

NHH



How Green Are We Thinking?

*The Influence of Levels of Processing on Consumers
Evaluations of Green Products*

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Abstract

As a result of a growing wave of more environmental awareness and a rise in environmental concerns, companies have started to incorporate green marketing strategies to meet consumers demands and expectations for sustainable products.

Nevertheless, despite this rising interest in environmentally friendly products, many sustainable products struggle to receive commercial success. Consequently, in the past decades, an increasing body of research has started to explore this inconsistency between green attitudes and purchasing behavior. It is still unclear, however, why it occurs, and which factors play a major role in the decision-making process. We explore how perceptions of functional quality can act as a potential barrier to green consumerism. Building on theories of attribute centrality, we study how products with central and peripheral green attributes are evaluated in contrast to a baseline, non-green alternative product in a strong product category. Further, we study the relationship between level of processing and consumers evaluations.

By means of a field experiment, we find from the main effects that consumers seem to choose the different alternatives equally, as no significant differences were found on choice neither when contrasting green vs. non-green nor when considering attribute centrality, in the strong product category. For this category, we find that there is a trade-off between sustainability and quality, as the green alternatives are perceived to have lower functional quality. Interestingly, a higher market success is nonetheless anticipated for these alternatives. Further, this trade-off seems to occur, irrespective of the cognitive information processing system. However, the cognitive enhancement manipulation reveals a significant positive effect on choice, with the green central alternative appearing as the preferred product. Under this manipulation, the green central alternative is, as well, ranked at the top when it comes to anticipated market success. Therefore, when system 2 is activated, eco-friendliness can increase product preference, although this might be perceived by consumers to have inferior functional quality.

Keywords: Sustainable Consumption, Attribute Centrality, Processing, Functional Quality, Trade-Off, Product Preference, Choice, Anticipated Market Success

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This master thesis is part of our Master's degree in Marketing and Brand Management at the Norwegian School of Economics (NHH). Symbolizing the end of our studies, this thesis marks an important milestone in our academic life. The research process, challenging at times, led us to be both persistent and critical by questioning available theories and resulting contradictions, repeatedly.

Studying a topic as important as sustainable consumption has truly been rewarding and valuable. We believe that one key challenge for our, as well as future generations relates to the reduction of plastic waste through the creation of a more circular economy. The aim of this thesis to understand why consumers often times do not choose more sustainable products - despite their intention to act in a sustainable manner - presents thus a highly relevant question.

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Chapter 1: Introduction

1.1 Background

As the world's population continues to rise and technological advancements make consumption more convenient, the degradation of the planet's resources and release of greenhouse gases put an increasing burden on the planet (Cohen, Lenzen, & Schaeffer, 2005; Munksgaard, Wier, Lenzen & Dey, 2005).

Despite existing for decades, it was only with the recent environmental crisis that sustainable consumerism became a mainstream phenomenon (Low & Davenport, 2007). Stakeholders across the spectrum, from policymakers to businesses and private consumers have come to realize that, if we are to transition into a more sustainable society, environmental protection must be a rather joint and long-term effort.

As a result, a growing wave of global consumers became more environmentally aware and a rise in environmental concerns led to a new consumption pattern described as 'green consumerism' (Yadav & Pathak, 2016). To meet these consumers' demands and expectations, companies started to develop green marketing strategies (Gunderson, 2014), committing themselves to offer environmentally friendly products and services.

Nevertheless, this is a rather puzzling reality, as many sustainable products often struggle to receive commercial success, despite the growing interest in environmentally friendly products (Olson, 2012). Previous studies suggest that, while 30% to 50% of consumers indicate their purchase intention of sustainable products, "the market share of these products is often less than 5% of the total sales" (Carrington, Neville & Whitwell, 2010; Young, Hwang, McDonald & Oates, 2010).

It is still unclear, however, why this inconsistency between green attitudes and purchasing behavior occurs and which factors play a major role in the decision-making process (Moser, 2015). According to Cagan and McComb (2015), this attitude-behaviour gap can be attributed to the unwillingness to make a trade-off between attributes such as form, function or price and sustainability. Lin and Chang (2012) found that, generally, consumers perceive green products as less effective when compared to non-green ones. Gershoff and Frels (2015) on the other hand

distinguished different green products and focused on the centrality of the green attribute and their influence on consumers perception of a product's overall greenness.

Still, unexpectedly little empirical research has investigated the influence of attribute trade-offs as a justification for such a phenomenon (Olson, 2012). In particular, little work has focused on examining the way consumers form quality perceptions of green products and how these contrast with their perceptions of conventional alternatives. Such an understanding of a sustainability-quality trade-off is vital if environmentally friendly products are to be successful in the marketplace (Young et al., 2010).

It is however known that to form this quality judgement or to arrive at a purchase decision coordination between different functions is required (Brocas & Carrillo, 2013). This implies that a decision-making process demands the involvement of different cognitive systems. Depending on the nature of the function and the degree of the overlap between systems, a response is produced “that is ‘as if’ they were cooperating with each other or ‘as if’ they were competing with each other” (Brocas & Carrillo, 2013). Previous research has linked choice inconsistency to conflicting motivations exhibited by the intuitive System 1 and the reasoning System 2 (Cappelletti et al., 2008). According to Daniel Kahneman (2002, 2011), high levels of cognitive load increase the workload of System 2, leading to a less reasoned behavior (Kahneman, 2002, 2011).

When it comes to environmentally friendly products, the relationship between cognitive processing and consumer evaluation is still to be explored. This positions the sustainability-quality trade-off as an important research topic: does the sustainability-quality trade-off only apply to situations where consumers are under cognitive load – and when the green attribute is central? Or is this a rather deliberate and reasoned judgement, characteristic of System 2 thinking?

Understanding this will likely help companies to better understand the reasons that frequently lead consumers to decide against purchasing sustainable products, even when having a relatively high level of environmental consciousness (Rokka & Uusitalo, 2008). If fruitful, such an investigation can give corporations the necessary tools to design and market green products, and, therefore, to successfully promote sustainable consumption (Joshi & Rahman, 2015).

Some corporations have already come to realize the importance and untapped potential of adapting their business models to accommodate sustainability efforts. The Fast-Moving Consumer Goods (FMCG) industry by itself has a “key role to play in curbing over a third of global greenhouse gas emissions” (Scott, 2019).

Amongst the companies in the FMCG industry that are already creating more sustainable consumer good brands is Orkla, a leading Norwegian supplier to the grocery, out-of-home, specialized retail, pharmacy and bakery sectors. The following work is part of a research project between this Nordic consumer good company and the Norwegian School of Economics (NHH) concerning the use of circular business models. Orkla’s main markets constitute the Nordic and Baltic regions as well as selected countries in Central Europe. The company operates in four areas, namely, Orkla Foods, Orkla Confectionery & Snacks, Orkla Care and Orkla Food Ingredients.

Orkla puts emphasis on sustainability by launching new products that are good, environment-friendly choices, through the development of healthier food products and by reducing food waste. The company has been in the Dow Jones Sustainability Index Europe for the past eight years, an achievement that results from the company’s efforts to promote sustainable consumption through its sustainability strategy. Orkla’s VP Corporate Social Responsibility voices the company’s efforts by stating that, among other targets, “(...) we want all the packaging we use to be 100 per cent recyclable by 2025” (Orkla, 2018).

This project between NHH and Orkla aims at analyzing how companies can reduce their environmental footprint and close the loop through a decrease in plastic waste and an increase in recycling (NHH, 2018). In particular, this cooperation focuses on the brand “Klar” (Klardag, n.d.), a brand that contains a range of sustainable household products. The brand was launched in 2017 by the Orkla Care division and sells hand soap, laundry detergent, bathroom spray, WC gel, dishwashing soap as well as an all-purpose soap to consumers. It differentiates itself by offering a product absent of unnecessary chemicals, incorporated in a 100 per cent recycled material bottle (Klardag, n.d.).

1.2. Purpose

The aim of this project is to explore how perceptions of functional quality can act as a potential barrier to green consumerism. We wish to understand if sustainability comes at the expense of quality and how this affects product preference. Further, we want to explore if such evaluations of green products are influenced by the level of processing. To do so, we manipulate participants level of processing, as a mean to understand if this potential trade-off is made under system 1 and/or system 2. Lastly, we wish to discover if gender might reveal differences in trade-off evaluations. This leads us to the following research questions:

RQ₁: Is there a perceived trade-off between sustainability and functional quality and how does it affect product preference?

RQ₂: How does the level of processing affect evaluations of sustainable products?

RQ₃: How does gender influence sustainable trade-off evaluations?

To shed light on the overall structure of the literature review to be conducted in the following chapter, the proposed model of effects is presented below. This research model is a representation of the current study and illustrates the variables and respective effects that we wish to further explore.

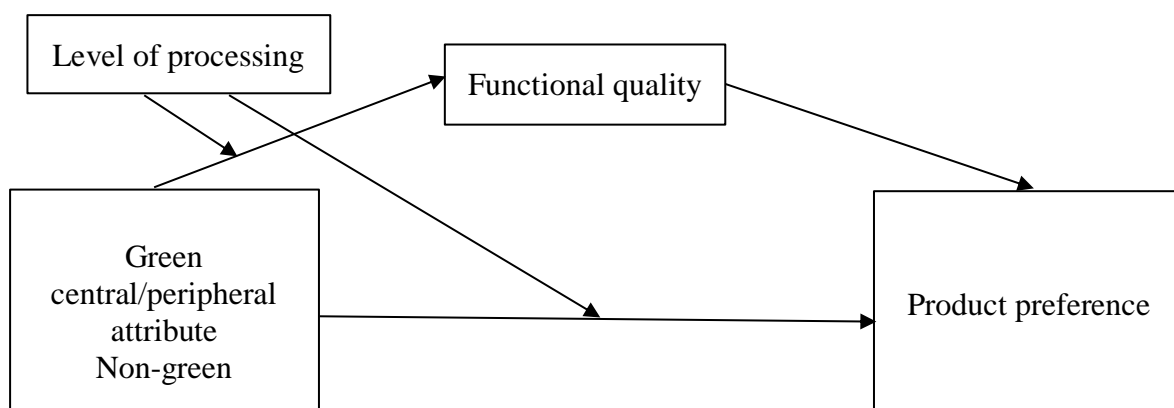


Figure 1.1: Proposed Model of Effects

As shown in Figure 1.1, we will examine the relationship between the three conditions; green central attribute, green peripheral attribute and non-green product and product preference.

We expect that attribute centrality will affect product preference, as previous studies suggest that attribute centrality impacts individuals' judgement regarding products with identical environmental benefits (Gershoff & Frels, 2015).

Furthermore, we expect functional quality to be the model's mediator. We believe that product type will affect perception of its functional quality, consequently affecting product preference.

We will also test experimentally the potential moderating effect of the level of processing. More specifically, we will investigate whether cognitive load (vs. cognitive enhancement) might unveil differences in product preference, as well as influence functional quality perception. We expect this to give more insight into how information processing systems can affect consumer responses to green products.

Chapter 2: Literature Review

The literature search process involved extensive research within the fields of sustainability, dual-system processing, and cognitive load, with the aim of gaining a comprehensive understanding of how these influence decision-making. The databases Emerald Insight, ABI/Inform Global and Business Source Complete were used as a starting point for the search process of the three central keywords. When neither of the abovementioned platforms resulted in a representative sample of relevant articles, Google Scholar was used to exploring other potentially pertinent articles.

In the following, the main outcomes of the literature review will be presented. The terms sustainable, eco-friendly and green will be used interchangeably.

2.1 Judgement and decision-making

Attitude-Behavior Gap

An increasing number of products are currently being produced and promoted as more sustainable (i.e. having a positive impact on society and/ or environment). Studies show that, generally, consumers perceive sustainable products positively (BBMG, 2007). However, several researchers found that, while the intention to behave ethically through green consumption is relatively high, the actual behavior does not necessarily reflect this intention (Bray, Johns & Kilburn, 2010; d’Astous & Legendre, 2009). In fact, previous research developed by the United Nations shows that despite 40% of consumers state that they are willing to purchase green products, only 4% actually do so (United Nations Environment Programme, 2005). This discrepancy in consumer’s attitudes and their buying behavior is widely known in research as *attitude-behavior gap* (Bray, Johns & Kilburn, 2010).

Looking to find an explanation for this attitude-behavior gap, Joshi and Rahman (2015) conducted a vast review of potential factors influencing consumers attitudes and behavior. According to the authors, these can either facilitate or hinder green purchase behavior.

Consumers’ concerns, environmental values, and ethics are described as having a positive impact on the adoption of green products. Luchs et al (2010) also showed that consumers might be triggered by the aim to perceive or present themselves more positively. In other words, they respond in a socially desirable manner, which seems to be especially relevant in the context of judging ethicality (Kruger & Gilovich, 2004). In this context, Griskevicius et al. (2010) argue that some consumers are driven by status motivation and thus espouse green behaviour to appear superior to others. The authors found that the activation of status motives can produce pro-environmental tendencies. Study participants under the “status activation” manipulation showed a higher preference for green products when compared to the control group. These findings were particularly significant for product types that are more easily viewed by others, as participants were driven by their desire to be perceived as pro-environmental by their peers (Griskevicius, Tybur & Van den Bergh, 2010). Numerous investigators also found that consumer knowledge of environmental issues also influences purchase intention and behavior.

On the other hand, product-related factors such as functionality and green attributes “form another group of motives that influence consumers’ green purchase behaviour” (Joshi & Rahman, 2015; Young, Hwang, McDonald & Oates, 2010). Poor product quality perception appears as an important barrier to green consumerism. And ultimately, this might result in a conflict between consumers’ environmental concerns and their desire to act ethically, widening the attitude-behavior gap (Tsakiridou et al., 2008)

As the focus of this work relates to the trade-off between functional quality and sustainability, this quality perception related to green products will be further examined in the following section.

Sustainability Liability

Research has found that the influence of sustainability on product preference can vary significantly, depending on the product category. In their study, Luchs et al. (2010) test how participants rate their preference for two different brands in the gentle product category versus two different brands within the strong product category. In each product category, the two brands vary in terms of the degree of sustainability. In accordance with the authors’ hypotheses, participants showed a greater preference for the sustainable brand in the gentle category when compared to the sustainable brand in the strong category. This relationship between product category and ethicality has been further tested with an implicit association test (IAT). The results showed that participants implicitly associate higher ethicality with gentle product categories when compared to strong product categories.

These findings emphasize that sustainability might not always be perceived as an asset when assessing the preference of consumers related to a certain product. Researchers refer to this phenomenon as *sustainability liability*. This is particularly relevant for product categories where strength-related attributes are valued most by consumers (Luchs, Naylor, Irwin & Raghunathan, 2010).

Related to this, Lin and Chang (2012) found that consumers view sustainable products differently when compared to non-sustainable ones. Participants in their study perceived green products as less effective than non-green alternatives (Lin & Chang, 2012). For Aaker et al. (2010), the positive societal and environmental externalities of green products may lead

consumers to perceive them as a signal of trustworthiness, generosity, and sincerity rather than competency, effectiveness and efficiency (Aaker, Vohs & Mogilner, 2010).

This perceived lack in effectiveness of green products by consumers results in a lower quality perception, hence creating a sustainability-quality trade-off. It is therefore crucial to understand how consumers evaluate a product's greenness level. Gershoff & Frels (2015) demonstrate the relevance of attribute centrality for consumers' product evaluations. Product attribute centrality refers to "the degree to which an attribute is integral in defining an object" (Gershoff & Frels, 2015). The authors hypothesize that perceived greenness of a product is strongly related to the extent to which green benefits come from attributes that are central to product concepts. In one of their studies, participants were asked to imagine the purchase of a new mattress. Participants were informed that while most mattresses were made from synthetic materials that rely on harmful chemicals, there was one mattress where the side foam was made from materials that are processed without harmful chemicals. The high (low) centrality group was told that the side foam was very (not very) important and central to a mattress and that it did (did not) affect comfort. In the following, participants were asked to evaluate the eco-friendliness of the mattress. As expected, participants rated the product as eco-friendlier when the component that provided the environmental benefit was described as a central feature of the mattress. In other words, when the environmental benefit comes from a green central (vs. peripheral) attribute, consumers may react by judging the entire product as green. Information about green attributes can thus help consumers to assess the importance of these green attributes in the product's functionality (Gershoff & Frels, 2015). This demonstrates the relevance of the relation between attribute centrality and a product's perceived functionality.

2.2 Dual Processing

As we have now identified the main barriers to sustainable consumption, it is important to discuss how these can influence decision-making. Can these barriers such as quality perception be led back to simple, intuitive inference making? Or is a more rational thinking process required to make the sustainability-quality trade-off? To answer these questions, literature on dual processing theory was reviewed.

Throughout the years, dissimilar dual system models have been applied in the literature as an effort to understand the thought process behind stereotyping, attitudes, judgements and

decision-making (Biel & Dahlstrand, 2005). One common feature of these models relies on how they characterize the two systems, described by Stanovich and West (2000) as System 1 and System 2. System 1 is referred to as intuitive, fast and automatic. It relies on mental shortcuts and quickly proposes intuitive answers to problems as they arise. System 2, on the other hand, is the deliberate and logical part of one's thought process. It is slow and effortful most of the time, requiring a considerable amount of energy (Kahneman, 2011).

According to Daniel Kahneman (2011), when an individual engages in a decision-making process, System 1's conclusions can be overridden by System 2, but only if he or she is motivated to engage in conscious effortful and deliberate thinking.

Often, decision-makers have limited capacity to engage in a deliberate and controlled thinking process. Consequently, they rely on mental shortcuts as an approach to decision-making (Tversky & Kahneman, 1974). These shortcuts, also named heuristics or inferences, help consumers to reach a decision faster by using fewer cognitive resources. It further serves consumers as an attractive substitute for search as well as direct product experience (Broniarczyk & Alba, 1994). This type of decision-making process usually occurs in busy, distracting surroundings such as supermarkets where consumers cannot analyze claims and underpinning information thoroughly (Auger & Devinney, 2007). It is therefore particularly relevant to study the role of heuristics when analyzing consumers purchase decisions within the fast-moving consumer goods industry.

Tversky and Kahneman (1974) describe three heuristics individuals employ under conditions of uncertainty. The three rules, namely representativeness, availability and adjustment and anchoring help to understand how probabilities and value predictions are assessed under uncertainty.

According to Kahneman and Tversky (1974), representativeness heuristic occurs when individuals estimate the probability of an event by the degree to which the event resembles an existing mental prototype. On the other hand, the availability heuristic regards to an individual's reliance on an easily recalled information (Tversky & Kahneman, 1974) when deciding. It is thus relevant to analyze how the information we have available affects choice and decisions. Lastly, people might make estimates by starting from an initial value that is then adjusted through a process called anchoring and adjustment.

Broniarczyk and Alba (1994) argue that consumers first form overall evaluations of the options based on information availability. Then, these evaluations are used to infer on potentially missing information. Here, the brand that is superior on the observable information will also be rated superior on the unobservable information. A contrasting strategy is proposed by Chernev and Carpenter (2001). The authors found that consumers use a compensatory inference strategy to evaluate incomplete information. They explain that this approach to decision-making is based on a consumer's intuition regarding the market's competitive nature. The thought behind this inference is; the more competitive a market is, the more likely it is that a certain brand cannot perform superior on all attributes (Chernev & Carpenter, 2001). As a result, consumers attempt to match the benefits offered by different products by inferring that "the dominance of the apparently superior brand might be compensated for by inferior performance on one of the unobservable attributes" (Chernev & Carpenter, 2001). This would mean that consumers conclude that the apparently superior brand is, in fact, inferior on the unobservable attributes.

Hoek et al. (2013) found that consumers arrive at a sustainable purchasing decision with the help of simplifying heuristics such as specific claims, imagery or symbols. In fact, this might be especially true when consumers personal environmental concerns do not match their knowledge. This lack of background knowledge limits their ability to engage in systematic processing of product information. Consequently, consumers tend to rely more on heuristics available to them (Hoek, Roling & Holdsworth, 2013).

Another area of interest examines how consumers evaluate product enhancements. In the past, such product enhancements were typically related to product performance. Today, however, many companies improve their products through socially beneficial enhancements. Newman et al. (2014) studied how consumers use inferences to evaluate socially beneficial product enhancements. The researchers found that intentionality plays a key role in consumer evaluations. In fact, consumers are less likely to purchase a product if they learn that the environmental enhancement was intendedly designed by the company. According to the authors, one possible explanation for this might be that differences in firm's intentions lead consumers to draw different inferences about the company's resource allocation. More specifically, customer's beliefs about the resource allocation changed their view on product quality and, consequently, on purchase intention (Newman, Gorlin & Dhar, 2014).

As previously stated, these different inference strategies used by consumers to make fast, intuitive decisions are especially employed when the level of cognitive busyness is high and cognitive resources are limited. Therefore, theory on cognitive busyness, also referred to as cognitive load will be presented in the following (Deck & Jahedi, 2015).

2.2.1 Cognitive Load and Enhancement

When consumers engage in a decision-making process, they are often subject to distractions from the surrounding environment. These distractions can affect the way cognitive processes are used in decision-making and, consequently, how they influence decisions (Roch, Lane, Samuelson, Allison & Dent, 2000). Followingly, it is crucial to understand which role cognitive load, also referred to as cognitive busyness, plays in decision-making. Cognitive busyness, as defined by Gilbert and Hixon (1991) can be described “as a situation that occurs when an individual simultaneously engages in several tasks consuming cognitive resources” (Gilbert & Hixon, 1991).

To understand how cognitive load affects behavior, a link to Kahneman’s dual system theories can be made. When the intuitive, automatic System 1 has made a decision, System 2 - the reasoning system - can override this decision. Under cognitive load, however, the workload of the reasoning system is increased, which hinders its ability to regulate choice, by overriding impulsive instincts. This ultimately leads to less reasoned behavior (Kahneman, 2002, 2011).

Prior research has manipulated System 1 thinking through cognitive load to examine intuitive decision processes. Several techniques have been used to create cognitive load. The most applied method is to ask participants to hold a minimum 6-digit number in their memory while making choices (Deck & Jahedi, 2015). In the present study, inducing cognitive load is also a relevant tool to reduce the social desirability bias. Setting a task to do alongside answering the questionnaire makes participants cognitive busy and potentially less concerned with social desirability (Stodel, 2015).

But not only System 1 has been previously manipulated by researchers studying cognitive processes. Similarly, the more conscious System 2 was activated in different studies to observe how consumers process larger and more diverse sets of information. DeWall et al. (2008) found that logical reasoning can be improved by enlisting the reflective, conscious System 2, in the

objective of being logical. In their experiment, the researchers used a method introduced by Priester et al. to stimulate conscious thought (Priester, Dholakia & Fleming, 2004). Amongst other techniques, such as offering a reward for good performance, they instructed participants to be prepared to explain their answers. Based on the conducted experiments, DeWall et al. (2008) concluded that logical reasoning depends on conscious processing. This process of evoking the more reflective System 2 to improve logical reasoning will be referred to as *cognitive enhancement*.

In the following study, cognitive load will be used as a manipulation contrasted with cognitive enhancement to examine consumer's perceptions of green versus non-green alternatives. This manipulation was chosen as the level of cognitive load is usually high in busy surrounding such as supermarkets, which is a particularly relevant study environment for the fast-moving consumer goods industry.

Previous research has already explored different effects of cognitive load on choice. Friese, Wänke, and Plessner (2006) studied the varying implicit and explicit attitudes of people towards a product or brand when under cognitive load. While implicit attitudes occur without conscious awareness (System 1), explicit attitudes correspond to consciously available attitudes (System 2). Interestingly, the authors found that participants whose implicit and explicit attitudes towards a product or brand are incongruent tend to rely on the implicit attitude when choices are made under time pressure, that is under cognitive load. On the other hand, when enough time was available, participants used their explicit attitudes to make a decision. This finding suggests that the implicit perceptions of consumers concerning green products and their functional quality might be crucial in reaching a decision (Friese, Wänke & Plessner, 2006).

Another research conducted by Drolet and Luce (2004) examines how cognitive load influences the use of attribute trade-offs by consumers during decision-making. Interestingly, the study shows that participants under cognitive load are more likely to apply trade-offs to support their decisions. The authors explained that a reason for this finding might be the disruptive effect that cognitive load has on the link between attribute trade-offs and underlying self-goals. This disruption lowers the motivation of consumers to alter their choice strategies to avoid potential negative emotions connected to their self-goals. Linking these findings to our study, an increased use of the sustainability-quality trade-off can be expected under cognitive load.

Cognitive Load and Stereotyping

Another factor that has been identified in the literature as an influencer of decision-making under cognitive load is stereotyping. Gilbert et al. (1988) asked both high and low cognitive load participants to do perception ratings of certain target individuals. They discovered that people under cognitive load were less able to correct their existing perception of respective target individuals. The authors emphasize that participants under high load did not fail to gather situational constraint information but were unable to use it to correct their perception. From this finding, they follow that correction requires a relatively high expenditure of cognitive resources (Gilbert, Pelham & Krull, 1988).

Similarly, Bodenhausen et al. (1990) found support that stereotypes function as judgmental heuristics. They report that these stereotypes particularly impact decision making when people are less able or motivated to engage in more systematic decision-making processes. This reliance on stereotypes by individuals during decision making is also examined by Kunda (1999). The authors argue that cognitive load results in a reliance on stereotypes because it disrupts the complex inhibition of stereotypes. In the same line of thought, Roch et al. (2000) discovered that individuals under high cognitive load lack the cognitive resources needed for systematic processing to consider situational cues. Resultantly, participants under high cognitive load often applied simplified cognitive processing, using equality heuristics for instance. The authors state that subjects are only able to adjust their decision-making strategy away from this anchor when they possess the required additional cognitive capacity to do so (Roch, Lane, Samuelson, Allison & Dent, 2000).

Having established that people increasingly use stereotypes as inferences under cognitive load, the effect of these judgmental heuristics on green product evaluations needs to be further examined. Several studies have investigated this relation through implicit association tests (IAT). Brough et al. (2016) found through an implicit association test (IAT) that an implicit cognitive association exists between greenness and femininity. Participants of both genders paired the label “female” and the label “environmentally friendly” with a significantly shorter response latency than “environmentally unfriendly”. From this finding, it was concluded that a mental association exists between the concepts of greenness and femininity. It was further shown in a second study that consumers engaging in green behavior were perceived as more feminine. Taken together, those results suggest that this green-feminine stereotype might be

applied by consumers as a heuristic to evaluate green products which ultimately might result in a lower preference of green products by male consumers (Brough, Wilkie, Ma, Isaac & Gal, 2016).

Another IAT conducted by Bjorvatn and Bjarnadottir (2018) examined respondents' associations between eco-friendliness and functional quality to find whether sustainable product alternatives are implicitly judged to be of high or low quality. Across all products tested, participants associated functional quality with the eco-friendly product. This is particularly surprising in the strong product category where consumers have previously been found to value strength-related attributes, as ethicality is usually connected to gentleness-related attributes (Luchs, Naylor, Irwin & Raghunathan, 2010). Connecting these findings to stereotype heuristics, it can be suggested that participants hold a stereotype that green is generally positive and thus use a "green=positive affect" heuristics. This inference ultimately leads them to judge all green products positively regarding functional quality (Bjorvatn, E. & Nordeng Bjarnadottir, Å., 2018).

2.3 Gender

As previously discussed, green behavior is perceived as unmanly by both women and men according to a study conducted by Brough et al. (2016). This poses the question of whether this stereotype is either based on subjective perceptions or on actual behavior. Davidson and Freudenburg (1996) showed that women, in fact, have a higher level of environmental concern compared to men, which is also reflected in their attitudes, choices, and behavior (Davidson & Freudenburg, 1996). In line with this finding, Dietz et al. (2002) examined the differences in value priorities between men and women and analyzed how these differences affect environmentalism. They were able to show that gender differences in environmentalism might be rooted in value differences, "especially differences in concern with other humans, other species, and the biosphere itself (...)" where women displayed a higher prioritization than men (Dietz, Kalof & Stern, 2002).

Zelezny et al. (2000) concluded in a similar line of reasoning that women tend to be more eco-centric. The authors define ecocentrism, similarly to Dietz et al. as "concern for nature, the biosphere, and all living things". They explain that women reported more responsibility for

improving the environment compared to men. Women showed, for instance, a higher interest in proactive environmental behavior such as recycling (Zelezny, Chua & Aldrich, 2000).

Brough et al. (2016) propose that this greenness-femininity association might, among others, be linked to the fact that many pro-environmental messages use more feminine font sizes and colors. Also, marketing efforts for green products tend to target product categories such as food or household products where women are often more involved. Their findings also imply that men might not engage so much in eco-friendly behavior to prevent being perceived as feminine by others. Besides, the authors observe that this stereotype is also applied to perceptions of the self. In this context, they examine how gender identity is influenced by the femininity-greenness stereotype. Interestingly, men whose gender identity is affirmed right before the purchase decision, tend to prefer the green product compared to the control group. They also found that more masculine branding can positively influence the evaluation of green products by men (Brough, Wilkie, Ma, Isaac & Gal, 2016).

2.4 Summing Up

Summing up the literature reviewed, it can be stated that consumers perceive sustainable products generally positive, even if this often does not translate into the decision to purchase the green product alternative (BBMG, 2007; Bray, Johns & Kilburn 2010; d’Astous & Legendre, 2009). This so-called *attitude-behavior gap* has been widely discussed in research related to sustainable consumption. To provide a potential explanation for this gap, Joshi, and Rahman (2015) reviewed numerous individual and situational factors. They found that consumers emotions, as well as their knowledge regarding environmental issues, impact their intention and behavior to purchase green products. Relevant situational factors are on the other hand price, availability and perceived quality of sustainable product alternatives. All these need to be taken into consideration as potential explanations for the attitude-behavior gap. As the focus of this work is however placed on the sustainability-quality trade-off occurring in green consumption, the perceived quality of sustainable products was studied in greater detail.

Lin and Chang (2012) discovered hereto that green products are in general perceived as less effective when compared to non-green products. A more differentiated perspective was provided by Luchs et al. (2010) who link consumers quality perception of green products to the

product category. More precisely, they found in their study that consumers show a stronger preference for sustainable brands in the gentle product category when compared to the strong product category. Besides the relevance of the product category, studies found that the centrality of a green attribute can lead to a higher level of a product's perceived greenness which might in turn impact product preference (Gershoff & Frels, 2015).

To further explore the way consumers evaluate sustainable products and arrive at a purchasing decision from a cognitive perspective, dual processing theory was reviewed. In this field, psychologists Richard West and Keith Stanovich described as first researchers the “*dual-self model*”. This model distinguishes between System 1, which allows for fast and automatic decision-making and System 2 which is characterized by controlled, slow and conscious thinking. System 1's conclusion can be overridden by System 2 if the motivation to engage in a conscious effortful and deliberate thinking is available.

Another important concept, called bounded rationality, explains that human judgements are limited by different constraints, such as mental capacities and information and time availability (Simon, 1982). These limited mental capacities occur when individuals are under cognitive load (Gilbert & Hixon, 1991). As a result, less reasoned behaviour can be observed while the use of heuristics increases (Kahneman, 2002; Deck & Jahedi, 2015). Individuals under cognitive load also seem to be less able to correct their existing perceptions and thus rely more on stereotypes (Gilbert, Pelham & Krull, 1988; Kunda, 1999).

Finally, it has been found that sustainable purchase decisions might differ according to gender. Davidson & Freudenburg (1996) discovered that women have a higher level of environmental concern compared to men, which is also reflected in their attitudes, choices, and behaviour. Adding to this, Brough et al. (2016) concluded that for both men and women, a mental association exists between femininity and greenness.

2.5 Our contribution to the literature

As discussed above, depending on the product category, sustainability can act as a liability, negatively influencing product preference. Luchs et al. (2010) found that sustainability might have a negative impact on preference in strong product categories where strength-related

attributes are valued (Luchs, Naylor, Irwin & Raghunathan, 2010). Related to this finding, Lin and Chang argue that consumers view green products generally as less effective when compared to non-green products (Lin & Chang, 2012).

In this thesis, the trade-off between sustainability and functional quality and its effect on product preference is studied. The chosen research design enables us to better understand consumers decision-making process regarding sustainable products in the strong product category.

Decision-making processes and the influence of cognitive load on those processes have been studied by researchers from different fields (Roch, Lane, Samuelson, Allison & Dent. 2000; Kahnemann 2002, 2011). However, from an information processing perspective, it is still wildly unknown which factors influence consumer preference. Therefore, we expect to contribute to the literature by analyzing the influence of the level of processing on product preference. We will add to the literature on attribute centrality by shedding light on how this might influence consumers' information processing. Using two green products - one with a green central attribute and one with a green peripheral - we will examine how attribute centrality might influence consumers evaluations of sustainable products.

Adding to this, we ultimately wish to better understand whether there is a perceived trade-off between sustainability and functional quality and how this affects product preference.

Chapter 3: Hypotheses

In the upcoming chapter, the model's hypotheses will be presented and used to answer our research questions.

3.1 Hypotheses

3.1.1 Product preference

In the current research, product preference is measured from a "personal point of view" - choice - and from an "other point of view" - anticipated market success.

As discussed in Chapter 2, sustainability might not always be perceived as an asset when assessing consumers' preference for certain products.

As previous research shows, different barriers exist when it comes to the adoption of green products. According to Joshi & Rahman (2015), perceived product attributes and quality influence consumers' willingness to purchase environmentally friendly products as opposed to non-green ones.

Furthermore, whether sustainability enhances consumer preferences also depends on the benefits that these actors value in different product categories. When strength-related attributes are valued by consumers in a specific product category, a preference for less sustainable product alternatives might occur. This might derive from a sociocultural conflict between ethicality and strength (Luchs, Naylor, Irwin & Raghunathan, 2010), therefore leading to an incongruity between the product's benefits and category. According to Luchs et al. (2010), since consumers value strength in products such as detergents and hand sanitizers, including ethicality might lead to a decrease in preference in the strong product category. This reasoning likely helps to explain why sustainable household cleaning alternatives have experienced weak market shares in the past few years (Porges, 2007).

Adding to this, Bjorvatn and Bjarnadottir (2018) also found that, for a strong product category, there is a believed trade-off between quality and eco-friendliness that might ultimately affect product preference. As quality is a strong predictor of preference (Newman, Gorlin & Dhar, 2014), we expect that consumers will show a preference for non-green alternatives in the strong product categories.

As we hypothesized that consumers show a preference for non-green alternatives in the strong product category, we propose the following hypothesis:

H1a *Non-green (vs. green) products will be rated higher (lower) on i) choice and ii) anticipated market success in the strong product category.*

Given that, according to Gershoff and Frels (2015), consumer's evaluation of a product's greenness is related to the centrality of a green attribute, we expect that preference will differ, depending on whether the attribute is central or peripheral. In their study, the authors found that the centrality of a green attribute influences the degree to which consumers perceive the entire

product as green. If a more central attribute has a green benefit, the overall product is perceived as greener when compared to a more peripheral attribute.

Following the previous hypothesis, as perceived greenness increases, so does the incongruity between the category and product's attribute.

Therefore, we derive that consumer's preference for green products is moderated by attribute centrality and consequently we suggest that:

***H1b** Consumers show lower (higher) product preference measured by i) choice and ii) anticipated market success when the green attribute is central (peripheral) in the strong product category.*

3.1.2 Functional quality as mediator

Since we believe that the effect postulated in the previous hypotheses is mediated by perceived quality, it is relevant to document this mediating effect.

As noted by Luchs et al. (2010), strength-related attributes are valued by consumers in the strong product category. This is the case for products such as detergents and hand sanitizers. Because ethicality is associated with a gentle product category, Luchs et al. (2010) noted that an incongruity occurs between the product's benefits and the strong product category. As a result, adding a green attribute to a product that belongs to this category leads to a reduction in perceived quality, because ethicality is associated with products that belong to gentle categories. We thus suggest that a sustainability-quality trade-off occurs in the strong product category.

Therefore, we propose the following hypotheses:

***H2a** The effects postulated in H1a are mediated by functional quality.*

Following on the attribute centrality theory previously described and explored by Gershoff and Frels (2015), we also expect that this sustainability-quality trade-off is affected by a product's attribute centrality. As proposed, if a product has a green central attribute in the strong product category, the perceived greenness is higher when compared to a product with a more peripheral

attribute. This will followingly result in a higher incongruity between the product's benefit and the category (Luchs, Naylor, Irwin & Raghunathan, 2010), affecting consumers' perceived quality. As the incongruity is more (less) severe when the attribute is central (peripheral), we propose that perceived quality will be lower (higher) for products with a green central (peripheral) attribute.

Based on this, we hypothesize that:

H2b The effects postulated in H1b are mediated by functional quality.

3.1.3 Cognitive load as moderator

As stated, decision-makers are rationally bounded, either due to limited mental capacity, information or time availability. Because of that, they often rely on mental shortcuts and quickly propose intuitive answers to problems as they arise (Kahneman, 2011). This can be observed for individuals under cognitive load, as individuals lack the necessary cognitive resources to process systematically and regulate choice (Kahneman, 2002).

As previously stated, Luchs et al. (2010) found that participants implicitly associate higher ethicality with gentle product categories when compared to strong product categories. This might lead to a preference for less sustainable product alternatives in the strong product category. According to Gilbert et al. (1988), people under cognitive load are less able to correct their existing perceptions.

The authors follow that correction requires a relatively high expenditure of cognitive resources (Gilbert, Pelham & Krull, 1988). As a result, and contrary to the cognitive load condition, we expect that participants under enhancement will appreciate the negative consequences of not acting sustainably. We also hypothesize that, when asked to justify their answers, consumers might adjust how they answer and act in a socially desirable manner (Stodel, 2015). Therefore, we expect that they might opt for the sustainable alternatives as an attempt to be perceived as pro-environmental when under cognitive enhancement.

We thus propose the following hypothesis:

H_{3a} Under cognitive load (vs enhancement), the non-green alternative will be rated higher (lower) on i) choice and ii) anticipated market success than the green alternatives in the strong product category.

When it comes to attribute centrality, we previously mentioned that if a more central attribute has a green benefit, consumers perceive it as greener when compared to a more peripheral attribute (Luchs et al., 2010). According to the authors, consumers might also face a sociocultural conflict between ethicality and strength, as ethicality seems to be associated with gentle product categories. Following the reasoning of the previous hypothesis, we expect that under load (enhancement), consumers will be less able (more able) to correct these existing perceptions.

H_{3b} Under cognitive load (vs enhancement), the green central will be rated lower (higher) on i) choice and ii) anticipated market success than the green peripheral in the strong product category.

3.1.4 Cognitive load and the mediator

As hypothesized in H_{3a} and H_{3b}, *cognitive load* is suggested to moderate the relationship between green/ non-green product alternatives and i) choice and ii) anticipated market success. According to Drolet and Luce (2004), consumers under cognitive load are more likely to use trade-offs among conflicting attributes to support their choices. In particular, the authors claim that under cognitive load, consumers may “fail to appreciate the potential negative consequences of not adhering to a self-goal by trading off the relevant attribute” (Friese, Wänke & Plessner, 2006).

Consequently, we propose that consumers will make a sustainability-quality trade-off under cognitive load. We expect them to overlook the threat to the goal of acting environmentally friendly that accompanies choosing a non-green alternative, in the hopes this choice will translate into higher functional quality.

On the other hand, we expect that under cognitive enhancement they will be more likely to correct their perception that greenness implies lower functional quality.

Therefore, it is expected that this moderator will influence the above-mentioned mediator: functional quality, as follows:

***H_{4a}** Under cognitive load (vs enhancement), the non-green alternative (vs green) will be rated higher (lower) on functional quality in the strong product category.*

Followingly, if a product with a more central attribute is perceived as greener, then it is expected that the sustainability-quality trade-off will be more prominent under cognitive load. On the other hand, under enhancement, we expect that consumers will be more likely to correct this perception that higher levels of greenness imply lower levels of functional quality.

As a result, we suggest that:

***H_{4b}** Under cognitive load (vs enhancement), the green central will be rated lower (higher) on functional quality when compared to the green peripheral in the strong product category.*

3.2 Exploratory research question: Gender

Based on the literature reviewed in Chapter 2.2.5, gender was identified as a potential influencer of consumers behavior towards sustainable products. However, little knowledge exists concerning its impact on preference and anticipated market success, which is why the research question “*how does gender influence sustainable trade-off evaluations?*” was designed in an exploratory manner. The topic will thus be analyzed further to understand the potential influence of gender on the dependent variables - preference and anticipated market success.

Chapter 4: Methodology

4.1 Introduction

To investigate the research questions and test the hypotheses presented in Chapter 3, two questionnaire surveys were conducted, differing in the nature of the manipulation method employed. A questionnaire survey is one of the most effective ways to gather data from an extensive number of individuals (Andi & Minato, 2003; McQueen & Knussen, 2002).

Respondents were randomly assigned to one of two conditions: one group was subject to cognitive load, while the other was bounded by cognitive enhancement. Cognitive load and cognitive enhancement were used as manipulation variables to analyze the influence of working memory span or capacity on respondents' survey responses. Participants under cognitive load were expected to lose hold of System 2 processing when answering the survey. We thus tested the contrast load vs enhancement by asking respondents on the other group to justify their answers, thus inducing the use of System 2 processing.

Throughout the questionnaire, participants were asked to evaluate three different drain openers: 1) a regular one 2) a drain opener made of recycled material and 3) a drain opener composed of 100 percent natural ingredients. The different attribute levels were used to test participants' judgement of greenness, as research shows that consumers' perception of environmental benefits is dependent on whether such benefit arises from a central or peripheral attribute (Gershoff & Frels, 2015). Therefore, the drain opener made of recycled material represents a product with a peripheral attribute, whereas the attribute level of the drain opener made of 100 percent natural ingredients is described as central.

The following sections will further discuss the employment of this research design, as well as present a thoroughly analysis on the manipulations, procedure for data collection and measurements employed.

4.2 Research Design

An experimental research design was chosen, with an approach based on randomization. The fundamental goal of this design is to establish a causal connection between independent and dependent variables (Kirk, 1995), which therefore justifies its employment on the current research. A between-subjects design was conducted, as each subject was exposed to only one of the two treatment levels: cognitive load or cognitive enhancement. This design opposes a within-subjects design, where participants are subject to more than one treatment (Pany & Reckers, 1987).

4.3 Manipulations

As mentioned, participants were subject to one of two different conditions: cognitive load or cognitive enhancement.

In the cognitive load condition, participants were asked to memorize an 8-digit number at the beginning of the survey and informed that they would be asked to recall the same number at the end of the survey. Previous research (Tarmizi & Sweller (1988); Chandler & Sweller (1992)) has shown that the use of a number memorization increases the task difficulty, potentially leading to a split-attention effect. Consequently, this effect creates the cognitive load that can lead an individual to act more automatically (Gilbert, 1989; Kahneman, 2011).

On the other hand, to engage the conscious and reflective system 2, respondents subject to the cognitive enhancement manipulation were instructed to justify their answers. Previous research has shown that individuals subject to this procedure, described in the literature as *accountability*, are more likely to make a thoughtful choice compared to those who do not feel accountable for their responses (DeWall, Baumeister & Masicampo, 2008; Lerner & Tetlock, 1993).

As a result, number memorization is set to engage and hamper system 1 and 2, respectively, whereas accountability is expected to stimulate conscious and reflective responses.

4.4 Procedure

Recruitment

The questionnaire survey was conducted at Laksevåg Center, a shopping mall located in Bergen, Norway. To ensure that the questions were answered individually, the setting was prepared to avoid contact between participants, obstructing the visibility to other participants' computer screens.

The respondents were randomly recruited to participate in the survey, and a small monetary incentive was used as a tool to incentivize participation. This incentive choice aimed at

improving the survey response rate, without creating a selection bias of voluntary participants that could jeopardize the questionnaire results.

Participants

As a result, from the recruitment efforts, 166 participants completed the survey. The respondents ranged in age from 15 to 73 years ($M=36.64$, $SD=14.84$). From these, 58.4 percent were women and the remaining 41.6 percent, men. Participants were randomly assigned to one of the two treatment levels and asked to rate three different products: a regular drain opener, a drain opener made with recycled materials and a drain opener made of 100 percent natural ingredients (See Appendix C). Both questionnaires were in Norwegian and therefore, all participants were Norwegian speakers. Of these, 87.3 percent held the country's nationality at the time of the survey (See Appendix D).

Questionnaire

The two surveys (Appendix B) were created on Qualtrics, each having their own link to a Qualtrics survey. Regardless of the experiment condition participants were assigned to, they were asked the same questions, in the same order throughout the survey (See Appendix C).

With an end goal of achieving the same number of responses on each group, computers were divided evenly, with two screens assigned to each of the two treatment levels. As a result of the 166 participants, 83 were assigned to each condition. On average, respondents under cognitive enhancement spent an average of 15.5 minutes to complete the survey, 2.9 minutes more than those under cognitive load.

4.5 Measurement

The questionnaire survey was designed to achieve a comprehensive understanding of the sustainability-quality trade-off in consumer decisions.

Since we are in the presence of a multivariable model, questions were set to analyze the potential effects of the dependent, mediator, moderator, and control variables in the research study.

Dependent variables

Two different items were applied to measure the dependent variable, *product preference*. These measured 1) choice and 2) anticipated market success in the market. We categorized product choice as product preference from a “personal point of view” while anticipated market success measures product preference from an “other point of view”.

Product preference from a “personal point of view”

To measure preference from a “personal point of view”, an item regarding *choice* was introduced in the questionnaire survey. Participants were asked to rate the likelihood of choosing each of the three different alternatives – regular drain opener, drain opener with 100% natural ingredients and drain opener made of recycled material – in case they needed one. A 7-point ordinal Likert scale was employed and used by respondents to rate the likelihood of choosing each product, on a scale from “very unlikely” to “very likely”.

Product preference from an “other point of view”

To measure product preference from an “other point of view”, an item regarding *anticipated market success* was introduced. In this case, participants were asked “how likely do you think these options will be a success on the market?”. Once again, respondents evaluated the statement by means of a 7-point Likert scale that ranged between “very unlikely” and “very likely”.

Mediating variable

The designed conceptual model is mediated by functional quality, used in the study to understand the process by which the dependent and independent variables are related.

Functional quality

To measure functional quality, participants were asked to rate each alternative’s ability to unclog pipes on a scale from 1 to 7, “very unlikely” to “very likely”, respectively.

Moderating variable

A moderator is a variable that alters the relation between an independent and a dependent variable (Aguinis, 2004). In the current research, the moderator variable is the study's manipulation and represents a factor to which individuals are randomly assigned to.

Cognitive load and cognitive enhancement

As previously described, half of the participants were subject to cognitive load, while the remaining were asked to reason their responses in writing, thus being subject to cognitive enhancement. Cognitive load was induced at the beginning of the survey when participants were asked to memorize an 8-digit number. The manipulation was expected to influence respondents until the end of the survey when they were asked to recall the same exact number. The cognitive enhancement manipulation was also introduced prior to the survey's questions when participants were advised to think thoroughly when answering the questions as they would be asked to justify them.

Independent variable

In the current model, the independent variable - "X" - is represented by "green vs non-green product". Therefore, the independent variable does not actually exist in the data gathered.

Control variables

Adding on to the aforementioned variables, a number of control variables were also measured, namely damage, trade-off, sacrifice, importance, recycling behavior, and demographics. These were introduced to prevent the effect of confounding variables in the experiment that could impact the relationship between the manipulation and the dependent variable (Pourhoseingholi, Baghestani & Vahedi, 2012).

Damage

To measure this variable, participants were asked to rank the level of damage they considered the three drain openers would have on 1) their pipes, 2) their health and 3) the environment.

Trade-off

The trade-off that participants might perceive between quality and sustainability when assessing a green product is measured by asking participants to rate the following statement on a 7-point Likert scale that ranged between “strongly disagree” and “strongly agree”:

“An environmentally friendly product has lower quality than a non-environmentally friendly product”

Sacrifice

On the same Likert scale ranging from “strongly disagree” to “strongly agree”, we measured the willingness to sacrifice quality for the benefit of environmental friendliness, by asking participants to rate the statement: “I am willing to sacrifice quality for the benefit of environmental friendliness”.

Importance

To control for individuals’ overall attitude towards sustainable consumption and their perception of environmental challenges, importance as variable was introduced. First, participants were asked to assess how strongly they agree with the following statement:

“It is important to me that the products I buy are environmentally friendly”

Secondly, two environmental problems were presented to the study participants. They were then asked to choose which of the two options they believe constitutes the biggest environmental challenge:

- (1) Chemicals from cosmetics and detergents that pollute the sea, rivers and lake
- (2) Packaging from products that end up in nature and pollute the sea, rivers and lake

Price

To measure participants perceptions concerning the price level of green vs non-green products, the variable price was used. Participants were asked whether they believe there are price differences between the three alternative products presented in the study.

If they answered yes, they were in the following asked to rank the three alternatives from the cheapest to the most expensive one.

Demographic variables

Finally, nine demographic questions were included in the survey to control for differences in the demographics of the participants. In the following order, they were asked to indicate their gender, age, nationality, education level, profession, approximate yearly income, marital status, dependent children and responsibility for household purchases (Appendix D).

Chapter 5: Analysis and Results

5.1 Data Analysis

5.1.1 Main Effects

To test the main effects of the conceptual model (H_1), a one-way analysis of variance (ANOVA) was used as statistical procedure. The ANOVA technique was invented by Ronald Fisher in the 1920s and is used to test whether the mean scores of two or more populations are equal or not (Wyllys, 2003). Since we are in the presence of three conditions that are within-subject factors (green central attribute, green peripheral attribute, and non-green product), a one-way repeated measures ANOVA was used as this is the correct methodology to be employed in the presence of two or more populations.

5.1.2 Mediation Analysis

To test hypothesis H_{2a} and H_{2b} , a mediation analysis was performed. This statistical procedure is described as a path-analytic framework since it gives researchers the possibility to quantify and test the pathways of influence by which a supposed causal independent variable X affects a dependent one Y (Montoya & Hayes, 2017). One of these pathways comprehends a mediator variable M that is affected by X and that, in turn, causally influences Y . Therefore, this indirect influence of the independent variable on the dependent variable through M quantifies the effect the mediator variable has on the relationship between X and Y .

This statistical methodology has been largely used across fields of study, typically lying on a research design that is between-subject in nature, through which different people test each condition (White, Abu-Rayya, Bliuc & Faultkner (2015); Littleton (2015); Shuldt, Guillory, & Gay (2016)). Less attention has been, however, given to mediation analysis of within-subjects

study designs, also referred to as repeated-measures. Contrary to a between-subject design, this method exposes each participant to all the existing conditions. In the questionnaire survey conducted, participants are asked to evaluate three different drain opener alternatives. We are therefore in the presence of a three-condition within-participant design, and no true X variable exists to regress Y and M on, which means that the approach to mediation does not follow the commonly used path-analytic form of a between-subjects design. As X does not actually exist in the data, its effect is carried in the difference scores in M and the difference scores in Y (Montoya & Hayes, 2017).

In the proposed model presented in Chapter 3.1, a single mediator - *functional quality* - is suggested to mediate the effect of “ X ” - product category - on the two dependent variables: choice and anticipated market success.

5.1.3 Moderation Analysis

To test hypotheses H_{3a} and H_{3b} , a moderation analysis was conducted. This analytical strategy is employed when the analytical goal is to determine whether a variable has an impact on or is related to the size of a variable’s effect on another (Hayes, 2013). Moderation occurs when the strength, size and, sign of an independent variable’s *effect* on the dependent variable Y can be forecasted or is dependent on a third variable W , referred to as *moderator* (Hayes, 2013).

In the proposed model presented in Chapter 3.1, the study’s manipulation, given by *cognitive load/enhancement*, is suggested to moderate the effect of “ X ” on the dependent variables *choice* and *anticipated market success*. Since we are in the presence of a two-instance repeated measures design, the moderation analysis was conducted by means of the MEMORE macro by Montoya & Hayes (2017).

As W is a dichotomous variable, the Johnson-Newton procedure could not be used to identify the point along with the moderators where the relationship between X and Y transition between being significant and non-significant. Instead, a pick-a-point approach (i.e. simple-slopes analysis) was employed to probe the interaction by analyzing “the conditional effect of the focal predictor on the outcome” (Montoya, 2018) at two specific points of W , say w . In the current analysis, W is given by $w=1.00$ and $w=2.00$, representing cognitive enhancement and cognitive load, respectively. By doing so, we expect to answer the following question: “*Does cognitive*

load effectively moderate the relationship between product type and choice/anticipated market success?”.

5.1.4 Conditional Process Analysis

The process by which moderation and mediation are pieced together in a statistical procedure is referred to as conditional process analysis (Hayes, 2013). A mechanism connecting X and Y is said to be conditional when the pathway that comprehends a mediator variable *M* is contingent on a moderator variable *W*. Consequently, conditional process models occur when the effect of X on M or, alternatively, of M on Y are moderated by W.

In the model proposed, it is suggested that the effect of “X” on the mediator *functional quality* is moderated by *cognitive load*.

5.1.5 Further Analysis: Gender Effects

To test for gender effects, a one-way repeated measures ANOVA was conducted, testing if gender significantly impacts the study’s manipulation and, consequently, product preference and anticipated market success.

5.2 Results

In the following section, results from the analysis will be presented. To clarify, we have referred to the three different alternatives as 1) *Green central attribute product* for 100% natural ingredients drain opener 2) *Green peripheral attribute* for the drain opener made with recycled material and 3) *non-green/regular product* for the conventional, regular drain opener. Given the considerably large sample size (N=166), a $p < .05$ significance value is used in the analysis.

5.2.1. Descriptive statistics

Descriptive statistics for both the dependent, mediator and moderator variables can be found in Appendix E.

5.2.2. Test of Assumptions

As it will now be briefly described, several assumptions need to be satisfied to perform the abovementioned analysis.

Independence of Observations

Observations of the gathered data must be independent and, therefore, not influence each other (Pallant, 2005). As participants performed the survey individually and were instructed to not communicate with each other until its completion, it is assumed that the data does not violate the independence assumption.

Normal Distribution

Although different descriptive measures have been employed to test normality, skewness and kurtosis are described as reliable descriptive statistics to characterize a data's distribution (Pallant, 2005). Skewness provides information about the symmetry of the distribution and the amount and direction of skew. If skewness equals zero, then one can state that the data is perfectly symmetrical. In case it is positive (negative), the data is characterized as being positively (negatively) skewed and the right tail of the distribution is longer (shorter) than the left tail.

The height and sharpness of the peak relative to the rest of the data are measured by kurtosis, a descriptive proposed in 1905 by Karl Pearson (Pearson, 1905). While a positive value characterizes a distribution as relatively peaked, a negative one indicates a relatively flat distribution.

In the presence of a perfectly normal distribution, both values of skewness and kurtosis are equal to zero, while values within the range $[-1, +1]$ indicate a normally distributed data.

None of the skewness values violated the normality assumption. However, one variable had a kurtosis value higher than 1. This breaks the normality assumption, but since we are in the presence of a large enough sample ($N=166$), no major problems are expected to arise from this violation (Pallant, 2005).

5.2.3 Control Variables

To analyze if the control variables mentioned in Chapter 4.5, namely damage, trade-off, sacrifice, importance, price, and demographic variables, could have influenced the responses on the dependent variable, a correlation analysis was used as statistical procedure.

Pearson's correlation is the most commonly used method to run a correlation analysis. This statistical procedure measures the strength and direction of the relationship between two variables measured on an interval scale (Pallant, 2005). Since the variables from the present study are measured on a Likert scale, being therefore not continuous, the data cannot be analyzed by means of Pearson's correlation. A Spearman rho procedure was instead employed.

No correlation was found between the dependent variables *choice* and *anticipated market success* and the control variables trade-off and demographics (excluding gender). A correlation was however found between these dependent variables and importance, recycling behavior, sacrifice, and damage. For the control variable *damage*, the correlation is only significant when the dependent variables are choice and anticipated market success related to the drain opener made of 100% natural ingredients. However, the values indicate a poor correlation between the variables, which leads us to conclude that there is a weak association between them.

5.2.4 Main Effects

As described in Chapter 5.1.1, a one-way repeated measures ANOVA was used to test the main effects of the independent variables on the dependent variable *product preference*. As previously mentioned, product preference was measured from a "personal point of view" and from an "other point of view", by adding an item regarding *choice* and *anticipated market success*, respectively.

As a result, the following hypotheses were tested:

H1a *Non-green (vs. green) products will be rated higher (lower) on i) choice and ii) anticipated market success in the strong product category.*

H1b Consumers show lower (higher) product preference measured by i) choice and ii) anticipated market success when the green attribute is central (peripheral) in the strong product category.

The descriptive statistics for the three sets of scores (n, Mean and Standard Deviation) for each variable are presented in Table 5.1.

Table 5.1: Descriptive Statistics for Choice and Anticipated Market Success, for the three Product Alternatives with Statistics Test Scores for each condition

<i>Variables</i>	<i>Green central attribute</i>			<i>Green peripheral attribute</i>			<i>Non-green product</i>		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Choice	166	4.94	1.835	166	4.83	1.757	166	4.57	1.817
Anticipated market success	166	5.30	1.544	166	5.00	1.577	166	4.56	1.565

Choice

To understand if there is a significant effect of product type, it is relevant to analyze the multivariate tests output box. While this results in the report of different statistics, the Wilks' Lambda is the most commonly used (Pallant, 2005). In the current analysis, the value for Wilks' Lambda associated with the variable preference is .985 with a probability of value of .281 (p-value > .05), $F(2, 163)=1.279$, which means that there is no statistically significant effect for choice across the three different alternatives under analysis.

Since there is no significant effect of the condition on choice in the strong product category, none of the pairwise comparisons illustrated in Table F.1 (Appendix F) are significant.

Therefore, no support was found for hypotheses H_{1a} and H_{1b}.

Anticipated market success

Regarding anticipated market success, the results show that participants anticipate the drain opener made out of 100% natural ingredients to be the most successful in the market, followed by the recycled material product, and the non-green alternative scoring the lowest in chances of success. Therefore, respondents believe the green alternatives to be more successful in the

market, rating the product with a green central attribute higher in likelihood of success than the green peripheral.

The Wilks' Lambda for anticipated market success is .905 with a probability of value of .000, which means that $p < .05$. Therefore, we can conclude that there is a statistically significant effect for anticipated market success, which suggests that there was a change in success scores across the three different product alternatives. Although the result is statistically significant, it is important to assess the effect size of this result, given by the Partial Eta Squared in the Multivariate Tests output (See Appendix G). The value obtained is .095, which means that, following a scale proposed by Cohen (1988)¹, the result suggests a moderate to large effect size.

Since we are in the presence of a statistically significant result related to the variable *anticipated market success* for the three product alternatives, this suggests that there is a difference among the three alternatives. To understand which of the three alternatives differ from each other and if such difference is statistically significant, it is relevant to analyze the pairwise comparisons. As it can be observed in Appendix F, each of the differences is significant, as all significance values are lower than .05.

From the pairwise comparisons (Table F.2 in Appendix F), we observe that the drain opener with a green central attribute scores higher on anticipated market success than the other two versions. This difference is significantly higher when this drain opener is contrasted with the non-green alternative.

Therefore, we can conclude that these results do not lend support for H_{1a} and H_{1b}.

5.2.5. Mediation Effects

To understand the process by which the dependent and independent variables are related, a mediation analysis was conducted. As no true independent variable "X" exists in the data gathered, the mediation analysis was conducted by means of the MEMORE macro by Montoya (2017) to analyze the following hypotheses:

H_{2a}: *The effects postulated in H_{1a} are mediated by functional quality.*

¹ .01=small, .06=moderate,.14=large effect

H_{2b}: *The effects postulated in H_{1b} are mediated by functional quality.*

The results discussed in the following part can be found in Appendix G.

Choice as dependent variable

Green versus non-green

The main focus of the analysis regards to the mediation effect, which quantifies how much of the effect of “X” on choice is mediated by functional quality. Followingly, we tested the effects of the conditions, “green” vs. “non-green” alternatives on choice through functional quality.

When contrasting the green central [NI] with the non-green [REG] alternative, we found a significant indirect effect (effect=-.4068, 95% BOOTCI={-.6347,-.1948}). We further found support for the direct effect ($c'=.7743$, $p=0.0004$), which means that we are not in the presence of a completely mediated model. Furthermore, when testing green peripheral [RM] vs. non-green [REG], we also found a significant indirect effect through functional quality (effect=-.1973, 95% BOOTCI={-.3928,-.0217}). Once again, we found support for the direct effect ($c'=.4563$, $p=.0097$).

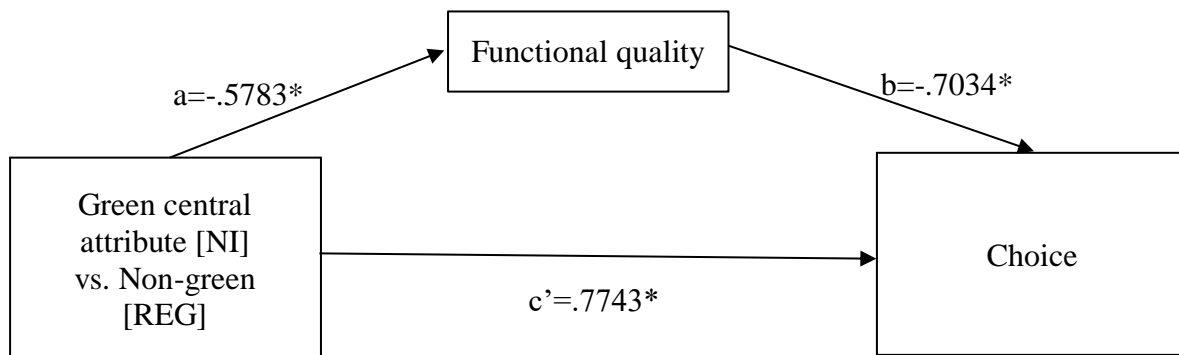
The more detailed processes behind the mediation effects can be illustrated through a visual representation, as seen in Figures 5.1. and 5.2.

As mentioned in Chapter 5.1.2, this statistical procedure is a path-analytic framework that gives the possibility to quantify and test the pathways of influence of a supposed causal independent variable X on a dependent one Y (Hayes & Montoya, 2017). In the present case, these pathways are referred to as the direct effect of a green attribute on choice (c') and the indirect effect of a green attribute on choice through functional quality ($a*b$). Together, they make up the total effect ($c=a*b+c'$). The positive (negative) signs of both paths a and b mean that “X” is positively (negatively) associated with M and M is positively (negatively) associated with Y , respectively.

The effect of including a green attribute, both central (Figure 5.1) and peripheral (Figure 5.2), was significant. The results reveal that there is a significant mean difference in functional quality between the drain opener with a green central attribute [NI] and the regular one ($a=-.5783$) (Figure 5.1) and between the drain opener with a peripheral attribute [RM] and the regular drain opener ($a=-.3193$) (Figure 5.2). This means that the green alternatives are

perceived to have lower functional quality. From path b, we can see that, in both cases, functional quality has a significant effect on choice at a p-value level lower than .05. Participants chose the non-green alternative because of higher perceived functional quality. For further interpretation, Table 5.2 contains an overview of the mean differences between the product types on functional quality.

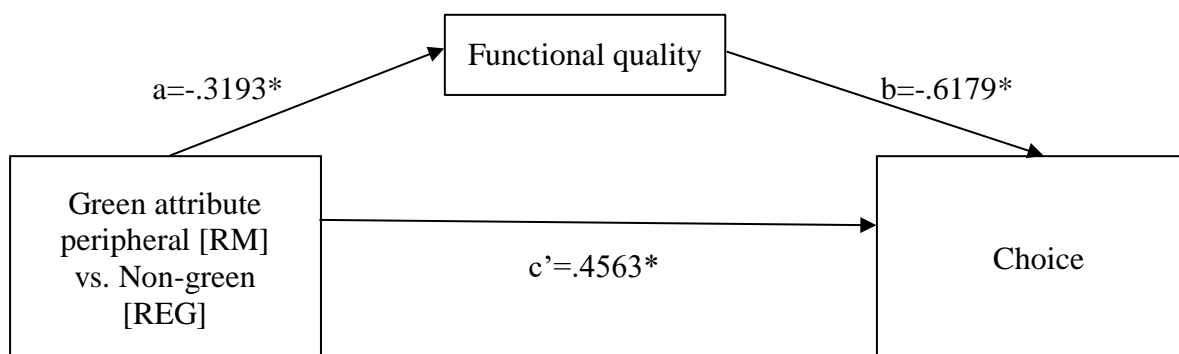
From this analysis, it can be concluded that the effect postulated in H_{1a} is, as hypothesized in H_{2a}, mediated by functional quality.



Note: Total effect of X on Y: .3675

*Value statistically significant at a 95% significance level

Figure 5.1: Simple Mediation Model: Effect of Green central attribute vs non-green on Choice



Note: Total effect of X on Y: .2590

*Value statistically significant at a 95% significance level

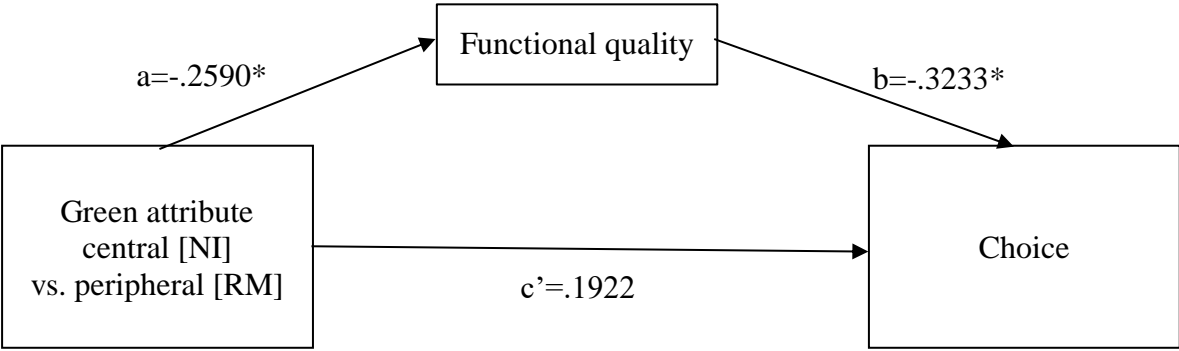
Figure 5.2: Simple Mediation Model: Effect of Green peripheral attribute vs non-green on Choice

Green central versus green peripheral attributes

When contrasting the green central [NI] with the green peripheral [RM] alternative, we found a significant indirect effect (effect=-.0837, 95% BOOTCI={-.185,-.0138}). We did not find support for the direct effect, which means that we are in the presence of a completely mediated model.

The results illustrated in Figure 5.3 show that there is a significant mean difference in functional quality between the drain opener with a green central attribute [NI] and the drain opener with a green peripheral attribute [RM] ($a=-.2590$) (Figure 5.3). This means that the alternative with a green central attribute is perceived to have lower functional quality. From path b, we can see that functional quality has a significant effect on choice at a p-value level lower than .05. Therefore, we can derive that participants chose the green peripheral alternative because of higher perceived functional quality.

Therefore, it can be concluded that the effect hypothesized in H_{1b} regarding choice is, as postulated in H_{2b} , mediated by functional quality.



Note: Total effect of X on Y: .1084
 *Value statistically significant at a 95% significance level

Figure 5.3: Simple Mediation Model: Effect of Green central attribute vs Green peripheral attribute on Choice

Table 5.2: Pairwise Comparisons for Measurements on Functional Quality by Product Attribute

<i>I</i>	<i>J</i>	<i>Mean difference (I-J)</i>	<i>Std. Error</i>	<i>Sig.^a</i>	<i>95% Confidence Interval for Difference^b</i>	
					<i>Lower Bound</i>	<i>Upper Bound</i>
Green central attribute [NI]	Green peripheral attribute [REG]	-.578*	.150	.000	-.874	-.283
Green central attribute [RM]	Non-green product [REG]	-.319*	.141	.025	-.598	-.041
Green peripheral attribute [NI]	Non-green product [RM]	-.259*	.105	.015	-.467	-.051

Note: ^aThe mean difference is significant at the .05 level.

^bAdjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments)

Anticipated market success as dependent variable

Green versus non-green

Followingly, we tested the effects of the conditions, “green” vs. “non-green” alternatives on anticipated market success through functional quality.

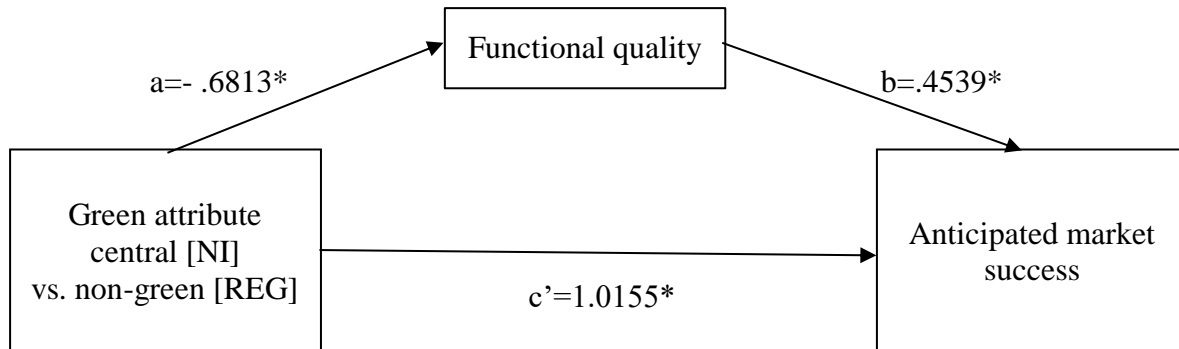
When contrasting the green central [NI] with the non-green [REG] alternative, we found a significant indirect effect (effect=-.0859, 95% BOOTCI={-.1998,-.0054}). We found support for the direct effect ($c'=.7743$, $p=.0000$), which means that we are not in the presence of a completely mediated model. Furthermore, when testing green peripheral [RM] vs. non-green [REG], we also found a significant effect through functional quality (effect=-.1764, 95% BOOTCI={-.3489,-.0491}). Once again, we found support for the direct effect ($c'=.6077$, $p=.0001$).

The mediating effect of functional quality is illustrated in Figure 5.4 and Figure 5.5, including anticipated market success as the outcome variable.

From path b, we can see that, in both cases, functional quality has a significant effect on choice at a p-value level lower than .05. Interestingly, despite perceiving the green central to have lower functional quality, ($a=-.6813$) participants anticipate a higher market success for this alternative ($b=.4539$) (Figure 5.4). On the other hand, when contrasting the green peripheral with the non-green alternative, participants anticipate a lower market success for the drain

opener made of recycled material ($b=-.4277$), in line with their perception of lower functional quality ($a=-.4125$) (Figure 5.5).

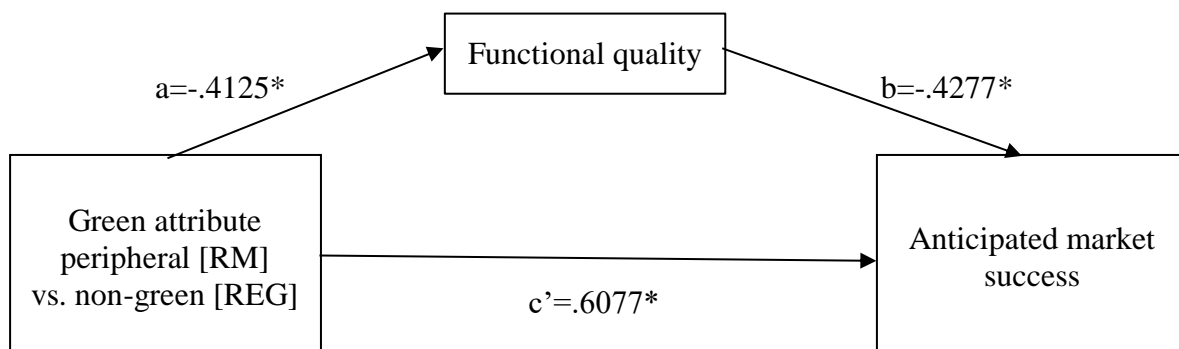
These results lend partial support for hypothesis H_{2a}.



Note: Total effect of X on Y: .7063

*Value statistically significant at a 95% significance level

Figure 5.4: Simple Mediation Model: Effect of Green central attribute vs non-green on Anticipated market success



Note: Total effect of X on Y: .4313

*Value statistically significant at a 95% significance level

Figure 5.5: Simple Mediation Model: Effect of Green peripheral attribute vs non-green on Anticipated market success

Green central versus green peripheral attributes

When contrasting the green central [NI] with the green peripheral [RM] alternative, we found a significant indirect effect (effect=-.0856, 95% BOOTCI={-.1884,-.0092}). We found support for the direct effect, which means that we are not in the presence of a completely mediated model.

From path b, we can see that functional quality has no significant effect on anticipated market success at a p-value level lower than .05.

Therefore, we can conclude that no support was found for H_{2b}, as the findings show that there is no significant effect of functional quality on anticipated market success.

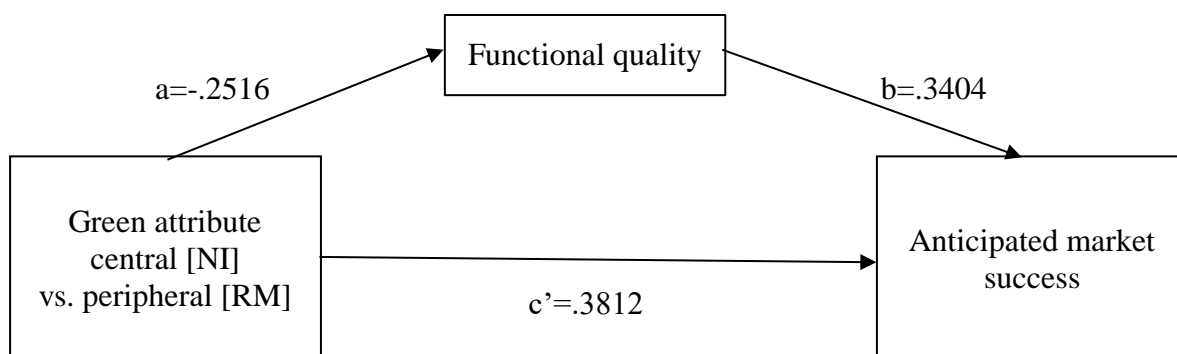


Figure 5.6: Simple Mediation Model: Effect of Green central attribute vs Green peripheral attribute on Anticipated market success

5.2.6. Moderation Effects

To unveil the boundary conditions that influence the relationship between the independent and dependent variables, a moderation analysis was performed using the MEMORE macro by Montoya & Hayes (2017).

By means of this statistical procedure, we expect to reach a conclusion regarding the impact of the study's manipulation on preference and anticipated market success, as follows:

H_{3a} *Under cognitive load (vs enhancement), the non-green alternative will be rated higher (lower) on i) choice and ii) anticipated market success than the green alternatives.*

H_{3b} Under cognitive load (vs enhancement), the green central will be rated lower (higher) on i) choice and ii) anticipated market success than the green peripheral.

Choice as dependent variable

Green vs. non-green

The results presented in Table 5.3 show that cognitive load does not moderate any of the direct effects, therefore suggesting that no significant interaction effects exist. In other words, the manipulation does not influence the size of the causal effect of “X”, product type, on choice.

On the other hand, cognitive enhancement has a significant, positive effect on the dependent variable, choice when the natural ingredients [NI] drain opener is contrasted with the non-green alternative. According to the results, participants asked to justify their answers - therefore under cognitive enhancement - show higher product preference (measured by *choice*) for the drain opener made of natural ingredients, an effect amplified when contrasting this alternative with a regular drain opener (*effect*=.7590).

Table 5.3: Moderation effect of cognitive load/enhancement on choice

Variables	Manipulation (W)	Effect	Std. Error	Sig. ^a	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Choice [NI]- Choice [RM]	Cognitive Enhancement	.4337	.1867	.0214	.0651	.8024
	Cognitive Load	-.2169	.1867	.2471	-.5855	.1518
Choice [NI]- Choice [REG]	Cognitive Enhancement	.7590	.3242	.0204	.1188	1.3993
	Cognitive Load	-.0241	.3242	.9409	-.6643	.6161
Choice [RM]- Choice [REG]	Cognitive Enhancement	.3253	.2717	.2330	-.2113	.8619
	Cognitive Load	.1928	.2717	.4791	-.3438	.7293

To complement the analysis, a one-way repeated measures ANOVA was conducted. The results presented in Table 5.5 show that, under cognitive enhancement, respondents rank the drain

opener made of natural ingredients higher on choice, followed by the drain opener made of recycled materials and, lastly, the regular alternative.

As a result, we found partial support for H_{3a}, since participants under the cognitive enhancement manipulation rated the green alternatives higher on choice. However, no significant differences were found when the manipulation was cognitive load.

Green central versus green peripheral attribute

When contrasting the green central with the green peripheral alternative, no significant moderating effect of cognitive load was found on choice ($p=.2471$) (Table 5.3). On the other hand, a significant effect was found when considering the cognitive enhancement manipulation ($p=.0214$). From Table 5.4, we can conclude that, under cognitive enhancement, consumers show a choice preference for the green central alternative.

Therefore, we can conclude that these findings show partial support for H_{3b}, as under cognitive enhancement consumers rated the green central higher on choice than the green peripheral alternative.

Table 5.4: Descriptive statistics of choice by manipulation

<i>Variable</i>	<i>Manipulation</i>	<i>Mean</i>	<i>Std. Deviation</i>
Choice [NI]	Cognitive enhancement	5.19	1.857
	Cognitive load	4.69	1.787
Choice [RM]	Cognitive enhancement	4.76	1.805
	Cognitive load	4.90	1.715
Choice [REG]	Cognitive enhancement	4.43	1.908
	Cognitive load	4.71	1.722

Anticipated market success as dependent variable

Green versus non-green

The results presented in Table 5.6 show that, in respect to anticipated market success, cognitive load solely moderates the direct effect of “X” on the dependent variable anticipated market success when the latter contrasts the green central alternative with the non-green one. As it can

be observed in Table 5.7, participants under cognitive load anticipate higher market success for the green central alternative when compared to the non-green one.

On the other hand, under cognitive enhancement, significant differences in choice scores were found. Participants under cognitive enhancement expect a higher market success for the green alternatives when contrasted with the non-green one, an effect amplified when the green central attribute alternative is contrasted with the regular drain opener (*conditional effect*=.8861).

Green central versus green peripheral

When contrasting the green central with the green peripheral alternative, no significant moderating effect of cognitive load was found on anticipated market success ($p=.1702$) (Table 5.5). On the other hand, a significant effect was found when considering the cognitive enhancement manipulation ($p=.0401$). Complemented by Table 5.6, we can conclude that, under cognitive enhancement, consumers anticipate a higher market success for the green central alternative.

Therefore, we can conclude that these findings show partial support for H_{3b}, as under cognitive enhancement consumers rated the green central higher on anticipated market success than the green peripheral alternative.

Table 5.5: Moderation effect of cognitive load/enhancement on anticipated market success

Variable	Manipulation	Conditional Effect	Std. Error	Sig. ^a	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Anticipated market success [NI] – Anticipated market success [RM]	Cognitive Enhancement	.3590	.1735	.0401	.0163	.7016
Anticipated market success [NI] – Anticipated market success [REG]	Cognitive Load	.2346	.1702	.1702	-.1017	.5708
Anticipated market success [RM] – Anticipated market success [REG]	Cognitive Enhancement	.8861	.2490	.0005	.3942	1.3780
Anticipated market success [RM] – Anticipated market success [REG]	Cognitive Load	.5309	.2459	.0324	.0451	1.0166
Anticipated market success [RM] – Anticipated market success [REG]	Cognitive Enhancement	.5696	.2247	.0122	.1258	1.0134
Anticipated market success [RM] – Anticipated market success [REG]	Cognitive Load	.2963	.2219	.1837	-.1420	.7346

Table 5.6: Descriptive statistics of anticipated market success by manipulation

Variable	Manipulation	Mean	Std. Deviation
Anticipated market success [NI]	Cognitive enhancement	5.47	1.560
	Cognitive load	5.07	1.523
Anticipated market success [RM]	Cognitive enhancement	5.12	1.595
	Cognitive load	4.84	1.545
Anticipated market success [REG]	Cognitive enhancement	4.58	1.679
	Cognitive load	4.54	1.475

5.2.7. Cognitive Load and the Mediator

Lastly, we aimed at gaining a comprehensive understanding of the relationship between the model's dependent variable, the mediator and the moderator.

Our last hypotheses proposed are the following:

H_{4a} Under cognitive load (vs enhancement), the non-green alternative (vs green) will be rated higher (lower) on functional quality in the strong product category.

H_{4b} Under cognitive load (vs enhancement), the green central will be rated lower (higher) on functional quality when compared to the green peripheral in the strong product category

As no true independent variable “X” exists in the data, we are not in the presence of a truly moderated mediation process. Therefore, to test the hypotheses, a simple moderation analysis using the MEMORE Macro (Model 1) was performed on the existing mediator *functional quality*. The mediator was selected as the outcome *Y* and the study's manipulation assumed the role of the moderator *W* of the relationship between the independent and dependent variables.

Green versus non-green

The results presented in Appendix H suggest that, for the variable functional quality of the drain opener made of 100% natural ingredients (vs. the regular alternative), the moderator is significant for both values of *w*: *w*=1.00 (cognitive enhancement) and *w*=2.00 (cognitive load). Under cognitive load, participants considered the non-green alternative to have higher functional quality than the green ones.

On the other hand, under cognitive enhancement, the results found and illustrated in Appendix H show that the effect of the manipulation was only statistically significant when opposing the green central alternative to the non-green one ($p=.0084$).

It can thus be concluded that, under cognitive load, consumers rate the non-green product alternative higher on functional quality when compared to the green alternatives. However, the effect cognitive enhancement was not present across the three combinations of the independent variables, therefore turning it infeasible to reach an overall conclusion on the effect of this manipulation on the consumers' evaluation of functional quality.

Therefore, the results lend partial support for H_{4a} .

Green central vs green peripheral attribute

When contrasting the green central alternative [NI] with the green peripheral [RM], the data presented in Appendix H suggests that the “conditional” effect of cognitive load is not statistically significant ($p=.1484$). Therefore, no conclusions can be made regarding the interaction effect of cognitive load.

On the other hand, the effect of cognitive enhancement is statistically significant ($p=.0453$), with consumers rating the product with a green central attribute lower on functional quality than the green peripheral alternative, as the results presented in Table 5.7 corroborate.

Consequently, the results lend no support for H_{4b} .

Table 5.7: Descriptive statistics of functional quality by manipulation

Variable	Manipulation	Mean	Std. Deviation
Functional quality [NI]	Cognitive enhancement	4.64	1.411
	Cognitive load	4.55	1.442
Functional quality [RM]	Cognitive enhancement	4.94	1.588
	Cognitive load	4.77	1.451
Functional quality [REG]	Cognitive enhancement	5.20	1.651
	Cognitive load	5.14	1.576

5.2.8. Gender effects

As described in Chapter 2.2.5, researchers have described gender as an important aspect in sustainable consumption (Davidson & Freudenburg, 1996; Dietz, Kalof & Stern, 2002; Zelezny, Chua & Aldrich, 2000; Brough, Wilkie, Ma, Isaac & Gal, 2016). However, despite evidence of gender differences regarding environmental concern, little is known about its effect on preference and anticipated market success.

To understand if there is, indeed, a significant gender effect on preference and anticipated market success, a one-way repeated measures ANOVA was performed. The analysis is expected to determine the way both men and women judge preference and anticipate market success under cognitive load and cognitive enhancement.

Choice

A one-way repeated measures analysis of variance was conducted to compare scores on choice under cognitive load and cognitive enhancement of each gender. The means and standard deviation are presented in Appendix I. The analysis revealed no significant effects of gender [main effect of gender: $F(2,161)=2.052$, $p=.132$] and no significant interaction effects [manipulation*gender interaction: $F(2,161)=.844$, $p=.432$].

Anticipated market success

Following the same reasoning, the results do not show a statistically significant interaction effect between gender and the study's manipulation on anticipated market success [manipulation*gender interaction: $F(2,154)=.638$]. However, the analysis revealed a significant effect of gender, indicating that women anticipate a higher market success of the product made of natural ingredients, while men rank the drain opener made of 100% recycled material higher on anticipated market success, irrespective of manipulation [main effect of gender: $F(2,154)=4.472$, $p=.013$] (See Appendix I).

Functional quality

To further investigate the potential gender impact, we hypothesized that an interaction effect might occur between gender and functional quality under cognitive load/cognitive enhancement.

To explore it, a one-way repeated measures ANOVA was performed. While no statistically significant effect of gender was found [main effect of gender: $F(2,161)=1.121$, $p=.328$], the interaction between gender and the study's manipulation was statistically significant [manipulation*gender interaction: $F(2,161)=3.646$, $p=.028$]. According to the results, male participants ranked the regular drain opener higher on functional quality, irrespective of the study's manipulation (cognitive load/cognitive enhancement). In fact, when asked to justify their answers – therefore being under cognitive enhancement – participants ranked the regular alternative even higher ($M=5.68$, $SD=1.447$) when compared to the remaining male respondents under cognitive load ($M=5.13$, $SD=1.614$). For female respondents, the results differ according to the manipulation participants were subject to. While participants under cognitive load also ranked the non-green alternative higher on functional quality ($M=5.16$, $SD=1.429$), the ones under cognitive enhancement ranked, instead, the green peripheral alternative (drain opener made of 100% recycled material) higher on functional quality ($M=4.98$, $SD=1.540$), followed by the regular and the natural ingredients alternatives, by that order.

5.3 Summary of Results and Discussion

Table 5.8: Summary of Hypotheses and Results

Hypothesis	Choice	Anticipated Market Success	Total
H_{1a} Non-green (vs. green) products will be rated higher (lower) on i) choice and ii) anticipated market success in the strong product category.	No Support	No Support	No Support
H_{1b} Consumers show lower (higher) product preference measured by i) choice and ii) anticipated market success when the green attribute is central (peripheral) in the strong product category.	No Support	No Support	No Support
H_{2a} The effects postulated in H _{1a} are mediated by functional quality.	Full Support	Partial Support	Partial Support
H_{2b} The effects postulated in H _{1b} are mediated by functional quality.	Full Support	No Support	Partial Support
H_{3a} Under cognitive load (vs enhancement), the non-green alternative will be rated higher (lower) on i) choice and ii) anticipated market success than the green alternatives in the strong product category.	Partial Support	Partial Support	Partial Support
H_{3b} Under cognitive load (vs enhancement), the green central will be rated lower (higher) on i) choice and ii) anticipated market success than the green peripheral in the strong product category.	-	Partial Support	Partial Support
H_{4a} Under cognitive load (vs enhancement), the non-green alternative (vs green) will be rated higher (lower) on functional quality in the strong product category.	-	-	Partial Support
H_{4b} Under cognitive load (vs enhancement), the green central will be rated lower (higher) on functional quality when compared to the green peripheral in the strong product category.	-	-	No support

After presenting the results regarding the established hypotheses H₁-H₄, a brief summary of the key findings will be provided.

In the conducted study, participants' preference for a non-green drain opener product compared to two green alternatives was tested. Further, the mediation effects of functional quality, as well as the moderation effects of cognitive load, were studied.

Main Effects

The results of the main effects revealed that there were no significant differences on choice neither when contrasting green vs. non-green nor when considering attribute centrality, in the strong product category. The study's participants seem to choose the different alternatives in an equal way.

When investigating anticipated market success, the results show that respondents anticipate higher market success for the green alternatives higher when compared to the regular drain opener.

This is an interesting finding, as, from the mediation analysis, we found that respondents perceive the three alternatives differently in terms of functional quality. In fact, the mean differences for each condition were statistically significant, with the regular drain opener scoring higher on functional quality than the remaining alternatives. Since, as noted by Newman et al. (2014), quality is a strong predictor of preference, we would expect that this perception of higher functional quality would translate into a higher preference score for the regular drain opener. This leads us to conclude that there might be other factors influencing consumers preference.

Therefore, these results do not show support for both hypothesis H_{1a} and H_{1b}.

Mediating Effects

From the mediation analysis, the results indicate that, when comparing the non-green with the green alternatives, there is a significant indirect effect on product preference (choice and anticipated market success), through functional quality. Therefore, full support was found for H_{2a}. When the dependent variable was choice, both green alternatives were perceived to have lower quality when compared to the regular drain opener. In fact, and as expected, respondents perceived the regular drain opener to have higher functional quality, followed by the recycled material and the natural ingredient one.

When the dependent variable was anticipated market success, we would expect that perceptions of lower functional quality would lead consumers to anticipate a lower market success. While this is the case when contrasting the green peripheral with the non-green alternative, such does not occur when the green central is contrasted with the non-green alternative. Interestingly, we found that, despite perceiving the green central to have lower functional quality, participants still anticipate a higher market success for this alternative.

When comparing the green central alternative with the green peripheral alternative, there is an indirect effect of the condition on choice, but no significant indirect effect was found on anticipated market success. This suggests that even though participants considered that both alternatives differ regarding functional quality, they still anticipate market success to be equal. Therefore, the results only show partial support for H_{2b}.

Moderating Effects

From the moderation analysis, the results show that when comparing the non-green with the green alternatives, no interaction effect of cognitive load was found on choice. For the cognitive enhancement manipulation, a significant positive effect was found on choice. Participants under cognitive enhancement showed higher product preference (measured by *choice*) for the green central alternative. In other words, participants triggered to use System 2 thinking chose the natural ingredient product over the one made of recycled material as well as the regular one.

In respect to anticipated market success, the results show that cognitive load only exhibits a significant interaction effect when the green central alternative is contrasted with the non-green one, with participants anticipating a higher market success for the green central alternative when compared to the non-green one. Therefore, these results do not lend support for H_{3a}.

When it comes to attribute centrality, the contrast between green central and green peripheral attributes reveals that, despite the manipulation, consumers seem to prefer both alternatives equally (from a “personal point of view”). This is in line with the results found regarding the model’s main effects. Regarding the model’s dependent variable *anticipated market success*, no significant moderating effect of cognitive load was found. This suggests that, when time-constrained, participants seem to anticipate equal market success for both alternatives. On the other hand, when consumers were asked to justify their answers, therefore being under

cognitive enhancement, they anticipated a higher market success for the green central alternative.

To sum up, the predicted results under cognitive enhancement were supported by the study while the hypothesized outcomes under load did not occur, leading to partial support for H_{3a} and H_{3b}.

Cognitive Load and the Mediator

In addition to the separate mediation and moderation analysis, the interaction of cognitive load and functional quality was examined. The conducted analysis showed that consumers under cognitive load rated the regular drain opener higher on functional quality in comparison with the natural ingredient as well as the recycled material one. For cognitive enhancement, the effect was not significant across all combinations of the three alternatives. However, when comparing the non-green alternative and the central green attribute alternatives, a statistically significant effect was found, showing that respondents rated the regular drain opener higher on functional quality. This contradicts H_{4a} partially as it was hypothesized that under cognitive enhancement, the green alternative would be rated higher on functional quality.

When considering attribute centrality, comparing the green central and the green peripheral product, no significant effects have been found for the cognitive load manipulation. For participants under cognitive enhancement, however, significant differences have been discovered. Contradicting H_{4b}, they rated the recycled material drain opener higher on functional quality than the natural ingredient one. Followingly, no support could be found for H_{4b}.

Gender

Finally, gender differences were considered. Here, it was found that women anticipate the green peripheral drain opener to be more successful in the market, while men expect the recycled material one to outperform the remaining alternatives. Also, when considering functional quality, a significant interaction between gender and the study's manipulation was observed. Men generally ranked the regular product higher on functional quality, irrespective of the manipulation. Female participants, on the other hand, rated the non-green alternative higher on

functional quality under cognitive load. Yet under cognitive enhancement, they assessed the functional quality of the recycled material product higher.

Chapter 6: General Discussion and Conclusion

6.1 Discussion of Findings

This research project aimed at gaining a better understanding of the potential trade-off consumers may make between sustainability and functional quality when making an environmentally friendly decision. To further explore the mechanism behind this potential barrier to green consumerism, a focus was placed on the influence of cognitive load on functional quality perceptions. The following research questions were hence initially developed:

RQ1: Is there a perceived trade-off between sustainability and functional quality and how does it affect product preference?

RQ2: How does the level of processing affect evaluations of sustainable products?

RQ3: How does gender influence sustainable trade-off evaluations?

Bearing these guiding questions in mind, the link between product attribute, choice and anticipated market success was investigated. In addition, the mediation effect of functional quality was studied to shed light on the potential trade-off between sustainability and quality. Finally, the moderation effect of cognitive load was introduced to complement the analysis of cognitive processing.

The first hypothesis designed, H1_a, proposed that consumers exhibit a preference for non-green products in the strong product category. This assumption followed previous literature research from Luchs et. al (2010), that concluded that a preference for less sustainable products might be prevalent in product categories where consumers value strength-related attributes (Luchs, Naylor, Irwin & Raghunathan, 2010). Further, it has been hypothesized in H1_b based on attribute centrality theory by Gershoff and Frels (2015), that product preference is lower for an eco-friendly product when the green attribute is central, compared to peripheral. Both parts of H1

were not supported through the analysis of this research study. Whereas no significant results were found for choice, an opposing result to the hypothesis occurred for anticipated market success. In fact, participants ranked the drain opener with green central attribute higher on anticipated market success, followed by the green peripheral and the regular one.

Looking at potential reasons for this anticipated market success of green products, Saikia (2017) describes the central role that media has in setting perceptions and creating awareness for environmental issues. This increased media coverage has led to a more sustainably aware society that might also expect a greener behavior from their peers. Followingly, when asked about the expected market success of a green product, participants assume that more sustainable products will be purchased by consumers when compared to non-sustainable ones (Saikia, 2017). The presence of sustainability in the mass media as well as in the society in general results further in a high availability of related information in consumer's minds. This does then in turn influence the decision making through availability heuristics (Tversky & Kahneman, 1974). It is thus likely that this easily recalled information regarding sustainability and sustainable products results in an overestimation of the anticipated market success of a green drain opener.

Another possible factor for this outcome relates to the impact of social desirability in surveys. Friedman (1967) and Rosenthal (1966) found that respondents tend to adapt their behavior regarding to how they believe the interviewer will expect it to be in a certain situation (Friedman, 1967; Rosenthal, 1966). Hence, participants might have felt the urge to respond in an eco-friendly manner, fulfilling the expectations they implicitly assigned to this research.

Regarding functional quality, supporting evidence was found, showing that respondents rated the green product alternatives lower compared to the non-green one. More specifically, the central green attribute drain opener was ranked the lowest in terms of quality, followed by the recycled material and the regular one. This finding strengthens Lin and Chang's (2012) finding noting that consumers view green products as less effective when contrasted to non-green products. This perception is especially relevant in the strong product category according to Luchs et al. (2010), where adding a green attribute might reduce consumer's perceived quality due to an incongruity between the product category and the valued benefits in this category. The importance of this finding is underlined by the impact that perceived quality has on

preference which has been identified in this study as well as in previous research (Newman, Gorlin & Dhar, 2014). This perceived poor product quality might ultimately constitute a key barrier to green consumption (Tsakiridou et al., 2008).

When directly contrasting the two green alternatives (green central vs. green peripheral), the inferior quality perception of the green central alternative, seems to support participants' choice for the green peripheral. The lower perceived quality of the central green attribute product can be connected to research by Gershoff and Frels (2015) who found that when the environmental benefit comes from a green central (vs. peripheral) attribute, consumers may judge the entire product as green (Gershoff & Frels, 2015). This greenness evaluation might have been used by study participants in this research to assess the product's functional quality and thus might have ultimately impacted their choice.

Interestingly, when looking at anticipated market success however, a negatively mediating effect of functional quality was found. Contradicting the proposed impact of perceived quality on preference, participants expected the natural ingredient drain opener to perform best in the market, followed by the recycled material and the regular one. One reason for this finding could be the presence of the topic of sustainability in the media as well as in society in general. This might create an inflated impression of the number of sustainable products that are actually purchased by consumers (Saikia, 2017) which in turn could have influenced the anticipated market success of the green drain openers.

From the conducted moderation analysis, no significant effect of cognitive load on the relation between product type (green vs. non-green) and choice was found. For anticipated market success on the other hand, an effect was identified when the natural ingredient drain opener was compared to the regular alternative. Here, participants predicted the product made of 100 percent natural ingredients to be most successful in the market. Cognitive enhancement was found to have a positive effect on both preference measures (choice and anticipated market success) when the green peripheral drain opener is contrasted with the two remaining alternatives. In fact, participants under cognitive enhancement ranked the green central alternative higher on choice, followed by the green peripheral and the regular one, by that order. This finding suggests that consumers that are actively triggered to use System 2 - the reasoning system - show a higher preference for one of the more sustainable drain opener alternatives.

Similarly, cognitive enhancement was found to have a positive effect on anticipated market success, depicting the same product order as for choice.

One reason for why participants under cognitive enhancement might have ranked the green products high on choice and anticipated market success could be related to the high expenditure of cognitive resources required to correct existing perceptions (Gilbert, Pelham & Krull, 1988). According to Luchs et al. (2010), individuals might implicitly associate higher ethicality with gentle product categories when compared to strong product categories. Certain perceptions of green products might be built on those associations. As respondents under cognitive enhancement had more cognitive resources available to arrive at a decision, we suggest that they might have corrected their existing perceptions, appreciating the negative consequences of not acting in a sustainable manner.

Related to this, it has been found that participants under cognitive load rated the regular drain opener higher on functional quality, compared to the green alternatives. For cognitive enhancement, a significant effect was identified when comparing the non-green with the central green attribute alternative, showing that these respondents also rated the regular drain opener higher on functional quality. Summing up, no clearly differing effects of cognitive load and cognitive enhancement on perceived quality could be identified in this study. From this, it can be assumed that for both manipulations, cognitive load and enhancement, a sustainability-quality trade-off has been made, suggesting that this trade-off is relevant for both System 1 and 2 thinking.

When analyzing the impact of gender on the observed results, a significant interaction was found. While men under both manipulations ranked the regular drain opener higher on functional quality compared to the other options, women showed different tendencies under the two manipulations. In fact, female participants under cognitive load rated the non-green product highest on quality, similar to male respondents. Female participants under cognitive enhancement on the other hand ranked the recycled material alternative highest, followed by the regular and the natural ingredient one. In line with this, research conducted by Zelezny et al. (2000) revealed that women tend to be more eco-centric, engaging more frequently in eco-friendly behavior such as recycling. This eco-centric aspect might have been activated when

under cognitive enhancement, resulting in a higher quality perception of the recycled material product.

Overall, it can be concluded that under both manipulations, cognitive load and enhancement, participants made a trade-off between quality and sustainability. For cognitive processing theory, this implies that, irrespectively of the information processing system used, sustainability-quality trade-offs are made by consumers when evaluating green products.

6.2 Implications

Following the general discussing of the research findings, theoretical and managerial implications will be presented. The subsequent paragraphs aim at clarifying the relevance of this work for both academic researchers and managers.

6.2.1 Theoretical Implications

The findings of the present study contribute to the research field of sustainable consumption and dual system processing. It should be noted that, even though sustainable consumption has been under analysis for several years, little research exists on consumers decision-making processes within the field of green consumerism. Thus, this research aimed at exploring the potential trade-off between sustainability and functional quality when consumers are to make an environmentally friendly decision.

First, our research revealed that participants, in fact, perceive green products in the strong product category to be of lower quality compared to non-green ones. With this finding, we contribute to Lin and Chang's (2012) research emphasizing that consumers view green products as less effective. We further add to the research conducted by Luchs et al. (2010) who found that ethicality is less valued in product categories where strength-related benefits are most valued by consumers. In other words, sustainability can act as a liability in certain product categories. Drain openers, the products tested in this study, can be certainly found in this category.

Furthermore, our study supports Gershoff & Frels's (2015) research on attribute centrality and perceived greenness. In fact, a significant effect of attribute centrality on anticipated market

success has been identified when contrasting the central and peripheral green attribute products. Here, the central green attribute drain opener was perceived to have lower quality compared to the peripheral green attribute one. This suggests that consumers did indeed evaluate the green central attribute product as greener (as proposed by Gershoff & Frels (2015)) which ultimately resulted in a lower quality perception.

The theoretical implications from our work concerning information processing literature focus on the effects of cognitive load and cognitive enhancement on green consumption. When looking at the influence of the manipulations on preference, no clear comparison can be drawn. For functional quality, on the other hand, interesting insights have been found. When respondents were asked about their functional quality perception regarding the three alternatives, participants under both manipulations rated the regular drain opener higher compared to both green alternatives. This poor-quality perception seems to be thus relevant for participants, independent of the current use of either System 1 or System 2 processing. This adds to the literature by challenging existing research by Bjorvatn and Bjarnadottir (2018) that suggests that “effortless and automatic processing of information is apparently not enough to consider this trade-off”.

Finally, regarding gender, we found that women ranked the recycled material drain opener highest on functional quality when under cognitive enhancement. Men, on the other hand, ranked the regular drain opener higher on functional quality independent of the manipulation. This finding adds to research by Zelezny et al. (2000) who found that women tend to be more eco-centric and engage more in green behavior such as recycling.

6.2.2 Managerial Implications

As this work is part of a research project between Orkla and NHH, the focus of these managerial implications will be directed towards Klar, a sustainable household brand in the Orkla portfolio. However, these recommendations are of interest to any brand manager in the consumer goods industry who aims at promoting sustainable consumption by offering greener product choices.

Rethinking the discussed theory and new findings, two issues are found to be especially problematic in the adoption of greener products. Firstly, the gap between intention and behavior

related to sustainable consumption and, secondly, the sustainability quality trade-off made by consumers.

With the attitude-behavior gap, one of the key challenges in green consumerism has been studied in this work. But why is it that consumers do not purchase sustainable products, even if they intend to do so? Numerous barriers have been identified that might have an impact on the purchase decision. One that has played a key role in this study is perceived functional quality. Here, participants revealed a poor-quality perception of the green product alternatives compared to the regular one. The product with the lowest perceived quality was, in fact, the one made of natural ingredients. Followingly, the more central the green attribute is for the overall definition of an object, the more critical the quality of the green product might be assessed. Based on this finding two opposing recommendations can be derived.

First, managers working with such brands (especially in the strong product category) need to invest a significant amount of time and financial resources in informing consumers about the high quality of such products. Here, campaigns highlighting the negative consequences of chemicals for consumer's health as well as for the environment could be created.

In another line of thought, brand managers working on green products in the strong product category might want to consider not focusing the communication on the sustainable aspect at all. This might be a suitable strategy for now. When considering the overall shift towards more sustainable consumption, on the other hand, the first approach is to be recommended. Here, further potential initiatives to inform and raise awareness about the quality of green products could include using stickers on the product label noting that the product has been tested and found to be equally or even more effective in destroying bacteria compared to a non-sustainable product. This claim could be also used in communication campaigns and for point of sales purposes. Finally, free samples might be useful in certain product categories to gain the trust of consumers in the sustainable alternatives' quality.

6.3 Limitations

After describing potential implications from the conducted study, possible limitations must be discussed. The limitations in this research relate to the questionnaire, in particular to the sample

and the implementation of the field study. The focus will be on restrictions regarding construct-, internal-, and external validity. Across different fields, the general aim of researchers is to maximize validity which means applying methods that lead to observations that adequately reflect the truth (Roe & Just, 2009).

Construct validity refers to “the correspondence between a construct (conceptual definition of a variable) and the operational procedure to measure or manipulate that construct” (Schwab, 1980). To increase construct validity, the survey questions and the manipulations were based and measured on existing research methods and scales. This ensures that the concepts in question are the ones measured in the study.

Secondly, internal validity was considered which is commonly defined as the ability of a researcher to demonstrate that observed correlations are causal (Roe & Just, 2009). The experimental research design, in this case, carried out in a shopping mall under observation of the researchers, strengthens the internal validity as the degree of control is relatively high compared to an online survey for instance. Nevertheless, three factors were identified that potentially lower the internal validity of this study. First, the field experiment was conducted in a shopping mall which generally presents a noisy, busy environment with various visual disturbances. These disturbances were minimized by setting up sight protections around the participants. The prospective participants were also informed concerning the scope and time requirements of the survey to manage their expectations and exclude overly busy or stressed individuals. Further, some minor technical issues regarding the laptop, the mouse or the size of the questionnaire on the screen occurred. These difficulties were rare and could be quickly resolved but might have represented a distraction for some respondents. Finally, social desirability might have biased the results, threatening the internal validity. Respondents generally tend to adapt their behavior regarding how they think the interviewer will expect it which could have influenced the results (Friedman, 1967; Rosenthal, 1966).

Finally, the external validity or in other words generalizability of the study needs to be reviewed. According to Roe and Just (2009), external validity concerns the ability to generalize the relationships found to other times, settings and persons. In order to reach generalizability, the sample needs to be as similar to the target population as possible. As the participants were randomly selected across different day times at a shopping mall in a residential area of Bergen,

it can be assumed that the sample was representative of Norwegian consumers which constitutes the target group. Looking at gender and age, a relatively balanced distribution was reached which further strengthens the external validity of this research.

6.4 Future Research

Barriers to sustainable consumption have been studied over the last years by numerous researchers. Similar to this phenomenon, there has been a wide interest in understanding cognitive processes, including the dual system processing theory that has been frequently discussed in theory.

To better understand the sustainability quality trade-off, consumers cognitive decision-making processes regarding green products needs to be further studied. In this research, it has been demonstrated that consumers under both manipulations, cognitive load and enhancement make a trade-off and rate sustainable product alternatives lower in quality, compared to non-sustainable ones. This finding needs to be further examined and confirmed by researchers. One possible approach could be the use of different manipulation methods for cognitive load and enhancement.

The conducted study could be also replicated with some slight adjustments regarding the sample as well as the tested products. It could be for instance interesting to inspect how differing levels of consumer knowledge about sustainable products and brands impact their quality perception of green products. Further, unknown and known brands, as well as different packaging claims, could be compared to find potential ways to circumvent this sustainability quality trade-off. This could shed light on the role of consumer's emotions and ultimately their trust concerning certain brands and its impact on quality perception.

Further, the impact of price differences between green and non-green products needs to be further examined. Joshi and Rahman (2015) found that the price of green products can act as a barrier to sustainable consumption. Followingly, researchers should focus more on this aspect to determine an acceptable price range for green products compared to regular products.

In this research, the three alternatives included a drain opener with natural ingredients, another one made from recycled material and a regular drain opener. These alternatives were chosen to

study the influence of one central and one peripheral green attribute on preference and perceived market success. In future research, a study with one sustainable product with both peripheral and central green attribute could be designed. In this case, the environmental benefits would be combined which could allow for another perspective on consumer's perceptions. In the study conducted in this work, the content of the recycled material drain opener was not extensively described. A clearer initial description of the product content could hence be interesting for future research to consider.

6.5 Conclusion

The overall goal of this research was to examine the sustainability-quality trade-off made by consumers especially regarding the adoption of products in the strong product category. Therefore, in an experimental research design, two questionnaire surveys were conducted where the treated group was manipulated with cognitive load while the other one was under a cognitive enhancement manipulation.

Summing up the outcome of this research, it has been shown that a sustainability quality trade-off is made by consumers concerning green consumption implicit under System 1, as well as in more reasoned processing, under System 2. This poor-quality perception of green products was found to be applied by participants both under cognitive load and enhancement. However, even if respondents rated the quality of the sustainable drain opener products lower, they still anticipated the green drain opener products to be more successful in the market compared to the non-green one.

Taken together, these findings confirm a prevalent sustainability-quality trade off in sustainable consumption. This perceived lack in functional quality constitutes a strong barrier to the adoption of greener consumption choices even if studies show that, generally, consumers perceive sustainable products positively (BBMG, 2007). Turning these positive sentiments and intentions towards sustainable products into impactful actions represents one of the key challenges of this generation of researchers, managers, and consumers.

Chapter 7: References

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Appendix A: Summary Literature Review

Appendix A1: Summary Literature Review Table 1

<i>Keyword(s)</i>	<i>Article/ Book/ Report Title</i>	<i>Author(s)</i>	<i>Findings</i>
Sustainable Consumption	The BBMG Conscious Consumer Report	BBMG (2007)	Consumers perceive sustainable products in general positively
Sustainability Liability, Product Category	The Sustainability Liability: Potential Negative Effects of Ethicality on Product Preference	Luchs, Naylor, Irwin & Raghunathan (2010)	Influence of sustainability on preference depends on product category
			Sustainability liability might occur in categories where consumers value strength-related attributes most
Sustainable Consumption, Functional Quality	Double Standard: The Role of Environmental Consciousness in Green Product Usage	Lin & Chang (2012)	Green products are perceived as less effective by consumers when compared to non-green ones
Sustainable Consumption, Functional Quality	Non-Profits are Seen as Warm and For-Profits as Competent: Firm Stereotypes Matter	Aaker, Vohs & Mogilner (2010)	Consumers perceive positive effect on environment and society of green products as signal of trustworthiness, generosity and sincerity rather than competency, effectiveness and efficiency

Appendix A2: Summary Literature Review Table 2

<i>Keyword(s)</i>	<i>Article/ Book/ Report Title</i>	<i>Author(s)</i>	<i>Findings</i>
Attitude-Behaviour Gap	An Exploratory Study into the Factors Impeding Ethical Consumption	Bray, Johns & Kilburn (2010)	While intention to behave ethically through green consumption is relatively high, actual behaviour does not reflect this intention
	Understanding Consumers' Ethical Justifications: A Scale for Appraising Consumers' Reasons for Not Behaving Ethically	d'Astous & Legendre (2009)	
Attitude-Behaviour Gap	Talk the Walk: Advancing Sustainable Lifestyles Through Marketing and Communications	United Nations Environment Programme (2005)	40% consumer state willingness to purchase green products but only 4% do so
Attitude-Behaviour Gap	Factors Affecting Green Purchase Behaviour and Future Research Directions	Joshi & Rahman (2015)	Numerous individual and situational factors influence attitude-behaviour gap
Attitude-Behaviour Gap, Social Desirability Bias	Do What Consumers Say Matter? The Misalignment of Preferences with Unconstrained Ethical Intentions	Auger & Devinney (2007)	Social desirability bias leads to inflated measures of consumers intentions
Attitude-Behaviour Gap, Social Desirability Bias	Going green to be seen: Status, reputation, and conspicuous conservation	Griskevicius, Tybur & Van den Bergh (2010)	An activation of status motives can increase pro-environmental behaviour

Appendix A3: Summary Literature Review Table 3

<i>Keyword(s)</i>	<i>Article/ Book/ Report Title</i>	<i>Author(s)</i>	<i>Findings</i>
Attitude-Behaviour Gap, Social Desirability Bias	Actions, Intentions, and Self-Assessment: The Road to Self-Enhancement Is Paved with Good Intentions	Kruger & Gilovich (2004)	Consumers respond in a socially desirable manner in the context of judging ethicality
Attribute Centrality	What Makes It Green? The Role of Centrality of Green Attributes in Evaluations of the Greenness of Products	Gershoff & Frels (2015)	The centrality of a green attribute can lead to a higher level of a products's perceived greenness which might impact product preference
Dual System Model	Thinking, Fast and Slow	Kahneman (2011)	Thought process can be separated into System 1 (intuitive, fast and automatic) and System 2 (slow and effortful)
			System 1's conclusion can be overridden by System 2 if he or she is motivated to engage in a conscious effortful and deliberate thinking (default-interventionist approach)
Bounded Rationality	Models of bounded rationality	Herbert Simon (1982)	Human judgements are limited by different constraints, such as mental capacities and information and time availability

Appendix A4: Summary Literature Review Table 4

<i>Keyword(s)</i>	<i>Article/ Book/ Report Title</i>	<i>Author(s)</i>	<i>Findings</i>
Heuristics	Judgment under Uncertainty: Heuristics and Biases	Tversky & Kahneman (1974)	Mental shortcuts are used to reach a decision faster by using fewer cognitive resources
			Heuristics might result in systematic errors and bias judgements
Heuristics	Ethical claims and labelling: An analysis of consumers' beliefs and choice behaviours	Hoek, Roling & Holdsworth (2013)	Consumers rely on heuristics in sustainable consumption when they lack background knowledge
			This limits their ability to engage in systematic processing of product information
Heuristics	Do what consumers say matter? The misalignment of preferences with unconstrained ethical intentions	Auger & Devinney (2007)	Heuristics often used in busy, distracting surroundings such as supermarkets where consumers cannot analyse claims and underpinning information thoroughly
Cognitive Load	The trouble of thinking: Activation and application of stereotypic beliefs	Gilbert & Hixon (1991)	Cognitive load or busyness can be defined: "as a situation that occurs when an individual simultaneously engages in several tasks consuming cognitive resources"
Cognitive Load	Maps of Bounded Rationality: A Perspective on Intuitive Judgement and choice	Kahneman (2002)	Less reasoned behaviour can be observed under cognitive load

Appendix A5: Summary Literature Review Table 5

<i>Keyword(s)</i>	<i>Article/ Book/ Report Title</i>	<i>Author(s)</i>	<i>Findings</i>
Cognitive Load, Risk, Choice	The effect of cognitive load on economic decision making: A survey and new experiments	Deck & Jahedi (2015)	Increase in level of cognitive load results in more risk aversion and impatient choice
Cognitive Load, Responsible Choice	Cognitive Load and the Equality Heuristic: A Two-Stage Model of Resource Overconsumption in Small Groups	Roch, Lane, Samuelson, Allison & Dent (2000)	Under high load, individuals lack the cognitive resources necessary to systematically process and hence to take task-relevant cues into account
Cognitive Load, Stereotypes	On cognitive busyness: When person perceivers meet persons perceived	Gilbert, Pelham & Krull (1988)	People under cognitive load are less able to correct their existing perceptions and thus rely more on stereotypes
	Parallel processing of stereotypes and behaviors	Kunda (1999)	

Appendix A6: Summary Literature Review Table 6

<i>Keyword(s)</i>	<i>Article/ Book/ Report Title</i>	<i>Author(s)</i>	<i>Findings</i>
Cognitive Enhancement	Evidence that logical reasoning depends on conscious processing	DeWall, Baumeister & Masicampo (2008)	Logical reasoning can be improved by enlisting the reflective, conscious System 2, in the objective of being logical
Gender	Gender and Environmental Risk Concerns	Davidson & Freudenburg (1996)	Women have a higher level of environmental concern compared to men, which is also reflected in their attitudes, choices and behaviour
Gender	Is Eco-Friendly Unmanly? The Green-Feminine Stereotype and Its Effect on Sustainable Consumption	Brough, Wilkie, Ma, Isaac & Gal (2016)	For both men and women, a mental association exists between femininity and greenness
			Prevalent stereotype that green consumers are more feminine
			Men whose gender identity is affirmed right before the purchase decision, tend to prefer the green product

Appendix B: Manipulations

B1: Cognitive load

Før du begynner å svare på spørsmålene vil vi be deg om å gjennomføre en hukommelsesoppgave. På neste side kommer vi til å vise deg et 8-sifret nummer. Du skal se på nummeret og forsøke å huske det. Etter en kort spørreundersøkelse kommer vi til å be deg om å skrive ned nummeret slik du husker det. Det er derfor viktig at du forsøker å huske på nummeret mens du svarer på spørsmålene i spørreundersøkelsen.

Siden dette er en hukommelsesoppgave så skal du **ikke** skrive ned nummeret når du får se det på neste side

Klikk på pilen for å se nummeret du skal huske.

62340676

Husker du det 8-sifrede nummeret vi viste deg i starten av undersøkelsen? Skriv ned nummeret slik du husker det her:

B2: Cognitive enhancement

Vi kommer nå til å stille deg noen spørsmål om disse tre produktene. Tenk deg godt om når du svarer, for vi vil be deg om å skrive ned en kort begrunnelse for noen av svarene dine underveis

Forklar med noen få ord hvorfor du svarte som du gjorde over.

Appendix C: Questionnaire Survey

Hei!

Denne undersøkelsen utføres som en del av vår masteroppgave ved Norges Handelshøyskole og vil ta ca. 9 minutter å gjennomføre. Vi setter stor pris på din deltakelse - dine svar er verdifulle for oss! Du vil motta et sentergavekort på 70 kr etter å ha fullført denne undersøkelsen.

Dersom du opplever tekniske problemer underveis i undersøkelsen, må du bare ta kontakt.

Svarene er helt anonyme og alle opplysninger du oppgir vil bli behandlet konfidensielt.

Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli anonymisert.

Dersom du bekrefter at du har lest informasjonen over, og gir samtykke til å frivillig delta i undersøkelsen, klikk «Ja».

- Ja, jeg ønsker å delta
- Nei, jeg ønsker ikke å delta

Forestill deg at du skal kjøpe en avløpsåpner, og at du kan velge blant de tre alternativene:

- **En avløpsåpner laget av 100% naturlige ingredienser**
- **En avløpsåpner i 100% resirkulert emballasje**
- **En vanlig avløpsåpner**

Vi kommer nå til å stille deg noen spørsmål om disse tre produktene. Tenk deg godt om når du svarer, for vi vil be deg om å skrive ned en kort begrunnelse for noen av svarene dine underveis

Vi lurer på hvor miljøvennlig du tror de ulike produktene er. Hvor enig eller uenig er du i påstandene i tabellene nedenfor? 1 = Svært uenig og 7 = Svært enig

	Avløpsåpner laget av 100% naturlige ingredienser						
	1 - Svært uenig	2	3	4	5	6	7 - Svært enig
Dette produktet burde bli merket som miljøvennlig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å kjøpe dette produktet er et miljøbevisst valg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
En miljøbevisst person vil sannsynligvis kjøpe dette produktet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Avløpsåpner i 100% resirkulert emballasje						
	1 - Svært uenig	2	3	4	5	6	7 - Svært enig
Dette produktet burde bli merket som miljøvennlig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å kjøpe dette produktet er et miljøbevisst valg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
En miljøbevisst person vil sannsynligvis kjøpe dette produktet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Vanlig avløpsåpner						
	1 - Svært uenig	2	3	4	5	6	7 - Svært enig
Dette produktet burde bli merket som miljøvennlig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å kjøpe dette produktet er et miljøbevisst valg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
En miljøbevisst person vil sannsynligvis kjøpe dette produktet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**På en skala fra 1-7, hvordan vil du rangere produktets evne til å løse opp tette rør?
1 = Svært lite god og 7 = Svært god**

	1 Svært lite god	2	3	4	5	6	7 Svært god
Avløpsåpner laget av 100% naturlige ingredienser	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Avløpsåpner i 100% resirkulert emballasje	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vanlig avløpsåpner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Se for deg at du har tette rør på badet og derfor trenger en avløpsrens. Hva er sannsynligheten for at du vil **velge disse produktene? 1 = Svært usannsynlig og 7 = Svært sannsynlig**

	1 - Svært usannsynlig	2	3	4	5	6	7 - Svært sannsynlig
Avløpsåpner laget av 100% naturlige ingredienser	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Avløpsåpner i 100% resirkulert emballasje	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vanlig avløpsåpner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Dersom du kun skulle velge ett av produktene over, hvilket ville du valgt?

- Avløpsåpner laget av 100% naturlige ingredienser
- Avløpsåpner i 100% resirkulert emballasje
- Vanlig avløpsåpner

Hvor sannsynlig tror du det er at disse alternativene vil bli en **suksess på markedet**, der 1 = Svært usannsynlig og 7 = Svært sannsynlig

	1 - Svært usannsynlig	2	3	4	5	6	7 - Svært sannsynlig
Avløpsåpner laget av 100% naturlige ingredienser	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Avløpsåpner i 100% resirkulert emballasje	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vanlig avløpsåpner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hvor stor eller liten skade tror du disse produktene vil ha på rørene, helsen din og miljøet?

1 = Svært liten skade og 7 = Svært stor skade.

	Avløpsåpner laget av 100% naturlige ingredienser						
	1 - Svært liten skade	2	3	4	5	6	7 - Svært stor skade
Rør	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Helse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Miljø	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Avløpsåpner i 100% resirkulert emballasje						
	1 - Svært liten skade	2	3	4	5	6	7 - Svært stor skade
Rør	●	●	●	●	●	●	●
Helse	●	●	●	●	●	●	●
Miljø	●	●	●	●	●	●	●

	Vanlig avløpsåpner						
	1 - Svært liten skade	2	3	4	5	6	7 - Svært stor skade
Rør	●	●	●	●	●	●	●
Helse	●	●	●	●	●	●	●
Miljø	●	●	●	●	●	●	●

Hvor enig eller uenig er du i påstandene nedenfor, der 1 = Svært uenig og 7 = Svært enig

	1 - Svært uenig	2	3	4	5	6	7 - Svært enig
Et miljøvennlig produkt har lavere kvalitet enn et ikke-miljøvennlig produkt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det er viktig for meg at de produktene jeg kjøper er miljøvennlige	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg resirkulerer så ofte jeg har muligheten til det	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg er villig til å ofre kvalitet til fordel for miljøvennlighet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Av de to alternativene nedenfor, hvilken mener du er den største miljøutfordringen mennesker står overfor?

- Kjemikalier fra kosmetikk og vaskemidler som forurensrer havet, elver og innsjø.
- Emballasje fra produkter som havner i naturen og forurensrer havet, elver og innsjø.

Tror du det er prisforskjeller mellom produktene?

- Ja
- Nei

Dersom du svarte "ja" på det forrige spørsmålet, ranger produktene nedenfor fra det du tror er billigst til dyrest. Der 1 er billigst, 2 er nest dyrest og 3 er dyrest. Dra de 3 alternativene i ønsket rekkefølge ved hjelp av touchpaden/musa på PCén. Spør dersom noe er uklart.

Avløpsåpner laget av 100% naturlige ingredienser

1

Vanlig avløpsåpner

2

Avløpsåpner i 100% resirkulert emballasje

3

Nå er du snart ferdig, men vi vil gjerne be deg om å svare på noen spørsmål om deg som person. For hver påstand nedenfor så velger du et punkt på skalaen som sier i hvilken grad dette er typisk for deg.

	Bruk skalaen fra 1-5 når du vurderer påstandene nedenfor				
	1 - Ekstremt lite typisk meg	2 - Noe utypisk meg	3 - Usikker	4 - Noe typisk meg	5 - Ekstremt typisk meg
Jeg foretrekker vanskelige heller enn enkle oppgaver	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg liker å ha ansvaret for situasjoner som krever mye tankevirksomhet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg foretrekker å tenke på små, daglige prosjekter fremfor langsiktige gjøremål	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ideen om å måtte bruke mine tankeevner for å nå toppen appellerer til meg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg føler lettelse heller enn tilfredshet etter å ha løst en oppgave som krevde dyp tankevirksomhet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg ender vanligvis opp med å reflektere over problemer selv om de ikke angår meg personlig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Til slutt ønsker vi å stille deg noen få spørsmål om deg selv. Svarene dine er fortsatt helt anonyme.

Kjønn:

- Kvinne
- Mann

Alder:

Nasjonalitet:

- Norsk
- Annet, vennligst spesifiser:

Hva er høyeste nivå av utdanning du har fullført? (Hvis du er i utdanning per dags dato, vennligst oppgi påbegynt nivå).

- Ungdomsskole
- Videregående
- Bachelorgrad
- Mastergrad
- PhD

Yrke:

- Student
- Pensjonist
- Yrkesaktiv
- Ikke i jobb

Årlig inntekt:

- Mindre enn 250.000 NOK
- Mellom 250.000 og 500.000 NOK
- Mellom 500.00 og 750.000 NOK
- Mellom 750.000 og 1 mill NOK
- Mer enn 1 mill NOK

Sivilstatus:

- Gift
- Ugift
- Samboer
- Skilt
- Enke/enkemann

Har du barn som bor hjemme?

- Ja, vennlist oppgi antall:
- Nei

Hvem har hovedansvaret for handling av dagligvarer i husholdningen din?

- Hovedsaklig meg
- Hovedsaklig en annen
- Delt ansvar

Appendix D: Demographic characteristics of participants

)

	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Kvinne	97	58,4	58,4	58,4
Mann	69	41,6	41,6	100,0
Total	166	100,0	100,0	

Figure D.1: Gender distribution

	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
[15,25[	37	22,2	22,2	22,2
[25,40[	71	42,8	42,8	65,0
[40,55[	30	18,1	18,1	83,1
[55,70[	25	15,1	15,1	98,2
>= 70	3	1,8	1,8	100,0
Total	166	100,0	100,0	

Figure D.2: Participants frequency of age

	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Norsk	145	87,3	87,3	87,3
Annet, vennligst spesifiser:	21	12,7	12,7	100,0
Total	166	100,0	100,0	

Figure D.3: Participants distribution by nationality

	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Ungdomsskole	4	2,4	2,4	2,4
Videregående	51	30,7	30,7	33,1
Bachelorgrad	71	42,8	42,8	75,9
Mastergrad	32	19,3	19,3	95,2
PhD	8	4,8	4,8	100,0
Total	166	100,0	100,0	

Figure D.4: Frequency of education level

	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Gift	52	31,3	31,3	31,3
Ugift	55	33,1	33,1	64,5
Samboer	51	30,7	30,7	95,2
Skilt	5	3,0	3,0	98,2
Enke/enkemann	3	1,8	1,8	100,0
Total	166	100,0	100,0	

Figure D.5: Marital Status

	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Mindre enn 250.000 NOK	46	27,7	27,7	27,7
Mellom 250.000 og 500.000 NOK	58	34,9	34,9	62,7
Mellom 500.000 og 750.000 NOK	43	25,9	25,9	88,6
Mellom 750.000 og 1 mill NOK	15	9,0	9,0	97,6
Mer enn 1 mill NOK	4	2,4	2,4	100,0
Total	166	100,0	100,0	

Figure D.6: Income distribution

	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Hovedsaklig meg	89	53,6	53,6	53,6
Hovedsaklig en annen	17	10,2	10,2	63,9
Delt ansvar	60	36,1	36,1	100,0
Total	166	100,0	100,0	

Figure D.7: Responsibility for household purchases

Appendix E: Descriptive Statistics

Table E.1: Descriptive Statistics, Mediators

<i>Variables</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Skewness</i>		<i>Kurtosis</i>	
				<i>Statistic</i>	<i>Std. Error</i>	<i>Statistic</i>	<i>Std. Error</i>
Functional Quality [NI]	166	4.60	1.423	.052	.188	-.371	.375
Functional Quality [RM]	166	4.86	1.519	-.309	.188	-.325	.375
Functional Quality [REG]	166	5.17	1.576	-.744	.188	-.050	.375

Table E.2: Descriptive Statistics, Dependent Variables

<i>Variables</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Skewness</i>		<i>Kurtosis</i>	
				<i>Statistic</i>	<i>Std. Error</i>	<i>Statistic</i>	<i>Std. Error</i>
Anticipated market success [NI]	166	5.30	1.544	-.746	.190	-.108	.377
Anticipated market success [RM]	166	5.00	1.577	-.513	.191	-.261	.380
Anticipated market success [REG]	166	4.56	1.565	-.200	.191	-.460	.380
Choice [NI]	166	4.94	1.835	-.518	.188	-.800	.375
Choice [RM]	166	4.83	1.757	-.547	.188	-.448	.375
Choice [REG]	166	4.57	1.817	-.400	.188	-.675	.375

Table E.3: Descriptive Statistics, Control Variables

<i>Variables</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Skewness</i>		<i>Kurtosis</i>	
				<i>Statistic</i>	<i>Std. Error</i>	<i>Statistic</i>	<i>Std. Error</i>
Damage pipes (NI)	166	2.73	1.634	.629	.188	-.549	.375
Damage health (NI)	166	2.82	1.769	.743	.188	-.382	.375
Damage environment (NI)	166	2.83	1.779	.784	.188	-.411	.375
Damage pipes (RM)	166	3.78	1.684	-.146	.188	-.616	.375
Damage health (RM)	166	3.99	1.695	-.109	.188	-.641	.375
Damage environment (RM)	166	3.75	1.774	.041	.188	-.866	.375
Damage pipes (REG)	166	4.38	1.767	-.379	.188	-.574	.375
Damage health (REG)	166	4.97	1.539	-.484	.188	-.279	.375
Damage environment (REG)	166	5.19	1.492	-.447	.188	-.578	.375
Trade-off	166	3.10	1.821	.395	.188	-1.042 ^(a)	.375
Sacrifice	166	4.77	1.709	-.292	.188	-.942	.375
Importance	166	4.37	1.721	-.234	.188	-.817	.375

^(a)The value represents a violation of the normality assumption

Appendix F: Main Effects

Table F.1: Pairwise Comparisons for Measurements on Choice by Product Attribute

<i>I</i>	<i>J</i>	<i>Mean difference (I-J)</i>	<i>Std. Error</i>	<i>Sig.^a</i>	<i>95% Confidence Interval for Difference</i>	
					<i>Lower Bound</i>	<i>Upper Bound</i>
Green central attribute [NI]	Green peripheral attribute [RM]	.108	.132	1.000	-.211	.428
Green central attribute [NI]	Non-green product [REG]	.367	.229	.333	-.187	.922
Green peripheral attribute [RM]	Non-green product [REG]	.259	.192	.538	-.206	.724

Table F.2: Pairwise Comparisons for Measurements on Anticipated Market Success by Product Attribute

<i>I</i>	<i>J</i>	<i>Mean difference (I-J)</i>	<i>Std. Error</i>	<i>Sig.^a</i>	<i>95% Confidence Interval for Difference</i>	
					<i>Lower Bound</i>	<i>Upper Bound</i>
Green central attribute [NI]	Green peripheral attribute [RM]	.297*	.122	.047	.003	.591
Green central attribute [NI]	Non-green product [REG]	.714*	.176	.000	.288	1.140
Green peripheral attribute [RM]	Non-green product [REG]	.417*	.158	.027	.035	.800

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Appendix G: Mediation Analysis

G.1 Tables of Indirect Effects

Table G.1: Mediation Effects of Functional Quality on Choice

<i>Dependent variable</i>	<i>Mediator</i>	<i>Total effect</i>		<i>Direct effect</i>		<i>Indirect effect</i>	
		<i>Effect</i>	<i>95% CI [LL, UL]</i>	<i>Effect</i>	<i>95% CI [LL, UL]</i>	<i>Effect</i>	<i>BootCI [LL, UL]</i>
Choice [NI-REG]	Functional quality [NI-REG]	.3675	[.3321, .4028]	.7743	[.3511, 1.1975]	-	[-.6347, -.1948]
Choice [RM-REG]	Functional quality [RM-REG]	.2590	[.2297, .2884]	.4563	[.1121, .8005]	-	[-.3928, -.0217]
Choice [NI-RM]	Functional quality [NI-RM]	.1084	[.0879, .1290]	.1922 ^(a)	[-.0696, .4539]	-	[-.185, -.0138]

Note: LL and UL represent the lower-limit and upper-limit of the 95% confidence interval, respectively.

^(a)Value not statistically significant at a 95% significance level

Table G.2: Mediation Effects of Functional Quality on Anticipated Market Success

<i>Dependent variable</i>	<i>Mediator</i>	<i>Total effect</i>		<i>Direct effect</i>		<i>Indirect effect</i>	
		<i>Effect</i>	<i>95% CI [LL, UL]</i>	<i>Effect</i>	<i>95% CI [LL, UL]</i>	<i>Effect</i>	<i>BootCI [LL, UL]</i>
Anticipated market success [NI-REG]	Functional quality [NI-REG]	.7063	[.6789, .7336]	1.0155	[.6700, 1.3610]	-	[-.488, -.1612]
Anticipated market success [RM-REG]	Functional quality [RM-REG]	.4313	[.4066, .4559]	.6077	[.3079, .9074]	-	[-.3489, -.0491]
Anticipated market success [NI-RM]	Functional quality [NI-RM]	.2956	[.2766, .3146]	.3812	[.1491, .6134]	-	[-.1884, -.0092]

Note: LL and UL represent the lower-limit and upper-limit of the 95% confidence interval, respectively.

Appendix H: Cognitive Load and the Mediator

H.1 Moderation effect of Cognitive Load/Enhancement

<i>Variables</i>	<i>Manipulation (W)</i>	<i>Conditional Effect</i>	<i>Std. Error</i>	<i>Sig.^a</i>	<i>95% Confidence Interval for Difference</i>	
					<i>Lower Bound</i>	<i>Upper Bound</i>
Functional quality [NI] - functional quality [RM]	Cognitive Enhancement	-.3012	.1493	.0453	-.5961	-.0063
	Cognitive Load	-.2169	.1493	.1484	-.5117	.0780
Functional quality [NI] - functional quality [REG]	Cognitive Enhancement	-.5663	.2121	.0084	-.9851	-.1474
	Cognitive Load	-.5904	.2121	.0060	-1.009	-.1715
Functional quality [RM] - functional quality [REG]	Cognitive Enhancement	-.2651	.1998	.1866	-.6596	.1295
	Cognitive Load	-.3735	.1998	.0634*	-.7681	.0211

Appendix I: Gender Analysis

Table I.1: Descriptive Statistics for Choice under cognitive enhancement and cognitive load for each gender

<i>Variables</i>	<i>Gender</i>	<i>Manipulation</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Choice [NI]	Female	Cognitive enhancement	52	5.58	1.684
		Cognitive load	45	4.53	1.841
	Male	Cognitive enhancement	31	4.55	1.981
		Cognitive load	38	4.87	1.727
Choice [RM]	Female	Cognitive enhancement	52	4.85	1.819
		Cognitive load	45	4.64	1.921
	Male	Cognitive enhancement	31	4.61	1.801
		Cognitive load	38	5.21	1.398
Choice [REG]	Female	Cognitive enhancement	52	4.52	1.863
		Cognitive load	45	4.71	1.660
	Male	Cognitive enhancement	31	4.29	2.003
		Cognitive load	38	4.71	1.814

Table J.2: Descriptive Statistics for Anticipated market success under cognitive enhancement and cognitive load for each gender

<i>Variables</i>	<i>Gender</i>	<i>Manipulation</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Anticipated market success [NI]	Female	Cognitive enhancement	49	5.84	1.297
		Cognitive load	44	5.16	1.584
	Male	Cognitive enhancement	29	4.86	1.787
		Cognitive load	37	4.97	1.462
Anticipated market success [RM]	Female	Cognitive enhancement	49	5.24	1.465
		Cognitive load	44	4.64	1.644
	Male	Cognitive enhancement	29	4.90	1.800
		Cognitive load	37	5.08	1.402
Anticipated market success [REG]	Female	Cognitive enhancement	49	4.84	1.546
		Cognitive load	44	4.77	1.395
	Male	Cognitive enhancement	29	4.14	1.827
		Cognitive load	37	4.27	1.539

Table J.3: Descriptive Statistics for functional quality under cognitive enhancement and cognitive load for each gender

<i>Variables</i>	<i>Gender</i>	<i>Manipulation</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Functional quality [NI]	Female	Cognitive enhancement	52	4.83	1.410
		Cognitive load	45	4.40	1.452
	Male	Cognitive enhancement	31	4.32	1.376
		Cognitive load	38	4.74	1.427
Functional quality [RM]	Female	Cognitive enhancement	52	4.98	1.540
		Cognitive load	45	4.67	1.492
	Male	Cognitive enhancement	31	4.87	1.688
		Cognitive load	38	4.89	1.410
Functional quality [REG]	Female	Cognitive enhancement	52	4.92	1.713
		Cognitive load	45	5.16	1.429
	Male	Cognitive enhancement	31	5.68	1.447
		Cognitive load	38	5.13	1.614