the measures and their statements used in the main experiment.

Table 3

Measures for the Dependent and Moderation Variables

Measurement	Statements
Food choice (Created for this research)	• This is the snack I put in my shopping basket.
Convenience (Created for this research)	• When I opened the product page, this product drew my attention and was very convenient to see.
Attractiveness (Created for this research)	• Comparing all options, I think this product is very attractive to choose.
Normal to choose (Created for this research)	• I feel like this product is a "normal" and popular choice compared to the other options.
Health-Conscious Scale (Gould, 1988)	• I am very self-conscious about my health. • I am more concerned about my health than the average person. • The healthiness of food has little impact on my food choices. *
Health and Taste Attitude Scale (Roininen et al., 1999)	• I am very particular about the healthiness of food I choose and eat. • I buy what I like, and I do not worry much about the healthiness of food. * • It is important for me that my diet is low in sugar. • The healthiness of snacks makes no difference to me. *

* Negative statements, and therefore recoded for the final scores

3.6.1. Food Choice

The dependent variable food choice was measured on a nominal level, depending on the condition the participant was assigned to. Participants in condition 1 and 3 could choose between 3 food products (0 = oatmeal porridge, 1 = mandarins, 2 = Maltesers), while participants in condition 2 and 4 had the option to choose between 2 products (0 = mandarins, 1 = Maltesers). After participants completed the assignment of fictively buying products, they had to indicate which snack they put in their shopping basket.

Each snack had a corresponding level of healthiness, based on the amount of sugar per 100 grams. The less sugar, the healthier the product was ranked. Thus, in this study, oatmeal porridge was classified as the healthiest (4 grams of sugar per 100 grams), then mandarins (8.2 grams per 100 grams), and Maltesers were the unhealthiest with 53 grams of sugar per 100 grams.

3.6.2. CAN Approach

The CAN approach by Wansink (2015) was implemented in this research by using the acronym for Convenience, Attractive, and Normal as three dependent variables. As the researcher could not find an existing scale, new statements were constructed in line with the article of Wansink (2015). Convenience was measured with the statement “when I opened the product page, this product drew my attention and was very convenient to see” where participants had to choose between the snacks

they were presented with on the supermarket website or could fill in that they perceived no product as more convenient to see.

Attractiveness was measured with the statement "comparing all options, I think this product is very attractive to choose" where participants had to rate each snack on a 7-point Likert scale, ranging from "strongly disagree" to "strongly agree". This same Likert scale was used to measure normality, where participants had to rate the snacks on the statement "I feel like this product is a normal and popular choice compared to the other options".

3.6.3. Health-Related Shopping Goals

The moderator health-related shopping goals was assessed through seven items on a unipolar 7-point Likert scale ranging from "strongly disagree" to "strongly agree". The seven statements were derived from the Health-Conscious Scale (Gould, 1988) and from the construct 'general health interest' in the Health and Taste Attitude Scale (Roininen et al., 1999). Only the items most relevant to this study were used, and some statements were slightly adjusted to fit the context of the study. The scales included items such as "I am very particular about the healthiness of food I choose and eat" and "I am very self-conscious about my health". A reliability analysis was executed to investigate internal consistency between the seven statements. The results reported a satisfactory internal consistency with a Cronbach's Alpha of $\alpha = .75$, exceeding the threshold of $\alpha = .70$.

3.7. Data Analysis

To analyse the results from the experiment, the program IBM SPSS Statistics 27 was used. A significance level (*p)* of 0.05 was needed to conclude whether the outcomes were statistically significant. Manipulation checks were performed to test whether the manipulation of the stimuli was successful and whether there were significant differences between the conditions. For this, Chi-square tests and t-tests were performed.

Descriptive analyses were used to analyse differences between the means, standard deviations, and percentages of variables and to discover potential effects. The results of the visual design cue and the decoy effect on food choice were analysed using a Chi-square test, as food choice was a dichotomous variable. A log-linear analysis gave further insights into the interaction effect of both nudges on food choice, as it measured the association between multiple categorical variables, estimating the probability of observing a statistically significant combination.

For the CAN approach, the visual design cue on convenience was tested using a Chi-square test. A Multivariate Analysis of Variance (MANOVA) was performed for the decoy effect on attractiveness and normality, considering the correlation between the outcome variables. Univariate

Analysis of Variance (ANOVA) revealed the difference between the means of the two groups on the outcome variable. The extent to which food choice was affected by attractiveness and normality could be determined.

A Median split on the mean moderator score was used to test the effect of health-related shopping goals on food choice. To check if the mean score of one's health-related shopping goals moderated any main or interaction effect, generalised linear models were conducted with binary logistic outcomes. These outcomes were further visualised in boxplots.

The analyses for the results omitted the decoy product, as there was a difference in the number of snacks the participants could choose from (two products in the no-decoy condition vs. three products in the decoy condition), which could bias the results (in line with van den Enden & Geyskens, 2021). Additionally, the decoy product was not meant to be chosen, but rather served as an attention seeker (Fechner & Herder, 2021). It was therefore no surprise that the decoy product was only chosen eight times by participants in total, and the results of the statistical tests did not rely on the data of the decoy product. The results of this study were thus about the differences between the target and competitor products.

3.8. Manipulation Check

3.8.1. Visual Design Cues

To verify that the manipulation of the visual design cue was successful, a manipulation check was conducted. Participants had to indicate whether they saw a green cue on the "snacks" product page (0 = no, 1 = yes). The Chi-square test revealed that there were significant differences between the conditions without and including the visual design cue, with $\chi 2(1, N = 189) = 42.34$, $p < .001$. In the condition without the visual design cue, 91.3% (N = 84) of the participants did not see the cue, whereas in the condition with the visual design cue, 52.5% (N = 51) of the participants did see the cue. The manipulation was therefore successful.

3.8.2. The Decoy Effect

Additionally, a manipulation check for the decoy effect was conducted to test whether participants could recall the number of snacks presented to them in their assigned condition. Participants were asked to indicate the number of snacks they were presented with on the supermarket website. An independent sample t-test revealed that there were significant differences between the conditions without the decoy product (M = 2.07, SD = .33) and including the decoy product (M = 2.97, SD = .35), with $t(187) = -18.16$, $p < .001$. This suggests that the manipulation was successful, as participants saw a different number of snacks within the different conditions. When the

decoy was absent, 91.8% of participants saw the correct number of snacks, and when the decoy was present, 94.5% of participants saw the correct number of snacks.

3.8.3. Textual Claim

The third manipulation check was conducted to test whether participants saw the textual claim of "tasty & thought out". Over all conditions, 61 participants (32.3%) mentioned they saw the textual claim, while 128 participants did not see the textual claim. Of the 61 participants that saw the claim, 82% (N = 50) remembered the correct textual claim. The textual claim was not a variable of interest for this study, so it was no bad thing that most participants did not see or remember the claim correctly. These results indicate that the textual claim was not a leading nudge within this study and that participants did not make their food choice solely based on the textual claim.

Noticeable is that when the visual design cue was absent, participants more often did not see the claim (N = 79, 85.9%) than did (N = 13, 14.1%). When the visual design cue was present, there was no clear difference in whether they saw (N = 48, 49.5%), or did not see the claim (N = 49, 50.5%). Accordingly, there was a significant difference between the conditions in the absence and presence of the visual design cue on seeing the textual claim ($\chi 2(1, N = 189) = 27.00$, $p < .001$).

3.8.4. Food products

Finally, the last manipulation check was conducted to test whether participants perceived the food products used on the website in the category "snacks" as healthy or unhealthy on a 5-point Likert scale (1 = unhealthy, 5 = healthy). The target product mandarins were perceived as healthiest (M = 4.62, SD = .53), whereas the competitor product Maltesers was perceived as unhealthy (M = 1.31, SD = .58), which is a significant difference (paired sample t-test, $t(188) = 55.07$, $p < .001$). The decoy product was, as intended, perceived as healthy (M = 3.75, SD = .85). These results correspond to the results of the pre-test and are in line with the research of van den Enden and Geyskens (2021). The manipulation products were perceived as intended.

4. Results

Several tests were performed to examine the effects of the predictor variables on the outcome variables. Table 4 presents an overview of the chosen snack per experimental condition.

Table 4

Chosen Snack per Experimental Condition

Condition	Decoy		Target		Competitor		Total
	N	%	N	%	N	%	N
1. VDC present x DE present	2	4.5%	34	77.3%	8	18.2%	44
2. VDC present x DE absent	0	-	37	69.8%	16	30.2%	53
3. VDC absent x DE present	6	12.8%	25	53.2%	16	34.0%	47
4. VDC absent x DE absent	0	-	25	55.6%	20	44.4%	45
Total	8	4.2%	121	64.0%	60	31.7%	189

Note: VDC = visual design cues, DE = decoy effect

4.1. Main Effects

4.1.1. Visual Design Cue

To test the effect of the green visual design cue on participants' food choice, a Chi-square test was performed. The results suggest a significant association between the green cue and the healthiness of the chosen snack, with $\chi 2(1, N = 181) = 5.61$, $p = .02$. When the visual design cue was present, 74.7% (N = 71) of the participants chose for mandarins, compared to 58.1% (N = 50) participants who chose mandarins when the visual design cue was absent. Even though the effect size is small ($\varphi = .176$), it can be stated that the healthiness of the chosen snack is dependent on the visual design cue, supporting H1.

Another Chi-square test was performed to examine whether there was an effect of visual design cues on the convenience of seeing the target product. The data suggest that visual design cues and convenience are associated with each other, with $\chi 2(1, N = 189) = 20.51$, $p < .001$, supporting H2. When the visual design cue was not present at the target product, mandarins were perceived as less convenient to see (N = 16, 17.39%), compared to no product or other food products (N = 76, 82.61%). Consequently, when the visual design cue was present, the number of participants that perceived mandarins as the most convenient was significantly higher (N = 47, 48.45%).

4.1.2. The Decoy Effect

A Chi-square test revealed no significant association between the decoy effect and the healthiness of the chosen snack ($\chi 2(1, N = 181) = 1.24$, $p = .27$). In both conditions, participants chose

the healthy snack (decoy effect absent: N = 62, 63.3%, present: N = 59, 71.1%) over the unhealthy snack (decoy effect absent: N = 36, 37.6%, present: 24, 28.9%). The difference between the two conditions was however not significant, rejecting H3.

A MANOVA revealed that the decoy effect had a statistically significant effect on the combined dependent variables "attractiveness" and "normal to choose", with $F(4, 184) = 6.36$, $p < .001$; Wilk's $\Lambda = 0.88$, partial $\eta^2 = .12$. Separate univariate ANOVA tests (Table 5) revealed that the decoy effect had a statistically significant effect on both the attractiveness ($F(1, 187) = 5.43$, $p = .02$), and normality ($F(1, 187) = 15.718$, $p < .001$) of the mandarins. As can be seen in Table 5, mandarins were considered more attractive (M = 5.41, SD = 1.42) and normal (M = 5.32, SD = 1.33) in presence of the decoy than in absence of the decoy (attractiveness: M = 4.92, SD = 1.46, normality: M = 4.50, SD = 1.49). No statistically significant effects were found towards the attractiveness of Maltesers, nor that they were perceived as more normal to choose. As such, both H4 and H5 are supported.

Table 5

Univariate Analysis of Variance Decoy Effect

	Decoy	Mean	SD	F (1, 187)	Sig.
Attractive – mandarins	Absent	4.92	1.46	5.43	.021
	Present	5.41	1.42		
Attractive – Maltesers	Absent	4.96	1.61	.13	.723
	Present	5.04	1.68		
Normal to choose – mandarins	Absent	4.50	1.49	15.72	<.001
	Present	5.32	1.33		
Normal to choose – Maltesers	Absent	4.62	1.48	2.51	.115
	Present	4.97	1.51		

4.2. Interaction Effect: Visual Design Cue x The Decoy Effect

A log-linear analysis was conducted to examine for an association between the two independent variables (visual design cues and the decoy effect), and the dependent variable, food choice (mandarins vs. Maltesers). The fit was adequate with $\chi 2(4, 181) = 3.24$, $p = .52$, meaning that the model provides a proper explanation for the variation in the data and has a low error rate. The log-linear analysis did not reveal a significant three-way interaction among visual design cues, the decoy effect, and food choice ($\chi 2(1, 181) = .34$, $p = .56$). As discovered before, significant main effects of visual design cues on food choice (B = .20, SE = .08, $p = .02$) were found, but, sequential, not for the interaction between the three variables (B = -.05, SE = .08, $p = .58$). Hypothesis 6 is therefore not supported.

Overall, in condition 1, where both nudges were present, participants chose the target product the most (77.3%, Table 4), indicating that the interaction did influence consumer decision-making. In comparison, in condition 4 where no nudges were present, the competitor product was chosen most often (44.4%, Table 4).

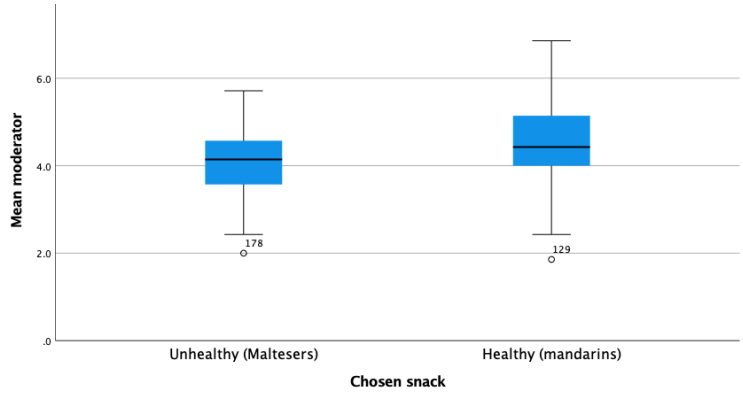
4.3. Moderator Effect: Health-Related Shopping Goals

Before conducting a moderation analysis between the nudges and the chosen snack, a Chi-square test was conducted to investigate whether there is an association between health-related shopping goals and food choice. With a median split of the moderator scores (Mdn = 4.29), the results suggest a positive significant association between the moderator and the healthiness of the chosen snack, with $\chi 2(1, N = 181) = 14.78$, $p < .001$. People with low health-related shopping goals (Mdn < 4.29) significantly chose the mandarins less often (28.3%) compared to those with high health-related shopping goals (Mdn > 4.29, 58.7%).

To investigate whether health-related shopping goals – at their scale measurement level – moderated the relation between the nudges and the chosen snack, generalised models with binary logistic outcomes were conducted. Testing hypothesis 7, the fit of the model (visual design cue * health-related shopping goals on food choice) was adequate with $\chi 2(51, 181) = 59.07$, $p = 1.16$. An overall difference in food choice between the presence or absence of the visual design cue and the mean score of the moderator was found, meaning that food choices were not the same in the different combinations of the visual design cue with the health-related shopping goals ($\chi 2(2) = 19.18$, $p < .001$). Specifically looking at when the visual design cue is present, as stated in the hypothesis, the results indicated that food choice was significantly predicted by the health-related shopping goals and the presence of the visual design cue, with B = .90, SE = .21, $\chi 2(1) = 18.00$, $p < .001$. As can be seen in Figure 6, when the visual design cue is present, and consumers have higher health-related shopping goals, their food choice is associated with a healthier option than when they have more hedonic shopping goals, supporting H7.

Figure 6

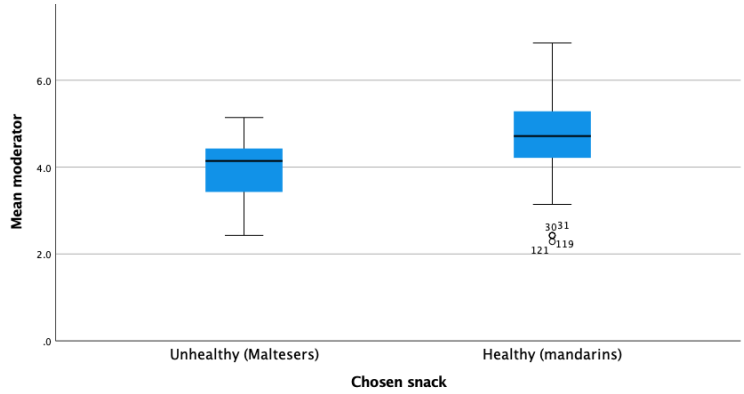
Boxplot of the Moderating Effect on Food Choice When the Visual Design Cue is Present



The non-significant main effect of the decoy effect on food choice might have been due to an underlying process of the moderator. Testing hypothesis 8 with a generalised model, the fit of the model (decoy effect * health-related shopping goals on food choice) was adequate (χ2(46, 181) = 52.08, p = 1.13). The generalised model revealed an overall significant difference in food choice between the presence or absence of the decoy effect and the mean score of the moderator, with χ2(2) = 15.91, p < .001. To answer H8, the parameter estimates revealed that food choice is significantly predicted by the moderator and the presence of the decoy effect (B = .83, SE = .21, χ2(1) = 15.87, p < .001), exposing an underlying process for the non-significant main effect. It can be concluded that in the sample population of adolescents in The Netherlands, when the decoy effect is present, a higher health-related shopping goal is associated with a higher probability of choosing mandarins over Maltesers, supporting H8 (Figure 7).

Figure 7

Boxplot of the Moderating Effect on Food Choice When the Decoy Effect is Present

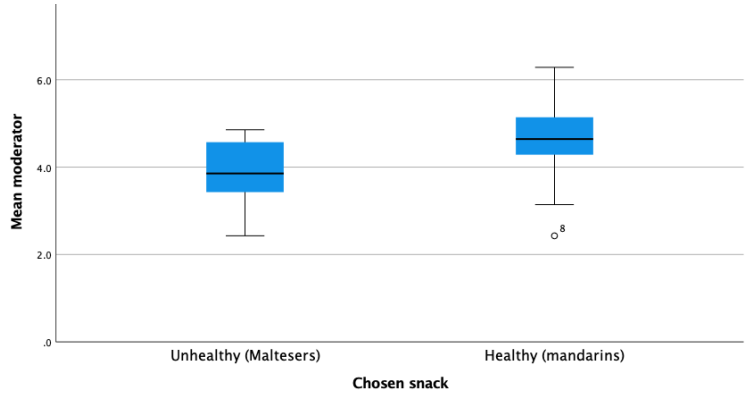


At last, the log-linear analysis revealed no statistically significant interaction effect between both nudges. However, just as with the decoy effect, health-related shopping goals might moderate this effect, further supporting the underlying mechanism of food choice. The fit of the model (visual

design cue * decoy effect * health-related shopping goals on food choice) was adequate, with χ2(45, 181) = 55.30, p = 1.23. An overall significant difference in food choice was found in the different combinations of the nudges with the health-related shopping goals, with χ2(2) = 18.03, p < .001. As expected, food choice was significantly predicted by the moderator and the presence of both the visual design cue and the decoy effect (B = .96, SE = .23, χ2(1) = 17.97, p < .001). In conclusion, a higher health-related shopping goal, when the visual design cue and the decoy effect are present, is related to a higher probability of choosing a healthier snack, supporting H9 (Figure 8).

Figure 8

Boxplot of the Moderating Effect on Food Choice When the Visual Design Cue and the Decoy Effect are Present



4.4. Additional Analyses

The level of hunger from participants was measured on a 5-point Likert scale, as hunger might influence one's food choice (Hoefling & Strack, 2010; Neumark-Sztainer et al., 1999). A Chi-square test was performed to examine the effects of one's level of hunger on their food choice. The Chi-square revealed no statistically significant association between the level of hunger and the healthiness of the chosen snack, with χ2(4, 189) = 1.87, p = .76. Accordingly, when participants indicated that they were hungry, it did not lead to unhealthy choices.

4.5. Overview Hypotheses

Based on the results of the statistical analyses, an overview of the tested hypotheses is presented in Table 6.

Table 6

Overview of the Tested Hypotheses

Hypothesis		Result
H1	When a green visual cue is presented, it is expected that consumers choose a product containing less sugar more often contrary to when a green visual cue is absent.	Supported
H2	When a green visual cue is presented with healthier products, it is expected that those food products are more convenient to see.	Supported
H3	When an inferior alternative product is added to the original set of products, it is expected that consumers choose a product containing less sugar more often contrary to when the inferior alternative is absent.	Rejected
H4	When an inferior alternative product is added to the original set of products, it is expected that consumers find the target product more attractive to purchase relative to what else is available.	Supported
H5	When an inferior alternative product is added to the original set of products, it is expected that consumers find the healthier products more normal to choose relative to what else is available.	Supported
H6	When a visual design cue and the decoy effect are presented together, consumers will choose a product containing less sugar more often contrary to when one or no nudges are presented.	Rejected
H7	The positive effect of a green visual cue on the healthiness of one's food choice is strengthened by health-related shopping goals.	Supported
H8	The positive effect of the decoy effect on the healthiness of one's food choice is strengthened by health-related shopping goals.	Supported
H9	The positive interaction effect of a green visual cue and the decoy effect on the healthiness of one's food choice is strengthened by health-related shopping goals.	Supported

5. Discussion

The study aimed at investigating the possible effects of a visual design cue and the decoy effect on one's food choice. Consumers' health-related shopping goals were considered as a moderator variable to examine whether their shopping goals moderated the effect on one's food choice.

5.1. Discussion of the Results

The biggest research gap this study adressed was the combined effect of visual design cues and the decoy effect on food choices. Previous research suggested that combined nudges make healthier food choices easier (Jesse et al., 2021; Wilson et al., 2016). In addition, the CAN approach argued making healthier products more convenient, attractive, and normal to choose enhances simplicity and holds promise for stimulating the purchase of healthy foods (Wansink, 2015). I find evidence for the hypotheses that visual design cues have a significant positive effect on convenience, and that the decoy effect significantly increases the attractiveness and normality of mandarins. These results verified that both nudges comply with the CAN approach. Visual design cues and the decoy effect were hypothesised to positively interact with each other, as they were complementary in terms of transparency. Results showed that when both nudges were present, participants chose the healthier product (mandarins) more often compared to when one or no nudge was presented.

Nonetheless, the results indicated no significant differences over the experimental conditions. This contrasts with previous research and may be due to several factors. As the positive effect is in line with previous research, the trend might suggest that there is another underlying relationship. For example, linking the results to Bottom-up vs. Top-down processing (Norman & Rumelhart, 1975), the visual design cue might have dominated the decoy effect. Bottom-up processing is data-driven. The stimulus is not known to the person, so one's mind looks at the individualised parts to comprehend the full stimuli (the stimulus influences its thinking). This can be linked to the decoy effect, as people do not know the meaning behind the presented products (non-transparent nudging). Top-down processing, on the other hand, is goal-driven. The stimulus itself does not say much, but one's mind makes sense of the stimuli (the thinking influences the stimulus). This can be linked to the visual design cue, as people try to make sense of the green shape and link it to their goals (transparent nudging). The thinking behind the significant moderation effect of health-related shopping goals is that people who already have the motivation and interest in healthy eating, specifically look for cues to support their lifestyle. Both the visual design cue and the moderator have shown to be goal-dependent, thereby possibly overshadowing the decoy effect, which is data-driven. While the interaction effect was not statistically significant, the result may be of added value and should not be

dismissed. Further research should determine the true effect and explore possible underlying relationships besides health-related shopping goals.

The individual nudges likewise affected the mechanism of the interaction effect. Based on the findings from, among others, Manasoontorn (2022), who investigated the effects of visibility enhancements on healthy food choice and calorie intake, it was expected that participants exposed to visual design cues were more likely to choose the healthier product (mandarins) over an unhealthy one (Maltesers). Results demonstrated statistical significance in line with previous research and hypothesis 1. It supports the assertion that visual design cues are effective in influencing the decision-making process of consumers, which can be explained by the Dual Process Theory.

Participants significantly perceived the mandarins as the most convenient to see, and they were significantly chosen more when the visual design cue was present. As expected, there are strong reasons to believe that participants relied on their System 1 processing. Argued by Johnson & Goldstein (2003) and Keller et al. (2011) about the default option, people choose the most convenient option to avoid investing time and because it is the recommended choice. This argument now also applies to visual design cues. Thus, respondents relied on their System 1 when presented with the visual design cue which made the mandarins more convenient to see, and in turn led to more fictitious purchases of the mandarins. The findings of the visual design cue add to the literature on how colour cues can influence behavioural outcomes, as limited evidence has been available to date. It furthermore supports the prediction that a visual design cue enables consumers to make healthier food choices. Argued by Kroese et al. (2015), and now also this study, it is better to adjust the environment rather than telling consumers to choose a healthier alternative.

With the decoy effect, it was investigated whether adding a decoy (oatmeal porridge) would result in more fictitious purchases of the mandarins, compared to no decoy. Based on the findings from several studies (e.g., Fechner & Herder, 2021; Huber et al., 1982; Josiam & Hobson, 1995; van den Enden & Geyskens, 2021), it was expected that respondents would choose the healthier option more often compared to an unhealthy option. Results showed no significant differences in food choice when the decoy was absent or present. To date, the decoy effect is mostly used for the same kind of products with different qualities. This study used three different products, which may have influenced the results of the nudge on food choice. Without the decoy product, the target and competitor products were shown to be equally attractive, supporting the attraction effect. Nonetheless, respondents preferred the mandarins overall, which could indicate a personal preference. This personal preference might be linked to cultural differences. As such, snacks may be cultural-dependent, and the decoy effect combined with this choice set has diverse influences on different cultures (Bekelman et al., 2020; Damen et al., 2019).

When looking at the products used for the study, it might be worth questioning whether it was really about the decoy effect, or whether other nudges led the decision-making process of respondents. For example, respondents might have chosen mandarins more due to the middle option effect (Asch, 1946) when the decoy product was present. The middle option is then perceived as a compromise that balances two extreme options, making it the most appealing choice. Thus, participants might have chosen mandarins because it was placed in the middle, rather than seeing oatmeal porridge as an inferior product which shifted their preference from Maltesers to mandarins.

Hansen and Jespersen (2013) discussed several papers which stated that transparent nudges are less effective than non-transparent nudges. This study contradicts this result, as the visual design cue showed a significant effect, while the decoy effect did not. Thus, evidence from this research seems to show that making a nudge transparent does not affect its effectiveness (Marchiori et al., 2017). Nudges are often criticized for their hidden nature (Marchiori et al., 2017), but their hidden nature may not be necessary for the nudges to work. So, although this research could not provide supporting evidence that the decoy effect can significantly help individuals to make healthier choices, it does add to the body of knowledge about the transparency of nudging.

5.1.1. The Role of Health-Related Shopping Goals

Results showed that visual design cues had a positive impact on one's food choice. These results further indicated that the relationship was moderated by health-related shopping goals. Specifically, consumers with higher health-related shopping goals, who were presented with a visual design cue, were more nudged towards buying a healthier food option than those with lower health-related shopping goals. This moderation effect was not only present for the visual design cue, but also for the decoy effect and the combination of both nudges on food choice.

These results highlight the importance of individual characteristics in which consumers respond differently nudges. This is consistent with previous research which suggested that people with higher health-related shopping goals have a higher level of health concern and are therefore more prone to choosing healthier foods (Bargh, 1989; van Ooijen et al., 2017). Furthermore, consumers are more often looking for and influenced by cues that support their healthy lifestyle (Jansen et al., 2021; Schuldt, 2013). Nudges aimed at choosing healthier food options may be more effective if they target those with higher health-related shopping goals. On the other hand, those with higher health-related shopping goals already look for cues and will identify the healthier products one way or the other. Thus, it might be worth questioning whether the visual design cues are of added value. Visual design cues do make healthier products more convenient to see and influence those with lower health-related shopping goals as well. It is therefore expected that they do indeed add value for every consumer.

5.2. Limitations and Recommendations for Future Research

Several limitations have been acknowledged in this study and should be taken into consideration. The first limitation includes that this research used a textual claim accompanying the target product. This textual claim was not investigated but might have played a role in the decision-making process of the participants. Although only a third of the participants remembered seeing the claim, it might have subconsciously played a role in their snack choice, just like priming. Since participants saw the textual claim more often when the visual design cue was present, it is worth investigating whether participants were influenced by the visual cue, or whether it was the textual claim that led to healthier food choices. Future research should investigate the effects of the textual claim on food choice as a third predictor variable or should redesign the visual design cue such that the textual claim can be omitted.

Although there is a growing body of literature on digital nudging (Hummel & Maedche, 2019), the nudges in this research were mostly investigated in the offline environment. Huyghe et al. (2017) stated that the appearances of products radically differ offline and online, which has different influences on purchase behaviour. As stated in the theoretical framework, consumers are more easily distracted in a physical supermarket, leading to more hedonic shopping sprees (Dijksterhuis et al., 2005), making the nudges more effective (System 1). This is partly attributed to other environmental cues, for example music (North et al., 1997). It could therefore be argued that online choices are made more thoughtful, rather than hedonic. This reasoning could support the result of why mandarins were always preferred over the Maltesers, and why the decoy effect nor the interaction effect had a statistically significant effect.

Brian Wansink has been accused of manipulating research materials, data mining, and omitting research data and results. This resulted in several retracted and corrected papers. With the CAN approach, Wansink was overly enthusiastic about the positive effect it would give, and the paper was not strongly supported empirically. Wansink (2015) argued that almost all effective interventions on healthy food choice have three things in common; making the food more convenient, attractive, and normal to choose. Nonetheless, he did not specify how to ensure that an intervention meets those requirements. To ensure that the nudges in this study met the abbreviations of the CAN approach, statements were developed by the researcher. These statements have not been tested before in other studies, and therefore the reliability cannot be guaranteed. The CAN framework summarises accurate articles and gives insight into the interventions for healthier food choices. Yet, given Wansink his background and the non-significant effect of the interaction effect in this study – while the nudges did comply with the CAN approach – it is recommended to conduct a meta-analysis

of interventions on healthy food choices and to conclude whether Wansink's article was a result of data mining or whether there are opportunities to expand the CAN framework.

This research investigated the effect of nudges on the healthiness of a chosen snack. Snacks are only one product category out of the many categories provided in a supermarket. While snacks are predominantly impulse purchases and driven by System 1 processing (Glanz et al., 1992), it does not mean that nudges in other categories, such as desserts, cannot exert positive influences on healthier food choices. Eating healthier snacks does not instantly solve the problem of obesity and an unhealthy society. By replicating the study, it would be of interest to investigate whether visual design cues and/or the decoy effect work in other product categories as well or how this significantly differs from the snacks category. It would broaden the understanding of visual design cues and the decoy effect on healthier food choices.

With a population of over 10 million people, a sample size of 189 participants is relatively small and reduced the power of the study to detect a significant effect. As the interaction effect went in the expected direction, a larger sample size would provide more robust evidence for the interaction between the two nudges. Additionally, the experiment was placed on survey exchange websites. The consequence of this is that participants might have rushed through the survey and did not choose the product that they would have chosen if it were a different situation. This leads to the recommendation to investigate whether the findings extend beyond the hypothetical online context. It could be of practical relevance to investigate which products consumers would choose and buy on an existing supermarket website, as there is a difference between what people say they do versus what they do.

Despite the positive results for the visual design cue, the extent to which this nudge can retain behaviour change over a longer period remains unclear. This study tested behaviour change based on one decision. Once consumers are exposed to the same nudge multiple times, there is a learning curve that might result in ignorance of the visual design cue, leading to different product choices. It is recommended to investigate how the nudge remains over time, and whether there is a point in time when consumers are no longer influenced by the nudge. It is likewise recommended to test for a behavioural spillover effect, defined as the effects of one behaviour on the following second different behaviour (Dolan & Galizzi, 2015; van Rookhuijzen et al., 2021). For the course of this study, that means conducting the same experiment with the same participants, but this time without the nudge they were exposed to (and thereby excluding participants from condition 4, as they were already exposed to no nudge). This gains insight into whether participants will still choose the same product once the nudge is absent.

5.3. Implications

5.3.1. Practical Implications

Using nudges as a tool to take on poor dietary choices could be an effective approach, as this study indicated that consumers make healthier choices in an online supermarket when they are exposed to a visual design cue. The food industry could use this result to reduce the sugar intake of consumers for both economic and societal interests. Economically speaking, healthier foods often have higher-profit margins, compared to unhealthy foods. For societal benefits, nudges would aid the problems of poor dietary choices and an unhealthy lifestyle.

Earlier research (e.g., Kroese et al., 2015; Suher & Hoyer, 2020) suggested that consumers are willing to eat healthier but need to be steered in the right direction. Visual design cues are able to achieve that. Especially online, where the appearances of products radically differ from offline (Huyghe et al., 2017), the visual design cue could be of great value. For example, a picture of the product on a mobile screen is smaller than that of the real product and of any other technological device, constraining the amount of information that can be presented (Xu & Huang, 2019). Consumers therefore rely more on other visual information. Online supermarkets can implement such a nudge relatively simply and cost-effective. A green visual cue can be implemented on products with lower sugar contents, suggesting it being a healthier product.

Sugar content however does not encompass the full picture regarding healthier diets. It is still relevant to the public health target, as adolescents consume on average more than the recommended amount (AGES, 2022) of 50 grams of added sugars per day. Practitioners should therefore carefully consider which products will be their target products and based on which criteria. Once established, these products can be accompanied with a visual design cue. Practitioners should also be careful with the long-term effect of the cue, as that has not been investigated yet.

The study showed no evidence that the decoy effect influences the healthiness of someone's food choice. For organisations or other practitioners, it is not recommended to use the decoy effect in an online supermarket environment. When the decoy effect is applied, consumers only have the choice between three products from a product category, which is considered very limited in a supermarket. Besides, it will not be profitable for the managers of supermarkets to offer only three products. The decoy effect therefore rarely occurs in the market today. The multiple attributes consumers can choose from, rather than two, makes it almost impossible to find an alternative product that has a superior quality or to find people that do not prefer some attributes already (Huber et al., 2014). Extending the decoy effect to multiple products is necessary to make it work in practice. For now, the decoy effect could be an interesting approach in smaller shops or at a different place

within a store, either physically or online. For instance, at the check-out where consumers make unconscious decisions or at an online header with recommended products.

The combined effect of both the visual design cue and the decoy effect did lead to healthier food choices, but not significantly. As there is a small effect, it is worth further investigating this interaction between the nudges, and whether the effect size could become significant when applying it to different kinds of products or scenarios.

Nudging consumers towards healthier decisions does not mean that they cannot enjoy products containing lots of sugar occasionally. The sugar content should only be regulated so that the average sugar intake per day comes closer to the recommended intake amount. Therefore, nudging intending to make healthier decisions or behaviours should be done with the right intentions and libertarian paternalism must be kept in mind. Ethical concerns should be reviewed carefully before deciding to use nudges on consumers, as they should not be exposed to any harm (Blumenthal-Barby & Burroughs, 2012).

5.3.2. Theoretical Implications

This research adds to the existing literature of online nudging on healthier food choices for multiple reasons. It provides evidence that transparent nudges in the form of visual design cues increase the healthiness of one's food choice, adding to the limited research of colour cues on the decision-making process. When the visual design cue was combined with the decoy effect, no significant interaction effect was found. This result decreases the gap of research investigating the combination of complementary nudges (Bonini et al., 2018; Ensaff, 2021; Wilson et al., 2016).

As mentioned by Bonini and colleagues (2018), they stated that even if the combined effect is not significant, the results could still shed light on the underlying process. As this research found that the interaction effect is not significant, but does lead to healthier food choices, it says something about the underlying process. Consumers' health-related shopping goals revealed the underlying process in which it has a moderating influence between the nudges and food choice. Another underlying process could have been the CAN approach, as there were main effects of the nudges on convenience, attractiveness, and normal to choose.

Earlier studies showed that the decoy effect is successful in the marketing domain based on the price-quality value of services and products. Not much research has been published on the decoy effect in a different context. It is worth asking whether this is because different contexts have not been researched yet, or due to biases. As of now, the quantitative review by Hummel and Maedche (2020) stated that 62% of the effects, of nudges in published studies, are statistically significant. This represents an upper bound which might also be due to possible publication biases (Arno & Thomas, 2016). Nevertheless, even though the results of the decoy effect were not significant, it still adds to

the existing body of the use-context of the decoy effect and gives new academic insights for future investigations.

To conclude, this was the first study that investigated whether visual design cues and the decoy effect (combined) can influence healthier food choices on an online supermarket while taking health-related shopping goals into account. Therefore, this study adds to the body of research about using online nudges to stimulate healthier food choices and behaviour.

5.4. Conclusion

The aim of this study was to examine to what extent visual design cues and the decoy effect could positively influence the healthiness of one's food choice in an online shopping environment. Additionally, the interaction effect between both nudges was tested, as well as the moderation effect of health-related shopping goals. The research question stated:

"To what extent do (the combined effects of) decoys and visual design cues have a positive effect on the low-sugar content of someone's food choice in an online supermarket environment, and what is the possible role of health-related shopping goals?"

The most prominent finding to answer the research question and its hypotheses was the main effect of the visual design cue on food choice. Participants significantly chose a healthier snack (mandarins) over an unhealthy snack (Maltesers) when the visual design cue was presented, contradictory to when the visual design cue was absent. A notable finding was that this result was even greater when participants indicated that they had high health-related shopping goals. Other main effects included that the visual design cue made the healthier snack more convenient to see, and that the decoy effect made the healthier snack significantly more attractive and normal to choose.

No main effect was found for the decoy effect on food choice, and additionally, no interaction effect was found between both nudges on food choice. This lack of effects contradicts earlier research. Three primary explanations for this are that (1) the snacks chosen in the study differed a lot from each other, (2) the decoy effect and the interaction effect between two complementary nudges have not been extensively studied in the domain of healthy eating (Bonini et al., 2018; Ensaff, 2021), and (3) the nudges have mostly been studied in an offline environment, while online and offline displays have a different impact on purchase intention (Huyghe et al., 2017). Statistical tests did find an underlying process of consumers' health-related shopping goals, which moderated the main effects of the decoy and the interaction between the nudges on food choice. When consumers had higher

health-related shopping goals, and one or both nudges were presented, they were more likely to choose a healthier product over an unhealthy one.

To conclude, if supermarkets want to stimulate the sales of low-sugar food products and thereby increase the healthiness of society, it is recommended to implement visual design cues in the user interface of their website or app. It should be considered that the effect of the nudge is strengthened or weakened depending on the health-related shopping goals of its customers. Ultimately, a visual cue could contribute to limiting the number of overweight people, decreasing health-related issues, and thereby increasing their health. Note that the study was conducted within its limitations, so further research is necessary to generalise the results.

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Appendices

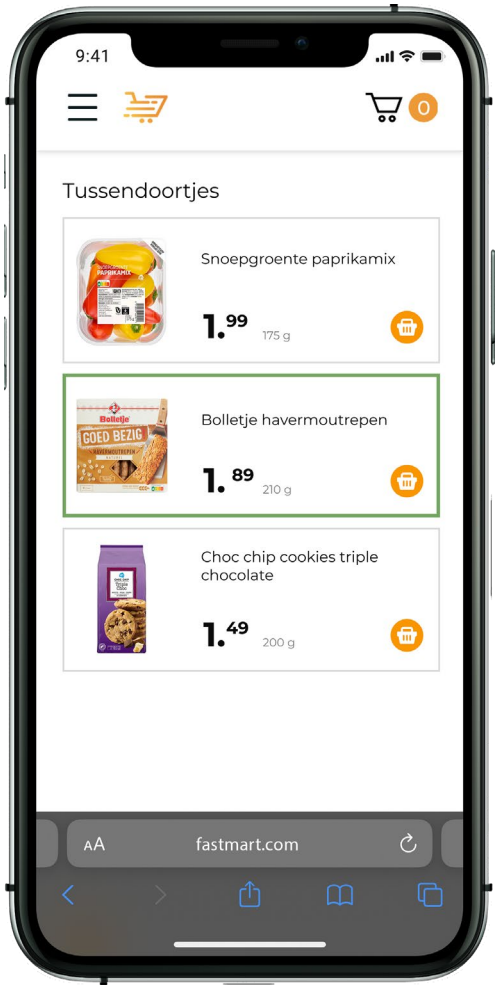
A: Preliminary Study: Designing the Visual Cues

The following textual claims were presented to the participants of the preliminary study. Below each claim a short summary of the discussion during the preliminary study can be found.

1. Onze gezonde aanbeveling (our healthy recommendation)
    - This claim received some negative reactions. Two participants stated that, just because the claim stated “healthy recommendation”, they purposively would not buy the product.
2. Verantwoord snacken (responsible snacking)
    - Participants liked the claim of “responsible snacking”. However, they liked other claims better, as they focused less on the healthy and responsible part of the product, but more on the tastiness of the product.
3. Lekker & gezond (tasty & healthy)
    - This claim was well received, however after deliberately consideration, this claim was not suitable for the experiment. The word “healthy” already gave too much information about the product, even when the green visual cue would not be present.
4. Lekker & slim (tasty & smart)
    - This claim was appreciated by participants. However, it sounded a bit “dull” compared to the claim “tasty & thought out”. That claim was perceived slightly better.
5. Lekker & goed (tasty & good)
    - Even with a green visual cue, this claim remained vague to participants. This claim was therefore not appropriate.
6. Lekker & vitaaal (tasty & vital)
    - This textual claim was too focused on healthiness. The claim therefore signalled healthiness, even without the visual cue.
7. Lekker & doordacht (tasty & thought out)
    - Participants liked this claim the best, as the claim is a bit vague in its meaning without a visual cue but can be associated to health once the green colour cue was added. This statement has therefore been chosen to use in the experiment.
8. Lekker & krachtig (tasty & powerful)
    - Participants liked this claim, as it sounded good. However, just like the claim “tasty & good”, the claim was and remained with a visual cue vague in its meaning.
9. Lekker & evenwichtig (tasty & balanced)
    - Participants also liked this claim, as it sounded professional. However, just like the claim “tasty & vital”, the claim was already slightly focused on healthiness.

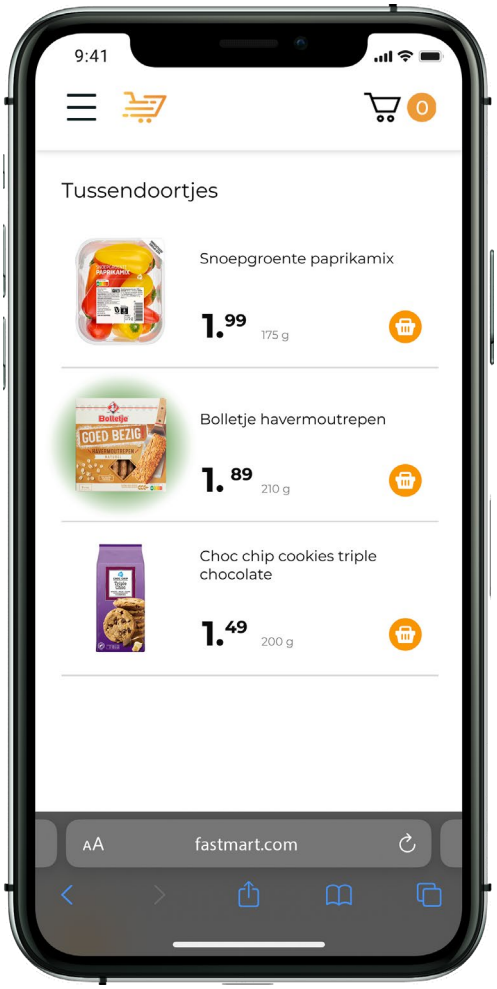
The following designs were presented to the participants of the preliminary study. Below each design a short summary of the discussion can be found.

Design 1 – border



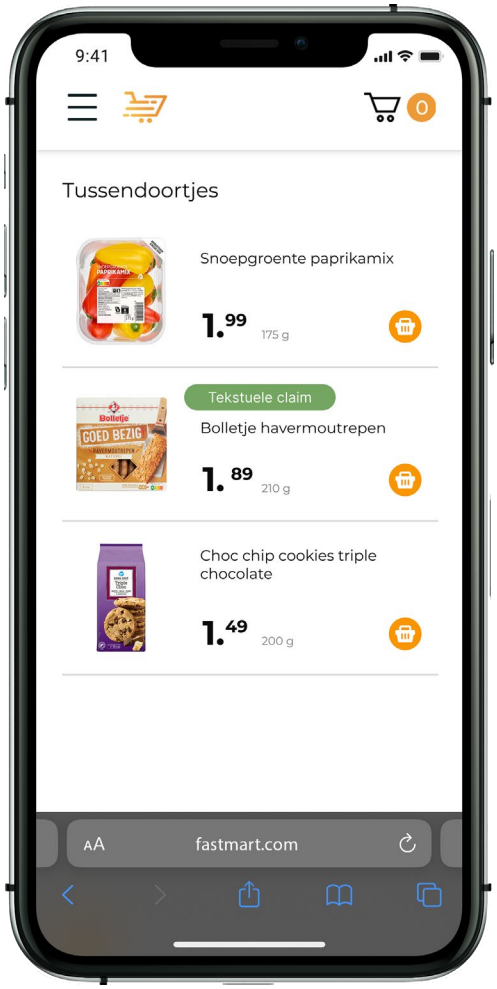
Looking at this design, participants thought that the border meant that the product was selected. This design was therefore not appropriate as a visual cue.

Design 2 – green highlight



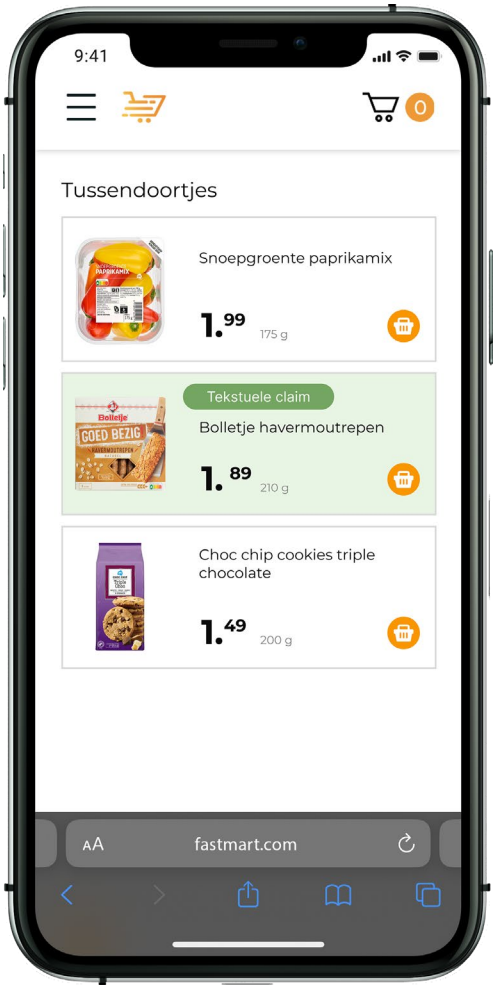
Looking at this design, participants noticed the highlight very well, but thought it looked a bit strange and somewhat like mold. This was not the association the design should convey, as the product should convey something healthy and tasty.

Design 3 – rounded rectangle



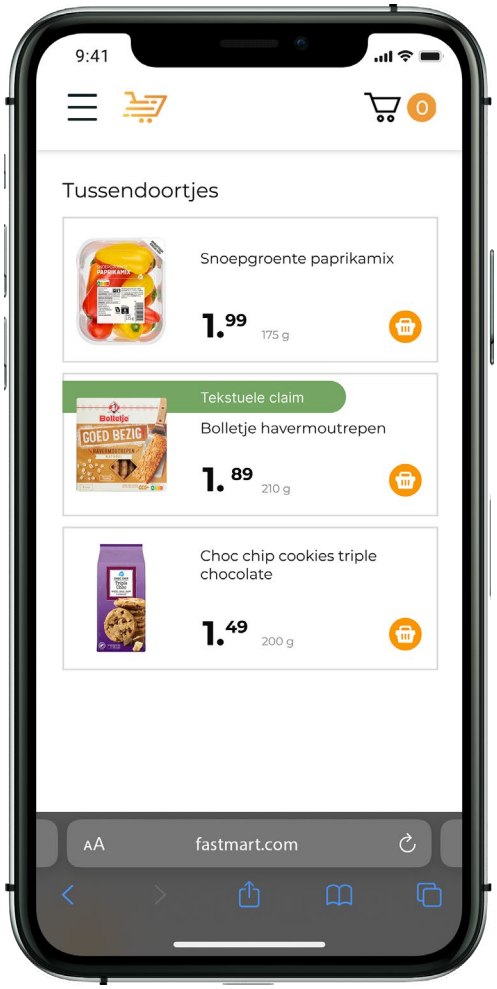
Overall, the participants liked this design very well. They agreed upon the visibility of the product. One downside of this cue was that the product somewhat seemed like it was on sale.

Design 4 – background



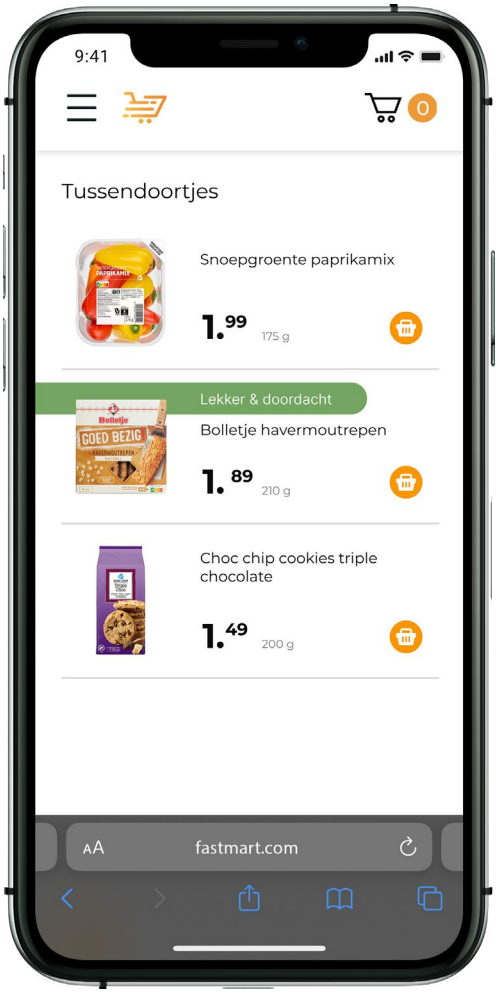
Just like design 1, this cue was perceived by the participants as if the product was selected. Even though a textual claim was included, most attention went straight to the background of the product information. This design was therefore not appropriate to serve as the right visual cue.

Design 5 – stripe



Participants liked this design better than design 3, as it seemed less like a sales-product, and more like a highlighted product. Their eyes were drawn to the green line, leading them to the "right" product.

Final design – stripe "lekker & doordacht"



After discussing the various design, a new and final design for the visual design cue was made. A combination between design 3 and 5 was chosen. These designs were convenient to see, as the green cue drew attention. The green colour together with the statement "tasty & thought out" conveyed a healthy, yet positive association. To make the green colour even more convenient, the green rectangle was stretched all the way to the left in the new and final design.

B: Pre-test Survey Flow

Start of Block: Informed consent

Dear participant,

Thank you for taking the time to participate in this research.

My name is Tessa den Dekker, and I am currently following the master Communication Science at the University of Twente. I am conducting an experiment for my master thesis about the website of a fictive supermarket. Within this experiment, you will have to put three products in your shopping basket to test the usability of the website.

Procedure

- You will receive a grocery list containing 3 different food and non-food related products. You will have to fictively purchase these items by putting them into your shopping basket.
- While purchasing these items, you are expected to think aloud. This means that you have to say everything out loud what you are thinking or experiencing at that moment. This helps the researcher gain insight on the usability of the website.
- The supermarket website is a prototype, meaning that not all functions work. Only the functions you need to purchase the products will work.
- After you complete shopping for the grocery list, you can go back to this survey and answer the remaining questions.

Potential risks and inconveniences

- There are no physical, legal, or economic risks associated with participating in this study.
- Your participation is voluntary, and you can stop your participation at any time.

Confidentiality of data

- Every effort is made to protect your privacy as best as possible.
- No confidential information or personal data about you will be disclosed in any way that would allow anyone to recognize you.
- The research data will be made available to my supervisors from the University of Twente in anonymous form.
- This research was assessed and approved by the ethics committee of the Behavioural Management and Social Sciences faculty of the University of Twente.

Contact details

- For any questions about the privacy of data, or the study, you can ask them by sending an e-mail to t.m.dendekker@student.utwente.nl.

Thanks again for your participation.
Tessa den Dekker

I have read the information above and understand that my anonymous data will be used for academic purposes.

- o Yes, I consent
- o No, I do not consent

Skip To: End of Survey If = No, I do not consent

Start of Block: Testing the setting: usability test of the supermarket website

You are now going to test the usability of the website.

Place the given items from the shopping list below in your shopping basket. There are different types of each product available. You can decide for yourself which product you want to add to your shopping basket. However, please choose the product you would buy in real life if this were a real supermarket. The difference is that you do not have to take the price into account.

The shopping list:

1. Dishwasher tablets
2. A sauce to go with your fries
3. Bread

Please click on the following link that will redirect you to the website of the supermarket: www.fastmart.com. From this point on, do not forget to think out loud.

Come back to this survey when you placed all the items in your shopping basket.

Did you finish the test?

- o Yes
- o No

Skip To: End of Survey If = No

Page Break

For each of the following statements, mark one box that best describes your reactions to the website you just tested.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I think that I would like to use this website frequently.	○	○	○	○	○
I found the website unnecessarily complex.	○	○	○	○	○
I thought the website was easy to use.	○	○	○	○	○
I think that I would need the support of a technical person to be able to use this website.	○	○	○	○	○
I found the various functions in this website were well integrated.	○	○	○	○	○
I thought there was too much inconsistency on this website.	○	○	○	○	○
I would imagine that most people would learn to use this website very quickly.	○	○	○	○	○
I found the website very awkward to use.	○	○	○	○	○
I felt very confident using the website.	○	○	○	○	○
I needed to learn a lot of things before I could get going with this website.	○	○	○	○	○

How realistic did you perceive the website of the online supermarket?

	Very unrealistic	Slightly unrealistic	Neutral	Slightly realistic	Very realistic
Realistic	○	○	○	○	○

Do you have any remarks regarding the website?

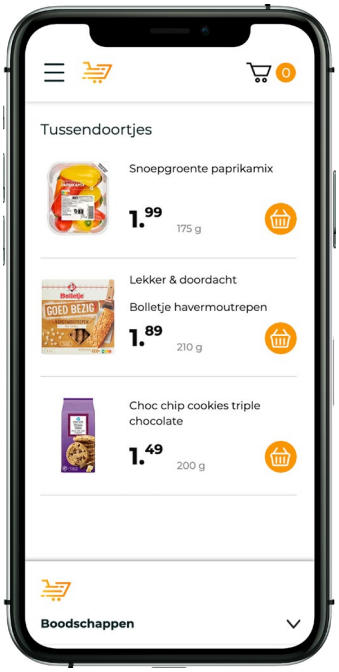
- Yes _____
- No

Start of Block: Testing the products: perceived healthiness & attractiveness

Rate the following products on how healthy and attractive you perceive them.

	Healthiness					Attractiveness				
	1 - not healthy	2	3	4	5 - very healthy	1- not attractive to choose	2	3	4	5 - very attractive to choose
Snack tomatoes	○	○	○	○	○	○	○	○	○	○
Oreo cookies	○	○	○	○	○	○	○	○	○	○
Dutch strawberries	○	○	○	○	○	○	○	○	○	○
Muesli bar chocolate zero added sugars	○	○	○	○	○	○	○	○	○	○
Gingerbread zero added sugars	○	○	○	○	○	○	○	○	○	○
Chocolate chip cookies	○	○	○	○	○	○	○	○	○	○
Snack cucumbers	○	○	○	○	○	○	○	○	○	○
Whole wheat crackers	○	○	○	○	○	○	○	○	○	○
Eierkoeken	○	○	○	○	○	○	○	○	○	○
Apples	○	○	○	○	○	○	○	○	○	○
Yoghurt breaker vanille high protein	○	○	○	○	○	○	○	○	○	○
Apekoppen sweet candy	○	○	○	○	○	○	○	○	○	○
Snack paprika	○	○	○	○	○	○	○	○	○	○
Oatmeal porridge	○	○	○	○	○	○	○	○	○	○
Mandarins	○	○	○	○	○	○	○	○	○	○
Sweet candy mix	○	○	○	○	○	○	○	○	○	○
Thin rice cakes	○	○	○	○	○	○	○	○	○	○
Sandwich cracker tomato & basil	○	○	○	○	○	○	○	○	○	○
Oatmeal bars	○	○	○	○	○	○	○	○	○	○
Snack carrots	○	○	○	○	○	○	○	○	○	○
Maltesers	○	○	○	○	○	○	○	○	○	○

Start of Block: Testing nudge "visual design cues"



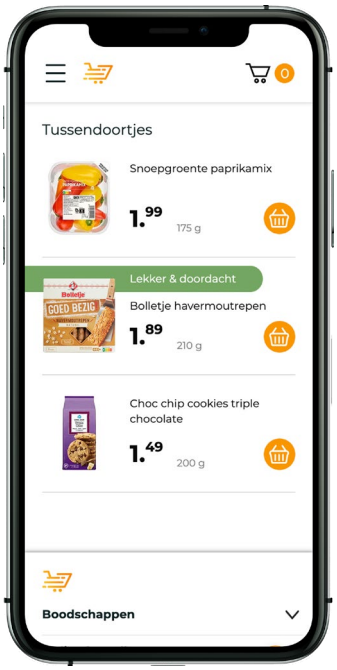
Look at the products on the website above. Which product do you feel like is the most convenient to see and choose?

- Bell peppers
- Oatmeal bars
- Chocolate chip cookies
- No product is more convenient to see than the others

Which description below best describes your interpretation of the claim "thought out" in the context of this website design?

- The product is well-considered
- The product is good for your wallet
- The product is good for your health
- The product is good for the environment
- The product is recommended
- It is a good product
- Other _____

Page Break



Look again at the products on the website above. Which product do you feel like is now the most convenient to see and choose?

- Bell peppers
- Oatmeal bars
- Chocolate chip cookies
- No product is more convenient to see than the others

Which description below now best describes your interpretation of the claim "thought out" in the context of this website design?

- The product is well-considered
- The product is good for your wallet
- The product is good for your health
- The product is good for the environment
- The product is recommended by others
- It is a good product
- Other _____

Start of Block: Demographics

What gender do you identify with?

- Male
- Female
- Non-binary / third gender
- Prefer not to say

What is your age?

_____

Start of Block: Control questions

After participating in this survey, were all the questions clear to you or did you notice any hiccups in terms of comprehension, language, or other aspects?

- Everything was clear.
- I have a few remarks.

Skip To: Follow-up control If = I have a few remarks.

Skip To: End of Survey If = Everything was clear.

What was not clear to you? What would you like to see improved?

_____

End of Survey

C: Pre-test Descriptive Statistics Food Products

Descriptive Statistics Perceived Healthiness and Attractiveness

	Healthiness		Attractiveness	
	Mean	SD	Mean	SD
Snack tomatoes	4.22	.67	3.11	1.45
Oreo cookies	1.67	.71	4.22	1.30
Dutch strawberries	4.33	.50	3.89	1.27
Muesli bar chocolate zero added sugars	3.33	1.00	4.11	.78
Gingerbread zero added sugars	2.89	1.05	3.00	.87
Chocolate chip cookies	1.56	.73	4.11	.60
Snack cucumbers	4.89	.33	3.56	1.13
Whole wheat crackers	3.89	.93	2.89	.78
Eierkoeken	2.67	.50	4.11	.60
Apples	3.78	1.09	3.22	1.20
Yoghurt breaker vanilla high protein	3.33	.71	3.00	.71
Apekoppen sweet candy	1.33	1.00	4.22	.67
Snack paprika	4.78	.44	3.33	1.58
Oatmeal porridge	4.11	.33	2.22	1.09
Mandarins	4.33	.50	4.00	.71
Red Band sweet candy mix	1.11	.33	3.00	1.23
Thin rice cakes	3.78	1.09	3.78	1.09
Sandwich cracker tomato & basil	2.89	.60	2.44	1.13
Oatmeal bars	3.44	.73	3.22	.83
Snack carrots	4.89	.33	2.56	1.42
Maltesers	1.22	.44	4.11	1.27

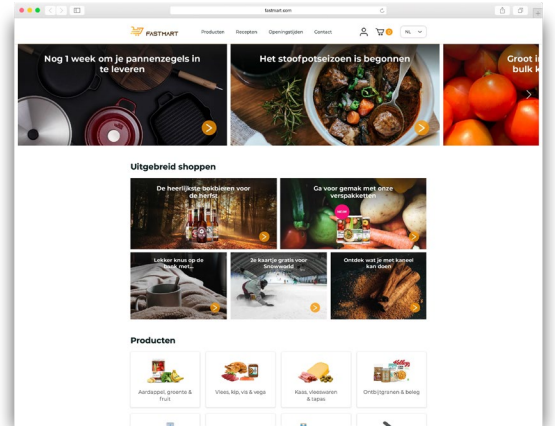
D: Stimulus Materials

Links to the websites

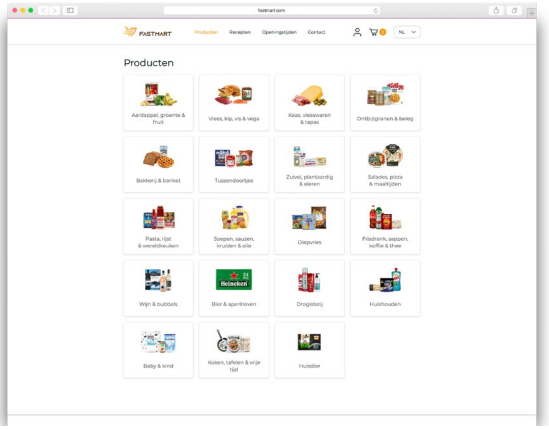
Condition 1 https://tessadendekker.wixsite.com/fastmart1
Condition 2 https://tessadendekker.wixsite.com/fastmart2
Condition 3 https://tessadendekker.wixsite.com/fastmart3
Condition 4 https://tessadendekker.wixsite.com/fastmart4

Website Design Desktop Version

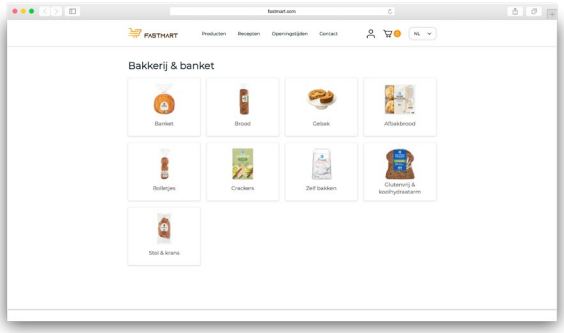
Homepage



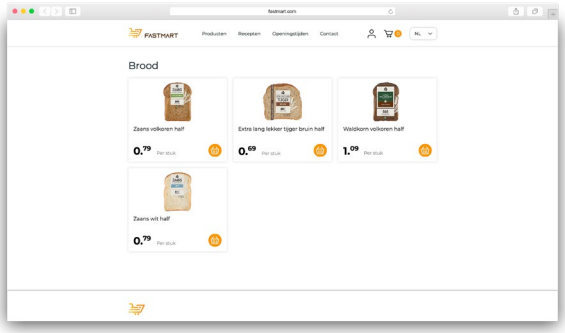
Product categories



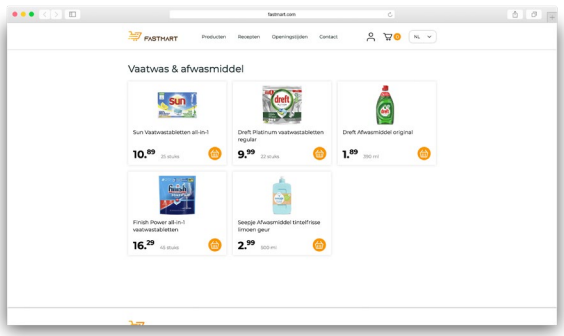
Subcategories (for bakery & banquet)



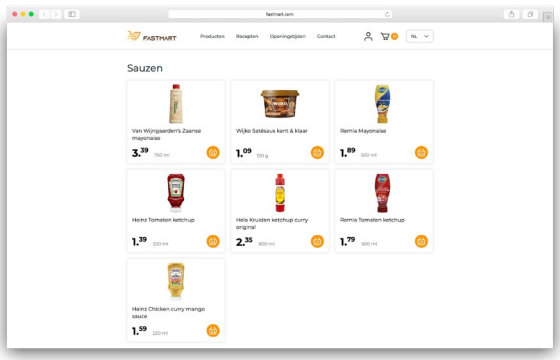
Product page (for bread)



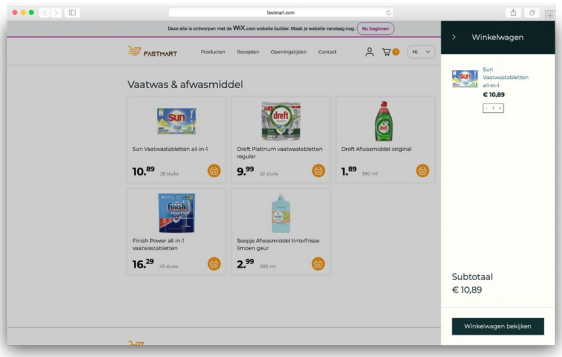
Product page (for dishwasher & detergent)



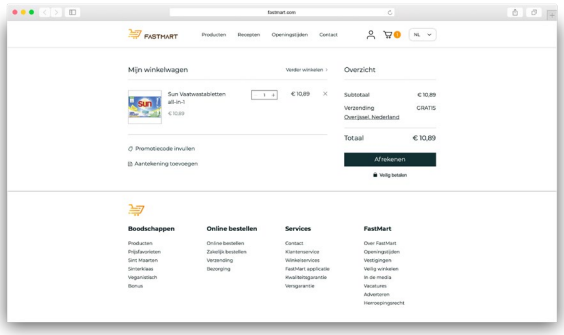
Product page (for sauces)



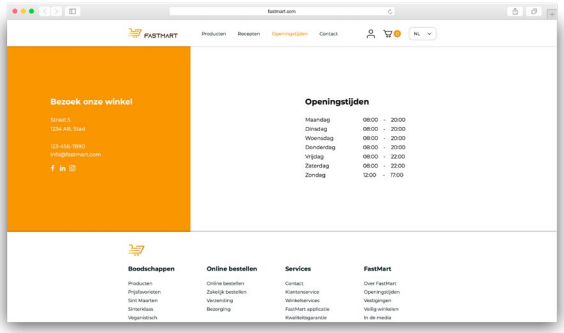
Adding a product to the shopping basket



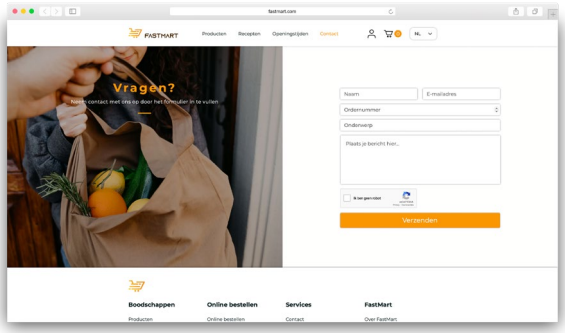
Shopping basket



Opening hours

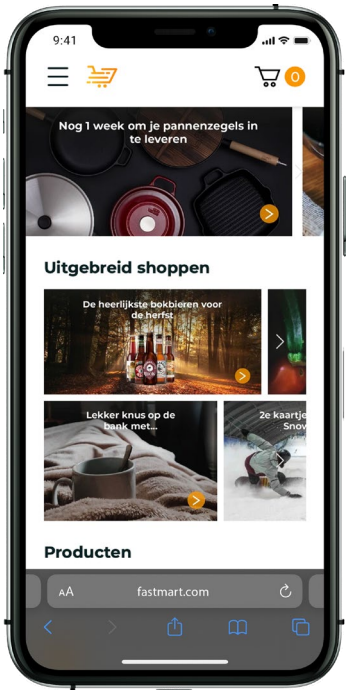


Contact page

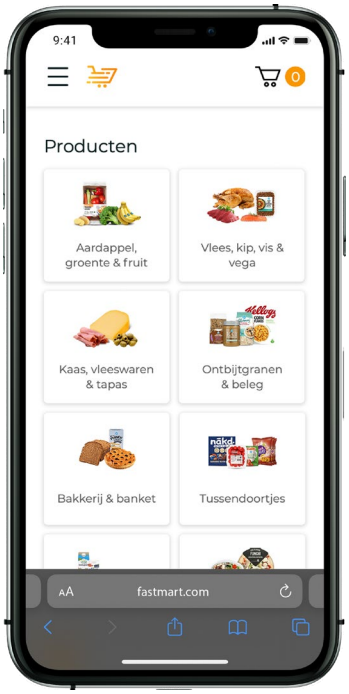


Website Design Mobile Version

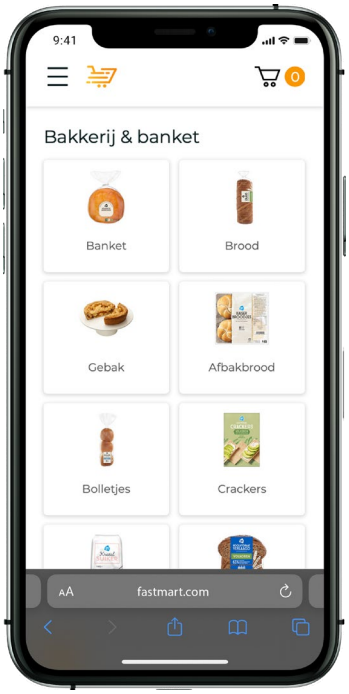
Homepage



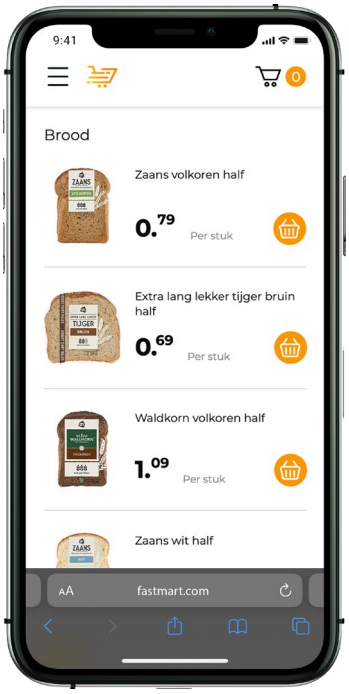
Product categories



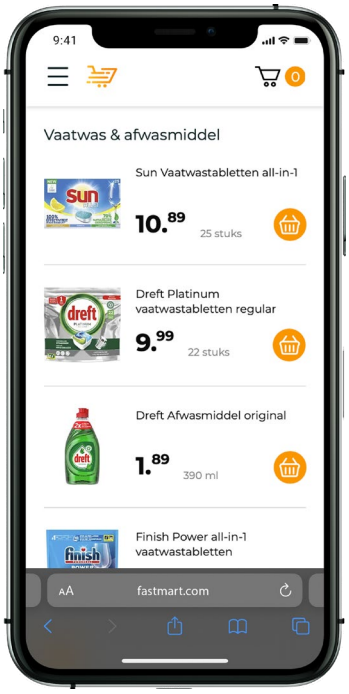
Subcategories (for bakery & banquet)



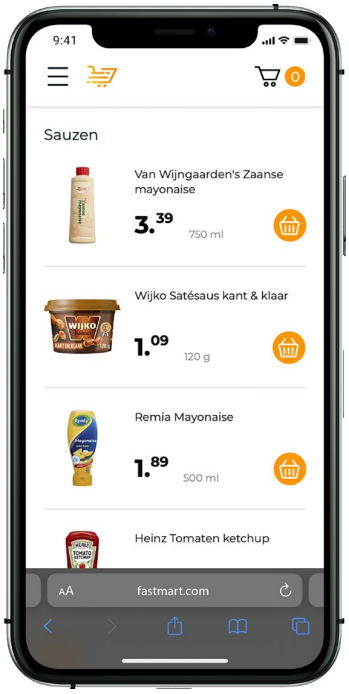
Product page (bread)



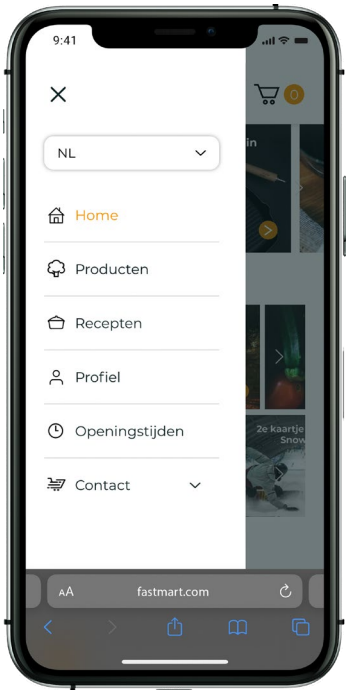
Product page (dishwasher & detergent)



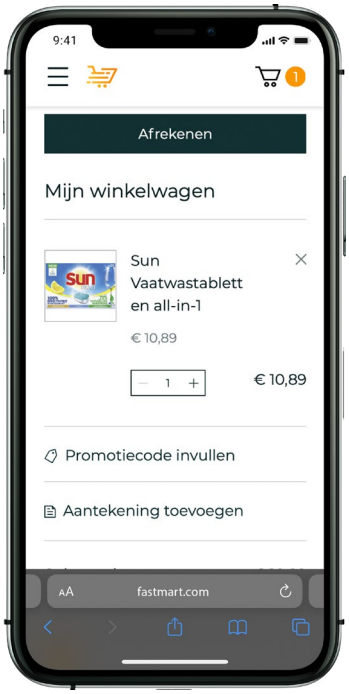
Product page (for sauces)



Menu

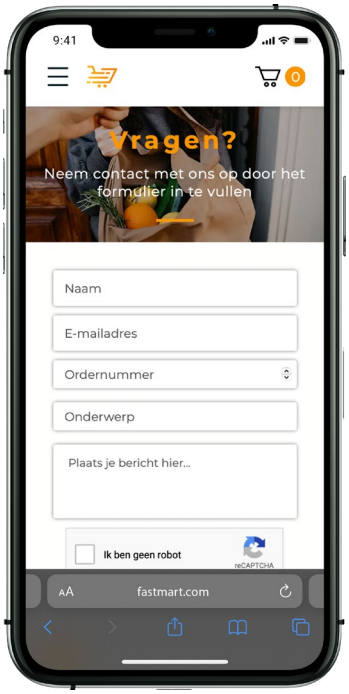


Shopping basket



Opening hours

Contact page



E: Main Experiment Survey Flow

Survey flow

Block: Informed consent (2 Questions)
Standard: Level of hunger (1 Question)
Standard: Moderator: health-related shopping goals (1 Question)

BlockRandomizer: 1 - Evenly Present Elements

Block: Condition 1: visual cue present x decoy present (7 Questions)
Standard: Condition 2: visual cue present x decoy absent (7 Questions)
Standard: Condition 3: visual cue absent x decoy present (7 Questions)
Standard: Condition 4: visual cue absent x decoy absent (7 Questions)

Standard: Demographics (3 Questions)
Standard: Condition 1: manipulation check (7 Questions)
Standard: Condition 2: manipulation check (7 Questions)
Standard: Condition 3: manipulation check (7 Questions)
Standard: Condition 4: manipulation check (7 Questions)
Standard: Control questions (2 Questions)

Page Break

Start of Block: Informed consent

Dear participant,

Thank you for taking the time to participate in this research. This survey should take approximately 5-7 minutes to finish. Within this experiment, you will have to put products in the shopping basket of a fictive supermarket website. Furthermore, you will have to answer questions about it.

Potential risks and confidentiality of data

- There are no physical, legal, or economic risks associated with participating in this study.
- Your participation is voluntary, and you can stop your participation at any time.
- Every effort is made to protect your privacy as best as possible.
- No confidential information or personal data about you will be disclosed in any way that would allow anyone to recognize you.

For questions about the study, send an e-mail to t.m.dendekker@student.utwente.nl.

Thanks again for your participation.

I have read the information above and understand that my anonymous data will be used for academic purposes.

- ○ Yes, I consent
- ○ No, I do not consent

Skip To: End of Survey If = No, I do not consent

Start of Block: Level of hunger

How hungry are you at the moment?

	1 - not hungry at all	2	3	4	5 - very hungry
Hunger	○	○	○	○	○

Start of Block: Moderator: health-related shopping goals

For each of the following statements, mark one box that best describes your current lifestyle.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I am very self-conscious about my health.	○	○	○	○	○	○	○
The healthiness of food has little impact on my food choices.	○	○	○	○	○	○	○
I am very particular about the healthiness of food I choose and eat.	○	○	○	○	○	○	○
I buy what I like, and I do not worry much about the healthiness of food.	○	○	○	○	○	○	○
It is important for me that my diet is low in sugar.	○	○	○	○	○	○	○
I am more concerned about my health than the average person.	○	○	○	○	○	○	○
The healthiness of snacks makes no difference to me.	○	○	○	○	○	○	○

Start of Block: Main experiment: stimuli (randomized)

Please place the given items from the shopping list below in your online shopping basket. There are different types of each product available. You can decide which product you want to add to your shopping basket. Please choose the product you would buy in real life if this were a real supermarket. The difference is that you do not have to take the price into account.

The shopping list:

- Dishwasher tablets
- A sauce to go with your fries
- A snack
- Bread

Come back to this survey when you have placed all the items in your shopping basket. If something, for example a button, does not work, you do not need that function to fulfill your shopping list.

The following link will redirect you to the website of the supermarket: www.fastmart.com.

Go to the next question page once you have put everything in your shopping basket.

Note: the stimuli were randomized. The participant was placed in one condition. The link to the website differed, as it was based on the condition the participant was assigned to.

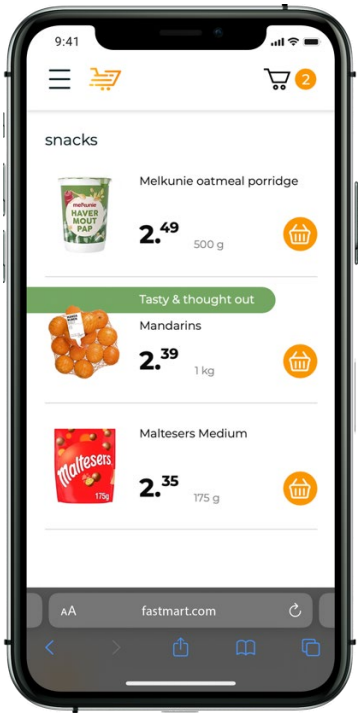
Page Break

Which snack did you put in your shopping basket?

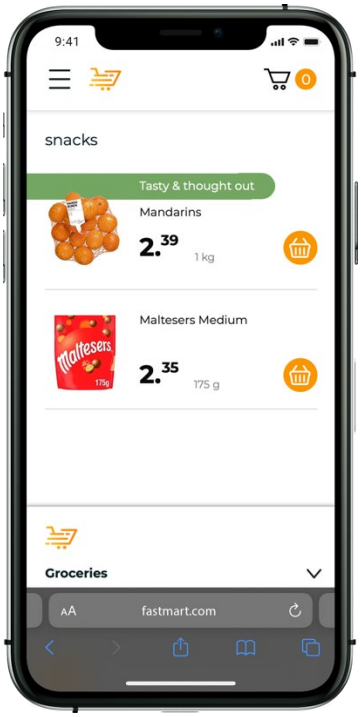
- Oatmeal porridge → answer only visible to participants in condition 1 or 3
- Mandarins
- Maltesers

Page Break

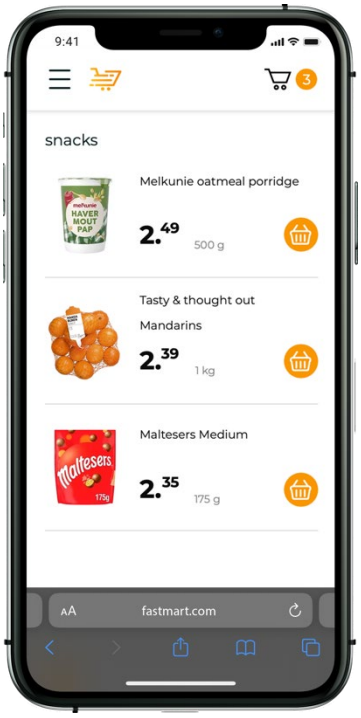
Condition 1



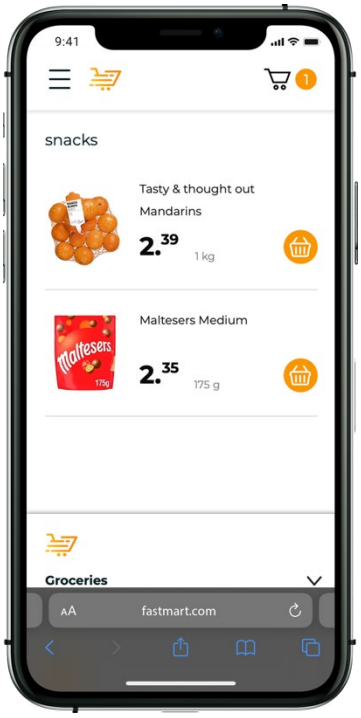
Condition 2



Condition 3



Condition 4



Note: the stimuli were randomized. The participant was only shown the stimuli condition he/she was assigned to.

While choosing a snack on the website, you saw the products above. Please answer the following statements.

When I opened the product page, this product drew my attention and was very **convenient** to see.

- Oatmeal porridge → answer only visible to participants in condition 1 or 3
- Mandarins
- Maltesers
- I perceived no product as more convenient to see than the other.

Comparing all options, I think this product is very **attractive** to choose.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Oatmeal porridge (only in c1 and c3)	○	○	○	○	○	○	○
Mandarins	○	○	○	○	○	○	○
Maltesers	○	○	○	○	○	○	○

I feel like this product is a "**normal**" and popular choice compared to the other options.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Oatmeal porridge (only in c1 and c3)	○	○	○	○	○	○	○
Mandarins	○	○	○	○	○	○	○
Maltesers	○	○	○	○	○	○	○

End of Block: Main experiment: stimuli (randomized)

Start of Block: Demographics

What gender do you identify with?

- Male
- Female
- Non-binary / third gender
- Prefer not to say

Page Break

What is your age?

_____

Page Break

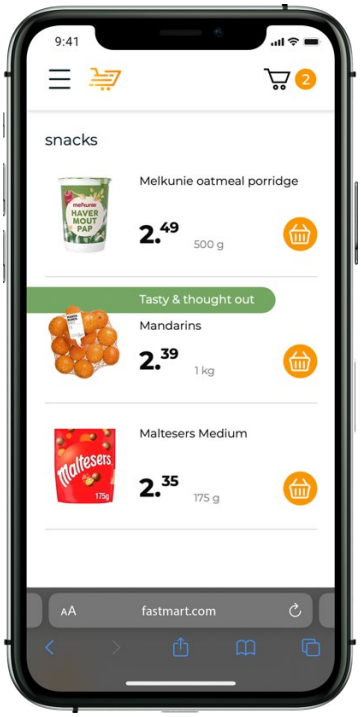
What is the highest degree or level of education you have completed?

- High school
- VET (mbo) degree
- HBO bachelor's degree
- HBO master's degree
- WO bachelor's degree
- WO master's degree
- Ph.D. or higher
- Other
- Prefer not to say

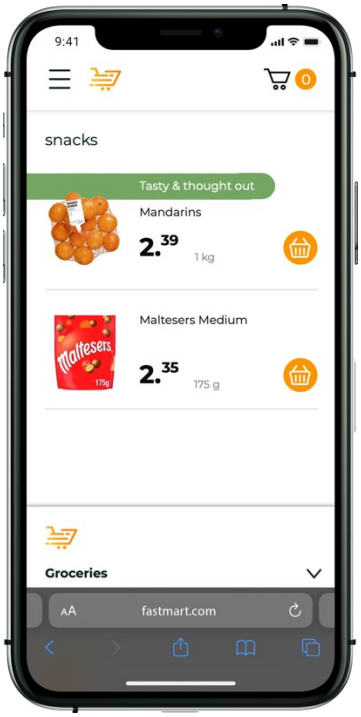
End of Block: Demographics

Start of Block: Manipulation check (randomized: same condition as main experiment)

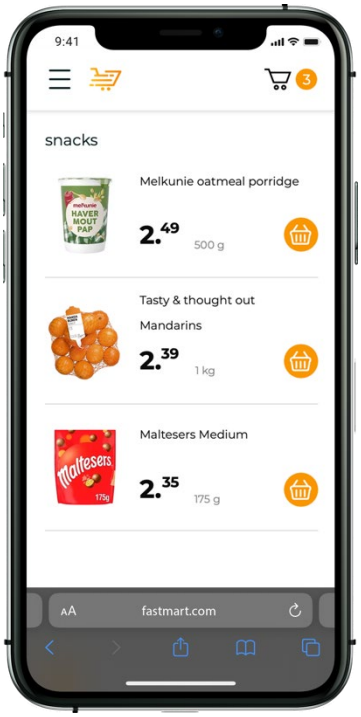
Condition 1



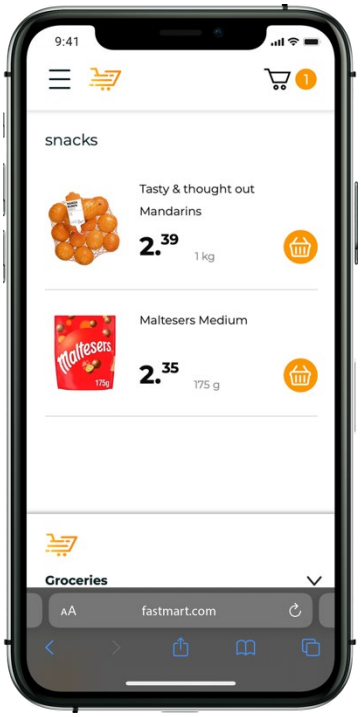
Condition 2



Condition 3



Condition 4



Note: the participant was only shown the stimuli condition he/she was earlier assigned to.

Once more review the image above about the product page "snacks", which was presented to you before on the website of the supermarket. Please answer the following questions about it.

Page Break

Did you see a textual claim next to one of the snacks?

- Yes
- No

Display This Question:

If "Did you see a textual claim next to one of the snacks?" = Yes

Which claim do you remember seeing?

- Tasty & smart
- Tasty & thought out
- Healthy & tasty
- Tasty & responsible
- Healthy & powerful

Did you see a green colour cue on the product page?

- Yes
- No

Page Break

Condition 1 & 2

Condition 3 & 4

Note: the participant was only shown the stimuli condition he/she was earlier assigned to.

On the website, you saw the following product. Which description below best describes your interpretation of the claim "tasty & thought out" used?

- ○ The product is well-considered
- ○ The product is good for your wallet
- ○ The product is good for your health
- ○ The product is good for the environment
- ○ The product is recommended by others
- ○ It is a good product
- ○ Other_____

Page Break

How many products do you remember seeing on the "snacks" product page

	1	2	3	4	5
Number of snacks					

Page Break

Rate the products on how **healthy** you perceive them.

	1 - not healthy at all	2	3	4	5 - very healthy
Oatmeal porridge (only in c1 and c3)	○	○	○	○	○
Mandarins	○	○	○	○	○
Maltesers	○	○	○	○	○

End of Block: Manipulation check (randomized: same condition as main experiment)

Start of Block: Control questions

After participating in this survey, were all questions clear to you or did you notice any hiccups in terms of comprehension, language, or other aspects?

- Everything was clear.
- I have a few remarks.

Display This Question:

If "After participating in this survey, were all questions clear to you or did you notice any hiccups...: = I have a few remarks.

Hiccups explained Please specify your remarks.

_____

_____

_____

_____

_____

End of Block: Control questions
