NHH

# Navigating Green Choices:

*The Role of Cognitive Inferences and Immediate Emotions in Sustainable Product Selection*

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## NORWEGIAN SCHOOL OF ECONOMICS

# Preface

This project has been a part of a larger research project conducted at the Center for Sustainable Business (CSB) at the NHH Norwegian School of Economics. CSB is engaged in research, teaching, and outreach activities focused on behaviors, business models, and technologies that advance sustainable business practices. You can visit the center's website at http://csb.nhh.no. The center provided funding for our data collection.

# Abstract

In response to the escalating trend of conscious consumption, there exists a significant market opportunity for sustainable products. To capitalize on this potential, it is essential to advance the field of the psychological mechanisms that influence consumers' decisions when choosing between sustainable and non-sustainable products. This research aims to investigate various cognitive inferences and immediate emotional responses, two pivotal psychological dimensions of consumer behavior, in relation to product decision, sustainable vs non-sustainable. Additionally, we seek to determine the extent to which these inferences and emotions influence the selection between these products.

By conducting two studies, where Study 1 utilizes secondary data and Study 2 acts as an expanded follow-up from the existing research, we discover that cognitive inferences such as perceived safety, aesthetic appeal, innovativeness, and femininity, along with the emotions of hope and pride, are associated with a sustainable product. Moreover, we find that perceived quality and the emotions of guilt and pride are associated with a non-sustainable product.

Key drivers for the selection of the sustainable product include perceived quality and safety, as well as the sub-dimension of perceived innovativeness, excitement, which are the most critical positive drivers for the preference of the sustainable product. Conversely, perceived femininity associated with the sustainable product has a negative effect on the willingness to pay a premium for it. The most intriguing finding is that fear has a slight negative effect on the choice of the sustainable product if this emotion is elicited by it. However, if this emotion is attributed to the non-sustainable product, it becomes a potent positive driver for the sustainable product.

These insights contribute significantly to the existing literature on sustainable consumer behavior, offering a perspective that can guide businesses in developing strategies that resonate with the immediate thoughts that influence customer preferences. Our study paves the way for future research to further unravel the nuanced dynamics of cognitive inferences and emotional responses in the context of sustainable consumption.

# Acknowledgements

This master thesis is a culmination of our academic journey in the MSc in Economics and Business Administration program at the Norwegian School of Economics (NHH), with a specialization in Marketing and Brand Management (MBM) and Energy, Natural Resources, and the Environment (ENE).

Our profound interest in sustainability and green consumer behavior inspired us to delve into this topic. The journey of exploring the intricate aspects of sustainability and green consumption has been incredibly rewarding, intellectually stimulating, and immensely educational.

First and foremost, we would like to express our profound gratitude to our supervisor, Siv Skard. Your expert guidance and deep involvement in this project have been instrumental in our research journey. Your willingness to engage in thoughtful discussions, guide our analytical approach, and provide unwavering support throughout the entire process have not only steered us through this academic endeavor but have also left a lasting impact on our professional growth.

We would also like to extend our heartfelt thanks to Hege Landsvik, whose research on sustainable consumer behavior provided us with an invaluable foundation for our own study. Hege's generosity in allowing us to build upon her research was a significant contribution to our thesis. We are particularly grateful to Hege for her assistance in the practical implementation of our survey in Qualtrics and her support in publishing it on Prolific. This contribution was essential in enhancing every aspect and reach of our study, enabling us to gather a wider range of data and insights.

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Karoline Sørnes and Mathilde Gulseth Høvik

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# 1. Introduction

## 1.1 Background

Recent decades have witnessed rapid economic growth driven by the rise in consumer consumption worldwide, leading to environmental degradation through over-consumption and exploitation of natural resources (Chen & Chai, 2010). Earth Overshoot Day, marking the date when humanity's resource consumption surpasses Earth's capacity to regenerate those resources within a year (World Wide Fund for Nature, n.d.), has been moving earlier by approximately one week annually. In 2023, this day occurred on August 2nd, indicating that for the rest of the year, we are depleting local resources and adding to atmospheric carbon dioxide (Global Footprint Network, n.d.).

Research by Grunert (1993) found that private household consumption activities are responsible for around 40 percent of environmental damage. There is a growing consensus that sustainable production and changes in consumer behavior are critical for addressing environmental problems (Sandhu et al., 2010; Aagerup & Nilsson, 2016). Thus, shifting consumer behavior is seen as pivotal in mitigating the environmental impact of our consumption (Geszler, 2017), with individual consumer actions having significant environmental implications (Stern, 2000; White et al., 2019).

As consumers become aware of issues related to environmental fragility, they place greater emphasis on environmentally friendly purchases (Gleim et al., 2013). Numerous studies have shown that sustainable products, that is, products with positive social and environmental attributes (Luchs et al., 2010), are gradually becoming the preferred choices among consumers (Zhang & Dong, 2020). For instance, an international market study revealed that a third of consumers opt to buy from brands they believe are contributing to social or environmental well-being (Unilever PLC, 2017). Additionally, a consumer sentiment survey in the U.S. by McKinsey (2020) found that over 60 percent of participants are inclined to pay more for products with sustainable packaging. Furthermore, a recent study by NielsenIQ corroborated that 78 percent of U.S. consumers affirm that a sustainable lifestyle is important to them (Am et al., 2023).

However, despite consumers' expressed concerns for the environment and the rising popularity of sustainable products, the purchase of green goods and services does not occur as frequently

as anticipated. In fact, reports by UNEP (the United Nations Environment Programme) indicate that the market share for green products is less than four percent globally (UNEP, 2005). In other words, sustainable products constitute only a small fraction of global demand (Gleim et al., 2013).

The problem lies in the fact that when consumers are presented with a choice between sustainable and non-sustainable products, many people tend to purchase the non-sustainable product, despite claiming a preference for sustainable options (Belk et al., 2005; Park & Lin, 2020). This discrepancy, often referred to as the gap, between consumers' attitudes and behaviors, is arguably the greatest challenge for those dedicated to promoting sustainable consumption (Johnstone & Tan, 2015; Prothero et al., 2011; White et al., 2019).

The causes of the attitude-behavior gap have been extensively studied, revealing various potential psychological explanations (Sachdeva et al., 2015). In categories where strength-related attributes are crucial, such as household cleaning products, there has been significant research on the perceived trade-off between product functionality (Skard et al., 2021; Luchs et al., 2010; Lin & Chang, 2012; Pancer et al., 2017; Newman et al., 2014), also referred to as the sustainable liability effect (Luchs et al., 2010). Furthermore, perceived trade-offs related to price (Kaczorowska et al., 2019) and perceived femininity (Newman et al., 2014; Joshi & Rahman, 2015; Brough et al., 2016) have also been recognized, among others, as barriers to selecting sustainable products. These barriers stem from negative inference making; a cognitive process in which negative conclusions or assumptions are drawn based on available information when this information is not comprehensive or explicitly stated (Dick et al., 1990).

On the other hand, research has also explored how consumers can derive positive inferences from sustainable attributes, commonly referred to as "halo effects." This phenomenon has been investigated in relation to various aspects, safety (Bearth et al. 2014), innovativeness (Jørgensen et al., 2022), and aesthetic appeal (Luchs et al., 2012). In contrast to the negative inferences, these positive cognitive inferences can, therefore, serve as potential drivers for the selection of sustainable products over non-sustainable ones.

Moreover, research has also dedicated considerable attention to investigating the role of emotions in consumer behavior and product choices (Connolly & Zeelenberg, 2002). When consumers make product choices, they can elicit immediate emotions that are either positive or negative, thus influencing their selection of available products. I In the context of

sustainability, research on emotions has primarily focused on exploring how emotional responses drive pro-environmental actions and foster a commitment to environmental engagement (Mallett, 2012; Antonetti & Maklan, 2014; Skurka et al., 2018; Van Zomeren et al., 2010). This includes examining contrasting emotions such as fear, hope, guilt, and pride. Given that these emotions have an impact in other settings, there is reason to believe that similar emotions may also arise when individuals are faced in a product selection situation, with product choices between sustainable and non-sustainable products. For instance, sustainable attributes may elicit positive emotions, while opting for a non-sustainable choice may trigger negative emotions. Consequently, these emotions can function as drivers for the preference of the sustainable product.

## 1.2  Purpose and Research question

To advance the field of sustainable consumer behavior and gain a deeper understanding of the psychological processes underpinning the decisions, it is crucial to investigate the choices modern consumers make when faced with a decision between a sustainable and a non-sustainable product. Prior research has identified barriers to the preference for sustainable products, with individuals forming negative inferences about sustainable products. Conversely, it has also been recognized that consumers can draw positive inferences about sustainable products. However, to the best of our knowledge, few studies have explored whether these inferences can serve as actual drivers of sustainable product choices. Furthermore, research on immediate emotions in sustainability contexts has not been linked to product choices. Hence, the purpose of our research is to investigate a selection of inferences and emotions more closely and identify which of these may serve as potential drivers for a preference for sustainable products. We have formulated the following research question:

*"What simple cognitive inferences and immediate emotional reactions are associated with sustainable products as compared to their non-sustainable counterparts, and to what extent do these inferences and reactions influence the choice between these two types of products?"*

To address this question, we will conduct two studies. In Study 1, we will utilize secondary data obtained from a study conducted by Landsvik et al. (2023), which investigated the sustainability liability and asset hypotheses. The study identifies several cognitive inferences about sustainable and non-sustainable products. Our objective is to leverage this existing data and investigate whether these cognitive inferences influence product preferences.

Additionally, we will undertake our own study, Study 2, using the same methodology employed by Landsvik et al. (2023). However, we will expand upon the list of potential cognitive inferences and include immediate emotions that may influence the choice between sustainable and non-sustainable products. In this study, we will also employ the dependent variable that pertains to product preference for sustainable versus non-sustainable options when purchasing in-store (as used in Study 1). Furthermore, we will extend the number of dependent variables to assess which product consumers would choose as a gift for others and which product they would be willing to pay more for.

## 1.3 Structure

The following section, Section 2, will encompass the theoretical foundation, wherein we will elucidate the concepts of cognitive inferences and immediate emotions and expound on their significance in the context of sustainable product choices. In this section, we will also specify the inferences and emotions under investigation and empirically elucidate their relevance to the study. Towards the end of this section, we will also outline our contributions to the existing literature. Moving forward to Section 3, we will present the research model and hypotheses. Subsequently, there will be a dedicated section for each of the studies: Section 4 will present Study 1, while Section 5 will introduce Study 2. Each of these sections will contain separate subsections for methodology, presentation of analyses, and a brief summary of the findings from the respective studies. Section 6 will then encompass a discussion of the findings from both studies, along with discussions regarding theoretical contributions, managerial implications, our recommendations for further research, as well as the limitations of our study. The conclusion will be presented in Section 7.

To clarify the use of terms in the thesis, the terms "environmentally friendly," "eco-friendly," "sustainable," and "green" are employed interchangeably throughout the paper, with no variation in their intended meaning.

# 2. Literature review

## 2.1 Inferences in decision-making

When confronted with complexity in decision-making processes, individuals often seek simpler solutions. As a result, they use heuristic decision-making (mental shortcuts to make quick decisions) and lay theories (everyday beliefs and assumptions) to simplify decisions through assumptions (Zedelius et al., 2017). This inclination towards simplification underscores the pervasive human tendency to rely on mental shortcuts.

On top of that, inference-making plays a key role in decision-making situations. While heuristics are mental shortcuts that simplify complexity, inference-making represents a cognitive process where individuals draw conclusions and make assumptions based on limited information and knowledge (Kardes et al., 2004). It is the process of creating if-then connections between information (such as cues, heuristics, arguments, and knowledge) and conclusions is known as inference formation (Kardes et al., 2004). This cognitive aspect is central to forming connections between information, filling in missing details and understanding complex relationships during decision-making processes. By way of example, when determining whether to admit patients to the emergency room, doctors do not refer to logistic regression (Katsikopoulos, 2011).

Customers frequently lack the knowledge or information needed to form an evaluation regarding a product. This is particularly important when it comes to sustainability, as customers may not have all the facts at hand about eco-friendly products. In situations like this, customers make assumptions about products based on inferences as an effort to make up for the "unknown." Customer's perceptions of items with certain features, such as environmentally friendly, are influenced by their past experiences and knowledge of other products (Luchs et al., 2010). For instance, envision a customer in a bustling store facing a choice between two products - one marketed as environmentally friendly and the other with a conventional label. In these instances, customers often rely on past experiences and their knowledge of other sustainable products to make decisions.

Customers may draw conclusions about a product lacking information by drawing a causal or ecological relationship between known and missing features, referred to as probabilistic consistency (Dick et al., 1990). In situations where a product's attribute is unknown, customers

may base their evaluation of it on the shown relationship between another feature. One illustration would be the relationship between a product's price and its perceived quality level.

A study by Broniarczyk & Alba (1994) has properly demonstrated that judgment processes may involve inference making in addition to, or apart from, the strict adding or averaging of explicit information, and that inference making can exert a significant but undetermined role in the measurement of attribute importance weights and forecasts of consumer preference.

According to the popular dual-process theory in psychology, as proposed by Kahneman (2013), human information processing operates through two systems: System 1 and System 2. System 1 operates subconsciously, generating implicit responses and ideas, often manifesting intuitive concepts spontaneously under the right conditions. On the other hand, System 2 is responsible for deliberate and explicit judgments, based on conscious thought processes, as described by Evans (2003). Decisions and preferences are primarily shaped by the accessible perceptions of System 1 unless they are overridden by the deliberate actions of System 2. This theory helps differentiate between dual-process reasoning and consumer inference making. In situations with limited information, the human mind often resorts to inferences, using mental shortcuts based on relevant and easily accessible information. System 1 plays a key role in this process, leveraging readily available information stored in the mind.

Extensive research has been conducted on the process of making inferences, forming both positive and negative associations with various product aspects. In our study, we will examine inferences documented in previous sustainability research, shedding light on how these cognitive shortcuts influence consumer perceptions and choices in the context of sustainable products.

### 2.1.1 Perceived quality

A study conducted by Yang (2017) found a link between purchase intention and perceived quality. Several research supports this, as it also states that consumers' overall satisfaction is mostly driven by their overall expectations and perceived quality performance (Olsen, 2002; Yu et al., 2005; Santy & Atikas, 2020; Govindaraj & Pradeep, 2023).

Lin and Chang (2012) demonstrated in their study that consumers seem to have stereotypes about the effectiveness of green and non-environmentally friendly products. They investigated the hypothesis that green, environmentally friendly products are seen as less effective than

non-environmentally friendly. The results of the study showed that the consumer considers green or environmentally friendly products to be less effective than ordinary non-environmentally friendly products. Other research that has noted that consumers frequently equate environmentally friendly products with poor performance (Chen & Chiu, 2016; Pancer et al., 2017). As a result, the consumer increases the quantity of the green product to compensate for the lack of perceived effect (Lin & Chang, 2012). Furthermore, according to a study done by Pancer et al. (2017), a single environmental packaging signal, such as an eco-label or the color green, can reduce a product's perceived efficacy.

Numerous studies examining the choice of sustainable products have highlighted a perceived "trade-off" between sustainability and quality as a significant impediment to the selection of sustainable products (Joshi & Rahman, 2015). Additional research has demonstrated a clear negative correlation between assessments of functional quality and sustainability. For instance, Luchs et al. (2010) demonstrated that consumers perceive sustainable items to be less durable than their non-sustainable counterparts in categories where product strength is crucial, a phenomenon termed the "sustainability liability effect." Customers appear to employ a zero-sum heuristic, assuming that in order to attain sustainability in a product, product quality must be compromised (Newman et al., 2014).

## 2.1.2 Perceived femininity

According to several studies, items are purchased not just for their utility, but also for what they represent to other people (Levy, 2001), like we presented earlier with signaling. This is due to the fact that products, like people, can represent an identity (Desmet et al., 2008). Based on research, people prefer to buy things that match their own self-concept (Van den Hende & Mugge, 2014). As an outcome, the fact that products can be viewed as masculine or feminine (Milner & Fodness, 1996), influences buyer choices significantly.

In the field of sustainable consumer behavior, there exists a perception that green products are often labeled as "feminine products" (Newman et al., 2014; Joshi & Rahman, 2015). Studies have shown that individuals practicing green consumption are often perceived as kind, caring, and altruistic (Yan et al., 2021), which is closely connected to being feminine. Brough et al. (2016) also found in their study that environmental friendliness and green products are consistently associated with femininity.

Consequently, environmentally friendly products are associated with femininity, which, in social perception, is linked to qualities like softness and gentleness (Davis et al., 2022; Felix et al., 2022). It's worth noting that such connotations may potentially diminish purchase intentions for products requiring strength or durability (Luchs et al., 2010). Stated differently, a product's perceived femininity might negatively impact its perceived quality, so serving as an obstacle to purchase. This is particularly relevant in strong product categories where durability and strength are essential.

Furthermore, males could feel that buying green products compromises their sense of masculinity. Van den Hende and Mugge (2014) found in their study that male consumers seem to avoid environmentally friendly behavior based on how it violates their own masculinity This is also supported by another study, where men tried to avoid being "eco-friendly" since it was seen to be a characteristic of women (Brough et al., 2016).

## 2.1.3 Perceived safety

As previously indicated, the literature suggests that sustainable products are often perceived to have lower quality compared to their non-sustainable counterparts (Lin & Chang, 2012; Chen & Chiu, 2016; Pancer et al., 2017). However, they are commonly perceived as being safer. In a study by Bearth (2016), an examination was conducted to assess the perceived risk associated with cleaning products. This analysis represented a logical and intuitive comparison between eco-friendly and conventional cleaning products. The findings of this investigation unveiled certain misconceptions, particularly related to customers' perceptions of eco-friendly cleaning solutions, which were generally believed to entail lower safety risks compared to conventional alternatives.

Previous study has demonstrated that people tend to generate opinions about a feature of a product depending on their bias (positive or negative) toward another feature. This cognitive bias is known as the "halo effect", which provides the explanation for this outcome (Nicolau et al., 2020). This phenomenon regularly affects people's assessments of the safety of foods or substances. Therefore, people believe that chemicals with a natural origin are safer than those with an artificial origin, even if this distinction is meaningless in terms of scientific risk assessment (Bearth et al. 2014; Evans et al., 2010). This halo effect has been observed through several studies of risk and health perceptions associated with eco- and fair-trade labels (Schuldt & Schwarz, 2010; Sörqvist et al., 2015).

## 2.1.4 Self-Signaling

Through the process of self-signaling, individuals have the ability to communicate details about themselves to others without explicitly disclosing them to them. Likewise, consumers' choices of products and services can validate a sense of self or reveal something about their personalities and character to themselves (Dhar & Wertenbroch, 2012). This self-signaling behavior can be categorized into social self-signaling, where individuals convey information to others, and private self-signaling, where choices affirm aspects of one's own identity and values. Engaging in sustainable behaviors can serve as a means of signaling, both privately and in social contexts.

### *Social self-signaling*

Social influence can be defined as the process through which an individual's thoughts, emotions, or behaviors are shaped by the influence of other individuals or groups (Abrahamse & Steg, 2013). The human species exhibits a remarkable level of sociability, engaging in a wide spectrum of social connections more deeply and consistently than most other animals. Alongside forming diverse interactions with fellow individuals and living within groups, people also consistently harbor concerns about their social acceptance and likability among those they interact with (Leary & Hoyle, 2009).

Social self-signaling can be defined as the process by which people use their buying patterns to share information with one another (Johnson & Chattaraman, 2019). Put another way, a decision-maker is seen to be engaging in social self-signaling when their actions are motivated by consideration for the opinions of others (Grossman, 2010). Here, customers use consumption as a symbol to tell others and themselves about who they are (Solomon, 1983). This is since a product's personality can be linked to a symbolic value and can be used as a signal for one's own identity (Wernerfelt, 1990).

Beliefs regarding what is socially acceptable and accepted in a certain setting, or social norms, can have a significant impact on sustainable consumer behaviors (Peattie, 2010). Social norms can be used to predict actions like not littering (Cialdini et al., 1990), composting and recycling (White & Simpson, 2013). A study by Griskevicius et al. (2010) discovered that consumers are willing to make purchases that lead to a "self-sacrifice" when making purchases in public. Further, a study by Guo et al. (2020) showed that social exclusion can enhance willingness to purchase green products through self-sacrifice in public. Also, shown by Rebecca Elliott's

(2013) studies, social status is related to green consumption in the United States. She also highlights how consumers can identify themselves in social settings by embracing green consumption, which has a socially accepted appeal.

### *Private self-signaling*

A significant portion of product-related decisions and consumption occurs privately, without the scrutiny of external observers. In such scenarios, the influence of social self-signaling on the choice is minimal, while private self-signaling can play a prominent role.

Consumer behavior theory underscores the notion that individuals are particularly attuned to their self-perception, specifically how they perceive themselves (Bodner & Prelec, 2003). As posited by Bodner and Prelec (2003), individuals may adapt their behavior to manage their self-image. These endeavors aimed at maintaining favorable self-perceptions are commonly referred to as "private self-signaling." Private self-signaling can be described as the process through which consumers utilize their choices to gain insights into their internal attributes (Dixon & Mikolon, 2021). Benabou and Tirole (2000) propose that private self-signaling can be rationalized as an effort to influence the beliefs of a future self that may not retain the original rationale behind the behavior at the initial point in time.

As stated by Darke and Chung (2005), the act of choice can result in the benefits of private self-signaling. According to this theory, positive private self-signals from decisions increase a product's overall consumption value (Zeithaml, 1988). Thus, in addition to functional value, a private self-signaling approach proposes that consumers connect ethical value to understanding or embracing aspects of their true selves (Dixon & Mikolon, 2021).

Private self-signaling can also explain environmentally conscious consumption behavior. Opting for a sustainable product over a conventional one has been found to lead to immediate associations, such as indirect advantages like improved ethical considerations, such as reduced chemical usage (Newman et al., 2014). Consequently, the choice of a sustainable product over a regular one has been linked to a sense of altruism for the greater good of society, signifying virtues such as pro-sociality and responsibility. Conversely, opting for a conventional product over a sustainable one may indicate negative attributes, such as materialism or frugality (Verplanken & Holland, 2002). For instance, when a consumer purchases a green product, they may perceive it as evidence of their environmental consciousness, even though its actual impact on the environment may be relatively minor (Dixon & Mikolon, 2021).

### 2.1.5 Perceived aesthetic

The aesthetics of products, including aspects like color, pattern, balance, and proportion, have been found to positively impact customer perception and product acceptance. Consumers generally prefer buying products that exhibit better color combinations and design elements, which can be particularly prominent in well-designed sustainable products (Pandey, 2022)

Luch, Brower, and Chitturi (2012) discovered the significant impact of product aesthetic design on increasing the likelihood of choosing sustainable products. It notes that superior aesthetic design plays a crucial role, having a disproportionately positive effect on the choice likelihood of sustainability-advantaged products compared to performance-advantaged ones. This is attributed to the ability of superior aesthetic design to address potential concerns associated with sustainable products.

Zafarmand et al. (2003) conducted a study focusing on the perceived aesthetics of sustainable products, identifying "aesthetic durability" as a pivotal factor. The research clarified that the key components of aesthetic durability encompassed a "fashionable or neutral design" along with a "timeless or classic design." This implies that the study delved into how the enduring visual appeal of sustainable items is associated with specific design characteristics, blending both contemporary and timeless elements. Subsequent research has also indicated that consumers tend to perceive sustainable products as more visually appealing (Zhang et al., 2023). This was further supported by the notion that sustainability cues in products positively impact the perceived aesthetic value, likely due to the association of naturalness and environmental consciousness with notions of beauty and design excellence.

### 2.1.6 Perceived innovativeness

Sustainability is undoubtedly one of the most significant innovation problems of our day, and it has long been identified as a driver of innovation (Nidumolu et al., 2009). When consumers observe a company's efforts to change and become more sustainable (compared to other types of efforts to change), they are more likely to perceive the company as more innovative (Jørgensen et al, 2022). Perceived innovativeness is the consumers' perception of a long-lasting corporate competency that results in original, creative, and market-impacting ideas and solutions (Kunz et al., 2011). Jørgensen et al. (2022) discovered in their study that perceived innovativeness was one crucial mechanism explaining the relationship between perceived sustainability improvements and trust in the organization. This indicates that the factors

sustainability and innovation have a positive impact on consumer impression in decision making.

To signal innovativeness to consumers can be a great way to raise consumer engagement. A study by Henard and Dacin (2010) found that a reputation for product innovation has a significant main effect on consumer excitement. This is a common emotion in the marketplace (Pham & Sun, 2020), and it is characterized by a pleasantly solid emotional state (Russel, 1980). Excitement, like other emotions, influences consumer behavior both directly and indirectly through its impact on evaluations of predicted consequences (Andrade et al., 2016). Furthermore, when this emotion becomes more intense, it has an increasing influence on behavior (Andrade et al., 2016). In a study, Derbaix and Pham (1991) found that excitement was the second most often reported feeling of affective reactions to consumption choices.

In a study by Maehle et al. (2011) the feeling of excitement is divided into symbolic and experiential benefits. It is reasonable to believe that the symbolic feelings of excitement are involved in sustainability. Also, a study by Rezvani et al., (2018) found that the excitement generated by sustainable products is believed to increase the likelihood of making a green purchase.

## 2.2  Immediate emotions

Emotions are defined as states of conscious feelings (Lazarus, 1991; Rezvani, 2017) and play a central role in our social lives. They signal people's immediate reactions to events in the world, (Ellsworth & Scherer, 2003) and cause many behaviors - both intentional and unintentional (Bargh & Williams, 2007). While choosing a product or action, consumers assume possible future emotions, which influences their behavior (Connolly & Zeelenberg, 2002). They choose things that they believe would make them feel good and avoid those that they believe will make them feel bad (Frijda et al., 1989; Rezvani, 2017).

A study investigating the impact of emotions on consumer decision-making (Achar et al., 2016) revealed that incidental emotions play a significant role in affecting various consumer responses, including perception and brand choice. Incidental emotions, described as "Prior or Unrelated Environmental Contexts/Personality traits," align closely with the focus of our study on immediate emotions. This underscores the crucial role immediate emotions play in decision-making.

Further, the influence of emotions on sustainable consumer behavior appears to be noteworthy. Several studies have discovered that emotion has a significant role in predicting an individual's propensity to participate in mitigation and adaptation activities related to climate change (Van Valkengoed & Steg 2019; Xie et al., 2019; Brosch, 2021; Geiger et al., 2021). However, it is not always apparent whether they have a positive impact on climate action, for example buying green products (Brosch, 2021). Upon reviewing the literature on emotions related to sustainability, the feelings of hope, fear, pride, and guilt emerged as the most convincing ones. These feelings are linked to the potential risks of not operating sustainably as well as the decision to take a proactive or passive role in reducing these risks. We'll review them in the sections that follow.

## 2.2.1 Hope and fear

Two strong emotions that can influence how information is processed and consumer choices are fear and hope (Lee et al., 2017). In their research, these emotions are categorized as anticipation-related emotions, providing a clearer understanding of how assumptions can be formed through their utilization. Fear and hope, often regarded as complementary emotions, are grounded in the evaluation of goal congruence. Striving towards an envisioned goal gives rise to hope, whereas the perception of impediments or deviations from the goal instigates fear. Appeals invoking fear tend to elicit unfavorable assessments, while appeals to hope are linked with favorable appraisals (Underhill, 2012).

Fear is defined as "the sense of a threat to some component of well-being, right along with the feeling of incapacity to meet the challenge" (Gill & Burrow, 2018). This unpleasant feeling is connected to fear, dread, anxiety, and anxiety over negative outcomes (Spears et al., 2012). Fear has been proven in studies to have a positive impact on climate engagement attitudes, intentions, and behaviors (Van Zomerenet al., 2010; Skurka et al. 2018), which is driven by the fact that fear increases risk perceptions and concerns (Skurka et al., 2018; Van Zomeren et al., 2010). For instance, in the study "Reassessing the Impact of Fear Appeals in Sustainable Consumption Communication" by Yu and Lu (2023), the influence of fear on sustainable choices and behaviors was examined. This research focused on the impact of messages that combined high levels of fear with explicit efficacy statements and a pronounced sense of consequences. The results indicated that fear, when effectively communicated, acted as a significant motivator, driving consumer behavior towards more environmentally responsible

choices. This suggests that fear is linked to the perception of non-sustainable choices as being unfavorable or risky, thus encouraging a shift towards sustainable alternatives.

Hope on the other hand, can be described as a positive motivational state rooted in a belief in one's ability to influence outcomes (Snyder et al., 2022). Studies have also stated that since hope improves one's ability to influence outcomes, it helps one align one's goals. This can further improve their attitude and increase their desire to act (O'Neill & Nicholson-Cole 2009; Lee et al. 2017). Previous research has demonstrated that hope has a favorable impact on consumers' brand satisfaction and attitudes (MacInnis & De Mello, 2005). The feeling of hope is often advised when it comes to environmental education, (Ojala, 2012; Stevenson et al., 2018) and research has found that hope is most likely an essential motivator for environmental engagement (Lueck, 2007; Hicks, 2014).

Exploring framing effects related to hope and fear in the context of sustainable choices adds an intriguing dimension to understanding how the presentation of information (positive/ negative) shapes perceptions and decisions. White et al. (2011) delved into the impact of loss-framed versus gain-framed messages on consumer recycling behaviors. Their findings revealed that loss-framed messages were more effective with concrete mind-sets, while gain-framed messages were more impactful with abstract mind-sets. In summary, the study suggests that both framing approaches can boost intentions for recycling behavior, emphasizing the importance of aligning message framing with the consumers' mindset. This research can be linked to the variables of hope and fear influencing sustainability choices, prompting further exploration of how these emotional factors potentially shape product choices between sustainable and non-sustainable options.

## 2.2.2  Guilt and pride

Guilt and pride, two emotions with the potential to shape information processing and consumer choices, share similarities in their evaluation and impact on moral consumption situations. Both emotions involve an appraisal process, with guilt arising from goal incongruence and pride stemming from goal congruent events (Antonetti & Maklan, 2014).

Pride is a positive emotion linked to a sense of achievement and self-worth (Antonetti & Maklan, 2014). A study conducted by Yan et al. (2023) notably demonstrated that pride augments sustainable behavior and intentions when the value of self-enhancement is prioritized. Additionally, a separate study by Onwezen et al. (2014) ascertained that pride

concerning environmental matters mediates the effects of attitudes and social norms on the intentionality of sustainable consumption choices. Antonetti & Maklan (2014) also deduced that pride exerts a positive influence on the consumer's future intentions to purchase sustainable products.

The concept of guilt is seen as a negative feeling, linked to negative responses to external elements, and is perceived as a direct consequence of personal action (De Lima et al., 2019). In the realm of research exploring the link between guilt and sustainable consumer behavior, "anticipated guilt" has garnered significant attention (Antonetti & Maklan, 2014). Anticipated guilt is defined as "guilt that arises from contemplating a potential violation of one's own standards", which often leads consumers to (Cotte et al., 2005) adjust their choices to avoid feeling guilty (Mellers & McGraw, 2001; Antonetti & Maklan, 2014).

The fact that environmental conservation is a widely recognized moral standard (Peloza et al. 2013), it is expected that individuals will feel guilty when they breach their perceived sense of obligation toward the environment (Theotokis & Manganari, 2015). This is also corroborated by the research conducted by Steenhaut and Kenhove (2006), which demonstrates that guilt can influence people to act in a pro-environmental manner (White et al., 2019). Additionally, Mallett (2012) crafted a distinct definition for "eco-guilt"; a form of guilt experienced when people think about times, they have not met personal or societal standards for environmental behavior", which has consequently been associated with environmentally friendly behavioral intentions (Mallett, 2012; Antonetti & Maklan, 2014).

## 2.3 Our contribution to the literature

Our unique contribution lies in the integration of diverse variables within the categories of simple cognitive inferences and immediate emotional reactions. Unlike studies that narrowly concentrate on a limited set of factors, we comprehensively explore the wide-ranging nature of consumer responses, providing a varied perspective on the complex relationships between cognition and emotion in sustainable consumption decisions.

Furthermore, this research also centers on how individuals make rapid decisions and experience immediate emotions when choosing between sustainable and non-sustainable products. While prior research has examined some of the same cognitive inferences and emotions in the context of sustainability, this study will specifically emphasize the swift thoughts and emotions that emerge when product information is limited. For instance, even though most of the factors we are investigating have been thoroughly examined in the context of sustainability (Skurka et al., 2018; Van Zomeren et al., 2010; Lueck, 2007; Hicks, 2014; Antonetti & Maklan, 2014), there is limited prior research that has explored them with a focus on simple rapid reactions to constrained product information. This unveils a critical dimension of how consumers rapidly perceive and respond to sustainability cues.

Moreover, according to our knowledge, the interplay of hope and fear in the context of product selection—specifically between sustainable and non-sustainable products—has not been collectively investigated in prior studies. Previous research has separately scrutinized the influence of hope on general product choice (Maclnnis & de Mello, 2005) and the role of fear in sustainable product selection (Yu & Lu, 2023). However, there is an absence of scholarly inquiry into the simultaneous examination of these two emotions during the decision-making process in the realm of sustainable product choices. Consequently, we aspire to contribute to the exploration of this area.

Additionally, this study delves into the domains of private and social self-signaling within the context of inference-making in sustainable consumption. While these topics have previously been explored individually in prior research (Peattie, 2010; Guo et al., 2020; Elliott, 2013; Newman et al., 2014; Dixon & Mikolon, 2021), our investigation uniquely examines them in tandem. By investigating the relative significance of private versus social self-signaling in the context of sustainable product selection, our study offers a distinctive amalgamation not extensively addressed in the existing literature. This integration yields a more profound

comprehension of the interplay between private and social self-signaling in sustainable product choice, constituting a significant contribution to the field.

We also believe that this study will enhance the existing literature on the perception of femininity in sustainable products by examining this relationship from multiple dimensions and in conjunction with other cognitive inferences. While previous research has primarily concentrated on how femininity acts as a barrier to sustainable product choices (Brough et al., 2016; Luchs et al., 2010), we expand the scope to encompass its influence on product selection across various dimensions, as well as examining this barrier alongside other cognitive conclusions. This multifaceted approach offers novel insights into the role of femininity concerning sustainable products.

Building on prior research we address a potential weakness by neutralizing the influence of colors to avoid biases. This precise approach enhances the robustness of our findings and adds a scientific contribution to the literature, demonstrating our commitment to quality in method.

# 3. Research model and hypotheses

Drawing from both our literature review and our own conceptual framework, we will articulate the hypotheses of our study and introduce the research model. These hypotheses will be founded on the premise that we aim to investigate whether there are significant differences in how the two products are rated across various cognitive inferences and immediate emotions, and that we aim to explore how these factors affect product preference when choosing between a sustainable and non-sustainable product. The research model merely serves as an illustration of the latter, proposing that the selection of simple cognitive inferences and immediate emotions will exert an influence on the preference for the sustainable product.

**Figure 1: Research model**
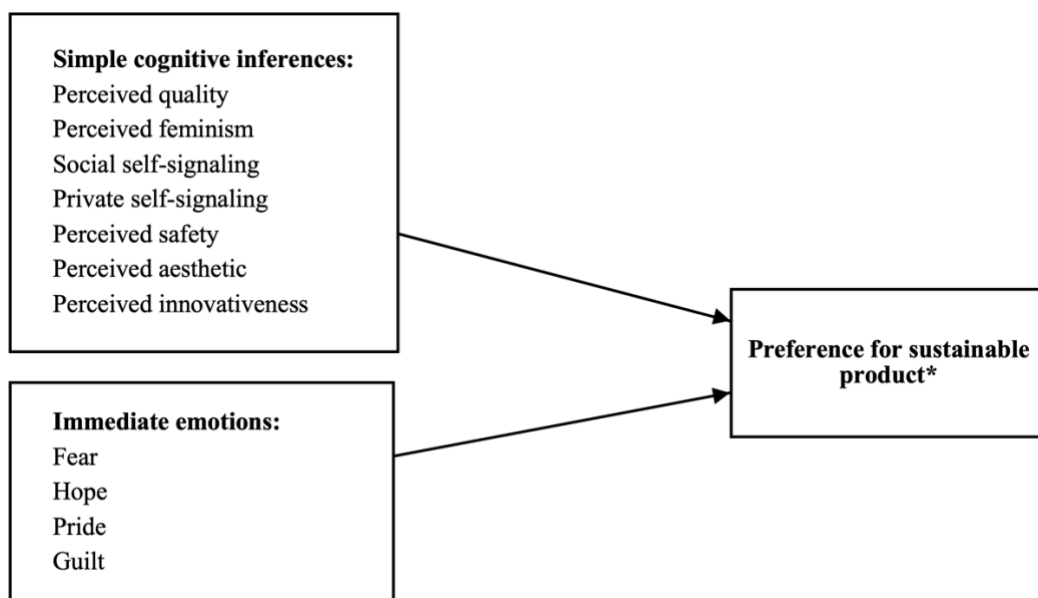


*Note: * In this context, preference for the sustainable product will encompass: 1) the selection of the sustainable product in product choice, 2) the selection of the sustainable product as a gift, and 3) willingness to pay more for the sustainable product.*

As outlined in the literature review, consumers' product choices can serve to validate their self-concept or disclose aspects of their personalities and character (Dhar & Wertenbroch, 2012). Drawing on previous research suggesting that sustainability enjoys greater social acceptance (Elliott, 2013), and that individuals are willing to purchase green products as a form of self-sacrifice in public (Guo et al., 2020), we hypothesize that individuals are more likely to choose the sustainable product when they believe it will project a positive image of their personalities and character to the public.

Additionally, we posit that choosing the sustainable product may make individuals feel better about themselves, aligning with the concept of private self-signaling. This proposition finds support in prior studies indicating that opting for a green product over a conventional one can result in immediate associations, such as indirect benefits like improved ethics and heightened selflessness (Newman et al., 2014; Verplanken & Holland, 2002).

Moreover, Bearth (2016) argued that people perceive environmentally friendly cleaning products as safer than their non-sustainable counterparts. Consequently, we hypothesize that if individuals have concerns about the safety of each option, perceived safety will act as a positive driver for selecting the sustainable product.

There is also research demonstrating that sustainable products are often perceived as more aesthetically pleasing (Zafarmand et al., 2003), and this perception contributes to purchasing behavior (Luch et al., 2012).

Finally, research conducted by Jørgensen et al. (2022) revealed an association between sustainability and innovativeness, suggesting that innovative products can be enticing to try. Therefore, we also hypothesize that perceived innovativeness will function as a positive driver for choosing a sustainable product. Given these theoretical foundations, we have formulated the following hypotheses:

*H1-A: The sustainable (vs. unsustainable) product is rated higher on a) social self-signaling, b) private self-signaling, c) perceived safety, d) perceived aesthetic appeal, and e) perceived innovativeness.*

*H1-B: The inferences postulated in H1-A will have a positive effect on a) preference for the sustainable product, b) preference for the sustainable product as a gift, and c) willingness to pay more for the sustainable product.*

Several studies have revealed that a perceived "trade-off" between sustainability and quality represents a significant impediment to the selection of sustainable products (Joshi & Rahman, 2015). Consequently, there exists a negative association between assessments of functional quality and sustainability (Luchs et al., 2010). Additionally, research conducted by Lin and Chang (2012) demonstrated that consumers perceive environmentally friendly cleaning supplies as significantly less effective. Based on these studies, we hypothesize that the

sustainable product will be perceived as lower in quality compared to non-sustainable alternatives.

*H2-A: The unsustainable (vs. sustainable) product is rated higher on perceived quality.*

Drawing on the findings of Santy and Atika's (2020), which underscored the pivotal significance of perceived quality in the context of purchase decisions, and the research conducted by Govindaraj and Pradeep (2023), which highlighted the intricate relationship between product quality and purchase intention, it can be inferred that this conclusion, when applied to the sustainable product, is also likely to exert a strongly positive influence on the selection of the sustainable product.

*H2-B: Perceived quality will have a positive effect on a) preference for the sustainable product, b) preference for the sustainable product as a gift, and c) willingness to pay more for the sustainable product.*

Furthermore, previous research has consistently indicated that environmental friendliness and green products are linked with femininity (Brough et al., 2016). This observation has been corroborated by other studies that have also highlighted the frequent categorization of green items as "feminine products" (Newman et al., 2014; Joshi & Rahman, 2015).

*H3-A: The sustainable (vs. unsustainable) product is rated higher on perceived femininity.*

However, the assumption that the product is considered feminine is identified as a barrier for preference for product choice in a strong product category because it violates the efficiency attribute that is important in the category (Davis et al., 2022; Felix et al., 2022; Luchs et al., 2010). In accordance with this we therefore have the following hypothesis:

*H3-B: Perceived femininity will have a negative effect on a) preference for the sustainable product, b) preference for the sustainable product as a gift, and c) willingness to pay more for the sustainable product.*

Regarding immediate emotions, existing research has shown that emotions significantly influence individual consumption choices (Connolly & Zeelenberg, 2002; Achar et al., 2016). In the context of environmental conservation, which is increasingly recognized as a moral standard (Peloza et al., 2013), choosing sustainable products is often associated with positive emotions. For example, selecting a sustainable product aligns with this moral standard and is

expected to elicit feelings of pride, contributing to a sense of societal well-being. This positive emotional response reinforces the individual's decision, supporting the idea that sustainable choices are not only environmentally responsible but also personally rewarding.

*H4-A: The sustainable (vs. unsustainable) product is rated higher on the positive emotions hope and pride.*

*H4-B: The positive emotions will have a positive effect on a) preference for the sustainable product, b) preference for the sustainable product as a gift, and c) willingness to pay more for the sustainable product.*

Considering our focused inquiry into the negative emotional dimensions of consumer choices, we have developed hypotheses based on the premise that negative emotions significantly influence preferences for products. Our reasoning is grounded in the idea that choosing non-sustainable products likely invokes feelings of fear and guilt due to their adverse environmental impacts (Theotokis & Manganari, 2015; Skurka et al., 2018; Van Zomeren et al., 2010). We anticipate that the unsustainable product will be linked with feelings of guilt and fear. If, however, the sustainable product elicits these negative emotions, this could negatively impact their appeal and consumer decisions.

*H5-A: The unsustainable (vs. sustainable) product is rated higher on the negative emotions fear and guilt.*

*H5-B: The negative emotions will have a negative effect on a) preference for the sustainable product, b) preference for the sustainable product as a gift, and c) willingness to pay more for the sustainable product.*

# 4. Study 1: Analysis of secondary data

The purpose of Study 1 is to conduct a further examination of secondary data obtained from a study by Landsvik et al. (2023). The original study aimed to investigate whether sustainability is viewed as a positive asset (the Sustainability-Asset hypothesis) or a negative liability (the Sustainability-Liability hypothesis) when individuals evaluate products and make real-life consumer choices. This was achieved by presenting participants with two household cleaning sprays, specifically, two "grill and BBQ sprays." One spray had sustainable attributes, such as a fully green design, was labeled with the sustainability core attribute "100% natural ingredients," and was named "Eco-Sera." The other was a non-sustainable (conventional) product named "Sera." Subsequently, participants were divided into two groups, one participating in a hypothetical product choice scenario and the other in a real (incentivized) product choice scenario. An analysis was then conducted to investigate whether there were disparities in the outcomes between these two scenarios. Additionally, a mediation analysis was performed, employing various factors representing diverse cognitive inferences. This analysis aimed to explore whether these cognitive inferences could elucidate any effects on product choice in both hypothetical and real-life situations.

In this study, we aim to utilize several of these identified mediator mechanisms between actual and hypothetical choice scenarios to conduct a driver analysis. Consequently, we will employ the existing dataset to determine the extent of influence that these cognitive inferences have on product preference. We have selected the variables that we deem the most pertinent and compelling based on our comprehensive literature review. Given that Study 2 will be a follow-up study exclusively comprising hypothetical choices, we will utilize data solely from the hypothetical choice scenarios.

## 4.1 Method

### 4.1.1 Description of the study and dataset

***Participants and sample***
Landsvik et al.'s (2023) study employed an online survey as its data collection method, which was designed using the web-based application Qualtrics. Participants were recruited through the Norstat online panel, a leading national data collection agency in Norway. A total of 381 participants provided consent, passed attention and comprehension checks, and completed the

survey, with 188 of them responding to hypothetical choice scenarios. Therefore, these 188 respondents constitute the sample for this follow-up study.

The average age of the sample was 45.81 years (SD = 17.526), with ages ranging from 18 to 82 years. The sample consisted predominantly of females (54.8%), while males made up the remaining 45.2 percent. In regard to educational background, the majority of participants (61.2%) held a university or college degree, followed by 30.9 percent who had completed high school, and 4.3 percent with a primary school education.

### *Variables and measures*

A comprehensive overview of the relevant variables and their respective scales is provided in Appendix A1. Since the study was conducted in Norwegian, all questions and descriptions have been translated into English.

The dependent variable in the study, representing the choice between the two household sprays, was labeled "Product choice." It was treated as a dichotomous variable, with a value of 0 indicating Sera (the non-sustainable product) and a value of 1 indicating Eco-Sera (the sustainable product).

The explanatory variables represented various cognitive inferences identified in our literature review. These inferences included perceived quality (measured with the variable "most effective"), social signaling (measured with the variables "positive person" and "display"), perceived aesthetics (measured with the variable "design"), perceived safety (measured with the variable "safe"), and perceived innovativeness (measured with the variables "exciting" and "innovative"). All measurement items for these constructs were designed using 5-point Likert scales, where 1 indicated that the non-sustainable product was significantly superior, 2 indicated that the non-sustainable product was slightly superior, 3 indicated that the two products were equal, 4 indicated that the sustainable product was slightly superior, and 5 indicated that the sustainable product was significantly superior. This consistent measurement approach was applied to all explanatory variables, and the resulting data were treated as interval data. We adopted this approach because it allows for the quantification of the difference between any two data values for a variable, even though it does not determine the relative difference (Saunders et al., 2016).

Demographic variables such as "age," "sex," and "education" were integrated as control variables. In this context, "age" was considered a continuous variable, while "sex" was treated

as a dichotomous variable where 0 denoted male and 1 denoted female. Furthermore, education level was initially treated as a categorical variable where 1=Primary School, 2=High School, 3=College/University, 4=Prefer not to answer. However, as we aimed to control for differences in product preference across education levels, a transformed version of this variable was created, with 0 representing lower education levels (which encompassed primary and high school), and 1 representing higher education levels (college/university). Those who responded with "prefer not to answer" were treated as missing data.

Additionally, we considered the variable "price," which measured respondents' assumptions regarding the price of the products, and the individual trait variable "Green consumption values" (referred to as "green cv"), which addressed inherent differences in respondents' levels of environmental consciousness, as relevant control variables. The "price" variable utilized the same 5-point Likert scale as the other explanatory variables, while "Green consumption values" were assessed using four questions on a 7-point scale. This measurement approach was based on the established scale used in the study by Haws et al. (2014), with the modification of using only four out of six questions in this context. Both variables were treated as continuous in the dataset.

Furthermore, we incorporated a measure to assess which of the two products respondents perceived as the most environmentally friendly, referred to as "ecofriendly," as a manipulation check in our analysis. This variable was also assessed using the same 5-point scale as the explanatory variables. Consequently, this variable will not be further integrated into the analysis as a potential cognitive inference driving product choice but will solely undergo examination as part of the descriptive analysis.

In the survey, the dependent variable was initially presented to respondents, followed by the explanatory variables, control variable "price" and the manipulation check "eco-friendly," presented in randomized order. The control variable for "Green consumption values" and the demographic variables were presented at the end of the survey.

## 4.1.2 Analytical approach

As an analytical tool, we used the statistical software Jamovi (Version 2.3.28.0). This is a free and open-source computer program designed for data analysis and conducting statistical tests. The program is built on top of the R statistical language and offers a wide range of statistical analyses through various modules, including the ability to input R codes and analyze data

using R within the program (The jamovi project, 2022). Visualization of outputs was both generated directly from Jamovi, and some of the tables and diagrams were condensed within Microsoft Excel.

To assess whether the data meet various assumptions for the statistical tests we will employ, we will initially conduct both descriptive statistics and VIF (Variance Inflation Factor) analyses. Subsequently, we will utilize descriptive analysis, binomial tests, and one-sample t-tests to examine the distribution in the dependent variable and test the hypotheses regarding whether there are significant and distinct rankings of the two products across all explanatory variables.

In addition to testing the hypotheses concerning the distribution, we have also used correlation analysis, chi-square analyses and one sample t-tests to determine if the control variables exhibit a significant association with product preference.

As this study aims to examine the effects on product choice, we will employ multiple regression analysis to test the hypotheses regarding these effects. This type of analysis allows us to assess the strength of the relationship between the dependent variable and the independent variables (Saunders et al., 2016, p. 616). For a binary dependent variable, like "product choice," using ordinary least squares (OLS) regression may yield unrealistic predictions for the response variable. This is because the conditional variance of the error terms depends on the independent variables and is consequently not constant, thereby violating the assumption of homoscedasticity (Tufte, 2000). Therefore, we will utilize a binary logistic regression analysis, which relies on a probability estimation method known as Maximum Likelihood Estimation (MLE) (Tufte, 2000). The model maximizes the probability of the dichotomous dependent variable having a value of 1 while being influenced by various independent variables.

In the logistic regression analysis, Nagelkerke's $R^2$ was utilized as a measure of model fit. This explanatory measure is a modification of the Cox and Snell $R^2$, adjusted to a scale with a maximum value of 1. This adjustment allows for a more interpretable comparison with the $R^2$ from linear regression (which will be used in Study 2) and provides an estimate of the explained variance relative to the maximum possible variance that could be explained by the model given the data.

Unlike the traditional OLS method, which provides standard coefficients, logistic regression employs odds ratios to elucidate the impact of predictors on the dependent variable. Odds ratios (OR) describe the relative probability of the outcome variable occurring with a one-unit change in the predictor variable while holding all other variables constant (Tufte, 200). An OR greater than 1 indicates that the event is more likely to occur as the predictor increases. Conversely, an OR less than 1 suggests that the event becomes less likely as the predictor increases. In the context of product choice as the dependent variable, an OR greater than 1 implies a positive association (greater likelihood of choosing the sustainable product), while an OR less than 1 would suggest a negative association (lower likelihood of choosing the sustainable product). When the OR is equal to 1, it signifies that the predictor has no effect on the probability of the outcome. To precisely estimate the percentage change in probability, the OR can be converted into a percentage increase using the formula (OR - 1) × 100%.

## 4.2 Analysis results

### 4.2.1 Test of assumptions

Given the utilization of various statistical tests, it becomes imperative to examine whether the data meet different assumptions. For the application of t-tests, binomial tests, chi-square analyses, and correlation analyses, it is essential to assess normality and independent observations.

*Normality*
The assumption of normality pertains to the degree to which the distribution of the sample data resembles a normal distribution. This implies a symmetric, bell-shaped probability distribution where most observations cluster around a central mean with decreasing frequency toward the extremes. To assess whether the data satisfy the assumption of normality, descriptive statistics such as standard deviation (SD), skewness, and kurtosis were computed, and normality was tested using the Shapiro-Wilk test.

The results, provided in Appendix A2, indicated that skewness values ranged from -0.846 for "ecofriendly" to 0.345 for "most effective," and kurtosis values ranged from -0.7117 for "green cv" to 0.7186 for "ecofriendly." While some skewness and kurtosis values were relatively close to 0, suggesting an approximate normal distribution, the highly significant p-values from the Shapiro-Wilk test confirmed that the distributions of these variables were not

normally distributed. However, it's important to note that the sample size of this study is relatively large (N = 188), and we assume that this would not exert a significant influence on the tests due to the increased statistical power resulting from reduced sampling error (Hair, 2006). When conducting the correlation analysis, we will, however, utilize Spearman's rho correlation, as it is more appropriate for use with Likert scales since it employs ranks rather than making assumptions about normality.

*Independent observations*

Independent observations imply that the outcome of one observation is not influenced by or correlated with the outcome of another observation (Hair, 2006). Given that participants were recruited through Norstat panel, which invites eligible and individual participants via email, it can be assumed that there is a minimal risk of interdependence between the observations.

*Assumptions for a logistic model*

Furthermore, we also need to assess whether the data meets the assumptions for a logistic model. This entails that the dependent variable must be binary, the odds are assumed to be dependent on a set of independent variables, the unit selection must be large and randomized, and there must be an absence of multicollinearity (Tufte, 2000). We ascertain that the first three assumptions are met based on the dataset description. To assess the final assumption concerning multicollinearity, which ensures that none of the predictor variables exhibit high correlations with each other, we conducted an examination of the Variance Inflation Factor (VIF) values of the variables (see Appendix A2). All variables had VIF values below the threshold of 10, as recommended by Hair (2006), thus maintaining the assumption of no multicollinearity.

## 4.2.2 Hypothesis testing: Differences in ratings

As described in Section 4.1.1, all explanatory variables were measured using a 5-point scale where values above 3 indicate that the sustainable product is perceived as superior, while scores below 3 indicate that the non-sustainable product was considered superior. The value of 3 represented the neutral point. To test the hypotheses related to whether respondents rate the sustainable vs. the non-sustainable product higher on the various cognitive inferences, we will employ statistical tests, specifically one-sample t-tests, to determine if the ratings of the variables significantly differ from the neutral value of 3. Given that this study encompasses variables related to social self-signaling, perceived safety, perceived aesthetic appeal,

perceived innovativeness, and perceived quality, we will conduct tests specifically for H1-A and H2-A.

Prior to the actual hypothesis testing, we will initially examine the distribution of the dependent variable, which is product choice. This was achieved by analyzing descriptive statistics and testing whether the various choices significantly deviated from what would be expected in a random choice distribution using a binomial test. Detailed results from all these analyses are provided in Appendix A3.

An examination of the frequency table of product choices reveals that out of the 188 participants, the majority, at 68.6%, selected the sustainable product, while 31.4% of participants opted for the non-sustainable product (as visualized in Figure 2 below). This clearly indicates a preference for the sustainable option among the respondents. The results of the binomial test demonstrated a significant departure from the expected distribution, where each of the two products would be chosen with equal probability ($p < 0.001$ for both products). This implies that the selection between the non-sustainable product and the sustainable product was not a random decision but rather reflected a specific preference among the participants.

**Figure 2: Distribution of Product choice**
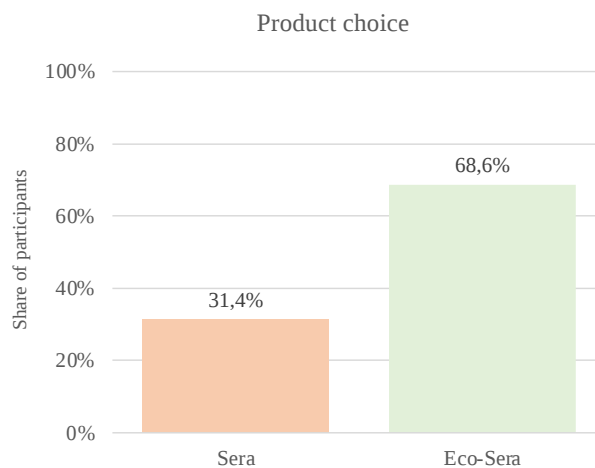


*Note: The deviation between the two choices was statistically significant at a 0.1% significance level.*

Regarding the hypothesis's tests regarding the explanatory variables, Figure 3 presents a visual comparison of the average scores for all the measures. The results from the descriptive analysis indicate that the mean values for all variables, except for "most effective" (M=2.33), exceed the neutral midpoint of 3. This implies that, on average, the non-sustainable product is

considered more effective, whereas for the remaining explanatory variables, the sustainable product is perceived as superior.

The results from the t-tests provided further support for the findings of the descriptive analysis. The variables "positive person" (t = 12.60), "design" (t = 7.27), "exciting" (t = 5.88), "safe" (t = 15.14), "display" (t = 7.36), and "innovative" (t = 9.63) all exhibited significant positive t-values (p < 0.001), aligning with hypothesis H1-A. Furthermore, the variable "most effective" also demonstrated a significant negative value of -10.01 (p < 0.001), supporting hypothesis H2-A, which suggested that the unsustainable product would be rated higher in terms of perceived quality.

**Figure 3: Overview of the mean scores**
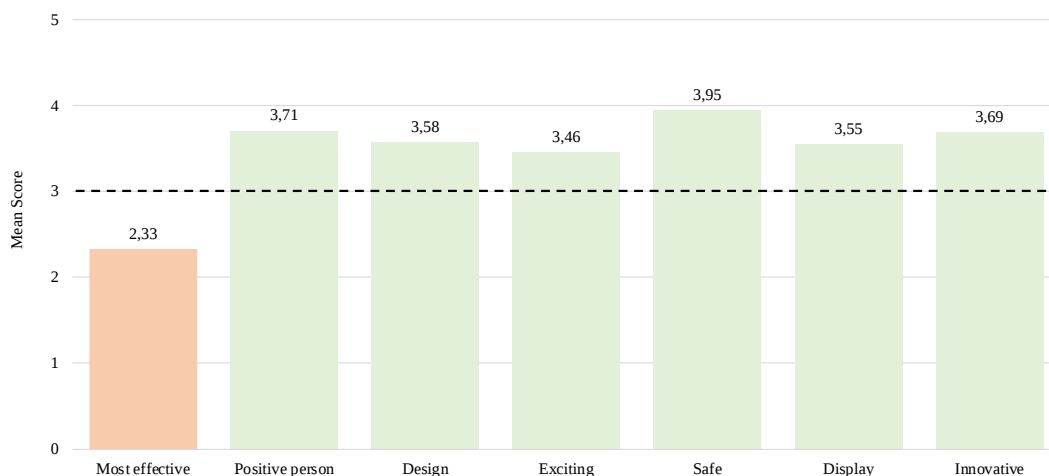


*Note: Values above the line (> 3) indicate that the sustainable product is perceived as superior (hence, the green color on the bar), while scores below the line (< 3) indicate that the non-sustainable product was considered superior (hence, the orange color on the bar). All variables exhibit statistically significant deviations from the neutral value of 3 at a significance level of 0.1%.*

*Manipulation check*

Concerning the manipulation check related to the attribute "ecofriendly," both the descriptive statistics and the t-test provide evidence of a successful manipulation (see appendix A3). The mean rating for "eco-friendly" is notably high at 4.29, with a standard deviation of 0.749. The t-test also yields a very high t-value (23.66) with a significant p-value (p < .001), indicating that respondents perceived the sustainable product as significantly more environmentally friendly than the non-sustainable product. This validates the differentiation between the two products in terms of their perceived sustainability.

### 4.2.3 Influence of demografic variables and price perception

As mentioned in section 4.1.2, in addition to testing the hypotheses, we also aim to examine whether the control variables are associated with product choice. These control variables represent several underlying factors that may impact respondents' decisions. By conducting separate statistical tests on the control variables, we can identify and address any potential biases or variables that warrant further investigation.

*Influence of age*

To examine the variable "age," which was treated as a continuous variable, Spearman's Rho correlations were utilized. The results of this analysis are outlined in the correlation matrix provided in Appendix A5. The correlation analysis revealed a positive but non-statistically significant association between respondents' age and their product choice (Spearman's Rho = 0.125, df = 186, p = 0.087). This suggests that age does not have an association with product choice in this sample.

*Influence of gender*

To ensure that any patterns or trends in the data are not caused by gender-related differences, a chi-square test for independence was conducted. This type of test is appropriate for evaluating whether two categorical variables are related to each other in a population (Laerd Statistics, n.d.). The results, provided in Appendix A4, indicated a statistically significant difference in product preference between males and females ($\chi^2$ = 10.6, df = 1, p = 0.001). Males showed a higher preference for the non-sustainable product (62.7%) compared to the sustainable one (37.2%), while females demonstrated a reverse pattern, favoring the sustainable product (62.8%) over the non-sustainable one (37.3%). These findings indicate a gender-related preference, with males leaning toward the non-sustainable product, while females demonstrate a stronger inclination toward the sustainable option.

The effect size, which measures the strength of the association between the two categorical variables, was assessed using the Phi coefficient as it is appropriate for use with 2x2 contingency tables. The effect size yielded a value of 0.238, indicating a moderate relationship between gender and product choice. This suggests that while there is a statistically significant relationship, the association is not very strong.

*Influence of education level*

In examining differences in product preference across education levels, we employ the transformed variable treated as dichotomous. The sample consisted of 181 respondents, categorized into two education levels: "0" representing high school or less, and "1" representing college/university education. Therefore, an independence chi-square test was also applied to this variable. The results of the analysis are included in Appendix A4 and shows that among those with high school education or less, 45.5% chose the non-sustainable product while 54.5% chose the sustainable product. Conversely, those with a college or university education showed a higher preference for the sustainable product (67.5%) over the non-sustainable product (32.5%). Nonetheless, there was no statistically significant relationship between education level and product choice ($\chi^2 = 2.76$, df = 1, p = 0.097), thus suggesting that education level does not exhibit any association with product choice.

*Influence of precieved price*

The control variable "price" was, as previously mentioned, measured in the same manner as all explanatory variables, using a 5-point Likert scale. Values above 3 indicate that respondents perceived the sustainable product to be more expensive, while values below 3 indicate that the non-sustainable product was perceived as more costly. The neutral value of 3 indicated that they perceived the products to be equally priced. To investigate whether price plays an underlying role in product choice, we initially conducted a one-sample t-test to determine if the sustainable product versus the non-sustainable product was rated as the most expensive. The results of the test, shown in Table 1 below, revealed a significant t-value of 15.60 (df = 187, p < 0.001), and indicates a statistically significant departure from the neutral midpoint value of 3. The Cohen's d effect size of 1.138 suggests a large practical significance, implying that the perception of cost for the sustainable product is not only statistically significant but also of a magnitude that could influence consumer choices.

**Table 1: One sample t-test of perceived price**

|       | Statistic | df  | p-value | Mean difference | Effect Size |
|-------|-----------|-----|---------|-----------------|-------------|
| Price | 15.60     | 187 | < .001  | 0.787           | 1.138       |

*Note. $H_a$ $\mu \neq 3$ (neutral value)*

However, the Spearman's rho correlation analysis provided in Appendix A5 reveals that there is no significant correlation between product choice and perceived price (Spearman's rho = -0.082, df = 186, p = 0.265). It can be inferred that while the participants acknowledge a higher

price point for the sustainable product, this perception of price does not influence their preference for one product over the other.

## 4.2.4  Hypothesis tesing: Regression analysis

By conducting a binomial logistic regression, we aimed to explore the predictors influencing consumers' choices between a sustainable product and its non-sustainable alternative. The objective was to assess the extent to which simple cognitive inferences related to sustainable products affect preference between the options. As this study focuses solely on the initial set of cognitive inferences from Landsvik et al. (2023) and utilizes "product choice" as the sole dependent variable, our analysis will be limited to testing hypotheses H1-B a) and H2-B a). This entails the exclusion of cognitive inferences not incorporated in this study, specifically private self-signaling and femininity.

Since our predictors are measured on a Likert scale ranging from 1 = the non-sustainable product is superior to 5 = the sustainable product is superior, the odds ratios in this analysis will be construed as indicating that with each one-unit increment on the scale from 1 to 5, the probability of opting for the sustainable product rises. Therefore, if the OR for a predictor exceeds 1, it implies that an increase in that predictor is associated with higher odds of selecting the sustainable product over the non-sustainable product (a positive effect). Conversely, if the OR is less than 1, it signifies that an increase in the predictor is linked to lower odds of choosing the sustainable product (a negative effect).

The statistical measures of model fit, as displayed in Table 2, suggest a robust level of explanation, with a Nagelkerke's $R^2$ of 0.636. This indicates that approximately 63.6% of the variance in product choice is accounted for by the included predictors. A significant $\chi^2$ value of 113 ($p < 0.001$) for the overall model confirms that the predictors, in aggregate, make a substantial contribution to explaining product choice.

**Table 2: Model Fit Measures - Product choice**

| Deviance | AIC | BIC | $R^2_N$ | $\chi^2$ | df | p-value |
|---|---|---|---|---|---|---|
| 120 | 136 | 162 | 0.636 | 113 | 7 | < 0.001 |

Concerning the predictors (shown in Table 3 below), "Exciting," one of the dimensions within the innovativeness construct, displayed a notable and positive association with the preference for the sustainable product, as evidenced by an OR of 1.87 ($p = 0.021$). This implies that for

every one-unit increase in the perception that the sustainable product is more exciting to try than the non-sustainable product, the likelihood of a respondent selecting the sustainable product increases by 87%, while keeping all other variables constant. This finding lends support to certain aspects of what was hypothesized in hypothesis H1-B a), which suggested that perceived innovativeness would have a positive impact on the choice of the sustainable product. However, the other dimension of the construct, "innovative," did not emerge as a statistically significant predictor in this context. The remaining variables also included in H1-B a), such as "positive person," "design," "safe," and "display," did not show significant effects on product choice.

In terms of the construct "most effective," which signifies perceived quality, it was established as a substantial predictor with an OR of 3.64 (p < 0.001). This finding implies that a one-unit increment in the perception of the sustainability product's effectiveness on the utilized scale will result in a 264% elevation in the likelihood of selecting this product over the non-sustainable alternative, while maintaining all other variables at a constant level. This corresponds to the originally hypothesized hypothesis H2-B a), thus providing support for the hypothesis.

**Table 3: Model Coefficients - Product choice**

|                 | Estimate | p-value | Odds ratio |
|-----------------|----------|---------|------------|
| Intercept       | -12.933  | < .001  | 2.42e-6    |
| Most effective  | 1.292    | < .001  | 3.64 ***   |
| Positive person | 0.806    | 0.053   | 2.24       |
| Design          | 0.454    | 0.080   | 1.57       |
| Exciting        | 0.627    | 0.025   | 1.87*      |
| Safe            | 0.140    | 0.682   | 1.15       |
| Display         | 0.585    | 0.059   | 1.79       |
| Innovative      | 0.529    | 0.069   | 1.70       |

*Note: Estimates represent the log odds of "Product choice = sustainable product"*
*vs. "Product choice = non-sustainable product"*
*$p < .05. **p < .01. ***p < .001.*

Furthermore, in light of our support for hypothesis H2-A, which indicates that perceived quality rates higher for the non-sustainable product, it becomes relevant to investigate the inverse effect of effectiveness perception. This examination aims to explore the reduction in the odds of choosing the sustainable product when the non-sustainable product is perceived as more effective (scores below the midpoint). To calculate this, we take the reciprocal of the OR for the sustainable product being considered the most effective, resulting in an OR of 0.275

(1/3.64). The reverse OR for effectiveness demonstrated that perceiving the sustainable product as less effective decreases its odds of being chosen by approximately 72.5%, a odds percentage that is three times lower than the magnitude of the odds percentage when the sustainable product is perceived as more effective.

### *Green Consumption Values as possible moderator*

The results from the correlation matrix, provided in Appendix A5, revealed a robust and statistically significant relationship between green consumption values and all explanatory variables, as well as product preference (Spearman's rho = 0.521, $p < 0.001$). This suggests that individuals with stronger environmental consciousness not only exhibit a higher tendency to choose the sustainable product, but also that these values positively correlate with their evaluations of product attributes.

Henceforth, we chose to undertake an extended regression analysis by incorporating green consumption values as a potential moderator. This decision was made in order to delve into the manner in which individuals' degrees of environmental consciousness might affect the association between product attributes and product selection. The model, provided in Appendix 6, was augmented with interaction terms involving "green cv" and the remaining predictor variables. These interaction terms allow us to examine whether the impact of the initial predictors on product choice is contingent upon the respondent's level of environmental awareness.

The results of the analysis indicated that the interaction term "green cv * most effective" yielded a statistically significant OR of 3.49 ($p = 0.006$). This signifies that the significance of perceived effectiveness in product choice between the sustainable and non-sustainable products varies depending on the respondent's green consumption values. More specifically, since the OR has a positive value, this may suggest that individuals with higher green consumption values are more influenced by perceived effectiveness as a driver for choosing the sustainable product over the non-sustainable one.

Moreover, while "safe" initially exhibited no significant effect in the model without the interaction, this model reveals that the interaction term "green cv * safe" exhibited a positive and statistically significant association (OR = 3.20464, $p = 0.024$). This indicates that the relationship between perceived safety and product preference among product variants varies based on the respondent's green consumption values. The positive value suggests that, for

individuals with higher green consumption values, the perception of a product's safety will have a more pronounced positive impact on their preference for the sustainable product.

### 4.2.5 Additional findings

Prior to performing the regression analysis, a correlation analysis encompassing all the continuous variables was undertaken (see Appendix A5). This preliminary step was executed with the aim of elucidating potential influencers on the dependent variable in the driver analysis. Notably, during this phase, an intriguing observation emerged concerning the control variable "price" and its interactions with the other explanatory variables.

As demonstrated in Section 4.2.3, which explored the influence of price perception, there was no significant correlation between price and product choice for sustainable products. However, a notable and statistically significant negative correlation was identified between price and perceived quality (Spearman's rho = -0.236, $p < 0.01$). This indicates that when participants perceived a sustainable product as having a higher price, they tended to perceive the product as less effective compared to non-sustainable products. Furthermore, a positive correlation was observed between price and perceived safety (Spearman's rho = 0.181, $p < 0.05$), as well as between price and perceived innovativeness (Spearman's rho = 0.181, $p < 0.05$). These correlations suggest that when a sustainable product was perceived as more expensive, it was also evaluated as safer to use and more innovative.

**Table 4: Correlations between price and explanatory variables**

|  | Product choice | Most effective | Positive person | Design | Exciting | Safe | Display | Innovative |
|---|---|---|---|---|---|---|---|---|
| Price | n.s. | -0.236** | n.s. | n.s. | n.s. | 0.181* | n.s. | 0.181* |

*Note. * $p < .05$, ** $p < .01$, *** $p < .001$, "n.s." = not significant*

## 4.3 Summary of Analyses Results

Given that this study utilized pre-existing data with a sample of cognitive inferences, we were only able to test portions of our proposed hypotheses in Section 3. Additionally, this study featured a sole dependent variable, exclusively representing the selection of the sustainable product in the product choice context. Consequently, we solely examined part a) of the hypotheses that posited the impact on preference for the sustainable product.

Hence, in this study, we have empirically tested the following hypotheses:

- *H1-A: The sustainable (vs. unsustainable) product is rated higher on a) social self-signaling, c) perceived safety, d) perceived aesthetic appeal, and e) perceived innovativeness.*
- *H1-B: The inferences postulated in H1-A will have a positive effect on a) preference for the sustainable product.*
- *H2-A: The unsustainable (vs. sustainable) product is rated higher on perceived quality.*
- *H2-B: Perceived quality will have a positive effect on a) preference for the sustainable product.*

**Test of differences in ratings**

Initially, the descriptive statistics revealed that a majority, specifically 68.6% of participants, opted for the sustainable product, while 31.4% selected the non-sustainable product. This distribution was further confirmed not to be random through the use of a binomial test and demonstrates a clear preference for the sustainable product when making a choice between the two options.

In testing hypotheses H1-A and H2-A, one-sample t-tests were employed to determine whether the ratings of the variables significantly deviated from the neutral value of 3. The initial descriptive statistics indicated that the mean values for all variables, except for "most effective," exceeded the neutral midpoint of 3. The results from the t-tests provided additional support for the descriptive analysis, where all distributions were found to be significant. Consequently, hypothesis H1-A that the sustainable product is rated higher on social self-signaling (demonstrated by "positive person" and "display"), perceived safety (demonstrated by "safe"), perceived aesthetic appeal (demonstrated by "design"), and perceived innovativeness (demonstrated by "exciting" and "innovative") was substantiated. Furthermore, hypothesis H2-A that the non-sustainable product is rated higher on perceived quality (demonstrated by "most effective") was also confirmed.

**Test of influence of control-variables**

Regarding potential underlying influencing factors, we examined the control variables of age, gender, education, and perceived price. While age exhibited a positive correlation with product choice, it did not reach statistical significance, suggesting no clear association between age and product preference. Education level also did not exert a statistically significant influence

on product choice, although there was a trend suggesting that higher education correlated with a greater preference for the sustainable product. However, a significant gender difference was observed, with men leaning towards the non-sustainable product and women showing a stronger inclination towards the sustainable option. This finding, however, is not surprising, as previous research has indicated that females may exhibit a higher level of environmental concern compared to males (Lee, 2009; Mostafa, 2007).

Regarding the examination of the influence of the control variable "perceived price," T-test results indicated that the sustainable product was perceived as significantly more expensive among respondents. One might have expected that this perception of price would influence product choice. However, further correlation analysis revealed that this perception did not have a significant impact on product choice. Thus, price did not influence product choice, even though the sustainable product was perceived as the most expensive option.

**Test of influencing predictors**

To test the remaining hypotheses, H1-B a) and H2-B a), we conducted a logistic regression analysis. In the execution of this analysis, the non-sustainable product was utilized as the reference level, as we aimed to investigate which of the cognitive inferences would influence the choice of the sustainable product. In a binomial logistic regression, where the dependent variable is dichotomous, one compares the probability of the outcome in one category against the reference category.

The analysis revealed a significant and positive OR for the predictor "exciting," which represents a dimension of perceived innovativeness, thereby supporting elements of H1-B a). This suggests that with each unit increase in the perception that the sustainable product is more exciting to try than the non-sustainable product, the probability of a respondent selecting the sustainable product increases. Such a perception of greater excitement in trying the sustainable product may influence consumer choices, as individuals tend to be curious about trying something new. Consequently, this aspect could serve as a distinguishing factor for sustainable products in comparison to conventional alternatives.

However, the remaining cognitive inferences tested in H1-B did not exhibit statistical significance. Consequently, the components of that hypothesis, namely social self-signaling, perceived safety, perceived aesthetic appeal, and the "innovative" aspect of perceived innovativeness, were not supported.

Furthermore, we found support for hypothesis H2-B, as perceived effectiveness emerged as a significant and positive driver for the choice of the sustainable product (OR = 3.64). This suggests that when respondents' perception of the sustainable product being more effective than the non-sustainable one increased by one unit, the likelihood of selecting the sustainable product over the non-sustainable one also increased by 264%.

Nonetheless, given that the test of differences in ratings revealed that, on average, respondents rated the non-sustainable product as the most effective one, we also explored the OR for choosing the sustainable product under the assumption that the non-sustainable product was more effective. The inverse OR for effectiveness indicated that perceiving the sustainable product as less effective reduces its likelihood of selection by approximately 72.5%, which is three times lower odds than when the sustainable product is considered more effective.

**Including Green Consumption Values as interaction in regression**

Furthermore, we observed that Green Consumption Values exhibited a strong correlation with both product choice and the remaining explanatory variables. This observation is not surprising, as numerous studies have investigated how individual traits of this nature can impact consumer behavior. Consequently, we included these traits as a potential moderator in the regression analysis, introducing interaction terms with all the other predictors.

The results of the model indicated that perceived quality and perceived safety are moderated by the degree of green consumption values. Both exhibited significant and positive odds ratios, signifying that individuals who place a higher value on environmental consciousness (higher green consumption values) will significantly increase the likelihood of choosing the sustainable product over the non-sustainable one with a stronger perception of effectiveness and safety for the sustainable product.

**Additional findings**

The correlation analysis unveiled a noteworthy inverse association between price and the perceived quality of sustainable products, implying a potential skepticism concerning the value proposition when these products command higher prices. Furthermore, there were positive correlations observed between price and perceived safety and innovation. These results underscore the intricate nature of consumer perceptions regarding sustainable products, where price functions not solely as an indicator of quality but also as an indicator of safety and innovation.

# 5. Study 2: Follow-up study

The purpose of Study 2 is to expand upon the research conducted in Study 1 by incorporating additional explanatory variables that we find relevant and intriguing for further exploration. In doing so, we draw insights from similar studies to introduce new variables and broaden the scope of our analysis. Study 2 serves as a natural extension of Study 1, delving deeper into various dimensions, including cognitive aspects such as feminism, immediate emotional responses (e.g., pride, guilt, hope, and fear), and signaling theory, which encompasses both social and private self-signaling.

In Study 2, we also introduce two new dependent variables: "gift" and "willingness to pay." The "gift" variable captures participants' choices regarding whether they would give the product as a gift, providing insights into how individuals intend to signal themselves, which aligns with our additional explanatory variables. Furthermore, recognizing the well-established barrier of willingness to pay for sustainable products, we include this as a dependent variable. This addition aims to investigate the complex dynamics surrounding willingness to pay and how it is influenced by the explanatory variables, drawing upon prior research (Kaczorowska et al., 2019; Malá et al., 2019; Ozimek & Zakowska-Biemans, 2011; Avitia et al., 2015; Aschemann-Witzel & Zielke, 2017).

In essence, our research design strategically progresses from Study 1, amplifying both the explanatory and dependent variable dimensions for a comprehensive understanding of the factors shaping consumer choices in the sustainability landscape.

## 5.1 Methodology

In this study, we properly followed a procedure within the social scientific method for gathering information about social reality. This includes data analysis and following interpretation of the data and information collected for the study. We will explain the methodologies we used to perform the study in this section of the thesis.

### 5.1.1 Participants and sampling

The sample consists of 400 respondents from the United States, all of which completed the Qualtrics. This was accomplished through Prolific, a website where you can purchase

authentic responders to do your surveys. The respondents' ages ranged from 19 to 75 years old (M = 38,49, SD = 12,55), whereas 49 percent were males, 48 percent were females, 2.3 percent were non-binary, and 0.8 percent classified as others. Regarding educational attainment, 14.2 percent of participants held a high school diploma or lower, 27.8 percent had completed some college or technical training, and 57.8 percent had obtained a college degree or higher as their highest completed or current educational level.

## 5.1.2 Data collection procedure

Our survey was developed and conducted using Qualtrics, a platform that enables the creation of online surveys. Given our utilization of Prolific as the distribution platform, data collection was accomplished expeditiously. This choice allowed us to accumulate a significant quantity of responses within a short timeframe, acknowledging the potential challenges associated with soliciting such many responses via individual email requests. Data collection took place over the course of a single day, specifically on November 13, 2023.

The first step was to conduct a pre-test with a group of 20 friends and family members to ensure that our survey questions were clear and easy to understand. During this pre-test, we analyzed all questions' comprehension and solicited input on their clarity. All replies were positive, indicating that the survey was regarded to be simple to understand. The early testing phase was critical in refining and optimizing the survey instrument for the primary study.

When the survey began, we welcomed respondents to participate in the survey by distributing our survey form through a Prolific profile. To ensure that respondents' responses to the questionnaire were completely anonymous, we configured Qualtrics to not track IP addresses. This eliminated the potential of tracing responses back to an individual's private data. The survey's opening also highlighted the respondent's complete anonymity. This reduced the likelihood of social desirability bias in our study, which occurs when respondents answer questions that will be perceived favorably by others rather than their genuine viewpoint (Saunders et al., 2016).

Using attention checks is a recommended practice in general to ensure the quality of data collection and to filter out individuals who do not provide serious responses to maintain the validity of the data (Kung et al., 2018). Therefore, the first thing the respondents had to answer after the introduction was an attention test. We used the question *"I swim over the Atlantic Ocean to work every day,"* and respondents had to react to the level to which they agreed with

a 4-point Likert scale (a forced scale), ranging from "I strongly agree" to "I strongly disagree". This particular attention check is referred to as a "face validity" attention check or a "content-based" attention check and was obtained from Prolific's own recommendations for attention checks. It discovers participants who do not read the questions thoroughly or answer by chance, by including a question that is clearly incorrect or unrealistic. This is a useful sort of attention check since it detects a lack of attention very well, reducing the possibility of "response bias" (Saunders et al., 2016). All of the respondents passed the attention test; thus, we included them all in the analyses.

When the respondents were directed to the main survey, they were shown a large image of the two sprays, sustainable and non-sustainable, with the text *"These are the two products that you will answer questions about."* This is to ensure that respondents in the two conditions have an identical first impression of the products. In addition, the design of the figures is created specifically for the Survey, and the products do not exist in real life, and will not be known to participants, which contributes to external validity (Dixon & Mikolon, 2021).

In the survey there were 19 questions in total, and all of them were closed questions. According to Saunders et al. (2016), this kind of research is thought to be more appropriate for comparisons and to require less effort and time from the respondent.

It is also worth noting why we included "individual traits" and demographic questions at the end of the survey, and not at the beginning. This is done to prevent answers from being biased by factors such as "Social Desirability Bias" and "Response Order Effects" (Saunders et al., 2016; Grimm, 2010). Additionally, not having this at the start of the survey makes it easier to sustain participant engagement.

### 5.1.3 Methodological choice to address question-order effects

To address question-order effects in our survey, we intentionally employed two different sequences of questions. This approach aimed to reduce biases in how respondents perceive and answer individual items (the 'Item Dimension') and the overall survey (the 'Framework Dimension'), as described by Moore (2002). Our goal was to enhance the reliability and validity of our findings by acknowledging and managing these effects.

Following the methodology of Barbarossa and De Pelsmacker (2016) in their study on eco-friendly purchasing, we randomized the order of questions. Participants were either presented

with dependent variables first and then independent variables, or the opposite. This randomization ensured an almost equal distribution, with 49.5% of participants in one group and 50.5% in the other.

The purpose of this design was to explore "motivated reasoning," as identified by Epley and Gilovich (2016), where participants might justify their responses to dependent variables based on their subsequent answers to independent variables. By varying the order of dependent and independent variables, we could examine if this phenomenon influenced the responses. Those who received independent variables first were in the reverse order condition, allowing us to assess the impact of question sequence on responses.

### 5.1.4  Manipulation of sustainable product

An essential motivation for expanding from Study 1 lies in recognizing limitations associated with the design of the products. In addition to featuring a product-related attribute of "100% natural ingredients" for the sustainable product, the two products also had vastly different designs. Previous research has indicated that sustainable products, and often green itself, can be perceived as more aesthetically pleasing (Zafarmand et al., 2003; Pancer et al, 2015). In Study 1, the sustainable spray featured a full green design, while the non-sustainable product exhibited a complete orange design. These substantial design differences may have introduced biases into the participants' responses. Recognizing this as a limitation, we have undertaken deliberate steps in this study to address and rectify this potential bias.

We retain the same method for manipulation, utilizing the product-related attribute to distinctly signal one spray as sustainable and the other as non-sustainable. However, we proactively tackle the aesthetic bias by modifying both sprays to have an orange color cover. This intentional design choice ensures that both sprays appear identical aesthetically, eliminating potential biases related to the full cover of green or orange. Notably, the sustainable spray, labeled Eco-Sera, maintains its green text, clearly communicating its eco-friendly status. This manipulation is strategically implemented to enhance the internal validity of our study by eliminating potential confounding variables linked to aesthetic preferences. By meticulous consideration and correction of biases, our aim is to present a more accurate and reliable exploration of the causal relationships under investigation. This thoughtful adjustment reinforces the robustness of our experimental design in this study.

## 5.2 Variables and measures

The majority of items on our questionnaire were structured as rating-based questions, a format that enhances the comprehension of opinion data and facilitates its utilization in statistical analyses, particularly when dealing with large sample sizes (Saunders et al., 2016). Specifically, we employed a Likert-style rating scale, in which respondents expressed their level of agreement or disagreement with various statements. The Likert scale, a well-established tool for gauging attitudes, typically comprises five points, with a neutral midpoint (Chyung et al., 2017). Furthermore, we opted for a five-point rating scale as it affords a more nuanced exploration of the generated data (Saunders et al., 2016). It is essential to emphasize that all Likert scales are treated as continuous (interval) variables, a widely accepted approach for handling Likert scale data (Laerd Statistics, n.d.).

The survey employed a uniform 5-point Likert scale consistently across all items to maintain survey coherence and mitigate potential respondent confusion, in line with recommendations by Dillman et al. (2014). Additionally, this standardized approach facilitates subsequent data analysis procedures.

### 5.2.1 Dependent variables

Our study encompasses three dependent variables: product choice, product choice as a gift, and the willingness to pay. In formulating these dependent variables, we conducted an extensive review of prior research to identify established methodologies. This approach is rooted in the recognized benefits of employing pre-existing measures, as it enables comparability with prior research, facilitates reliability assessment, and streamlines the research process (Saunders et al., 2016).

***Product choice***

The selection of the dependent variable "Product choice" was a deliberate and natural choice for measuring personal choice, drawing inspiration from Study 1 (Landsvik et al., 2023), and similar research endeavors (Herrmann et al., 2022; Dixon & Mikolon, 2021). As the main dependent variable, "Product choice" encapsulates participants' preferences and selections, offering valuable insights into individual product preferences and decision-making dynamics.

The "Product choice" dependent variable was operationalized through a specific scenario: *"Imagine you need a new oven and BBQ cleaner for baked-on food residues and burnt-in*

*grease. You are in the store considering these two products. Which oven and BBQ cleaner would you buy?"* Respondents were given the option to choose between the cleaning sprays, allowing us to treat the variable dichotomously, where 0 corresponded to "Sera" and 1 to "Eco-Sera."

This approach is intentionally retained from Study 1 to ensure consistency across both studies, allowing for a seamless comparison and analysis of the results. By employing the same dependent variable, we aim to build upon the insights gained in Study 1 and further explore the dynamics of consumer decision-making in the context of sustainable and non-sustainable product choices in Study 2.

### Product choice as gift

Research suggests that individuals approach gift-giving with distinct intentions, utilizing it to signal familiarity and intimacy to recipients or to showcase their role as a thoughtful friend (Ward, 2016). Additional studies indicate that consumer behavior varies based on whether a product is intended for personal use or as a gift for someone else (Gillison & Reynolds, 2016; Lyu et al., 2022). Notably, findings reveal that consumers tend to prioritize desirability more in gift-purchases compared to self-purchases (Lyu et al., 2022). This observation underscores the significance of the gift variable in assessing the interplay between social self-signaling theory and sustainable purchasing behavior. Examining signaling in gift-giving through the lens of sustainability adds an intriguing dimension to our study.

Based on this, our second dependent variable is labeled "Gift" and was measured by posing the question*: "If you were to choose one of these products to give as a gift to a close friend or a family member, which oven and BBQ cleaner would you choose to give as a gift?"* Similar to the first dependent variable, "In-store," the "Gift" variable is treated dichotomously, with 0=Sera and 1=Eco-Sera.

Opting for a dichotomous approach instead of a Likert scale in both in both "Product choice" and "Gift" variables facilitates a direct comparison of responses between regular and sustainable products. This methodology enhances our ability to scrutinize the observed options in terms of both regular and sustainable choices.

### Willingness to pay

Our third dependent variable, "Willingness to pay," was chosen strategically, acknowledging the common scenario where sustainable products often come with a higher price tag than their

non-sustainable counterparts. Numerous studies highlight the conflict between environmental concern and the inclination to pay a premium for items labeled as sustainable (Kaczorowska et al., 2019). Despite the desire to make environmentally friendly choices, the perceived barrier of high prices often deters individuals from purchasing sustainable products. For instance, Malá et al., (2019) study identified the high cost as the most commonly cited reason for consumers refraining from buying sustainable products, aligning with findings from other studies (Ozimek & Zakowska-Biemans, 2011; Avitia et al., 2015; Aschemann-Witzel & Zielke, 2017).

Conversely, there is ample evidence suggesting that consumers demonstrate a willingness to pay a premium for products labeled as sustainable (Aprile et al., 2012; Liu et al., 2019; Vecchio & Annunziata, 2015; Salazar & Oerlemans, 2016). In our comprehensive literature review, we identified several studies that employed the "willingness to pay" variable in a similar context (Tey et al., 2018; Gomes et al., 2023; Dixon & Mikolon, 2021), drawing inspiration from studies such as Dixon and Mikolon's (2021) investigation into self-signals on consumer valuation. Similar to our study, their research delved into the choice between a conventional and an eco-friendly household product (specifically, laundry detergent), with "willingness to pay" serving as the dependent variable across all experimental conditions.

In our study, respondents were prompted with the question, *"Please indicate which product you would be willing to pay more for,"* utilizing a 5-point Likert scale. The scale ranged from "I would pay a lot more for Sera" to "I would pay a lot more for Eco-Sera." This adaptation provides valuable insights into the perceived monetary value associated with sustainable choices and contributes to our comprehensive exploration of consumer preferences and decision-making in the sustainable product landscape.

### 5.2.2 Explanatory variables

In maintaining continuity with Study 1, we retained all the explanatory variables. We preserved approximately the original wording of the sample questions from Study 1, ensuring that Study 2 remains a faithful follow-up.

The explanatory variables represented various cognitive inferences identified in our literature review. These inferences included perceived quality (measured with the variable "most effective"), perceived aesthetics (measured with the variable "design"), perceived safety

(measured with the variable "safe"), and perceived innovativeness (measured with the variables "exciting" and "innovative").

Lastly, when it comes to the measurements for social self-signaling (measured with the variables "positive individual" and "display") we adjusted tailored to our study (earlier positive person), emphasizing the distinction between social and private self-signaling. Further elaboration on these modifications will be provided when detailing our additional explanatory variables. All measurement items for these constructs were designed using 5-point Likert scales, where 1 indicated that the non-sustainable product was significantly superior and 5 indicated that the sustainable product was significantly superior. This consistent measurement approach was applied to all explanatory variables, and the resulting data were treated as interval data. We adopted this approach because it allows for the quantification of the difference between any two data values for a variable, even though it does not determine the relative difference (Saunders et al., 2016).

Expanding beyond the variables retained from Study 1, our research aimed to diversify the range of explanatory variables for a more comprehensive understanding of consumer behavior. To achieve this, we conducted a thorough exploration of contemporary studies, identifying additional variables that could offer nuanced insights. This strategic approach not only enhances the efficiency of our research process but also enables us to draw meaningful comparisons with findings from other studies (Saunders et al., 2016).

By incorporating a wider array of variables, our study is positioned to provide a richer and more detailed exploration of the intricate factors influencing consumer preferences and decision-making. This comprehensive approach acknowledges the evolving dynamics in the market landscape, allowing us to uncover deeper insights into the complexities surrounding the choices consumers make between sustainable and non-sustainable products.

### *Immediate emotions:*

Our approach to measuring hope and fear in this study closely aligns with the methodology utilized by Hornsey and Fielding (2016), who delved into hope within the context of reducing carbon emissions. Additionally, the measurements for pride and guilt were inspired from the Norm Activation Model proposed by Onwezen et al. (2014). Consequently, we took inspiration from these and developed our own scales instead of using pre-existing ones. However, since we made them understandable and straightforward and utilized relatable words and feelings,

we believe the queries to be valid. To gauge hope, fear, pride, and guilt in our study, respondents are prompted to assess the degree to which they experience specific emotions when evaluating the two products. In this measurement process, participants were asked to anticipate their emotional responses using a 5-point Likert scale. The scale's labeled endpoints ranged from 1 = "Sera to a large degree" to 5 = "Eco-Sera to a large degree" (Lee et al., 2017).

*Femininity*

In alignment with the methodology used by Brough et al. (2016) "The Green-Feminine Stereotype", we crafted our question: "Which of the products is more feminine?" Respondents are provided with a 5-point Likert scale, with the scale's labeled endpoints ranging from 1 = "Sera appears much more feminine" to 5 = "Eco-Sera appears much more feminine". By adopting a consistent approach to measuring femininity, our aim is to contribute to the ongoing exploration of gender perceptions in the context of sustainable product evaluations. This approach enhances our understanding of consumer attitudes and preferences regarding the perceived femininity of different product options.

*Social and private self-signaling*

Inspired by Dixon and Mikolon ' s (2021) on how self-signals influence consumer value in the context of green choices approach, our questions are tailored to capture feelings related to both social and private self-signaling. When it came to measuring social self-signaling, we kept the essence of the "positive person" variable from Study 1, a nuanced refinement was introduced to capture the subtleties of social self-signaling. The revised "positive individual" item shifted the focus to a more personal context*: "To what extent do you believe buying either of these products would say something positive about you to other people?"* Simultaneously, the variable "display" was maintained to investigate participants' perceptions of the public visibility associated with their sustainable choices. To assess private self-signaling, we will use the question, *"To what extent would buying either of these products make you feel good about yourself as a person?"*. Responses will be collected using a 5-point Likert scale, ranging from "Sera to a high extent" to "Eco-Sera to a high extent." This approach allows us to delve into the nuanced dynamics of signaling behaviors in the context of sustainable product choices.

### 5.2.3 Control variables

The use of control variables is crucial for precise research analysis, isolating the impact of key independent variables. This practice enhances the reliability of findings by mitigating the

influence of potential alternative explanations (Schjoedt & Bird, 2014). The inclusion of control variables such as "Price", "Eco-friendly", and "Green CV" and demographic is strategic in our study, as they help mitigate potential confounding factors. These control variables were likewise included in research 1, making this a good follow-up study.

### *Percieved price*

The inclusion of perceived price (named "price") as a control variable in our study is pivotal for several reasons. Primarily, price stands out as a significant factor shaping consumer behavior, particularly within the context of sustainable products (Kaczorowska et al., 2019; Malá et al., 2019; Ozimek & Zakowska-Biemans, 2011; Avitia et al., 2015; Aschemann-Witzel & Zielke, 2017). By incorporating price as a control variable, we aim to untangle and evaluate the effects of other variables on consumer choices of sustainable products, ensuring that the influence of price does not distort the results.

Furthermore, including price as a control variable offers a deeper exploration into how consumers' willingness to pay for sustainable products may be influenced. This is particularly pertinent for comprehending the barriers associated with sustainable consumption and understanding how various factors, beyond price alone, contribute to or mitigate an increased willingness to pay for environmentally friendly alternatives. Overall, integrating price as a control variable provides a nuanced perspective on consumer behavior related to sustainable products, facilitating a more thorough analysis of other potential influencing factors.

To gauge respondents' perceptions of price, we posed the question: *"What are your thoughts on the price of these products?"* Using a 5-point Likert scale, respondents were asked to express their views, ranging from 1="Sera costs much more" to 5="Eco-Sera costs much more." This approach allows us to capture and quantify participants' perceptions of price, contributing to a more comprehensive understanding of the multifaceted dynamics at play in sustainable product choices.

### *Eco-friendly*

The design of the depicted cleaning sprays aimed to effectively communicate the distinction between the sustainable and non-sustainable products. This goal was accomplished by naming the sustainable alternative "Eco-Sera" instead of simply "Sera." Additionally, core attributes such as "100% natural ingredients" were included, and green text was featured on the label. As the accurate interpretation of this distinction is crucial for our study, any misinterpretation

could significantly impact the responses. To ensure that participants perceive the products as intended, a manipulation check is necessary. A manipulation check assesses the effectiveness of an experimental variable, verifying that a variable or manipulation has the intended impact on the participants (APA Dictionary of Psychology, 2021b). In cases where there is a misunderstanding, we can appropriately control it during the analysis, ensuring the reliability and validity of our results.

The concept of a manipulation check finds support in previous studies, such as "The Green-Feminine Stereotype" by Brough et al. (2016), where the trait "eco-friendly" was utilized as a manipulation check to confirm whether using a reusable canvas bag was perceived as more environmentally friendly than using a plastic bag. Building on the success of the method used in Study 1 and insights from earlier research, we recognized the effectiveness of a straightforward question. Therefore, we posed the question*: "Which of the products do you think is the most environmentally friendly?"* using a 5-point Likert scale, ranging from "Sera is the most environmentally friendly" to "Eco-Sera is the most environmentally friendly."

### *Green consumption values*

By integrating "green consumption values" ("Green CV") as an individual trait, our primary goal is to acknowledge the inherent variations in the environmental consciousness levels among respondents. Recognizing these traits as stable characteristics that exert a substantial influence on attitudes and behaviors related to sustainable choices, our aim is to augment the accuracy of our analysis by including its potential moderator variable.

Our measurement of respondent's green consumption values draws inspiration from the approach employed by Haws et al. (2014) and responses to environmentally friendly products. In this study, Green CV was measured using six statements that encapsulated various aspects of environmental consciousness. These statements were carefully curated based on insights from prior research, including studies by Lastovicka et al. (1999) on frugality, Haws et al. (2012) on consumer spending self-control, and Lichtenstein et al. (1990) on value consciousness.

While Study 1 used four of the six statements in their approach (Haws et al., 2014), we opted to utilize all six questions in Study 2 to obtain a more comprehensive understanding of respondent's Green CV. Participants expressed their opinions on these statements, indicating their level of agreement or disagreement on a 7-point Likert scale. This scale was chosen to

capture nuanced variations in respondent's attitudes and behaviors toward environmental concerns, thereby enhancing the precision of our measurements.

Essentially, the incorporation of the Green CV as both a control variable and a potential moderator is driven by the necessity to account for and comprehend the impact of respondents' intrinsic environmental consciousness on their responses. The comprehensive nature of our approach, which draws upon established research and expands the array of statements, facilitates a rigorous examination of this crucial attribute within the framework of our study.

### *Demographics*

The inclusion of demographic characteristics in our study serves the purpose of assessing the representativeness of our sample within the broader population and exploring potential differences across various groups (Saunders et al., 2016). Incorporating these demographic variables in our study not only enables us to gauge the representativeness of our sample but also provides valuable insights into potential variations in responses. Demographic information was gathered through three key questions, derived from insights gained in Study 1.

The first demographic variable pertained to age, a fundamental yet crucial component for understanding how preferences and needs evolve over a person's lifespan (Royne et al., 2011). Extensive research has indicated that individuals who prioritize environmental concerns tend to be younger and more educated than their counterparts (Shama, 1985; Royne et al., 2011). In our survey, respondents indicated their age using a slider with a range from 18 to 90 years.

Another vital demographic variable considered was gender (named "sex"). Recognizing that men and women may exhibit different characteristics and viewpoints, gender has long been utilized as a predictor in various studies. Recent research in the realm of environmental concerns suggests that women may demonstrate a higher level of concern for the environment compared to men (Lee, 2009; Mostafa, 2007). The question about gender identity allowed respondents to choose from options including 1=male, 2=female, 3=non-binary, or 4=other/prefer not to answer. However, to effectively control for potential gender differences, specifically between men and women, as previously investigated in research, we opted to transform the variable into a dichotomous one, where 0 represents male and 1 represents female. Those who identified as non-binary or selected "others/prefer not to answer" were treated as missing data in this transformation.

Additionally, educational background was assessed, with participants selecting their highest level of education from categories such as 1= high school or less, 2= some college or technical training, 3=college and above, or 4=other/prefer not to answer. Similar to our approach with gender, in our analyses, we aim to examine whether there are differences in product preference across various levels of education. Therefore, we also transformed this variable so that 0 represents a lower level of education (those who indicated high school or less), while 1 represents a higher level of education (those who indicated some college or technical training and college and above). Participants who selected "other/prefer not to answer" were treated as missing data in this transformation.

## 5.3 Analysis results

Similar to Study 1, we employed the analytical software program Jamovi (Version 2.3.28.0) as our primary analytical tool. Microsoft Excel was utilized for the visual representation of charts and tables. As a statistical approach, we will initially address the potential Question-Order Effects using chi-squared tests and independent sample t-tests. Subsequently, we will assess compliance with the various assumptions required for the remaining tests in our analysis.

Moreover, we will ascertain the success of the manipulation of the sustainable product. Following this, we will proceed with hypothesis testing, specifically examining the differences in ratings, employing descriptive analysis, binomial tests, and one-sample t-tests. Additionally, we will employ Cronbach's alpha test to evaluate the feasibility of consolidating the multi-item variable "Green CV" into a single variable.

Furthermore, we will investigate whether the control variables exert an influence on the dependent variables, utilizing correlation tests, chi-square tests, and one-sample t-tests. Lastly, we will conduct regression analyses, both logistic and linear, to examine the hypotheses concerning the impact on product preference for the sustainable product.

### 5.3.1 Test of possible question-order fffects

The study's design, as mentioned in Section 5.1.2, involved the randomization of the order of questions related to dependent and independent variables to control for potential order-effects. Respondents were randomly assigned to either the "DV first" or "DV last" groups, with the

former receiving questions about dependent variables first and the latter receiving them in reverse order. Among the respondents, 202 belonged to the "DV last" group, while the remaining 198 were part of the "DV first" group.

To examine potential order effects in the dichotomous dependent variables "Gift" and "Product choice," chi-square tests of independence were employed (see Appendix B3 and Table 1 below). For the variable "Product choice," the test did not reveal any statistically significant difference between the two conditions ($\chi^2=0.210$, df=1, N=400, p=.647), with 48.8% of the "DV last" group and 51.2% of the "DV first" group choosing the non-sustainable product, and 51.3% and 48.7%, respectively, opting for the sustainable product. These findings, along with a very low Phi coefficient of 0.0229, suggest that the order of questions had no substantial impact on respondents' product preferences.

Nonetheless, the examination of product preference concerning the "Gift" variable yielded a statistically significant disparity, as determined by the Chi-square test ($\chi^2=4.81$, df=1, N=400, p=0.028). More specifically, within the "DV last" group, 41.0% of participants opted for the non-sustainable product, while 59.0% chose the sustainable product. In contrast, among the "DV first" group, 46.3% selected the non-sustainable product, with 53.7% favoring the sustainable option. These findings suggest that the sequence in which the dependent and independent variables were presented may have influenced product preference. Notably, a higher proportion of participants chose the sustainable product when they made their decision after evaluating both products across various driver dimensions (i.e., DV Last). However, the strength of this association, as quantified by the Phi coefficient, was modest, registering at 0.110, signifying a weak relationship (Sullivan & Feinn, 2012).

**Table 5: Summary of Contingency tables**

| | Product choice | | Gift* | |
|---|---|---|---|---|
| | DV Last | DV First | DV Last | DV First |
| Non-sustainable product | 48.8 % | 51.2 % | 41.0 % | 59.0 % |
| Sustainable product | 51.3 % | 48.7 % | 53.7 % | 46.3 % |

*Note: * Significant ($\chi^2=4.81$, p < 0.05)*

To examine the remaining continuous variables, independent sample t-tests were conducted. To determine the appropriate type of t-test to employ, a preliminary assessment of group variances was conducted using Levene's test for homogeneity. Based on the test results (see Appendix B3), variables with significantly different variances (p < 0.05), such as "price," and

"fear," were analyzed using Welch's T-test. This choice was justified by the robustness of Welch's T-test in handling variance inequalities between groups. For variables where Levene's test indicated homogeneous variances ($p > 0.05$), the Student's T-test was applied, given its suitability for comparing means between two groups with assumed equal variances.

The results of the t-tests revealed that there is no statistically significant difference between the "order conditions" regarding the dependent variable "willingness to pay" (see Appendix B3). However, a statistically significant difference emerged for the independent variable "Exciting" ($t = 2.43$, $df = 398$, $p = 0.015$), signifying that the "DV last" group exhibited a higher mean score on this variable in comparison to the "DV first" group. This suggests that presenting the dependent variables last had a positive impact on how participants perceived the product as "exciting" when contrasted with when the dependent variables were presented first. Nevertheless, the practical significance, assessed using Cohen's d as a measure of the difference's importance irrespective of sample size, indicated a small effect size of 0.243. This effect size is typically considered small (Sullivan & Feinn, 2012).

**Table 6: Independent Samples T-Test for Exciting**

|  | Statistic | p-value | Mean difference | SE difference | Effect Size (Cohen's d) |
|---|---|---|---|---|---|
| Exciting | 2.43 | 0.015 | 0.225 | 0.0923 | 0.243 |

*Note. $H_a \mu$ DV Last $\neq \mu$ DV First*

As for the remaining explanatory variables, the differences did not achieve statistical significance.

Considering the observed results, the data may suggest a degree of order effect, as significant differences between groups were detected for the variables "gift" and "exciting." However, it is essential to consider that statistical significance, in the absence of a substantial effect size, can sometimes be attributed to large sample sizes; large samples can lead to even minimal differences in achieving statistical significance, even if they may not be practically significant (Sullivan & Feinn, 2012). Therefore, significant results with small effect sizes should be interpreted cautiously. Since the effect sizes in both cases can be considered small, we can assume that the overall influence of the order of questions on respondent's responses was minimal. Consequently, we choose to proceed with our analysis under the assumption that the order had no effect on our study and will combine the responses from both groups in further analyses.

### 5.3.2 Test of assumptions

Similar to Study 1, several assumptions must be tested before applying the statistical analyses. In the case of the dependent variables "Product choice" and "Gift" being treated as dichotomous, it is necessary to assess the assumptions for logistic regression. Based on the dataset description provided in Sections 5.1 and 5.2, it can be concluded that some of the assumptions, including the requirement that the dependent variable must be binary, the assumption that the odds are contingent on a set of independent variables, and the necessity for a large and randomized unit selection, have been met.

However, the last dependent variable, "Willingness to pay," is treated as continuous, and therefore, an ordinary least squares (OLS) regression analysis will also be employed (specifically a multiple linear regression). This necessitates compliance with some of the same assumptions as logistic regression, such as the absence of multicollinearity. However, OLS regression imposes additional, more stringent assumptions, including a linear relationship, normal distribution, independent observations, and homoscedasticity. It is worth noting that these assumptions encompass the prerequisites for the remaining statistical tests to be employed in the subsequent analyses.

The ensuing section will encompass the presentation of tests for these assumptions, encompassing assessments for multicollinearity applicable to both logistic and linear analyses, as well as other requisite tests pertinent to the linear model.

*Multicollinearity*
The same method is employed to test for multicollinearity in this study as in Study 1. This approach involves an examination of the Variance Inflation Factor (VIF) values of the variables. Detailed results of the multicollinearity tests for all analyses involving the three dependent variables can be found in Appendix B4.

For the logistic, all VIF values fall between 1 and 2, indicating an absence of multicollinearity in these analyses. In the linear analysis of "willingness to pay," the majority of values are below 2, with only "self-signaling" and "display" slightly exceeding 2. However, these values are considered low, particularly when compared to the conventional threshold of 10. Furthermore, the tolerance values remain above 0.1, which aligns with the recommended threshold as per Hair (2006). As a result, we can confidently conclude that there is no multicollinearity present in the linear model.

*Independent observations*

The assumption of independent observations pertains to ensuring that data collected from one participant remains unaffected by observations obtained from other participants (Hair, 2006). To assess the fulfillment of this assumption, we conducted a Durbin-Watson test, a formal statistical assessment aimed at detecting the presence of autocorrelation in residuals, and by extension, in observations. A Durbin-Watson (DW) value falling within the range of 1.5 to 2.5 confirms the absence of first-order autocorrelation.

The results of the test, as displayed in the table below, reveal an extremely low autocorrelation value (0.0388), indicating the strength of autocorrelation (which should be close to 0 for no autocorrelation). Furthermore, the DW-value of 1.19 signifies the absence of autocorrelation, thus leading us to consider the assumption as met.

**Table 7: Durbin-Watson test**

| Autocorrelation | DW Statistic | p-value |
|---|---|---|
| 0.0388 | 1.92 | 0.368 |

*Normality*

Normality pertains to the assumption that the residuals generated by the model follow a normal distribution. To assess the normality assumption for our data, we initially examined the skewness and kurtosis of the constructs, which respectively indicate the balance and the peak of the distribution and can offer insights into whether our constructs follow a normal distribution (Hair, 2006). The results of this analysis are provided in Appendix B4.

For most variables, the skewness values fell within the range of -1 to 1, and the kurtosis values were within the range of -2 to 2. These findings suggest an approximation to a normal distribution (Hair, 2006). This indicates that data for these variables do not exhibit significant deviations from symmetry and that the distribution of data has an acceptable spread around the mean.

However, the variable "Fear" exhibited a kurtosis value of 6.2505, significantly beyond the accepted range for normal kurtosis. This suggests a distribution with a sharper peak and thicker tails than typical of a normal distribution. Additionally, a skewness of -1.221 indicates a skewed distribution toward the lower value range. This combination of high kurtosis and

negative skewness may reflect a distribution with a high frequency of low scores and a few extreme values in the higher range.

Nonetheless, it is essential to note that while skewness and kurtosis can provide insights into the data distribution, parametric tests are generally robust against deviations from normality, particularly with large sample sizes, as in the present case with N=400. To further investigate the extent to which the skewness in the "Fear" variable might affect the assumed normal distribution, the Kolmogorov-Smirnov (K-S) test was applied. The K-S test serves as a non-parametric method to compare a sample's cumulative distribution to a reference distribution, including the normal distribution. The results of the test, provided in Table 10 below, yield a p-value of 0.163, implying that the deviation from normality is not statistically significant. This conclusion is supported by the sample size, which provides the test with sufficient power to detect minor deviations.

**Table 8: Kolmogorov-Smirnov test for normality**

|  | Statistic | p-value |
| --- | --- | --- |
| Kolmogorov-Smirnov | 0.0560 | 0.163 |

### *Homoscedasticity*

Homoscedasticity posits that the variance of residuals remains constant across all levels of predictor variables, a critical assumption for obtaining unbiased standard errors and, consequently, accurate p-values. To assess homoscedasticity, we utilized the Breusch-Pagan test, which tests the null hypothesis that the variance of residuals is equal across the entire spectrum of independent variables. The results, shown in the table below, did not provide evidence of heteroscedasticity ($\chi^2 = 9.55$, p = 0.730), indicating that the assumption of constant variance in the residuals is met.

**Table 9: Breusch-Pagan-test**

|  | Statistic | p-value |
| --- | --- | --- |
| Breusch-Pagan | 9.55 | 0.730 |

### *Linear relationship*

The presence of a linear relationship between the dependent and independent variables suggests that changes in the independent variables are associated with linear changes in the dependent variable (Hair, 2006). To assess whether this assumption is met, scatterplots for all

independent variables were initially examined to visualize whether it is feasible to draw a straight line among the observations. All scatterplots are provided in Appendix B4 and demonstrate tendencies toward a linear relationship with "Willingness to pay."

It is crucial to note that while a scatterplot can provide visual indications of linearity, a statistical test is necessary to confirm this formally. While the plot offers an indication, for a more formal assessment of linearity, Ramsey's Regression Equation Specification Error Test (RESET) was employed to evaluate whether the linear regression model was suitable for our data. The primary purpose of the RESET test is to detect specification errors in the model, such as non-linear relationships between the dependent and independent variables (Ramsey, 1969). Such a test is critical to ensure that the model not only fits the observed data but also has the ability to provide accurate predictions for new, untested data.

The test results, as presented in the table below, yielded an F-statistic of 1.617 with an associated p-value of 0.199. A p-value exceeding 0.05 indicates that there is no significant evidence of non-linearity in the model. In other words, there is no strong statistical support for the presence of omitted non-linear variables or that the model suffers from a mis specified functional form.

**Table 10: RESET-test of linearity**

|  | Statistic | p-value |
| --- | --- | --- |
| Ramsey's RESET test | 1.617 | 0.199 |

### 5.3.3 Manipulation check

To validate the efficacy of the manipulation of sustainable vs. non-sustainable product, the participants' perceptions of the eco-friendliness of the products was assessed. A frequency analysis of the variable revealed that 71.3% of participants rated the sustainable product as much more eco-friendly, while 23.8% rated it as slightly more eco-friendly. A small proportion (4%) perceived both products as equally eco-friendly, and only 1% of the sample perceived non-sustainable product as slightly more eco-friendly. Notably, no participants rated the non-sustainable product as much more eco-friendly.

**Figure 4: Distribution of manipulation**
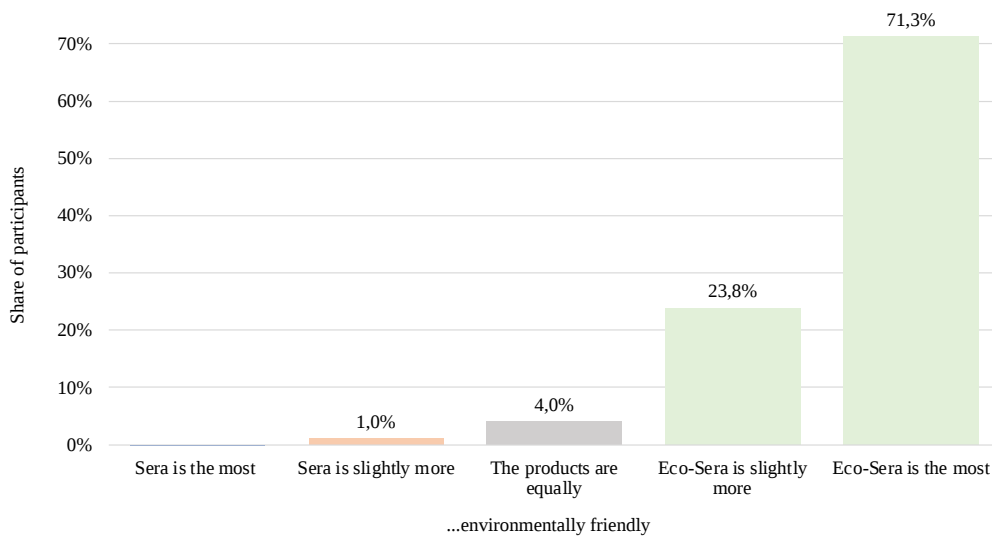


To determine if this distribution was statistically significant, a one-sample t-test was conducted. Specifically, we tested whether the ratings of the variable were significantly higher than the neutral value of 3, as values above 3 indicated that the sustainable product was considered somewhat or mostly environmentally friendly. The result from the t-test, as presented in the table below, indicated that the average rating of the sustainable product as environmentally friendly was significantly higher than the neutrality point, with an average difference of 1.65 units above the neutrality marker (t= 54.5, df = 399, p < 0.001). The effect size for this difference, measured by Cohen's d, was 2.73, indicating a very large effect size.

**Table 11: One Sample T-test of manipulation variable**

|  | Statistic | df | p-value | Mean difference | Effect Size (Cohen's d) |
|---|---|---|---|---|---|
| Eco-friendly | 54.5 | 399 | < .001 | 1.65 | 2.73 |

*Note. $H_a \mu \neq 3$, values above 3 indicates that the sustainable product is perceived as more environmentally friendly*

These findings provide evidence supporting the effective manipulation of the eco-friendliness variable, which is consistent with the experimental design of the sustainable product. This confirms that the manipulation accurately represented the intended eco-friendly characteristic of the sustainable product.

### 5.3.4  Hypothesis testing: Differences in ratings

Given that we have applied the same measurement methodology to the variables in this study as in Study 1, we will similarly employ One Sample T-Tests to scrutinize the hypotheses about

disparities in ratings. In this investigation, we will assess the following hypotheses: H1-A, H2-A, H3-A, H4-A, and H5-A.

Before delving into the hypothesis testing concerning cognitive inferences and immediate emotions, we will initiate the analysis by examining the frequency table and employing binomial tests for the dependent variables. This initial step is aimed at providing insights into the distribution of product preferences across the three dimensions of the dependent variables. Comprehensive tables encompassing the descriptive analysis and distribution tests for all variables, including both dependent and independent variables, are provided in Appendix B5.

Regarding the distribution of product preference as reflected in the variable "product choice," 68.8% of participants demonstrated a preference for the sustainable product (n = 275) over the non-sustainable alternative (31.3%, n = 125), signaling a notable inclination toward the sustainable option. This preference was even more pronounced in the context of gift selection (as denoted by the "Gift" variable), where a substantial 75% (n = 300) opted for the sustainable product.

As in Study 1, a binomial test was also conducted to investigate whether the distribution of product choices significantly deviated from what would be expected in a random choice distribution. In both scenarios, the p-value was less than 0.001, indicating that the differences are highly significant, with less than a 0.1% chance that these results could have occurred by random chance.

**Figure 5: Distribution of product preferences**
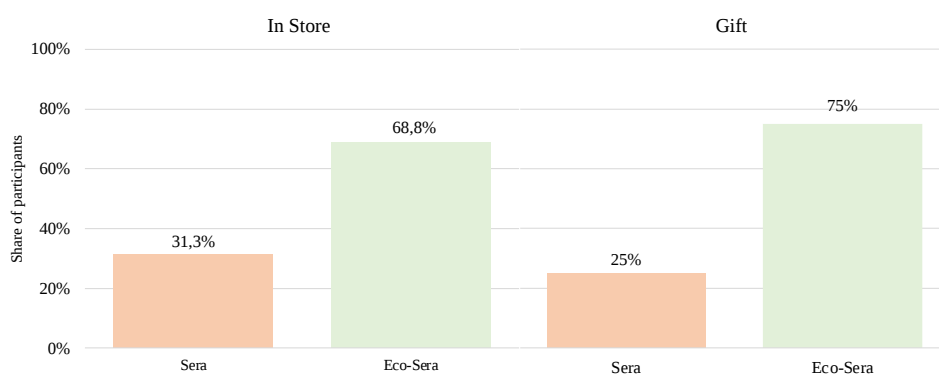


*Note: The deviation between the two choices (in both variables) was statistically significant at a 0.1% significance level.*

Regarding "Willingness to pay", as shown in Figure 6, the data revealed that a significant majority, accounting for 94.3% of respondents, were either price-neutral or willing to pay

more for the sustainable product. Only a negligible fraction of 1% (n = 4) indicated they would pay significantly more for the non-sustainable product. In contrast, nearly half of the participants (45.3%, n = 181) expressed a willingness to pay the same amount for both products, and a comparable proportion (44.0%, n = 176) favored the sustainable product, demonstrating their willingness to pay more for it. A minority of 5% (n = 20) exhibited a high willingness to pay substantially more for the sustainable product.

To assess whether this difference was also statistically significant from neutrality ($\mu = 3$), a One Sample T-Test was conducted. The analysis revealed a significant deviation from neutrality with a t-value of 13.3 (df = 399, $p < 0.001$), indicating an average difference of 0.473 points above neutrality. This suggests that, on average, respondents are more inclined to pay more for the sustainable product compared to the non-sustainable one.

**Figure 6: Distribution of Willingness to pay**
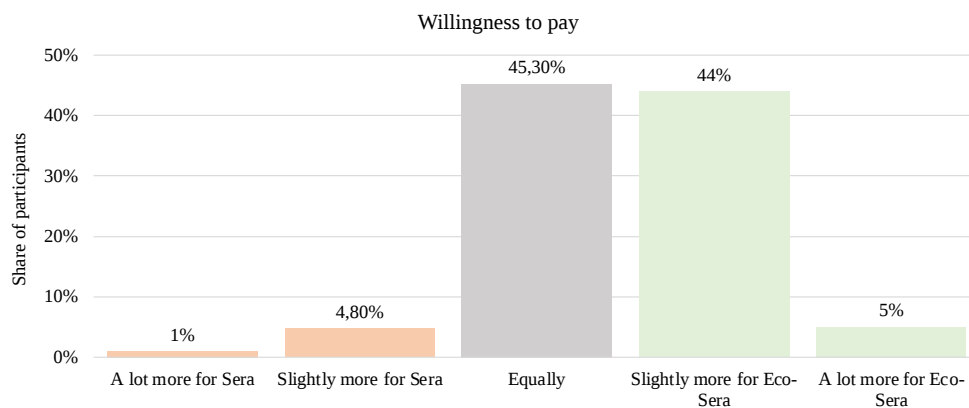


*Note: The variable exhibit statistically significant deviation from the neutral value of 3 at a significance level of 0.1%.*

Figure 7 provides a visual comparison of the average scores for all explanatory variables. It is evident that the sustainable product is perceived as superior to the non-sustainable product across almost all examined attributes, with average scores ranging from 3.45 (the emotion "pride") to 4.33 (perceived safety). The non-sustainable product is superior in the dimensions of "effective," "fear," and "guilt," but "fear" (M = 2.87) is closer to the neutral line than the other two, indicating a slight superiority.

**Figure 7: Overview of the mean scores of explanatory variables**
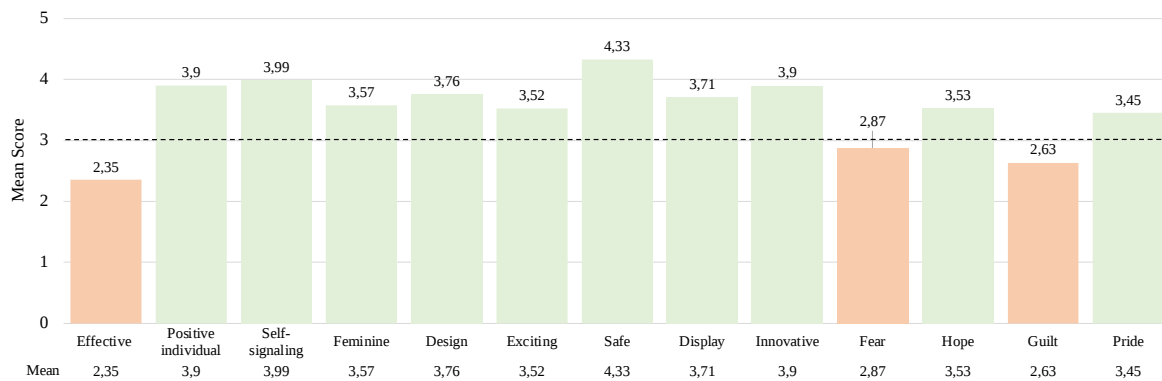


*Note: Values above the line (> 3) indicate that the sustainable product is perceived as superior (hence, the green color on the bar), while scores below the line (< 3) indicate that the non-sustainable product was considered superior (hence, the orange color on the bar). All variables exhibit statistically significant deviations from the neutral value of 3 at a significance level of 0.1%.*

In order to assess the hypotheses pertaining to the ratings of both products across all selected metrics, we utilized the same type of one-sample t-test. The outcomes of these analyses confirmed hypotheses H1-A and H3-A, demonstrating that participants consistently assigned significantly higher ratings to the sustainable product across various dimensions. These dimensions encompassed social self-signaling (both in terms of "display" and "positive person"), private self-signaling, perceived aesthetic appeal, perceived safety, perceived innovativeness (both in "exciting" and "innovative"), as well as perceived femininity. All of these variables exhibited statistically significant positive deviations from the neutral value of 3 ($p < 0.001$).

The range of t-statistics for these variables varied from 11.26 to 35.63, and for Cohen's d, effect sizes ranged from 0.563 to 1.781, indicating a strong preference for the sustainable product on these factors. Specifically, "safe" was the dimension with the highest t-value at 35.63 and Cohen's d of 1.781 (df = 399), indicating the largest positive effect. In contrast, "exciting" was the variable with the lowest t-value at 11.26 and Cohen's d = 0.563 (df = 399), but still had a significant positive effect.

Perceived effectiveness exhibited a statistically significant deviation from neutrality, registering lower scores (t = -12.59, df = 399, $p < 0.001$), with an average difference of -0.652 and a medium negative effect size (Cohen's d = -0.629). This suggests that the ratings were higher for the non-sustainable product, thereby providing support for H2-A.

Regarding the emotional responses, the negative emotions "Fear" (t = 5.63, df = 399, p < 0.001, Cohen's d = -0.281) and "Guilt" (t = -10.98, df = 399, p < 0.001, Cohen's d = -0.549) displayed significantly lower scores, indicating higher ratings for the non-sustainable product. Conversely, the positive emotions "Hope" (t = 14.62, df = 399, p < 0.001, Cohen's d = 0.731) and "Pride" (t = 13.29, df = 399, p < 0.001, Cohen's d = 0.664) were significantly higher, suggesting greater preference for the sustainable product. These findings support hypotheses H4-A and H5-A.

## 5.3.5 Merging of measurements

As we employed multiple questions to measure green consumption values ("Green CV"), it was imperative to examine their internal consistency, i.e., the extent to which a set of questions measures the same underlying concept, to facilitate their aggregation into a single variable. To assess this, a Cronbach's Alpha test was employed. A high Alpha value (closer to 1) indicates that the elements exhibit strong internal consistency and are therefore robust measures of the same underlying construct. Typically, an Alpha value of 0.7 or higher is deemed acceptable, values of 0.8 or higher are considered good, and values of 0.9 or higher are regarded as excellent.

**Table 12: Cronbach's Alpha test**

|  | Mean | SD | α |
|---|---|---|---|
| Green CV 1 | 5.15 | 1.32 |  |
| Green CV 2 | 4.86 | 1.46 |  |
| Green CV 3 | 4.61 | 1.53 |  |
| Green CV 4 | 5.38 | 1.44 |  |
| Green CV 5 | 4.87 | 1.40 |  |
| Green CV 6 | 4.68 | 1.51 |  |
| Scale statistics | 4.92 | 1.30 | 0.952 |

The scale exhibited excellent reliability, with a Cronbach's alpha of 0.952, suggesting that the items displayed a high degree of interrelatedness and constituted a cohesive measurement tool. The item-total correlations ranged from 0.854 to 0.900, providing further evidence that each item consistently correlated with the overall scale. The mean score for the scale was 4.92 (SD = 1.30), signifying a strong endorsement of green consumption values among the respondents.

Given the high level of internal consistency, the composite score, computed as the mean of these six items, named Green CV, was utilized in subsequent analyses to represent an

individual's green consumption values. This composite score serves as a reliable indicator for evaluating the extent to which green values influence consumer choices and behavior in the context of sustainable product selection.

### 5.3.6  Influence of demografic variables and price perception

Various tests were conducted to assess whether the demographic variables of age, gender, and education level, which were utilized as control variables in our analysis, may be associated with product preference. Our aim was to control for any noteworthy disparities in preference among different age groups, between genders (male and female), and across various levels of education. Similar to Study 1, we also aimed to control for participants' perceptions of product price, as price can be a significant factor influencing consumer behavior.

*Influence of age*

As in Study 1, we used Spearman's Rho correlations to examine the continuous variable "age." The findings of this analysis are detailed in the correlation matrix presented in Appendix B6.

The results, as summarized in the table below, reveal a weak but statistically significant negative correlation between age and the product preference in "product choice" (Spearman's rho = -0.110, p = 0.028). This suggests that increasing age is associated with a slightly reduced likelihood of preferring the sustainable product option. However, there was no significant correlation between age and product choice as a gift, as well as no significant correlation between age and the "willingness to pay" variable.

**Table 13: Correlation with control variable "Age"**

|  | Product choice | Gift | Willingness to pay |
|---|---|---|---|
| Spearman's Rho | -0.110* | 0.039 | -0.050 |
| p-value | 0.028 | 0.438 | 0.317 |

*Note. \* p < .05, \*\* p < .01, \*\*\* p < .001,*

*Influence of gender*

To examine the associations between the dichotomous dependent variables and the categorical variable "sex", a chi-squared test was employed. In these analyses, the transformed version of the variable was utilized, with "sex" coded as 0=male and 1=female. The results of these analyses are provided in Appendix B8.

The results of the analysis, summarized below, reveal a non-statistically significant trend in the association between gender and "product choice" ($\chi^2 = 3.74$, df = 1, p = 0.053), with a weak effect size (Phi coefficient = 0.0982). This suggests that gender has a minimal impact on the preference for sustainable versus non-sustainable products in this sample. On the other hand, the "Gift" test demonstrated a statistically significant association ($\chi^2 = 4.38$, df = 1, p = 0.036) with a weak effect size (Phi coefficient = 0.106). Among those who selected the non-sustainable product as a gift, there was a higher proportion of males (59.6%) compared to females (40.4%). Conversely, among those who preferred the sustainable product as a gift, there was a higher proportion of females (52.6%) than males (47.4%). These findings indicate that gender exerts a modest yet significant influence on the choice of sustainable products as gifts, with females showing a higher preference for the sustainable option as a gift compared to males.

**Table 14: Test of gender differences (chi-square)**

|  | $\chi^2$ | df | p-value | Phi-coefficient |
|---|---|---|---|---|
| Product Choice | 3.74 | 1 | 0.053 | 0.0982 |
| Gift | 4.38 | 1 | 0.036* | 0.106 |

*Note. \* p < .05, \*\* p < .01, \*\*\* p < .001*

To examine the association with the continuous variable "willingness to pay," an independent samples t-test (Student's t-test) was employed. The t-test is appropriate for comparing the means of two independent groups when the dependent variable is continuous. The results of the t-test, as displayed in Table 17, unveiled a statistically significant disparity in willingness to pay for the sustainable product between males and females (t = -2.88, df = 386, p = 0.004), exhibiting a mean difference of -0.205 (SE = 0.0713). The effect size, quantified by Cohen's d, was -0.293, denoting a small to moderate effect. The negative value of Cohen's d indicates that males had a lower score in willingness to pay for the sustainable product compared to females.

**Table 15: Test of gender differences (independent t-test)**

|  | Statistic | df | p | Mean difference | SE difference | Effect Size |
|---|---|---|---|---|---|---|
| Willingness to pay | -2.88 | 386 | 0.004 | -0.205 | 0.0713 | -0.293 |

*Note. $H_a \, \mu \, Male \neq \mu \, Female$*

*Influence of education level*

An independence chi-square test was also conducted to assess the association between education level and product preference. The transformed education variable was employed in this analysis as well, where the variable is coded as 0 = high school or less (lower education level) and 1 =college/university (higher education level).

The results, summarized in the table below, indicated that there was no statistically significant association between education level and product choice ($\chi^2$ = 0.00194, df = 1, p = 0.965), with an extremely low Phi coefficient of 0.00221. This suggests that respondents' education levels did not have a significant impact on their product preference.

The results regarding product choice for gift selection showed a near statistical significance ($\chi^2$ = 3.56, df = 1, p = 0.059), but not enough to reject the null hypothesis of no association on a 5% level. The effect size was low, with a Phi coefficient of 0.0944, indicating a weak association. Among the respondents who preferred the non-sustainable product, 20.0% had lower education levels, while 80.0% had higher education levels. For the sustainable product, 12.4% of those with lower education levels preferred it, compared to 87.6% of those with higher education levels. Although the differences were not statistically significant, the percentages suggest a trend where respondents with higher education levels were more inclined to select the sustainable product as a gift.

**Table 16: Test of education level differences (chi-square)**

|  | $\chi^2$ | df | p-value | Phi-coefficient |
|---|---|---|---|---|
| Product Choice | 0.00194 | 1 | 0.965 | 0.00221 |
| Gift | 3.56 | 1 | 0.059 | 0.0944 |

*Note. * p < .05, ** p < .01, *** p < .001*

The same type of t-test was conducted to investigate whether there were differences in willingness to pay for the products based on education level. The results of the test, as displayed in Table 19, did not reveal a statistically significant difference in willingness to pay between the two education groups (t = -1.41, df = 397, p = 0.160), with a mean difference of -0.143 (SE = 0.102). The effect size, Cohen's d, was -0.202, indicating a small effect size. These findings suggest that education level does not have a significant impact on how much respondents are willing to pay for either the non-sustainable or sustainable product.

**Table 17: Test of education level differences (t-test)**

|  | Statistic | df | p | Mean difference | SE difference | Effect Size |
|---|---|---|---|---|---|---|
| Willingness to pay | -1.41 | 397 | 0.160 | -0.143 | 0.102 | -0.202 |

*Note. H$_a$ μ Lower Education level ≠ μ Higher Education level*

### *Influence of perceived price*

To examine whether the perception of price was greater or less than the neutral value of 3, which implies that both products would be perceived as having equal prices, a one-sample t-test was employed. The results indicated a significant deviation from the neutral point (t = 29.1, df = 399, p < 0.001), with an average difference of 0.960. This suggests that participants perceived the sustainable product as more expensive than the non-sustainable one. The Cohen's d value of 1.46 signifies a large effect size, implying that this perception was robust among the participants.

**Table 18: One sample t-test of perceived price**

|  | Statistic | df | p-value | Mean difference | Effect Size |
|---|---|---|---|---|---|
| Price | 29.1 | 399 | < .001 | 0.960 | 1.46 |

*Note. H$_a$ μ ≠ 3*

However, similar to Study 1, correlation analysis (provided in Appendix B6) was employed to examine whether this price perception was indeed correlated with the dependent variables. The results revealed a weak but statistically significant negative correlation between price and product choice (Spearman's rho = -0.120, df = 398, p = 0.016). This suggests that as the price increases, there is a tendency for consumers to be less inclined to choose the product, although the effect is modest.

Furthermore, a moderate positive correlation was also found between perceived price and willingness to pay (Spearman's rho = 0.166, df = 398, p < 0.001). This indicates that a higher perception of price is associated with increased willingness to pay for the sustainable product. Nevertheless, no significant correlation was found between price and the choice of the product as a gift (Spearman's rho = 0.001, df = 398, p = 0.981), suggesting that price does not influence the decision to give the product as a gift.

**Table 19: Correlation analysis of Perceived price**

|       | Product choice | Gift | Willingness to pay |
|-------|----------------|------|--------------------|
| Price | -0.120*        | n.s. | 0.166***           |

*Note. * p < .05, ** p < .01, *** p < .001, "n.s." = not significant*

## 5.3.7 Hypothesis tesing: Regression analyses

In this section of the analysis, we will examine the remaining hypotheses that address the influence of the selected cognitive inferences and immediate emotions on product preference across all three dependent variables. Therefore, we will test the following hypotheses: H1-B, H2-B, H3-B, H4-B and H5-B. We will begin by presenting the logistic regression models with the dichotomous dependent variables representing product choice and product choice as a gift. Finally, we will employ a linear regression model (OLS) to test the influence on the continuous variable "willingness to pay."

### *Logistic regression with "Product choice"*

This logistic regression analysis will assess part a) of all three aforementioned hypotheses, specifically examining the impact of predictors on product preference for the sustainable product. Similar to Study 1, odds ratios greater than 1 will indicate a positive effect (higher likelihood of selecting the sustainable product), while odds ratios less than 1 will signify a negative effect (lower likelihood of choosing the sustainable product). To precisely estimate the percentage change in probability, the OR can be converted into a percentage increase using the formula (OR - 1) × 100%.

The Model Fit measures indicated a robust model fit, with a Nagelkerke's $R^2$ of 0.688, suggesting that approximately 68.8% of the variance in the product choice between the sustainable and non-sustainable products is explained by the model. The overall model test yielded a Chi-square statistic of 269, with a corresponding p-value of less than 0.001, indicating that the model significantly predicts the product choice over chance level.

**Table 20: Model Fit Measures of Product choice**

| Deviance | AIC | BIC | $R^2_N$ | $\chi^2$ | df | p-value |
|----------|-----|-----|---------|----------|----|---------|
| 228      | 256 | 312 | 0.688   | 269      | 13 | < 0.001 |

Regarding the predictors related to H1-B, it is evident that several of the pertinent variables are statistically significant. Notably, the variable "self-signaling," representing private self-signaling, exhibits an OR of 3.198 (p < 0.001). This suggests that for each unit increase in the perception that choosing a sustainable product enhances one's self-esteem, the likelihood of selecting the sustainable product increases by 219.8%. This provides support for the hypothesis H1-B a) that private self-signaling has a positive influence on the choice of the sustainable product.

Furthermore, the results also reveal a remarkably significant positive impact associated with "design," exhibiting an OR of 2.059 (p < 0.001). This implies that for every unit increase in the perception that the sustainable product possesses a more aesthetically pleasing ethical design compared to the non-sustainable counterpart, the probability of selecting the sustainable product increases by 105.9%. This reinforces the elements of H1-B related to the influence of aesthetic appeal on the choice of sustainable products.

Significant positive effects are also observed for the variables "exciting" and "safe," yielding ORs of 2.653 (p < 0.001) and 2.145 (p = 0.008), respectively. This indicates a 165.3% elevation in the odds of choosing the sustainable product for each additional point in perceived innovativeness (the excitement to try the product aspect), and a 114.5% increase in the odds of opting for the sustainable product with each increment in perceived safety rating. Both of these findings lend support to specific aspects of hypothesis H1-B. However, the remaining variables within hypothesis H1-B, such as "innovative," representing facets of perceived innovativeness, and the variables associated with social self-signaling ("display" and "positive individual"), did not achieve statistical significance.

Regarding hypothesis H2-B, which proposes that perceived quality will exert a positive influence on product choice, this hypothesis is also supported. The predictor "effective" yielded an OR of 5.359 (p < 0.001). This indicates that for each unit increase in the perception that the sustainable product is more effective, the odds of selecting the sustainable product increase by 435.9% compared to the non-sustainable product.

In reference to Hypothesis H3-B, which posits that perceived femininity negatively influences product selection, the predictor is not statistically significant. Although the OR of 0.725 indicated a negative effect, suggesting that higher levels of femininity correlate with a reduced

probability of choosing the sustainable product, the substantial p-value does not corroborate the hypothesis.

Regarding the immediate emotions, only the variable "Fear" demonstrates statistical significance (p = 0.022). The OR, which is negatively valued at 0.300, suggests that for every unit increase in the feeling of fear associated with the sustainable product, the likelihood of choosing the product decreases by 70%. This finding aligns with the propositions of Hypothesis H5-B, thereby lending partial support to this hypothesis. Conversely, the other emotional predictors, namely "Hope," "Guilt," and "Pride," did not achieve statistical significance. Consequently, Hypothesis H4-B is rejected, including the specific aspect of Hypothesis H5-B related to "guilt."

**Table 21: Model Coefficients - Product choice**

|  | **Estimate** | **p-value** | **Odds ratio** |
| --- | --- | --- | --- |
| Intercept | -11.24591 | <.001 | 1.31e-5*** |
| Effective | 1.67879 | <.001 | 5.359*** |
| Positive individual | 0.25044 | 0.412 | 1.285 |
| Self-signaling | 1.16259 | <.001 | 3.198*** |
| Feminine | -0.32199 | 0.132 | 0.725 |
| Design | 0.72244 | <.001 | 2.059*** |
| Exciting | 0.97556 | <.001 | 2.653*** |
| Safe | 0.76291 | 0.008 | 2.145** |
| Display | 0.06808 | 0.808 | 1.070 |
| Innovative | -0.01434 | 0.956 | 0.986 |
| Fear | -1.20328 | 0.022 | 0.300* |
| Hope | -0.22359 | 0.511 | 0.800 |
| Guilt | 0.00704 | 0.985 | 1.007 |
| Pride | -0.16264 | 0.674 | 0.850 |

*Note: Estimates represent the log odds of "Product choice = Eco-Sera" vs.*
*"Product choice = Sera"*
*\*p < .05. \*\*p < .01. \*\*\*p < .001.*

Given the confirmation of hypothesis H2-A, which established that perceived quality was rated higher for the non-sustainable product, it is pertinent, akin to the approach employed in study 1, to incorporate the computation of the inverse OR for "effective." The calculated value of this ratio approximates 0.187 (1 / 5.359), signifying that with each unit increase in the perception that the non-sustainable product is more effective than the sustainable one, the odds of choosing the sustainable product decrease by 81.7%.

The computation of the reverse OR also applies to the variable "fear," given that it was significantly higher for the non-sustainable product. This value will clarify the odds of selecting the sustainable product if the "fear" variable decreases by one unit on the scale (i.e., if the feeling of fear for the non-sustainable product increases). The reverse OR for "fear" is approximately 3.33 (1 / 0.330). This implies that for each unit increase in "fear" associated with the non-sustainable product, the odds of choosing the sustainable product over the non-sustainable one increase by 233.33%. In other words, if a respondent reports heightened levels of fear associated with the non-sustainable product, they are significantly more inclined to opt for the sustainable product.

**Product choice with Green Consumptions Values as potential moderator**

As the approach in Study 1, we assessed the correlation of "Green CV," which reflects green consumption values, with both the dependent and independent variables. The correlation matrix, as detailed in Appendix B6, unveiled a notable and positive correlation with all three dependent variables. Specifically, for product choice, Spearman's rho yielded a value of 0.475 (p < 0.001). Furthermore, it indicated statistically significant relationships among all the explanatory variables. Consequently, we made the decision to extend the regression model by introducing green consumption values as a potential moderator.

None of the interaction terms in the revised model demonstrated statistical significance, as detailed in the comprehensive analysis presented in Appendix B8, indicating that respondent's green consumption values do not moderate the effects of the examined predictors on product choice. This outcome suggests that the cognitive and emotional drivers of product choice remain constant, irrespective of the level of environmental consciousness.

It should be emphasized that the absence of significant interaction effects may be attributed to limitations in the study's power to detect these effects. Nevertheless, the addition of multiple predictors improved model fit measures, implying a more comprehensive understanding of the factors driving product choice. This phenomenon, where model fit improves even in the absence of significant individual predictors, may reflect the notion that non-significant predictors can contain relevant information that, when combined, contributes to a richer model of consumer behavior.

*Logistic regression with Product choice as gift*

In this regression model, we employ the dichotomous variable "Gift" as the dependent variable. Therefore, through the use of logistic regression analysis, we aim to examine the segments of hypotheses H1-B, H2-B, H3-B, H4-B and H5-B that pertain to uncovering the effects of the selected cognitive inferences and immediate emotions influencing the preference for the sustainable product as a gift (part b). In this analysis, odds ratios greater than 1 will indicate a higher likelihood of selecting the sustainable product as a gift, while odds ratios less than 1 will signify a lower likelihood of choosing the sustainable product as a gift.

The model's goodness-of-fit metrics indicate a reasonably robust fit to the data. With a Nagelkerke's $R^2$ value of 0.476, the model suggests that approximately 47.6% of the variance in the selection of the sustainable product as a gift can be explained by the included predictors. Furthermore, the overall model test, with a Chi-square statistic of 155 and an associated p-value of less than 0.001, affirms that the model predicts the choice of gift significantly better than what random chance would suggest.

**Table 22: Model Fit Measures of Product choice as gift**

| Deviance | AIC | BIC | $R^2_N$ | $\chi^2$ | df | p |
|---|---|---|---|---|---|---|
| 295 | 323 | 379 | 0.476 | 155 | 13 | < .001 |

When examining the predictors tested in hypothesis H1-B, it becomes evident that the perceived aesthetic appeal of the product, as measured by the predictor "design," exerts a statistically significant influence on the selection of gifts, yielding an OR of 1.529 (p = 0.014). This finding suggests that for each unit increase in the perception that the sustainable product is more aesthetically pleasing, the odds of selecting the sustainable product as a gift increase by 52.9% compared to the odds of choosing the non-sustainable product. This observation is in accordance with hypothesis H1-B b), which hypothesized a positive association between perceived aesthetic appeal and the preference for sustainable products.

Furthermore, the construct "safe," which assesses perceived safety, also exhibits a significant and positive OR of 1.715 (p = 0.019). This positive association implies that for each unit increase in perceived safety, the odds of selecting the sustainable product as a gift increase by 71.5% compared to the odds of choosing the non-sustainable product. In other words, the perception of safety exerts a robust positive effect on the preference for the sustainable product as a gift, thereby providing support for the corresponding portion of hypothesis H1-B b).

The remaining cognitive inferences in H1-B did not yield statistically significant results. Hence, the hypothesis positing a positive influence of social self-signaling, private self-signaling, or perceived innovativeness (both in "exciting" and "innovative" aspects) on the choice of the product as a gift is not supported.

Regarding the variable "effective," which signifies the perceived quality of the product, it also demonstrates a significant positive OR of 2.345 ($p < 0.001$). For each unit increase in the perceived effectiveness of the sustainable product, the odds of selecting the sustainable product as a gift increase by 134.5%. An OR exceeding 2 indicates a substantial effect. This indicates that when consumers perceive the sustainable product as more effective, they are significantly more inclined to choose it as a gift. This finding lends support to hypothesis H2-B b).

Furthermore, the regression results indicate that "fear" is the only emotion that exhibits statistical significance. It displays a negative relationship with the selection of the sustainable product as a gift, with an OR of 0.198 ($p = 0.005$). This signifies that for every unit increase in the feeling of fear associated with the sustainable product, the odds of choosing this product as a gift decrease by 80.2%. This finding corroborates portions of hypothesis H5-B b), which posited that the negative emotion of fear would have an adverse impact on product preference for the sustainable product as a gift.

Hypothesis H3-B, which pertained to perceived femininity, and H4-B, which focused on positive emotions, are not supported due to the absence of statistically significant values.

**Table 23: Model Coefficients - Product choice as gift**

|  | **Estimate** | **p-value** | **Odds ratio** |
|---|---|---|---|
| Intercept | -1.1037 | 0.650 | 0.332 |
| Effective | 0.8522 | <.001 | 2.345*** |
| Positive individual | 0.4544 | 0.066 | 1.575 |
| Self-signaling | 0.2057 | 0.432 | 1.228 |
| Feminine | -0.0445 | 0.809 | 0.956 |
| Design | 0.4244 | 0.014 | 1.529* |
| Exciting | 0.1806 | 0.400 | 1.198 |
| Safe | 0.5396 | 0.019 | 1.715* |
| Display | 0.4654 | 0.063 | 1.593 |
| Innovative | -0.1246 | 0.573 | 0.883 |
| Fear | -1.6170 | 0.005 | 0.198** |
| Hope | 0.2970 | 0.318 | 1.346 |
| Guilt | -0.6066 | 0.075 | 0.545 |
| Pride | -0.5810 | 0.105 | 0.559 |

*Note. Estimates represent the log odds of "Gift = Eco-Sera" vs. "Gift = Sera".*
*\*p < .05. \*\*p < .01. \*\*\*p < .001.*

As in the previous analyses, it is essential to examine the inverse OR for perceived quality. In this case, the inverse OR would be 1 divided by 2.345, which is approximately 0.426. This implies that for each unit increase in the perceived effectiveness of the non-sustainable product (i.e., if respondents perceive the non-sustainable product as more effective than the sustainable one), the odds of selecting the sustainable product as a gift decrease by approximately 57.4% (1 - 0.426).

Similarly, it is relevant to examine the reverse OR for the emotion "fear." The reverse OR for "fear" is approximately 5.05 (1 / 0.198), indicating that an increase in fear associated with the non-sustainable product (as opposed to the sustainable one) results in a 405% increase in the odds of selecting the sustainable product as a gift. This can be interpreted as the sustainable product being more preferred as a gift in cases where the non-sustainable product evokes feelings of fear.

**Product choice as gift with Green Consumptions Values as potential moderator**
As previously mentioned, the variable "Green CV" exhibited statistic significant correlations with both the dependent and independent variables. Specifically, it showed a correlation with the "Gift" variable yielding a Spearman's rho of 0.397 (p < 0.001). Consequently, we introduced interaction terms with all the predictors in the model with "Gift" to investigate

whether this individual variable exerts a moderating effect. The model is included in Appendix B8.

In this model, only the interaction term "effective * Green CV" exhibits statistical significance (OR = 1.4503, p = 0.038). This significant interaction implies that the impact of perceived effectiveness on the decision to select the sustainable product as a gift is amplified as respondent's green consumption values increase. A higher score on "GreenID" indicates that the respondent places greater emphasis on environmentally friendly attributes. Thus, when individuals with higher "GreenID" perceive the sustainable product as more effective, they are significantly more likely to choose it as a gift.

The absence of significance in the remaining interaction terms may indicate a lack of sufficient statistical evidence to assert that the influence of the relevant predictors on the decision to select the sustainable product as a gift is contingent upon the respondents' green consumption values.

### *Linear regression with Willingness to pay*

Given that "Willingness to pay" is a continuous variable, an Ordinary Least Squares (OLS) model has been employed. In this model, the coefficients represent the strength and direction of the relationship between each predictor and "Willingness to pay." In this analysis, we have thus examined the final segment of hypotheses H1-B, H2-B, H3-B, H4-B, and H5-B, which focus on the influence of cognitive inferences and immediate emotions on the willingness to pay more for the sustainable product (part c). Consequently, it will elucidate whether the various variables have a positive or negative effect on the willingness to pay more for the sustainable product.

The model's fit measures indicate a moderate fit with an R-value of 0.644 and an $R^2$ value of 0.415 (adjusted $R^2$ = 0.396). This implies that approximately 41.5% of the variation in willingness to pay can be explained by the independent variables in the model. The F-test is significant (F = 21.1, df1 = 13, df2 = 386, p < 0.001), indicating that the model, as a whole, is a strong predictor for measuring willingness to pay.

**Table 24: Model Fit Measures of Willingness to pay**

| R | $R^2$ | Adjusted $R^2$ | AIC | BIC | F | df1 | df2 | p-value |
|---|---|---|---|---|---|---|---|---|
| 0.644 | 0.415 | 0.396 | 677 | 737 | 21.1 | 13 | 386 | < .001 |

Upon closer examination of the individual predictors, the results reveal that the assumed positive effect of social self-signaling, as posited in H1-B c) (via "positive person"), is indeed statistically significant (Coefficient = 0.15388, SE = 0.16701, $p < 0.001$). This indicates that the more the sustainable product is perceived to signal positive social values to others, the greater the willingness to pay more for this product. However, the predictor "display," representing the other facet of the social self-signaling construct, does not reach statistical significance. This finding thus lends partial support to hypothesis H1-B c), suggesting that social self-signaling has a positive influence on the willingness to pay more for the sustainable product.

Furthermore, the predictors representing perceived innovativeness, namely "innovative" and "exciting," also demonstrate positive and significant associations with the willingness to pay more for the sustainable product. The former yields a coefficient of 0.11237 (SE = 0.13097, $p = 0.010$), indicating that a higher perception of the sustainable product as innovative increases the willingness to pay more for it. "Exciting" boasts a coefficient of 0.15890 (SE = 0.20745, $p < 0.001$), signifying that for every unit increase in the perceived excitement of the sustainable product, the willingness to pay more intensifies. Therefore, hypothesis H1-B, which pertains to perceived innovativeness, receives full support. It is worth noting, however, that "exciting" carries the highest standardized coefficient among all predictors, underscoring its substantial positive impact on the willingness to pay more for the sustainable product.

It is noteworthy that perceived safety (the variable "safe") exhibits a marginally significant effect on the willingness to pay more for the sustainable product ($p = 0.05$). While the p-value precisely aligns with the conventional threshold for significance, it carries a positive coefficient of 0.09568 (SE = 0.0464). This suggests that the willingness to pay more for the sustainable product may increase when the product is perceived as being safer. With a p-value exactly at 0.050, the result implies a 5% probability of observing such an effect by random chance if it were nonexistent.

However, the remaining variables under H1-B c), specifically those related to private self-signaling and perceived aesthetics, do not achieve statistical significance.

Regarding perceived quality, the predictor "effective" demonstrates a significant positive coefficient of 0.10076 (SE = 0.0325, $p = 0.002$). This supports hypothesis H2-B c), as it indicates that an increased perception of the sustainable product's effectiveness also enhances

the willingness to pay more for it. To be more precise, for each unit increase in the perception of effectiveness, the willingness to pay for the sustainable product increases by 0.10076 units.

Furthermore, the variable of perceived femininity, assessed through "feminine," exhibits a significant negative coefficient of -0.08825 (SE = 0.0340, p = 0.010). This suggests that as the sustainable product is perceived to possess more feminine characteristics, the inclination to pay a higher price for it diminishes. This finding aligns with hypothesis H3-B c).

The negative emotion "fear" also presents a marginally significant coefficient of -0.13047 (SE = -0.08482, p = 0.05). This effect is negative, indicating that when the emotion of fear becomes more associated with the sustainable product, the willingness to pay a higher price for the sustainable product diminishes. Similar to the variable "safe," a p-value exactly at 0.050 implies that there is a 5% probability of observing such an effect by random chance if it were nonexistent.

The remaining emotions, namely "hope," "guilt," and "pride," did not achieve statistical significance. Therefore, hypothesis H4-B c) is not supported, and the part related to the negative emotion "guilt" in H5-B c) is also unsupported.

**Table 25: Model Coefficients - Willingness to pay**

|  | Estimate | p-value | Stand. Estimate |
|---|---|---|---|
| Intercept | 1.19848 | 0.002 |  |
| Effective | 0.10076 | 0.002 | 0.14689 ** |
| Positive individual | 0.15388 | <.001 | 0.16701*** |
| Self-signaling | 0.02872 | 0.570 | 0.03322 |
| Feminine | -0.08825 | 0.010 | -0.10763** |
| Design | 0.02371 | 0.465 | 0.03474 |
| Exciting | 0.15890 | <.001 | 0.20745*** |
| Safe | 0.09111 | 0.050 | 0.09568´ |
| Display | 0.04190 | 0.338 | 0.05443 |
| Innovative | 0.11237 | 0.010 | 0.13097* |
| Fear | -0.13047 | 0.050 | -0.08482´ |
| Hope | 0.06142 | 0.229 | 0.06233 |
| Guilt | 0.06817 | 0.200 | 0.06462 |
| Pride | -0.00579 | 0.915 | -0.00551 |

*Note: ´p=.05, *p < .05. **p < .01. ***p < .001.*

Similar to the logistic regressions, it is relevant to examine the reverse effects of perceived quality and the emotion of fear, as these variables were significantly rated higher for the non-

sustainable product. Since the OLS method provides coefficients, the reverse coefficient is simply the reciprocal of the original coefficient. For "effectiveness," this implies that if we were to assess the impact of perceiving the product as less effective (i.e., perceiving the non-sustainable product as more effective), each unit reduction in the perception of effectiveness for the sustainable product would lead to a reduction in willingness to pay by 0.10076 units. The reverse coefficient for "fear" is thus positive at 0.13047. This means that each unit reduction in fear associated with the sustainable product (and consequently, an increase in fear associated with the non-sustainable product) would increase the willingness to pay for the sustainable product by 0.13047 units.

**Willingness to pay with Green Consumptions Values as possible moderator**

Green Consumption Values also exhibited a strong correlation with the dependent variable "Willingness to pay" (Spearman's rho = 0.444, $p < 0.001$). Hence, an extended model incorporating "Green CV" as an interaction term with all the predictors was also examined in the linear model.

In the extended model, the results reveal that the interaction term with the variable "self-signaling" has a significant positive effect (Estimate = 0.12835, SE = 0.0406, p = 0.002). This indicates that the impact of self-signaling on the willingness to pay more for the sustainable product increases with a higher value of green consumption values compared to those with lower green consumption values.

Furthermore, the interaction term with "innovative" has a significant negative effect (Estimate = -0.07750, SE = 0.0293, p = 0.008). This finding is intriguing as it suggests that for individuals with higher green consumption values (higher "GreenID"), the relationship between the perception of innovativeness ("innovative") and the willingness to pay may be less strong or even negative compared to individuals with lower green consumption values.

### 5.3.8  Additional findings

Similar to Study 1, a correlation matrix was constructed in this study to examine the relationships between the control variables and the remaining variables (the matrix is provided in Appendix B6). Additionally, the Spearman rank correlation between "effective" and "price" reveals a weak negative correlation (Spearman's rho = -0.189, $p < 0.001$). This suggests that the higher the perceived price of the sustainable product, the lower the perception of its effectiveness compared to the non-sustainable product.

## 5.4 Summary of Analyses Results

Given that this study served as an extension of Study 1, in this investigation, we have tested all the proposed hypotheses in Section 3. Through various statistical tests, we have identified the following findings:

**Test of possible Question-Order Effects**

The study was designed to investigate the potential impact of question sequence on participant responses. Participants were randomly assigned to one of two groups: the first group received questions related to dependent variables first ("DV first" - group), while the second group received them last ("DV last" - group). With the respondents evenly distributed across these two conditions, a range of statistical tests was employed to assess whether this manipulation of randomized sequence had any effect on survey responses.

The analysis of dichotomous dependent variables, namely "Gift" and "Product choice," using chi-square tests yielded mixed results. For "Product choice," no significant order effect was detected. However, the "Gift" variable exhibited a significant order effect ($p = 0.028$), with the "DV last" group displaying a higher frequency of choosing sustainable products compared to the "DV first" group. Nevertheless, the association was found to be weak, indicating limited practical significance.

Regarding continuous variables, independent sample t-tests were utilized. Notably, the variable "Exciting" displayed a significant difference ($p = 0.015$), with the "DV last" group reporting higher scores, suggesting that question order may influence how exciting a product is perceived. However, the effect size was small, implying minimal practical impact.

The results suggest the presence of some order effect, particularly concerning the variable "Gift" and the perception of products as "Exciting." Nevertheless, given the small effect sizes, it is advisable to interpret these findings cautiously. Consequently, we concluded that, overall, the order of questions had a minimal influence on the study outcomes, and we proceeded to analyze the combined data from both groups without accounting for the order effect.

**Test of differences in ratings**

Similar to Study 1, sample T-tests were used to evaluate hypotheses regarding the differences in ratings for certain product attributes. The hypotheses tested were H1-A, H2-A, H3-A, H4-A, and H5-A.

An initial analysis using binomial tests on the dependent variables showed a strong preference for sustainable products both in general product choice (68.8%) and as gifts (75%), with both scenarios showing statistically significant deviations from a random distribution (p < 0.001). Further analysis of the last dependent variable, "willingness to pay," demonstrated that a majority of respondents were price-neutral or willing to pay more for sustainable products, with a statistically significant deviation from neutrality (p < 0.001), indicating a preference for the sustainable option. These findings indicate a preference for sustainable products across all three dimensions presented by the dependent variables.

The average scores across all explanatory variables indicated a more favorable perception of the sustainable product, except for "effective," "fear," and "guilt," where the non-sustainable product received higher scores. The results of the one-sample t-tests confirmed hypotheses H1-A and H3-A, revealing a significant preference for the sustainable product in terms of perceived social self-signaling, private self-signaling, perceived safety, perceived aesthetic appeal, perceived innovativeness, and perceived femininity. Effect sizes across these variables ranged from medium to large, signifying strong preferences.

The findings from the t-tests also provided support for hypotheses H2-A, H4-B, and H5-B. The non-sustainable product scored significantly higher in terms of perceived effectiveness. Additionally, the negative emotions "fear" and "guilt" were significantly associated with the non-sustainable product, while positive emotions such as "hope" and "pride" were significantly associated with the sustainable product.

It is also worth mentioning that the manipulation of the sustainable product was successful, as the tests showed significantly higher ratings for the sustainable product on the variable "eco-friendly."

**Test of influence of control-variables**

A weak but statistically significant negative correlation was observed between "age" and "product choice," indicating that as age increases, there is a slight decrease in the likelihood of preferring the sustainable product. This association was characterized as weak. Nevertheless, no significant correlations were found concerning "gift" or "willingness to pay."

Chi-square tests revealed a non-significant trend between gender and product choice. Nonetheless, a significant yet weak correlation was identified in the context of gift choice, with females displaying a stronger preference for the sustainable product. This trend was also

found to be significant in the analysis of "willingness to pay," as the results of the t-test indicated that females were more willing to pay for the sustainable product compared to males. The effect sizes for these gender differences were considered to be low to moderate in both tests.

There was no significant association detected between education level and product preference across all the dependent variables. However, a trend suggested that individuals with higher education levels might exhibit a preference for the sustainable product, particularly when selecting it as a gift.

The one-sample t-test conducted on the price variable revealed that participants perceived the sustainable product as being more expensive than the non-sustainable counterpart, with a significant and substantial effect size (t = 29.1). In the examination of the correlation matrix, we identified a weak negative correlation between price and product choice, along with a moderate positive correlation between price and willingness to pay. These findings suggest that a higher perception of price is associated with a reduced preference for choosing the sustainable product but an increased willingness to pay more for the sustainable product. However, perceived price did not significantly influence the selection of the product as a gift.

**Test of influencing predictors**

To test the hypotheses related to the influence of cognitive inferences and immediate emotions on product preference, we employed logistic regression for dichotomous dependent variables (product choice and gift choice) and linear regression for the continuous variable "willingness to pay." Therefore, we tested hypotheses H1-B, H2-B, H3-B, H4-B, and H5-B.

*Regression with "Product choice"*

In the analysis concerning product choice (part a of the hypotheses), the model fit measures indicated a robust fit (Nagelkerke's $R^2$ = 0.688). In this context, components of hypothesis H1-B about private self-signaling, perceived aesthetic appeal, and perceived safety were supported, as they exhibited positive effects on the selection of the sustainable product (all had OR values exceeding 1). Additionally, the variable "exciting," which falls under perceived innovativeness, yielded a statistically significant positive result. For all these predictors, this implies that for every unit increase in the perception that the sustainable product is rated higher in these cognitive inferences (in comparison to the non-sustainable counterpart), the probability of choosing the sustainable product increases.

However, the remaining predictors in H1-B related to social self-signaling (both "positive individual" and "display"), as well as the "innovative" component of perceived innovativeness, were not supported in this analysis. Hypothesis H3-B, concerning perceived femininity, also lacked support.

The predictor "effective" exhibited a significantly strong positive influence on product choice (OR = 5.359), supporting H2-B. This indicates that perceived effectiveness is a powerful motivator for choosing the sustainable product. On the other hand, it was relevant to examine the reversible OR, as the effectiveness variable was significantly rated higher for the non-sustainable product. The reversible OR was 0.187, meaning that individuals are less inclined to choose the sustainable product if the non-sustainable product is perceived as more effective. However, it's important to note that this effect is not as strong as the positive effect of believing the sustainable product is effective.

This opposite effect was also explored for the negative emotion "fear," as it was found to have a significant negative influence on product choice (OR = 0.300), partially supporting H5-B. This result may suggest that fear associated with the sustainable product can have a deterrent effect on the choice of sustainable products. However, the reversible OR was 3.33, indicating that if the emotion is associated with the non-sustainable product, it is an even more powerful driver for choosing the sustainable product (compared to the reverse scenario).

The other emotions, namely "guilt," "hope," and "pride," did not emerge as significant predictors in the model, not supporting H4-B and parts of H5-B.

*Regression with "Gift"*

Furthermore, the model for "gift" choice did not exhibit as strong model fit values as the previous one. Nonetheless, a Nagelkerke's $R^2$ value of 0.476 can be considered indicative of a robust model. In this analysis, we tested for the second part of the hypotheses.

In contrast to the model for "product choice," the variable "design" emerged as a significant predictor (OR 1.529, p=0.014), with a positive impact on the choice of the product as a gift. Additionally, "safe" was also significant and had a positive effect (OR = 1.715, p = 0.019). This indicates that the aspects related to perceived aesthetics and perceived safety in H1-B were supported. However, the remaining variables in the hypothesis did not achieve statistical significance.

Furthermore, "effective" also displayed strong significance and a positive effect in this model (OR = 2.345, p < 0.001). This signifies that perceived quality is a robust driver of choosing the sustainable product as a gift. In this analysis, we also examined the reversible OR, which was 0.426. This indicates, akin to the product choice analysis, that even though a negative perception of the effectiveness of sustainable products may somewhat influence the choice, the positive effect of considering them more effective is significantly stronger.

The emotion "fear" also showed significance in gift choice, with a negative effect (OR = 0.198, p = 0.005). However, the reversible OR exhibited a high value of 5.05, once again indicating that while an increase in fear of a sustainable product significantly reduces the likelihood of it being chosen, the effect of increased fear associated with a non-sustainable product on the selection of sustainable alternatives is much more pronounced.

The other emotions, namely "guilt," "hope," and "pride," did not emerge as significant predictors in the model either, not supporting H4-B and parts of H5-B.

### *Regression with "Willingness to pay"*

The linear model also exhibited a moderately good level of explanatory power ($R^2 = 0.415$). While this level of explanation cannot be directly compared to that of the logistic models, it suggests that it does not fit as well as the "product choice" model.

In contrast to the other regression analyses, one dimension of social self-signaling now reveals a positively significant effect. The predictor "positive individual" had a coefficient of 0.15388 (p < 0.001), which supports the hypothesis HB-1 that positive social self-signaling associated with the sustainable product increases the willingness to pay more for it. Furthermore, the entire dimension of perceived innovativeness displayed a positively significant effect. "Innovative" had a coefficient of 0.11237 (p = 0.010), and "exciting" had a coefficient of 0.15890 (p < 0.001), supporting the hypothesis in HB-1 that perceived innovativeness of the sustainable product increases the willingness to pay more for it.

However, "safe" only exhibited a marginal significant effect (Coefficient = 0.09568, p = 0.050). This suggests that perceived safety has a marginal positive effect on willingness to pay, sitting at the threshold of statistical significance. The remaining predictors in H1-B and femininity in H3-B were not significant and, therefore, are not supported.

In this model, Hypothesis H2-B is supported, suggesting that perceived quality associated with the sustainable product positively influences the willingness to pay more for it (Estimate = 0.10076, SE = 0.0325, p = 0.002). Furthermore, the reverse coefficient represents the negative value of the estimate, that is, -0.10076. Although it does not convey as much information as the reversed coefficients in logistic models, its inclusion is pertinent since the non-sustainable product was ranked significantly higher in the efficiency variable in H2-A.

The negative emotion "fear" was also marginally significant and negative (Coefficient = -0.13047, p = 0.05), indicating that increased fear associated with the sustainable product may diminish the willingness to pay more for it. Thus, parts of H5-B are marginally supported. The reverse coefficient is therefore 0.13047, relevant because this emotion was associated with the non-sustainable product. The remaining emotions, namely "guilt," "hope," and "pride," did not emerge as significant predictors in the model, thus not supporting H4-B and parts of H5-B.

An intriguing discovery arises from the fact that "femininity" exhibited statistical significance within this particular model, in contrast to the absence of significance in the other models. The predictor demonstrated a negative coefficient of -0.08825 (SE = 0.0340, p = 0.010), thereby providing support for Hypothesis H3-B, which posited that the perception of femininity associated with the sustainable product has a detrimental impact on the willingness to pay a premium for it.

**Including Green Consumption Values as interaction in regression analyses**

Given that the control variable "Green CV" exhibited a strong and statistically significant correlation with all the dependent and independent variables, it was introduced as a potential moderator in all regression models. Consequently, interaction terms were added to explore in more detail how green consumption values influence the relationship between cognitive and emotional factors and preferences for sustainable products.

In the model related to product choice, the analysis did not reveal any statistically significant interaction effects between green consumption values and the cognitive or emotional drivers. This suggests that respondents' environmental consciousness does not alter the relationship between these drivers and product choice. However, the absence of significant interaction effects can be attributed to limitations in the study's statistical power to detect such effects.

Significant interaction terms were, however, identified in the model pertaining to product choice as a gift. In this case, the interaction between perceived effectiveness and green

consumption values exhibited a significant and positive effect, indicating that for individuals who highly value sustainability, effectiveness is a stronger driver for choosing sustainable gifts.

In the willingness-to-pay model, the interaction term between private self-signaling and green consumption values displayed a significant positive effect. This suggests that the more an individual identifies with green values, the more willing they are to pay for a product that they perceive as signaling these values. Conversely, the interaction between the perception of innovation and green consumption values was negatively correlated with willingness to pay. This could be interpreted to mean that for individuals with strong environmental awareness, innovative attributes may not necessarily be as convincing in justifying a higher price.

These findings provide insights into the complexity of consumer behavior regarding sustainable products and demonstrate that green consumption values can either enhance or diminish the impact of other factors in decisions about sustainable products, depending on the context of the decision at hand.

**Additional findings**

Similar to the findings in Study 1, we also identified the intriguing negative correlation between price and effectiveness (Spearman's rho = -0.189, $p < 0.001$). This indicates that as the perceived price of the sustainable product increases, the perception of its effectiveness in comparison to the non-sustainable product decreases. This implies a potential skepticism regarding the value proposition associated with higher-priced sustainable products.

# 6. General discussion

In this section, we will systematically discuss the overarching findings of our research, delve into both theoretical and managerial implications, acknowledge the limitations inherent in our research, and suggest areas for future research.

## 6.1 General Discussion of Findings

The objective of this research was to examine the cognitive inferences and immediate emotional responses associated with sustainable products in comparison to non-sustainable alternatives, and to assess the extent to which these inferences and reactions impact the choice between these product categories. To accomplish this, we conducted two comprehensive studies to delve into these intricate dynamics. Both studies employed the same data collection method and questionnaire but had different participant samples. The first study consisted of participants from Norway, while the second study involved participants from the United States. This approach allows us to compare and generalize the findings, as well as examine the robustness and consistency of the hypotheses across different populations.

In Study 1, which relied on secondary data from Landsvik et al. (2023), we were able to evaluate only a subset of the proposed hypotheses due to the utilization of the original list of potential cognitive inferences from the original study. Study 2 significantly expanded the research framework by introducing a more comprehensive set of dependent variables. This extension encompassed the inclusion of the "gift" variable, aimed at investigating the interaction between social self-signaling theory and sustainable purchasing behavior, as supported by previous research (Gillison & Reynolds, 2016; Lyu et al., 2022). Furthermore, the integration of the "willingness to pay" variable, which has been extensively explored as a significant barrier in sustainable consumer behavior (Tey et al., 2018; Gomes et al., 2023; Dixon & Mikolon, 2021), provided valuable insights into the perceived financial worth associated with sustainable choices. These enhancements enabled us to capture multiple facets of product preference between sustainable and non-sustainable products.

Furthermore, we expanded the set of cognitive inferences by incorporating perceived femininity and introduced a novel dimension of self-signaling, specifically private self-signaling. We also included potential immediate emotions that consumers may experience when confronted with choices. These supplementary variables provided novel insights into the

factors influencing consumer preferences, thereby revealing a more nuanced understanding of the underlying dynamics in the selection of sustainable products.

Importantly, Study 2 verified the non-existence of order effects, thereby assuring that the sequence in which the products were presented did not bias participants' preferences or perceptions. This element of the study bolstered the credibility of the findings, affirming that the expanded array of variables, encompassing both dependent and independent variables, provided an authentic representation of consumer attitudes and decisions within the framework of sustainability.

Before delving into the hypothesis testing results, it is pertinent to examine the distribution of choices across the three dependent variables. Concerning the variable representing product choice, where respondents were tasked with selecting one of the products for personal purchase, both Study 1 and Study 2 participants exhibited a strong preference for the sustainable product. This finding was unsurprising, as numerous studies have indicated that a significant number of consumers intend to or prefer purchasing sustainable products (Zhang & Dong, 2020; Unilever PLC, 2017; Am et al., 2023). The preference for the sustainable product was even more pronounced when selecting a product as a gift in Study 2. This can be attributed to the fact that people tend to prioritize desirability more in gift purchases compared to self-purchases, as demonstrated by Lyu et al.'s (2022) study. Regarding willingness to pay, Study 2 revealed that the majority of respondents were price-neutral or willing to pay more for sustainable products, indicating a general preference for sustainable alternatives even in terms of willingness to pay. This aligns with expectations, as several studies have shown that consumers are willing to pay a premium for products labeled as sustainable (Aprile et al., 2012; Liu et al., 2019; Vecchio & Annunziata, 2015; Salazar & Oerlemans, 2016).

To investigate the first part of our research question, which aimed to determine the simple cognitive inferences and immediate emotional reactions associated with sustainable products in comparison to their non-sustainable counterparts, we tested hypotheses H1-A, H2-A, H3-A, H4-A, and H5-A. These hypotheses predicted which of the products, either the sustainable or non-sustainable one, would be rated higher among the respondents in the various cognitive inferences and immediate emotions.

In both Study 1 and Study 2, we found support for H1-A, demonstrating that participants consistently rated the sustainable product higher than its non-sustainable counterpart in terms

of social self-signaling, private self-signaling (in Study 2), perceived safety, perceived aesthetic appeal, and perceived innovativeness. This set of cognitive inferences is often referred to as "halo effects" because they are associated with something positive and lead consumers to prefer the sustainable product.

Concerning H2-A, we also identified support in both studies, where the non-sustainable product received higher ratings in perceived quality. This aligns with prior research, as sustainable products within strong product categories, the category we employed in our study, are frequently associated with lower quality compared to their non-sustainable counterparts (Chen & Chiu, 2016; Pancer et al., 2017; Lin & Chang, 2012). This discovery implies a prevailing consumer perception that attributes greater effectiveness or performance to non-sustainable products, underscoring a potential challenge in shaping the perception of sustainable products within the marketplace.

Furthermore, we also found support for H3-A, indicating that the sustainable product was rated significantly higher in perceived femininity. This corresponds with previous research indicating that environmental friendliness and green products are consistently linked to femininity (Brough et al., 2016; Newman et al., 2014; Joshi & Rahman, 2015).

Regarding immediate emotions, as tested by hypotheses H4-A and H5-A, we also found statistical support. H4-A, which pertained to the positive emotions of hope and pride, exhibited significantly higher ratings for the sustainable product, while the negative emotions in H5-A demonstrated significantly higher ratings for the non-sustainable product. This aligns with the expectation derived from previous studies, as choosing sustainable products is often linked to positive emotions (Ojala, 2012; Stevenson et al., 2018; Antonetti & Maklan, 2014). Similarly, selecting the non-sustainable product is therefore associated with negative emotions (Theotokis & Manganari, 2015; Skurka et al., 2018; Van Zomeren et al., 2010). It is worth noting, however, that the emotion "fear" only indicated a slight superiority for the non-sustainable product, as its average value was closer to the neutral line compared to the other emotions. This could suggest that the emotion of fear may not have a strong and consistent association with a particular product, or that the emotion may hold different meanings among the respondents.

To examine the latter part of our research question, which addressed the extent to which the identified inferences and emotions influence the choice between these two types of products,

we employed various regression analyses. In the logistic models, we used the non-sustainable product as the reference level, allowing us to investigate which of the predictors drove the preference for the sustainable product. Consequently, we tested hypotheses H1-B, H2-B, H3-B, H4-B, and H5-B. The hypotheses that received statistical support, as well as the specific predictors, are summarized in the table below.

**Table 26: Summary of Hypotheses (part B)**

| Hypothesis: | Inference/emotion: | Product choice (1) | Product choice (2) | Gift (2) | Willingness to pay (2) |
|---|---|---|---|---|---|
| H1-B: | Positive individual/person Display | | | | Supported |
| | Self-signaling | | Supported | | |
| | Safe | | Supported | Supported | Marginally |
| | Design | | | Supported | |
| | Exciting | Supported | Supported | | Supported |
| | Innovative | | | | Supported |
| H2-B | Effective | Supported | Supported | Supported | Supported |
| H3-B | Feminine | | | | Supported |
| H4-B | Hope | | | | |
| | Pride | | | | |
| H5-B | Fear | | Supported | Supported | Marginally |
| | Guilt | | | | |

*Note: The gray area indicates that the variable was not included in the study.*

Regarding the cognitive inferences in H1-B, it is evident that the predictor "exciting" received support in nearly all models, except in the context of product choice as a gift (thus only supporting HB-2, part a and c). This predictor, which is part of the perceived innovativeness measure, demonstrated a strong and positive influence on the choice of the sustainable product in both Study 1 and Study 2. Additionally, it had the highest standardized coefficient among all predictors in the model for willingness to pay, emphasizing its significant positive impact on the willingness to pay more for the sustainable product. However, the second component of the perceived innovativeness measure, as measured by the predictor "innovative," only received support in the model with Willingness to pay. Furthermore, the model with the interaction terms indicated that the interaction between "innovation" and "Green CV" was significantly negatively correlated with " willingness to pay". In other words, among individuals with high green consumption values, the perception of innovation alone may not be as potent a driver for paying more for the sustainable product. This suggests that when it comes to product choice, the perception of something as exciting is the most crucial driver.

However, when assessing the willingness to pay more for the sustainable product, the perception of it being an innovative product also plays a role, but this effect may not be as strong when green consumption values are high.

Furthermore, perceived safety was identified as a positive driver for the preference of the sustainable product in all models in Study 2, providing support for part a, part b, and marginally part c in H1-B. This implies that the perception of safety plays a substantial role in the choice of a sustainable household product, aligning with the results observed in Bearth's (2016) research. Although perceived safety did not emerge as a significant driver in the product choice model in Study 1, we nonetheless discovered that this relationship is moderated by the degree of green consumption values. While this interaction was not significant in the choice model of Study 2 (as the model with the interaction did not reach significance), it can still be assumed that for individuals with higher green consumption values, the perception of a product's safety will exert a more pronounced positive influence on their preference for the sustainable product.

A notable finding when examining H1-B is that, while the sustainable product received higher ratings in both social and private self-signaling, it is primarily private self-signaling that appears to exert a significantly positive influence on preference in the context of individual product choice (supporting only H1-B part a). This suggests a greater inclination among consumers to engage in private self-signaling rather than social signaling to others in their product selection process, which is an intriguing observation. On the other hand, it was only in the willingness-to-pay model where social self-signaling, specifically the variable "positive individual," was found to be positively significant (partially supporting H1-B, part c). This implies that consumers are inclined to pay more for sustainable products as a means of external signaling. These results offer valuable insights into the dynamics between social and private signaling in consumer behavior, clearly demonstrating how the two aspects of signaling operate and underscoring their significance in various domains of consumer behavior.

In both Study 1 and Study 2, H2-B was supported across all dependent variables. This suggests that when individuals perceive the sustainable product as more effective (indicating higher product quality), it positively influences their preference for it across all preference dimensions. This finding aligns with previous research indicating that quality plays a significant role in the selection of sustainable versus non-sustainable products in strong

product categories (Newman et al., 2014; Luchs et al., 2010; Joshi & Rahman, 2015; Lin & Chang, 2012).

However, an interesting aspect of our findings was the investigation of the reverse odds in the logistic models. This analysis revealed that if individuals perceived the non-sustainable product as more effective (as supported by H2-A), the odds of not choosing the sustainable product were much lower than the odds of choosing it when it was perceived as more effective. In other words, while a negative perception of the effectiveness of sustainable products may influence the choice to not select the sustainable product over the non-sustainable one, the positive effect of considering the sustainable product as more effective is significantly stronger. This implies that if consumers can be convinced that the sustainable product is as good or better in terms of effectiveness compared to the non-sustainable one, it will confer a significant advantage over non-sustainable products.

Another interesting finding related to perceived quality, as mentioned in the additional findings in both Study 1 and 2, we observed a negative correlation between price and effectiveness. This suggests a potential skepticism regarding the value proposition associated with higher-priced sustainable products. In other words, the more expensive the sustainable product, the less effective consumers perceive it to be compared to a cheaper, non-sustainable product.

Regarding the hypothesis of perceived femininity in H3-B, we identified a significant negative effect exclusively within the willingness-to-pay model. Consequently, our findings provide support solely for part c of H3-B, suggesting that when consumers perceive a sustainable product as more feminine, their willingness to pay a premium for it may diminish. This specific impact of perceived femininity on willingness to pay could potentially be contextualized within our findings related to gender differences in this area. Prior studies have demonstrated that male consumers often eschew environmentally friendly behaviors, perceiving them as feminine and as a challenge to their masculinity (Van den Hende and Mugge, 2014; Brough et al., 2016). Our examination of gender differences revealed that males were less inclined to pay for sustainable products compared to females. This could be attributed to the fact that in scenarios where males contemplate paying a premium for a sustainable product, they may also consider how this choice signifies their identity to others (social self-signaling). This elucidates why femininity negatively influenced the willingness to pay, but not the actual product choice or the choice of products as gifts.

None of the positive emotions had a significant effect on product preference in both studies (across all dimensions). We, therefore, fully reject hypothesis H4-B. However, it turned out that the negative emotion "fear" had a significant negative effect across all dimensions of product preference for the sustainable product, supporting all its parts in H5-B. This finding is highly interesting, as the emotion of fear has not been specifically researched in the context of sustainable product choices but rather in relation to general sustainable behavior (Yu & Lu, 2023; White et al., 2011). This finding indicates that if the feeling of fear is more associated with the sustainable product than the non-sustainable product, it will reduce the likelihood of choosing the sustainable product.

However, similar to perceived quality, we also investigated the reverse effect here. Across all the models, we found that if the emotion of fear is associated with the non-sustainable product, as supported in H5-A, it becomes an even more powerful driver for choosing the sustainable product (compared to the reverse scenario). To provide a concrete example, in the "gift" model, we found that if fear is more associated with the sustainable product than the non-sustainable product, it reduces the odds of selecting the sustainable product as a gift by approximately 57.4%. However, the reverse odds show that the odds of choosing the sustainable product as a gift increase by 405% if fear is more associated with the non-sustainable product. This demonstrates that while an increase in fear for a sustainable product significantly reduces the chance of it being chosen, the effect of increased fear for a non-sustainable product on the choice of sustainable alternatives is much stronger. This suggests that consumers' aversion to non-sustainable products, when associated with negative emotions like fear, is a more effective driver of choosing sustainable products than the reverse situation. In other words, fear of non-sustainable products appears to be a more potent motivator for promoting the choice of sustainable alternatives.

## 6.2 Theoretical Implications

Our study, conducted in collaboration with another project (Landsvik et al., 2023), has significantly enriched the understanding of cognitive inferences and emotions in product choice. Our research delved deeper into the inferences explored in the original study (study 1) while also introducing additional inferences and emotions into the framework. Through this work, we have made a distinctive contribution to the existing literature, conducting a

comprehensive investigation into product choices with a notably extensive array of explanatory variables related to inferences and emotions.

The combined findings from study 1 and study 2 reinforce the prevalent consumer preference for sustainable products, which is consistent with several other research. Additionally, our research aligns with Bearth (2016) and Evans et al. (2010) studies in recognizing sustainable products as safer alternatives. This highlights the evolving consumer mindset where safety is increasingly linked with sustainability, influencing consumer choice. Also, the aesthetic appeal of sustainable products positively influences consumer preferences, which corresponds to the findings of Zafarmand et al. (2003) and Zhang et al. (2023). This suggests that the visual appeal of sustainable products is a crucial factor in shaping consumer choices.

In terms of femininity, we confirmed its association with sustainability, which aligns with the findings of Newman et al. (2014) and Joshi & Rahman (2015). However, we found that femininity was not a significant driver in product choice or in the selection of products as gifts. Intriguingly, it emerged as a negative driver in the willingness to pay more for the sustainable product. This insight offers an intriguing addition to the existing literature, highlighting a complex relationship between perceptions of femininity and consumer behavior in the context of sustainable products.

Furthermore, we observed that non-sustainable products are generally perceived as more effective, or of higher quality, which aligns with existing studies (Chen & Chiu, 2016; Pancer et al., 2017; Lin & Chang, 2012). However, a pivotal finding emerged: when sustainable products are perceived as more effective, there is a dramatic increase in their selection likelihood, far exceeding the decrease in likelihood when they are seen as less effective than non-sustainable products. To quantify, perceived higher effectiveness in sustainable products more than quadruples their selection odds. On the other hand, when they are viewed as less effective, the reduction in selection odds is considerably milder, not even amounting to a halving. This suggests that the positive impact of perceived effectiveness in sustainable products is significantly stronger than the negative impact when non-sustainable products are viewed as more effective. It's also important to note that our research focused on a "strong product category," where quality is highly valued, suggesting that the effect of perceiving a sustainable product as efficient could be even more pronounced in such contexts. These findings have significant implications for how we understand consumer decision-making in relation to the perceived effectiveness of sustainable products.

Another valuable addition to literature is our enhancement of the measurement of perceived innovativeness, achieved through the inclusion of the variable "excitement." This facet of innovativeness exhibited a significant and positive impact on both the preference for sustainable products and consumers' willingness to pay for them. These findings underscore the potency of excitement, as a cognitive inference, in driving choices favoring sustainable products. By illuminating this dimension, our study enriches the theoretical foundation of innovativeness, emphasizing the pivotal role that excitement plays in influencing consumer behavior towards sustainable product selections

In addition, we found that fear serves as a motivator for sustainable behavior, aligning with previous studies such as those by Van Zomeren et al. (2010) and Skurka et al. (2018). However, our study introduces a novel perspective by investigating a previously unexplored dimension: product choices between sustainable and non-sustainable options. Previous studies have primarily focused on general sustainable behavior. This contribution to the literature provides a more comprehensive and nuanced understanding of the emotional factors driving sustainable product choices.

In line with the findings of Griskevicius et al. (2010) and Newman et al. (2014), our study identified private self-signaling and social self-signaling as potential motivators for more sustainable behavior. However, our research adds depth to these concepts by examining them together in a product choice context, sustainable vs non-sustainable. We discovered that in product choice, private self-signaling was a key driver, whereas social signaling became more influential in determining the willingness to pay more for a sustainable product. These insights significantly enrich the understanding of consumer-choice behavior, delineating the distinct roles of private self-signaling and social signaling.

## 6.3 Managerial Implications

Our study reveals the significant influence of cognitive inferences and immediate emotions such as private self-signaling, social self-signaling, excitement, and fear on consumer choices for sustainable products. Supermarket leaders can take advantage of this influence by incorporating nudges into their marketing strategies. Nudges, as described in the literature (Congiu & Moscati, 2022), are strategic and subtle interventions designed to guide people towards better decisions. These approaches often rely on cognitive biases and heuristics rather than solid rationality, softly influencing choices without overt compulsion. Such an approach

aligns with our objective of subtly influencing greener decisions through inferences and emotions.

One nudge strategy idea involves employing the concept of private signaling in product presentation. Specifically, products, particularly those deemed sustainable, can be designed, and labeled in a manner that elicits feelings of self-worth and environmental responsibility among consumers. By transforming the act of choosing sustainability into a visible and tangible representation of one's personal dedication to the environment, these products effectively function as nudges, encouraging eco-friendly purchases.

Additionally, our research suggests the potential benefits of social signaling in influencing consumer choices, providing a basis for developing an effective nudge strategy. This aligns with similar findings in the realm of nudging, such as those presented by Ingendahl et al. (2021), which emphasize the potency of nudges that incorporate social influence to alter consumer behavior. An illustrative example of this is the concept of presenting sustainable products on a staircase, with each step symbolizing an increased level of environmental benefit. Such an imaginative exhibition not only influences consumers by functioning as a social signal, showcasing their contribution, but it also generates excitement.

As our final suggestion, based on insights gathered from studying fear, we propose an effective nudge strategy that involves the use of a dual-sided display in stores. This display is designed to contrast the negative environmental impacts of non-sustainable choices with the positive effects of sustainable ones. On one side, it would show the negative outcomes through imagery of climate damage and a depleting battery indicator, while on the other, it would highlight the benefits of sustainable choices using nature imagery and an increasing battery symbol. This approach utilizes fear to influence consumer behavior towards environmentally responsible choices, with the negative side evoking fear about environmental damage and the positive side offering a reassuring alternative.

In summary, integrating nudges into marketing strategies, by capitalizing on cognitive biases and immediate emotions, offers supermarket leaders an innovative and effective approach to boost sales of sustainable products. This strategic use of nudges can transform environmental friendliness into a compelling selling proposition.

## 6.4 Limitations

As we explore our research methods, it's crucial to recognize certain limitations that could influence the robustness and applicability of our results. We touch upon challenges related to internal validity, external validity, construct validity, providing a glimpse into the complexities shaping our study.

The basic goal of researchers across many domains is to maximize validity, which involves using procedures that result in findings that sufficiently reflect the truth (Roe & Just, 2009). When it comes to internal validity challenges, this is often defined as a researcher's capacity to prove that observed correlations are causal (Roe & Just, 2009). Social desirability bias, described as "the pervasive tendency of individuals to present themselves in the most favorable manner relative to prevailing social norms" (King & Bruner, 2000), is a possible threat. We attempt to minimize this by emphasizing anonymity at the start, but there is always the potential that people will respond to what they think to be correct. The use of fictive products may decrease internal validity in addiction by throwing doubt on participants' ability to transfer their preferences and judgments to actual things.

When it comes to external validity, this is the ability of research findings to be generalized to other relevant groups (Saunders et al., 2016). A limitation regarding external validity in our study is the use of a survey to measure inferences and emotions related to product choices. The intensity of the inferences and emotions experienced in a survey setting may not accurately reflect those that appear in real life choices, potentially affecting the generalizability of our findings to actual consumer behavior. This implies that while our results are relevant within the hypothetical choices context, they might not fully capture the emotional dynamics present in real life choices. Another notable point is that although the sustainable product was perceived as more expensive in our survey, this didn't significantly affect product choice. This observation appears to be in conflict, considering that past research has found a higher price for sustainable products is a barrier for many buyers (Ozimek & Zakowska-Biemans, 2011; Avitia et al., 2015; Aschemann-Witzel & Zielke, 2017). It highlights the difficulty in ensuring that hypothetical survey responses accurately reflect how consumers would act in real life choices, particularly regarding price sensitivity. On top of that, the use of imaginary items such as "Eco-Sera" and "Sera," which do not exist, raises concerns regarding participants' ability to transfer their preferences and judgments to actual products. This may have an impact on the study's findings' applicability to real-world market scenarios.

Ensuring measurement and construct validity is crucial for establishing the credibility of our findings (Saunders et al., 2016). Construct validity, defined as "the degree to which an operationalization measures the concept it purports to measure," presents a significant challenge in the context of surveys due to the potential for respondents to misinterpret the questions (Jacobsen, 2005). To mitigate this risk and enhance conceptual validity, we adapted questions from previous research in similar studies and employed straightforward language to facilitate comprehension. However, there remains the possibility that respondents may have misunderstood the questions' intended meaning, potentially affecting our construct validity. Measuring constructs such as social and private self-signaling and emotions like guilt, pride, fear, and hope posed additional challenges. While our measurement approach drew inspiration from previous similar studies, the examination of these emotions within the same context was less common, making it challenging to find precise precedents, especially for hope and fear. Emotions are inherently subjective and can vary significantly among individuals, complicating their precise measurement. For instance, although multiple respondents may report experiencing fear, the nature and intensity of this emotion can differ widely, reflecting the intricate and personalized nature of emotional experiences. Consequently, this aspect represents a potential limitation in our research.

Another challenge pertaining to construct validity revolves around the measurement of cognitive inferences and immediate emotions. Our methodology encounters limitations due to the inherent variability in individuals' emotional responses, which can be influenced by daily mood fluctuations and external factors. While the study strives to faithfully capture distinct emotions associated with sustainable choices, the day-to-day emotional variability introduces a level of ambiguity. It prompts considerations regarding the consistency and genuine reflection of the constructs being examined, thus constituting a noteworthy constraint in the construct validity of our study. In addition, while we view it as a strength of our study to explore multiple explanatory variables simultaneously, this approach also presents a potential limitation. It is reasonable to assume that both the focus and comprehension of the various variables may diminish when there are as many as we have. Consequently, this could lead to weaker reactions or responses.

## 6.5 Further Research

Our study identified fear's significant influence on product choices. However, using only the response option fear to measure the emotion was a limitation, as it restricted our ability to fully capture its complexity. Future research should more thoroughly investigate fear's role in sustainable consumer behavior, using varied indicators and methods, like physiological measures or observations, for a more nuanced and accurate assessment. This approach will improve the research's validity and deepen understanding of emotions in consumer decision-making.

In addition to fear, our study also measured hope, pride, and guilt, but these emotions didn't significantly explain product choice. This outcome might be due to the limitations of survey methods in capturing real-life decisions, as they measure hypothetical choices. We hypothesize that if emotions were measured more in line with more real-life experiences, they might significantly affect the preferences. Future research should therefore focus on methods that mimic real-world scenarios, providing a truer representation of emotional influences. This could lead to a better understanding of how various emotions, beyond fear, influence consumer behavior, especially in choosing sustainable versus non-sustainable products.

Given the noteworthy impact of the excitement dimension on perceived innovativeness, there exists a clear avenue for further exploration in this area. The relationship between excitement and innovativeness, especially in the context of sustainability, remains relatively unexplored in the current literature. Therefore, future studies should concentrate on analyzing the role of excitement as an element of innovativeness in sustainable consumer behavior. Examining how the sensation of excitement, triggered by the innovative aspects of a product, can enhance the attractiveness and perceived value of sustainable products would be particularly beneficial. This investigation has the potential to reveal new insights into how excitement can be effectively utilized to enhance consumer engagement with sustainable product choices.

Our study found that private self-signaling significantly impacted product choices, specifically against sustainable options, while social self-signaling affected willingness to pay more for such products. This distinction implies unique consumer needs for each signaling type. Future research should explore these differences more distinctly, perhaps by separating the study of private and social self-signaling. Since we measured both private and social self-signaling within the same survey. This approach may have caused an overlap of the signaling types,

potentially mixing their effects, and influencing the responses. Isolating these in different contexts, such as online (private) and physical (social) stores, could clarify their individual or collective impact on consumer behavior. Investigating how different products or scenarios might favor one signaling type and the effects in "ultimatum" scenarios would also be insightful.

We also found an intriguing observation: the rise in perceived femininity associated with the sustainable product correlated with a decrease in willingness to pay more for it. This relationship was only significant concerning willingness to pay, thus suggesting a distinct avenue for further investigation. Additionally, as our findings also revealed a significant gender difference in willingness to pay, with men displaying less willingness to pay than women, this intersection of gender disparities and the impact of perceived femininity on payment willingness presents an appealing research opportunity. It raises questions about potential underlying factors, such as whether societal biases or stereotypes about femininity and their association with specific products or values play a role in influencing these economic decisions.

As we previously highlighted, a significant limitation in our study lies in the day-to-day variability of immediate thoughts and emotions. Therefore, future studies should consider the adoption of longitudinal research methods. This is crucial to comprehensively understand the temporal dynamics of inferences and emotions in sustainable consumer behavior. This approach not only addresses the limitations posed by daily emotional variability but also contributes to a deeper and more dynamic understanding.

# 7. Conclusion

This research aimed to investigate whether a selection of simple cognitive inferences and immediate emotional reactions is associated with sustainable products in comparison to their non-sustainable counterparts. Furthermore, we examined the degree to which these inferences and reactions impact preferences between these two product categories. Through the implementation of two comprehensive studies, we have acquired valuable insights into consumer preferences and decision-making processes within the realm of sustainable consumption.

Study 1, which utilized secondary data from Landsvik et al. (2023), served as a fundamental starting point for examining the relationship between cognitive inferences and consumer preferences for sustainable products. Utilizing these data provided a unique opportunity to delve deeply into existing insights and build upon previous research findings, specifically investigating whether the cognitive conclusions functioned as potential drivers for the selection of sustainable products. Study 2 significantly built upon Study 1 by collecting primary data and introducing a broader range of cognitive inferences and immediate emotions, as well as new dependent variables to investigate consumer preferences more comprehensively. Among other aspects, the introduction of "product choice as a gift" and "willingness to pay" illuminated how product choices serve as a form of identity affirmation and how economic considerations are shaped by both individual values and social influence.

Our findings align with existing research, demonstrating that cognitive inferences such as perceived safety, aesthetics, and innovation, along with emotional reactions like hope and pride, are associated with sustainable products. Furthermore, through driver analyses, we found that "excitement," examined as a subdimension of perceived innovativeness, as well as perceived safety, were two of the most significant drivers of preference for sustainable products.

Moreover, the study offers significant insights into the dynamics of consumer behavior within sustainable consumption by highlighting the distinct roles that private and social self-signaling play. We identify a duality in the motivation behind consumer choices: private self-signaling emerges as a central driver for sustainable product choices in personal product selection, while social self-signaling reflects a stronger association with the willingness to pay more for sustainable products.

Additionally, we found that perceived quality, which normally is known as a barrier to sustainable choices in strong product categories, was associated with non-sustainable products, which created a potential to operate as a strong positive driver for sustainable products. This is rooted in the finding that the positive effect of perceiving sustainable products as more efficient was more prominent than the negative effect of perceiving them as less efficient.

Regarding perceived femininity, this inference was associated with sustainable products, but this association only functions as a negative driver for the willingness to pay more for sustainable products.

Furthermore, we found that even though the emotions of hope and pride were statistically rated higher for sustainable products, they were not significant drivers of choice in this sample. However, we discovered that the emotion of fear had a significant effect on the choice of sustainable products in all dimensions of product preference. If the feeling of fear are transferred to non-sustainable products, it could function as a significant driver for the choice of sustainable products.

In summary, this study substantially contributes to the literature on sustainable consumer behavior by identifying specific cognitive inferences and emotional reactions that impact consumers' product choices. The findings emphasize the need for a deeper understanding of the psychological processes underlying sustainable product choices and offer crucial insights to promote sustainable consumption patterns.

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# Appendix A: Study 1

## A1: Description of variables in the dataset

| Variable name | Question | Scale |
|---|---|---|
| product choice | Imagine that you need a new oven and BBQ cleaner for baked-on food residues and burnt-in grease. You are in the store considering these two products.<br><br>Which oven and BBQ cleaner would you buy? | Picture of the two products and binary choice between them. 0 = Sera (non-sustainable product), 1 = Eco-Sera (sustainable product) |
| price | What do you think about the price of these products? | 5-point relative slider scale (Likert) for all these measures. |
| most effective | In tests of these products, which do you think proved to be the most effective at removing burnt food residue? | |
| positive person | To what extent do you think the products say something positive about the person who buys them? | On this scale, 1 signifies that the non-sustainable product is far superior, while 5 denotes the sustainable product as far superior. The midpoint, 3, indicates that the products are perceived as equal. |
| design | Which of the products do you think looks nicest? | |
| exciting | Which of the products do you this would be the most exciting to try | |
| safe | Which of the products do you think is the safest to use? | |
| display | Which of the products would you most like to have on display at home? | |
| innovative | Which of the products do you think is the most innovative? | |
| ecofriendly | Which of the products do you think is the most environmentally friendly? | |
| green cv | 1) It is important to me that the products I use are not harmful to the environment.<br>2) I consider how my choices and actions can impact the environment.<br>3) I would describe myself as environmentally friendly.<br>4) I am willing to do something that is more inconvenient to make a more environmentally friendly choice. | Measured on a Likert scale ranging from 1 to 7. |
| age | Age | Slider scale from 18 to 100 |
| sex | Gender | 1=Male, 2=Female, 3=Other/Prefer not to answer |
| education | Level of education | 1=Primary school, 2=High school, 3=College/University, 4=Prefer not to answer<br><br>(Transformed: 0=lower education 1=Higher education Missing = prefer not to answer) |

# A2: Test of assumptions

Descriptives of Independent variables (including control)

| | SD | Variance | Skewness | | Kurtosis | | Shapiro-Wilk | |
|---|---|---|---|---|---|---|---|---|
| | | | Skewness | SE | Kurtosis | SE | W | p |
| Most effective | 0.918 | 0.843 | 0.345 | 0.177 | 0.2793 | 0.353 | 0.858 | < .001 |
| Positive person | 0.776 | 0.602 | -0.216 | 0.177 | 0.0895 | 0.353 | 0.853 | < .001 |
| Design | 1.094 | 1.197 | -0.516 | 0.177 | -0.2419 | 0.353 | 0.889 | < .001 |
| Exciting | 1.066 | 1.137 | -0.436 | 0.177 | -0.1804 | 0.353 | 0.895 | < .001 |
| Safe | 0.857 | 0.735 | -0.309 | 0.177 | -0.5147 | 0.353 | 0.845 | < .001 |
| Display | 1.020 | 1.040 | -0.345 | 0.177 | -0.1921 | 0.353 | 0.891 | < .001 |
| Innovative | 0.977 | 0.954 | -0.447 | 0.177 | -0.0370 | 0.353 | 0.880 | < .001 |
| Price | 0.692 | 0.479 | -0.181 | 0.177 | -0.0615 | 0.353 | 0.821 | < .001 |
| Green cv | 1.246 | 1.552 | -0.361 | 0.177 | -0.7117 | 0.353 | 0.964 | < .001 |
| Ecofriendly | 0.749 | 0.561 | -0.846 | 0.177 | 0.7186 | 0.353 | 0.779 | < .001 |

Collinearity Statistics

| | VIF | Tolerance |
|---|---|---|
| Most effective | 1.19 | 0.838 |
| Positive person | 1.31 | 0.761 |
| Design | 1.16 | 0.859 |
| Exciting | 1.14 | 0.875 |
| Safe | 1.46 | 0.683 |
| Display | 1.25 | 0.799 |
| Innovative | 1.23 | 0.815 |

# A3: Hypothesis testing - Differences in ratings

## Descriptives and frequencies of the demographic variables:

Descriptives of demographic variable «age»

|  | N | Mean | SD | Variance | Minimum | Maximum |
|---|---|---|---|---|---|---|
| Age | 188 | 45.8 | 17.5 | 307 | 18.0 | 82.0 |

Frequencies of Gender

|  | Counts | % of Total | Cumulative % |
|---|---|---|---|
| Male | 85 | 45.2 % | 45.2 % |
| Female | 103 | 54.8 % | 100.0 % |

Frequencies of Level of education

|  | Counts | % of Total | Cumulative % |
|---|---|---|---|
| Primary school | 8 | 4.3 % | 4.3 % |
| High school | 58 | 30.9 % | 35.1 % |
| College/University | 115 | 61.2 % | 96.3 % |
| Prefer not to answer | 7 | 3.7 % | 100.0 % |

## Frequencies and binomial tests of the dependent variable:

Frequencies of Product choice

|  | Counts | % of Total | Cumulative % |
|---|---|---|---|
| Sera | 59 | 31.4 % | 31.4 % |
| Eco-sera | 129 | 68.6 % | 100.0 % |

Binomial Test of Product choice

|  | Level | Count | Total | Proportion | p |
|---|---|---|---|---|---|
| Product choice | Sera | 59 | 188 | 0.314 | < .001 |
|  | Eco-sera | 129 | 188 | 0.686 | < .001 |

*Note. $H_a$ is proportion $\neq$ 0.5*

## Descriptives and t-tests for the independent variables:

Descriptives of Independent variables

| | N | Mean | SD | Variance | Skewness | | Kurtosis | | Shapiro-Wilk | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | | Skewness | SE | Kurtosis | SE | W | p |
| Most effective | 188 | 2.33 | 0.918 | 0.843 | 0.345 | 0.177 | 0.2793 | 0.353 | 0.858 | < .001 |
| Positive person | 188 | 3.71 | 0.776 | 0.602 | -0.216 | 0.177 | 0.0895 | 0.353 | 0.853 | < .001 |
| Design | 188 | 3.58 | 1.094 | 1.197 | -0.516 | 0.177 | -0.2419 | 0.353 | 0.889 | < .001 |
| Exciting | 188 | 3.46 | 1.066 | 1.137 | -0.436 | 0.177 | -0.1804 | 0.353 | 0.895 | < .001 |
| Safe | 188 | 3.95 | 0.857 | 0.735 | -0.309 | 0.177 | -0.5147 | 0.353 | 0.845 | < .001 |
| Display | 188 | 3.55 | 1.020 | 1.040 | -0.345 | 0.177 | -0.1921 | 0.353 | 0.891 | < .001 |
| Innovative | 188 | 3.69 | 0.977 | 0.954 | -0.447 | 0.177 | -0.0370 | 0.353 | 0.880 | < .001 |
| Ecofriendly | 188 | 4.29 | 0.749 | 0.561 | -0.846 | 0.177 | 0.7186 | 0.353 | 0.779 | < .001 |

*Note: All variables, except for "green cv," were assessed using a 5-point Likert scale. "Green cv" was measured using a*

*7-point Likert scale.*

One Sample T-Test of explanatory variables and manipulation

| | | Statistic | df | p | Mean difference | | Effect Size |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Most effective | Student's t | -10.01 | 187 | < .001 | -0.670 | Cohen's d | -0.730 |
| Positive person | Student's t | 12.60 | 187 | < .001 | 0.713 | Cohen's d | 0.919 |
| Design | Student's t | 7.27 | 187 | < .001 | 0.580 | Cohen's d | 0.530 |
| Exciting | Student's t | 5.88 | 187 | < .001 | 0.457 | Cohen's d | 0.429 |
| Safe | Student's t | 15.14 | 187 | < .001 | 0.947 | Cohen's d | 1.104 |
| Display | Student's t | 7.36 | 187 | < .001 | 0.548 | Cohen's d | 0.537 |
| Innovative | Student's t | 9.63 | 187 | < .001 | 0.686 | Cohen's d | 0.702 |
| Ecofriendly | Student's t | 23.66 | 187 | < .001 | 1.293 | Cohen's d | 1.726 |

*Note. $H_a \mu \neq 3$ (the neutral value).*

## A4: Influence of demografic variables and price perception

### Controlling for gender:

Contingency Tables

| Product choice | | Gender | | |
|---|---|---|---|---|
| | | Male | Female | Total |
| Sera | Observed | 37 | 22 | 59 |
| | % within row | 62.7 % | 37.3 % | 100.0 % |
| Eco-sera | Observed | 48 | 81 | 129 |
| | % within row | 37.2 % | 62.8 % | 100.0 % |
| Total | Observed | 85 | 103 | 188 |
| | % within row | 45.2 % | 54.8 % | 100.0 % |

$\chi^2$ Tests

| | Value | df | p |
|---|---|---|---|
| $\chi^2$ | 10.6 | 1 | 0.001 |
| N | 188 | | |

Nominal

| | Value |
|---|---|
| Phi-coefficient | 0.238 |
| Cramer's V | 0.238 |

### Controlling for education level:

Contingency Tables

| Product choice | | Education | | |
|---|---|---|---|---|
| | | Low Level | High Level | Total |
| Sera | Observed | 18 | 107 | 125 |
| | % within row | 14.4 % | 85.6 % | 100.0 % |
| Eco-Sera | Observed | 39 | 235 | 274 |
| | % within row | 14.2 % | 85.8 % | 100.0 % |
| Total | Observed | 57 | 342 | 399 |
| | % within row | 14.3 % | 85.7 % | 100.0 % |

$\chi^2$ Tests

| | Value | df | p |
|---|---|---|---|
| $\chi^2$ | 2.76 | 1 | 0.097 |
| N | 181 | | |

Nominal

| | Value |
|---|---|
| Phi-coefficient | 0.123 |
| Cramer's V | 0.123 |

# A5: Correlation alalysis

Correlation Matrix

| | | product_choice | age | price | green_cv | most_effective | positive_person | design | exciting | safe | display | innovative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| product_choice | Spearman's rho | — | | | | | | | | | | |
| | df | — | | | | | | | | | | |
| | p-value | — | | | | | | | | | | |
| age | Spearman's rho | 0.125 | — | | | | | | | | | |
| | df | 186 | — | | | | | | | | | |
| | p-value | 0.087 | — | | | | | | | | | |
| price | Spearman's rho | −0.082 | −0.022 | — | | | | | | | | |
| | df | 186 | 186 | — | | | | | | | | |
| | p-value | 0.265 | 0.761 | — | | | | | | | | |
| green_cv | Spearman's rho | 0.521 *** | 0.186 * | −0.104 | — | | | | | | | |
| | df | 186 | 186 | 186 | — | | | | | | | |
| | p-value | <.001 | 0.010 | 0.155 | — | | | | | | | |
| most_effective | Spearman's rho | 0.457 *** | 0.188 ** | −0.236 ** | 0.217 ** | — | | | | | | |
| | df | 186 | 186 | 186 | 186 | — | | | | | | |
| | p-value | <.001 | 0.010 | 0.001 | 0.003 | — | | | | | | |
| positive_person | Spearman's rho | 0.428 *** | 0.048 | 0.136 | 0.391 *** | 0.077 | — | | | | | |
| | df | 186 | 186 | 186 | 186 | 186 | — | | | | | |
| | p-value | <.001 | 0.516 | 0.063 | <.001 | 0.291 | — | | | | | |
| design | Spearman's rho | 0.411 *** | −0.090 | −0.041 | 0.287 *** | 0.124 | 0.329 *** | — | | | | |
| | df | 186 | 186 | 186 | 186 | 186 | 186 | — | | | | |
| | p-value | <.001 | 0.222 | 0.580 | <.001 | 0.090 | <.001 | — | | | | |
| exciting | Spearman's rho | 0.519 *** | 0.114 | 0.111 | 0.444 *** | 0.251 *** | 0.485 *** | 0.452 *** | — | | | |
| | df | 186 | 186 | 186 | 186 | 186 | 186 | 186 | — | | | |
| | p-value | <.001 | 0.120 | 0.128 | <.001 | <.001 | <.001 | <.001 | — | | | |
| safe | Spearman's rho | 0.379 *** | −0.082 | 0.181 * | 0.296 *** | 0.102 | 0.495 *** | 0.391 *** | 0.479 *** | — | | |
| | df | 186 | 186 | 186 | 186 | 186 | 186 | 186 | 186 | — | | |
| | p-value | <.001 | 0.261 | 0.013 | <.001 | 0.162 | <.001 | <.001 | <.001 | — | | |
| display | Spearman's rho | 0.532 *** | −0.021 | 0.040 | 0.321 *** | 0.319 *** | 0.510 *** | 0.452 *** | 0.539 *** | 0.471 *** | — | |
| | df | 186 | 186 | 186 | 186 | 186 | 186 | 186 | 186 | 186 | — | |
| | p-value | <.001 | 0.779 | 0.587 | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | — | |
| innovative | Spearman's rho | 0.447 *** | 0.019 | 0.181 * | 0.335 *** | 0.141 | 0.465 *** | 0.428 *** | 0.534 *** | 0.452 *** | 0.447 *** | — |
| | df | 186 | 186 | 186 | 186 | 186 | 186 | 186 | 186 | 186 | 186 | — |
| | p-value | <.001 | 0.800 | 0.013 | <.001 | 0.054 | <.001 | <.001 | <.001 | <.001 | <.001 | — |

*Note.* * $p < .05$, ** $p < .01$, *** $p < .001$

# A6: Regression analysis with Green Consumption Values

**Product choice with green consumption values as moderator:**

Model Fit Measures - Product choice

| | | | | | Overall Model Test | | |
|---|---|---|---|---|---|---|---|
| **Model** | **Deviance** | **AIC** | **BIC** | **R²N** | **χ²** | **df** | **p** |
| 1 | 89.6 | 122 | 173 | 0.753 | 144 | 15 | < .001 |

Model Coefficients - Product choice

| **Predictor** | **Estimate** | **SE** | **Z** | **p** | **Odds ratio** |
|---|---|---|---|---|---|
| Intercept | 6.0289 | 10.244 | 0.5885 | 0.556 | 415.26787 |
| Most effective | -4.2370 | 1.934 | -2.1907 | 0.028 | 0.01445 |
| Positive person | 4.2331 | 2.704 | 1.5653 | 0.118 | 68.93152 |
| Design | 1.2342 | 1.624 | 0.7601 | 0.447 | 3.43564 |
| Exciting | -0.6025 | 1.456 | -0.4139 | 0.679 | 0.54742 |
| Safe | -5.0099 | 2.262 | -2.2150 | 0.027 | 0.00667 |
| Display | 0.9897 | 1.809 | 0.5472 | 0.584 | 2.69042 |
| Innovative | -1.0991 | 1.971 | -0.5577 | 0.577 | 0.33318 |
| Green cv | -4.4957 | 2.512 | -1.7897 | 0.074 | 0.01116 |
| Most effective ✳ green cv | 1.2505 | 0.457 | 2.7376 | 0.006 | 3.49208** |
| Positive person ✳ green cv | -0.8259 | 0.590 | -1.3990 | 0.162 | 0.43785 |
| Design ✳ green cv | -0.1656 | 0.350 | -0.4729 | 0.636 | 0.84735 |
| Exciting ✳ green cv | 0.3153 | 0.335 | 0.9413 | 0.347 | 1.37063 |
| safe ✳ green cv | 1.1646 | 0.515 | 2.2624 | 0.024 | 3.20464* |
| display ✳ green cv | -0.0151 | 0.367 | -0.0412 | 0.967 | 0.98499 |
| innovative ✳ green cv | 0.3534 | 0.438 | 0.8061 | 0.420 | 1.42392 |

*Note. Estimates represent the log odds of "product_choice = Eco-sera" vs. "product_choice = Sera"*

# Appendix B: Study 2

## B1: Questionnaire

### Introduction and attention check:

Welcome!

Thank you for your interest in our research! This is a survey about perceptions and some follow-up questions about opinions.

The survey should take around 4 minutes, and you'll receive £0.60. You will be asked to respond to some questions. There are no right or wrong answers. We just want to learn about your thoughts.

To minimize platform glitches, **please complete the task in one go and carefully read the instructions**. All your responses are anonymous so feel free to respond as frankly as possible.

**Informed Consent**

Please read the following conditions carefully for participation in this task.

- You are at least 18 years of age.
- You have a general understanding of the task.
- Your participation is completely voluntary, and you can withdraw participation at any time without any negative consequences.
- You will be paid a £0.60 base payment after you complete the full task. However, if you withdraw before completion, you will not be paid.
- You have complete anonymity. All your responses will be treated anonymously and can never be traced back to your identity. Any presentation of results will be at the aggregate level. Any data shared with other researchers for transparency will also be anonymized and untraceable.

If you agree to all of the above points, then confirm informed consent by selecting "I AGREE" and continue to the next page. If you disagree with any of the points, simply navigate away from this page.

| | |
|---|---|
| Yes, I agree | ○ |

What is your Prolific ID?

*Please note that this response should auto-fill with the correct ID.*

Please indicate your agreement with the statements below.

|  | Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|---|
| I swim across the Atlantic Ocean to get to work every day | ○ | ○ | ○ | ○ |

In this survey, we will ask you questions about two versions of oven and BBQ cleaners from the brand Sera.

## Questions with the dependent variables:

In this section we would like you to indicate which product you would choose in the following situations.

If you were to choose one of these products to **give as a gift** to a close friend or a family member,

**Which oven and BBQ cleaner would you choose to give as a gift?**



Imagine you need a new oven and BBQ cleaner for baked-on food residues and burnt-in grease. You are in the store considering these two products.

**Which oven and BBQ cleaner would you buy?**

Please indicate which product you would be **willing to pay more for**.

| | | | | |
|---|---|---|---|---|
| I would pay a lot more for Sera | I would pay slightly more for Sera | I would pay equally much for both products | I would pay slightly more for Eco-Sera | I would pay a lot more for Eco-Sera |
| ○ | ○ | ○ | ○ | ○ |

## Questions with the explanatory variables, manipulation check and price-control:

Here, we would like you to provide your thoughts on various aspects of these products.

Which of the products do you consider to be the **most innovative**?

| | | | | |
|---|---|---|---|---|
| Sera is much more innovative | Sera is slightly more innovative | The products are equally innovative | Eco-Sera is slightly more innovative | Eco-Sera is much more innovative |
| ○ | ○ | ○ | ○ | ○ |

Which of the products do you believe is the **safest to use** (in terms of health)?

| | | | | |
|---|---|---|---|---|
| Sera is much safer | Sera is slightly safer | The products are equally safe | Eco-Sera is slightly safer | Eco-Sera is much safer |
| ○ | ○ | ○ | ○ | ○ |

Which of the products would you prefer to **have on display** at home?

| | | | | |
|---|---|---|---|---|
| I would much rather have Sera on display | I would rather have Sera on display | No difference between the products | I would rather have Eco-Sera on display | I would much rather have Eco-Sera on display |
| ○ | ○ | ○ | ○ | ○ |

What are your thoughts on the **price** of these products?

| Sera costs much more | Sera costs a bit more | The products cost the same | Eco-Sera costs a bit more | Eco-Sera costs much more |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

To what extent do you believe buying either of these products would say **something positive about you to other people**?

| Sera to a high extent | Sera to some extent | No difference between the products | Eco-Sera to some extent | Eco-Sera to a high extent |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

Which of the products do you find **most pleasing to to look at**?

| Sera is much more pleasing to look at | Sera is slightly more pleasing to look at | There are no differences in the aesthetics | Eco-Sera is slightly more pleasing to look at | Eco-Sera is much more pleasing to look at |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

Which of the products do you think is the **most environmentally friendly**?

| Sera is the most environmentally friendly | Sera is slightly more environmentally friendly | The products are equally environmentally friendly | Eco-Sera is slightly more environmentally friendly | Eco-Sera is the most environmentally friendly |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

Which of the products would you find most **exciting to try**?

| Sera is much more exciting | Sera is slightly more exciting | The products are equally exciting | Eco-Sera is slightly more exciting | Eco-Sera is much more exciting |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

To what extent would buying either of these products make you **feel good about yourself as a person**?

| Sera to a high extent | Sera to some extent | No difference between the products | Eco-Sera to some extent | Eco-Sera to a high extent |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

In tests of these products, which do you believe proved to be the **most effective** in removing baked-on food residues and burnt-in grease?

| Sera is much more effective | Sera is slightly more effective | The products are equally effective | Eco-Sera is slightly more effective | Eco-Sera is much more effective |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

Which of the products do you think appears more **feminine**?

| Sera appears much more feminine | Sera appears slightly more feminine | The products appear equally feminine | Eco-Sera appears slightly more feminine | Eco-Sera appears much more feminine |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

Now, we would like you to share your immediate emotional reactions these products.

**To what degree do you experience the following emotions when looking at the two products?**

| | Sera to a large degree | Sera to some degree | Neither of the products makes me experience this emotion | Eco-Sera to some degree | Eco-Sera to a large degree |
|---|---|---|---|---|---|
| Fear | ○ | ○ | ○ | ○ | ○ |
| Hope | ○ | ○ | ○ | ○ | ○ |
| Guilt | ○ | ○ | ○ | ○ | ○ |
| Pride | ○ | ○ | ○ | ○ | ○ |

## Last part of questionnaire with control variables:

Here, we would like you to provide your opinion on various statements.

| | Strongly Disagree | Disagree | Somewhat Disagree | Neutral | Somewhat Agree | Agree | Strongly Agree |
|---|---|---|---|---|---|---|---|
| It is important to me that the products I use do not harm the environment | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I consider the potential environmental impact of my actions when making many of my decisions | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| My purchase habits are affected by my concern for our environment | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I am concerned about wasting the resources of our planet | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I would describe myself as environmentally responsible | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| I am willing to be inconvenienced in order to take actions that are more environmentally friendly | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

**Please answer some questions about yourself**

What is your age?

18                                                                90

Gender: How do you identify?

| | |
|---|---|
| Male | ○ |
| Female | ○ |
| Non-binary | ○ |
| Other/ Prefer not to answer | ○ |

What is the highest level of education you have finished?

| | |
|---|---|
| High school or less | ○ |
| Some college or technical training | ○ |
| College and above | ○ |
| Other/ Prefer not to answer | ○ |

Thank you very much for participating in this survey.

Please click the button below to be redirected back to Prolific and register your submission.

# B2: Description of variables in the dataset

| Variable name | Question | Scale |
|---|---|---|
| Product choice | Imagine that you need a new oven and BBQ cleaner for baked-on food residues and burnt-in grease. You are in the store considering these two products.<br><br>Which oven and BBQ cleaner would you buy? | Picture of the two products and binary choice between them. 0 = Sera (non-sustainable product), 1 = Eco-Sera (sustainable product) |
| Gift | If you were to choose one of these products to give as a gift to a close friend or a family member,<br><br>Which oven and BBQ cleaner would you choose to give as a gift? | Picture of the two products and binary choice between them. 0 = Sera (non-sustainable product), 1 = Eco-Sera (sustainable product) |
| Willingness to pay | Please indicate which product you would be willing to pay more for. | 5-point relative slider scale (Likert)<br><br>On this scale, 1 signifies that they would pay a lot more for the non-sustainable product, while 5 denotes that they would pay a lot more for the sustainable product. The midpoint 3, indicates that they would pay equally much for both products. |
| Effective | In tests of these products, which do you believe proved to be the most effective in removing baked-on food residues and burnt-in grease? | 5-point relative slider scale (Likert) for all these measures.<br><br>On this scale, 1 signifies that the non-sustainable product is far superior, while 5 denotes the sustainable product as far superior. The midpoint, 3, indicates that the products are perceived as equal. |
| Positive individual | To what extent do you believe buying either of these products would say something positive about you to other people? | |
| Self-signaling | To what extent would buying either of these products make you feel good about yourself as a person? | |
| Feminine | Which of the products do you think appears more feminine? | |
| Design | Which of the products do you find most pleasing to look at? | |
| Exciting | Which of the products do you this would be the most exciting to try? | |
| Safe | Which of the products do you think is the safest to use? (in terms of health)? | |
| Display | Which of the products would you most like to have on display at home? | |
| Innovative | Which of the products do you think is the most innovative? | |
| Eco-friendly | Which of the products do you think is the most environmentally friendly? | |
| Price | What do you think about the price of these products? | |

| Immediate emotions: Fear, Hope, Guilt and Pride | To what degree do you experience the following emotions when looking at the two products? Fear, hope, pride, guilt. | 5-point relative slider scale (Likert) for all these measures.<br><br>On this scale, 1 indicates that they experience the emotion strongly with the non-sustainable product, while 5 indicates that they experience the emotion strongly with the sustainable product. The midpoint, 3, indicates that they do not feel the emotion with either of the products. |
|---|---|---|
| Green CV | 1) It is important to me that the products I use do not harm the environment.<br>2) I consider the potential environmental impact of my actions when making many of my decisions.<br>3) My purchase habits are affected by my concern for our environment.<br>4) I am concerned about wasting the resources of our planet.<br>5) I would describe myself as environmentally responsible.<br>6) I am willing to be inconvenienced in order to take actions that are more environmentally friendly. | Measured on a Likert scale ranging from 1 to 7.<br><br>On this scale, 1 corresponds to strongly disagree with the statement, while 7 corresponds to strongly agree with the statement. |
| Age | What is your age? | Slider scale from 18 to 100 |
| Sex | How do you identify? | 1=Male,<br>2=Female,<br>3=Non-binary,<br>4=Other/Prefer not to answer<br><br>(Transformed:<br>0=Male<br>1=Female<br>Missing = non-binary/prefer not to answer) |
| Education | What is the highest level of education you have finished? | 1= High school or less,<br>2= Some college or technical training,<br>3= College and above,<br>4= Other/ Prefer not to answer<br><br>(Transformed:<br>0=lower education<br>1=Higher education<br>Missing = prefer not to answer) |

# B3: Test of possible Question-Order Effects

Frequencies of Order

| Order | Counts | % of Total | Cumulative % |
|---|---|---|---|
| DV First | 198 | 49.5 % | 49.5 % |
| DV Last | 202 | 50.5 % | 100.0 % |

## Chi-square tests of independence:

Contingency Tables - Product preference

| Product choice | | Group: Product choice | | |
| | | DV Last | DV First | Total |
|---|---|---|---|---|
| Sera | Observed | 61 | 64 | 125 |
| | % within row | 48.8 % | 51.2 % | 100.0 % |
| Eco-Sera | Observed | 141 | 134 | 275 |
| | % within row | 51.3 % | 48.7 % | 100.0 % |
| Total | Observed | 202 | 198 | 400 |
| | % within row | 50.5 % | 49.5 % | 100.0 % |

$\chi^2$ Tests - Product preference

| | Value | df | p |
|---|---|---|---|
| $\chi^2$ | 0.210 | 1 | 0.647 |
| N | 400 | | |

Nominal - Product preference

| | Value |
|---|---|
| Phi-coefficient | 0.0229 |

Contingency Tables - Gift

| Gift | | Group: Gift | | |
| | | DV Last | DV First | Total |
|---|---|---|---|---|
| Sera | Observed | 41 | 59 | 100 |
| | % within row | 41.0 % | 59.0 % | 100.0 % |
| Eco-Sera | Observed | 161 | 139 | 300 |
| | % within row | 53.7 % | 46.3 % | 100.0 % |
| Total | Observed | 202 | 198 | 400 |
| | % within row | 50.5 % | 49.5 % | 100.0 % |

χ² Tests - Gift

|     | Value | df | p     |
| --- | ----- | -- | ----- |
| χ²  | 4.81  | 1  | 0.028 |
| N   | 400   |    |       |

Nominal - Gift

|                | Value |
| -------------- | ----- |
| Phi-coefficient | 0.110 |

## Independent sample T-tests:

Homogeneity of Variances Test (Levene's)

|       | F    | df | df2 | p     |
| ----- | ---- | -- | --- | ----- |
| Price | 5.77 | 1  | 398 | 0.017 |
| Fear  | 6.80 | 1  | 398 | 0.009 |

*Note. $H_a$ μ DV Last ≠ μ DV First*

Independent Samples T-Test

|                    | Type of test | Statistic | df  | p     |
| ------------------ | ------------ | --------- | --- | ----- |
| Willingness to pay | Student's t  | 1.49      | 398 | 0.138 |
| Effective          | Student's t  | 1.14      | 398 | 0.255 |
| Positive individual | Student's t  | 0.416     | 398 | 0.678 |
| Self-signaling     | Student's t  | 0.488     | 398 | 0.626 |
| Feminine           | Student's t  | 0.445     | 398 | 0.657 |
| Design             | Student's t  | 0.0460    | 398 | 0.963 |
| Exciting           | Student's t  | 2.43      | 398 | **0.015** |
| Safe               | Student's t  | 0.983     | 398 | 0.326 |
| Display            | Student's t  | 0.929     | 398 | 0.354 |
| Innovative         | Student's t  | -0.338    | 398 | 0.736 |
| Price              | Welch's t    | -0.596    | 381 | 0.552 |
| Eco-friendly       | Student's t  | 0.526     | 398 | 0.599 |
| Fear               | Welch's t    | -1.25     | 387 | 0.214 |
| Hope               | Student's t  | 0.339     | 398 | 0.735 |
| Guilt              | Student's t  | 0.851     | 398 | 0.395 |
| Pride              | Student's t  | 0.901     | 398 | 0.368 |

*Note. $H_a$ μ DV Last ≠ μ DV First*

Independent Samples T-Test for Exciting

|          | Mean difference | SE difference | Effect Size (Cohen's d) |
| -------- | --------------- | ------------- | ----------------------- |
| Exciting | 0.225           | 0.0923        | 0.243                   |

*Note. $H_a$ μ DV Last ≠ μ DV First*

# B4: Test of assumptions

## Collinearity Statistics:

| | Product choice | | Gift | | Willingness to pay | |
|---|---|---|---|---|---|---|
| | VIF | Tolerance | VIF | Tolerance | VIF | Tolerance |
| Effective | 1.42 | 0.702 | 1.36 | 0.734 | 1.48 | 0.674 |
| Positive individual | 1.46 | 0.684 | 1.30 | 0.771 | 1.63 | 0.613 |
| Self-signaling | 1.79 | 0.558 | 1.77 | 0.566 | 2.25 | 0.445 |
| Feminine | 1.20 | 0.831 | 1.14 | 0.875 | 1.14 | 0.879 |
| Design | 1.29 | 0.773 | 1.24 | 0.807 | 1.49 | 0.671 |
| Exciting | 1.15 | 0.867 | 1.34 | 0.749 | 1.73 | 0.579 |
| Safe | 1.47 | 0.681 | 1.35 | 0.740 | 1.57 | 0.638 |
| Display | 1.49 | 0.673 | 1.59 | 0.630 | 2.12 | 0.471 |
| Innovative | 1.40 | 0.712 | 1.37 | 0.729 | 1.68 | 0.595 |
| Fear | 1.27 | 0.787 | 1.17 | 0.857 | 1.22 | 0.817 |
| Hope | 1.65 | 0.605 | 1.50 | 0.665 | 1.77 | 0.566 |
| Guilt | 1.72 | 0.582 | 1.47 | 0.679 | 1.67 | 0.598 |
| Pride | 1.71 | 0.584 | 1.79 | 0.560 | 1.75 | 0.571 |

## Normal distribution:

Descriptives

| | N | SD | Variance | Skewness | | Kurtosis | |
|---|---|---|---|---|---|---|---|
| | | | | Skewness | SE | Kurtosis | SE |
| effective | 400 | 1.037 | 1.074 | 0.487 | 0.122 | -0.1018 | 0.243 |
| Positive individual | 400 | 0.772 | 0.595 | -0.442 | 0.122 | 0.6823 | 0.243 |
| Safe | 400 | 0.747 | 0.557 | -0.802 | 0.122 | -0.1499 | 0.243 |
| Pride | 400 | 0.677 | 0.459 | 0.864 | 0.122 | 0.0440 | 0.243 |
| Guilt | 400 | 0.674 | 0.454 | -0.581 | 0.122 | 1.1106 | 0.243 |
| Hope | 400 | 0.721 | 0.521 | 0.306 | 0.122 | 0.1419 | 0.243 |
| Fear | 400 | 0.462 | 0.214 | -1.221 | 0.122 | 6.2505 | 0.243 |
| Innovative | 400 | 0.829 | 0.687 | -0.369 | 0.122 | -0.0437 | 0.243 |
| Display | 400 | 0.924 | 0.853 | -0.199 | 0.122 | -0.0600 | 0.243 |
| Exciting | 400 | 0.928 | 0.862 | -0.104 | 0.122 | 0.0647 | 0.243 |
| Feminine | 400 | 0.867 | 0.752 | 0.281 | 0.122 | -0.3376 | 0.243 |
| Design | 400 | 1.042 | 1.085 | -0.563 | 0.122 | -0.1134 | 0.243 |
| Self-signaling | 400 | 0.823 | 0.677 | -0.443 | 0.122 | 0.1226 | 0.243 |

**Linearity:**
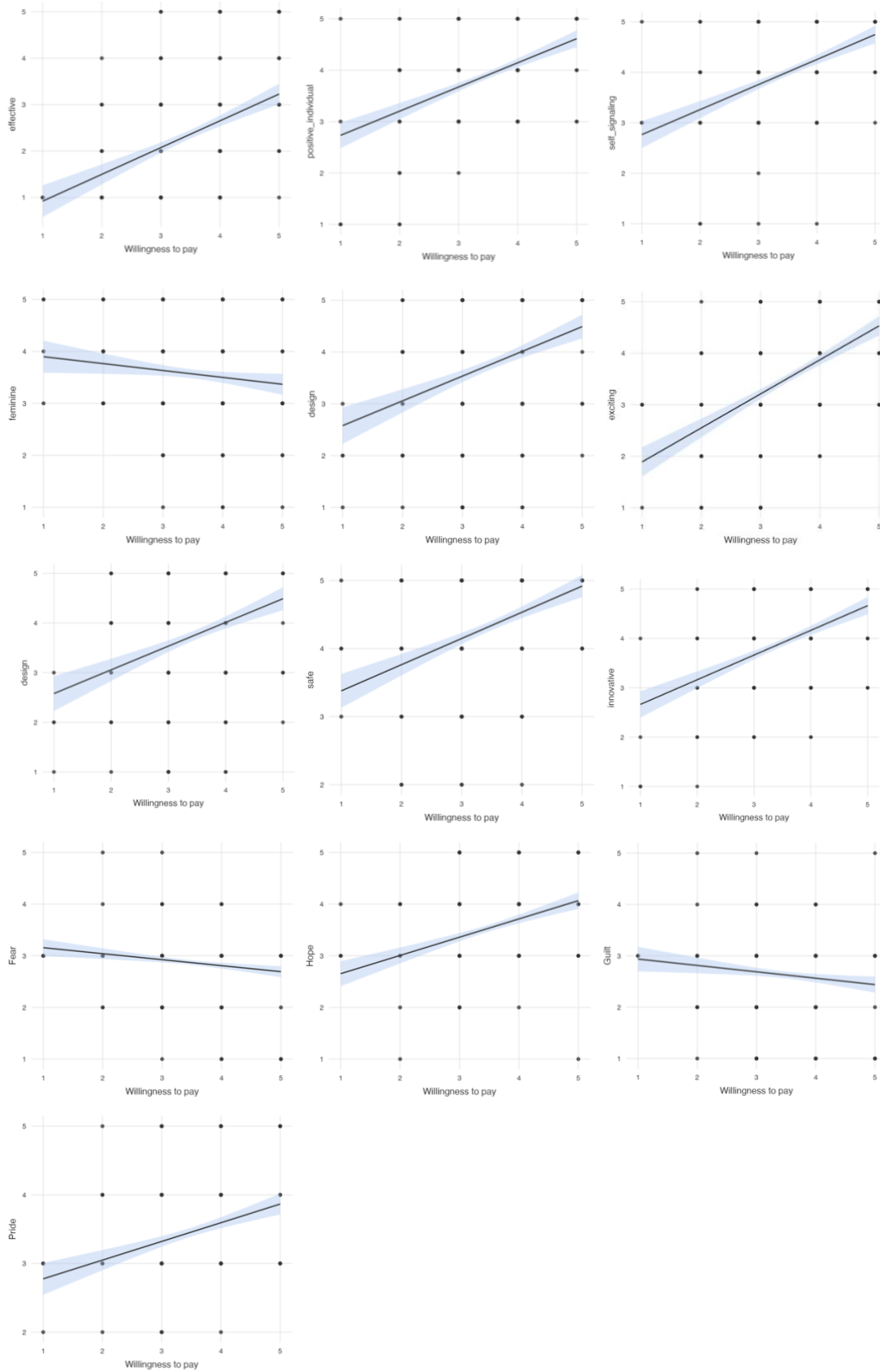
# B5: Hypothesis testing - Differences in ratings

**Descriptives and frequencies of the demographic variables:**

Descriptives of Demographics

|  | N | Mean | Median | SD | Variance |
|---|---|---|---|---|---|
| Age | 400 | 38.49 | 36.00 | 12.554 | 157.599 |
| Sex | 400 | 1.55 | 2.00 | 0.582 | 0.339 |
| Education | 400 | 2.44 | 3.00 | 0.733 | 0.538 |

Frequencies of «Sex»

| Sex | Counts | % of Total | Cumulative % |
|---|---|---|---|
| Male | 196 | 49.0 % | 49.0 % |
| Female | 192 | 48.0 % | 97.0 % |
| Non-binary | 9 | 2.3 % | 99.3 % |
| Other | 3 | 0.8 % | 100.0 % |

Frequencies of «Education»

| Education | Counts | % of Total | Cumulative % |
|---|---|---|---|
| High school or less | 57 | 14.2 % | 14.2 % |
| Some collage and technical | 111 | 27.8 % | 42.0 % |
| Collage and above | 231 | 57.8 % | 99.8 % |
| Other/prefer not to answer | 1 | 0.3 % | 100.0 % |

**Frequencies and binomial tests of the dichotomous dependent variables:**

Frequencies of product preference

| Product choice | Counts | % of Total | Cumulative % |
|---|---|---|---|
| Sera | 125 | 31.3 % | 31.3 % |
| Eco-Sera | 275 | 68.8 % | 100.0 % |

Frequencies of product preference as a gift

| Gift | Counts | % of Total | Cumulative % |
|---|---|---|---|
| Sera | 100 | 25.0 % | 25.0 % |
| Eco-Sera | 300 | 75.0 % | 100.0 % |

Binomial Test for Product preference

| | Level | Count | Total | Proportion | p |
|---|---|---|---|---|---|
| Product choice | Sera | 125 | 400 | 0.313 | < .001 |
| | Eco-Sera | 275 | 400 | 0.688 | < .001 |
| Gift | Sera | 100 | 400 | 0.250 | < .001 |
| | Eco-Sera | 300 | 400 | 0.750 | < .001 |

*Note. $H_a$ is proportion $\neq 0.5$*

## Descriptives, frequencies and t-test for the continuous dependent variable:

Frequencies of willingness to pay

| Willingness to pay | Counts | % of Total | Cumulative % |
|---|---|---|---|
| A lot more for Sera | 4 | 1.0 % | 1.0 % |
| Slightly more for Sera | 19 | 4.8 % | 5.8 % |
| Equally | 181 | 45.3 % | 51.0 % |
| Slightly more for Eco-Sera | 176 | 44.0 % | 95.0 % |
| A lot more for Eco-Sera | 20 | 5.0 % | 100.0 % |

Descriptives for willingness to pay

| | | | | | Skewness | | Kurtosis | |
|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | Variance | Skewness | SE | Kurtosis | SE |
| Willingness to pay | 400 | 3.473 | 0.711 | 0.506 | -0.302 | 0.122 | 0.665 | 0.243 |

One Sample T-Test of willingness to pay

| | | Statistic | df | p | Mean difference | | | Effect Size |
|---|---|---|---|---|---|---|---|---|
| Willingness to pay | Student's t | 13.3 | 399 | < .001 | 0.473 | Cohen's d | | 0.665 |

*Note. $H_a$ $\mu \neq 3$ (neutral value)*

## Descriptives and t-tests for the independent variables:

Descriptives of independent variables:

| | N | SD | Variance | Skewness | | Kurtosis | |
|---|---|---|---|---|---|---|---|
| | | | | Skewness | SE | Kurtosis | SE |
| Effective | 400 | 1.037 | 1.074 | 0.487 | 0.122 | -0.1018 | 0.243 |
| Positive individual | 400 | 0.772 | 0.595 | -0.442 | 0.122 | 0.6823 | 0.243 |
| Self-signaling | 400 | 0.823 | 0.677 | -0.443 | 0.122 | 0.1226 | 0.243 |
| Feminine | 400 | 0.867 | 0.752 | 0.281 | 0.122 | -0.3376 | 0.243 |
| Design | 400 | 1.042 | 1.085 | -0.563 | 0.122 | -0.1134 | 0.243 |
| Exciting | 400 | 0.928 | 0.862 | -0.104 | 0.122 | 0.0647 | 0.243 |
| Safe | 400 | 0.747 | 0.557 | -0.802 | 0.122 | -0.1499 | 0.243 |
| Display | 400 | 0.924 | 0.853 | -0.199 | 0.122 | -0.0600 | 0.243 |
| Innovative | 400 | 0.829 | 0.687 | -0.369 | 0.122 | -0.0437 | 0.243 |
| Fear | 400 | 0.462 | 0.214 | -1.221 | 0.122 | 6.2505 | 0.243 |
| Hope | 400 | 0.721 | 0.521 | 0.306 | 0.122 | 0.1419 | 0.243 |
| Guilt | 400 | 0.674 | 0.454 | -0.581 | 0.122 | 1.1106 | 0.243 |
| Pride | 400 | 0.677 | 0.459 | 0.864 | 0.122 | 0.0440 | 0.243 |
| Price | 400 | 0.659 | 0.434 | -0.696 | 0.122 | 2.0403 | 0.243 |
| Green CV | 400 | 1.297 | 1.682 | -0.812 | 0.122 | 0.6143 | 0.243 |

One Sample T-Test - Testing hypotheses

| | | Statistic | df | p | Mean difference | | Effect Size |
|---|---|---|---|---|---|---|---|
| Effective | Student's t | -12.59 | 399 | < .001 | -0.652 | Cohen's d | -0.629 |
| positive individual | Student's t | 23.20 | 399 | < .001 | 0.895 | Cohen's d | 1.160 |
| Self-signaling | Student's t | 24.07 | 399 | < .001 | 0.990 | Cohen's d | 1.204 |
| Feminine | Student's t | 13.15 | 399 | < .001 | 0.570 | Cohen's d | 0.657 |
| Design | Student's t | 14.59 | 399 | < .001 | 0.760 | Cohen's d | 0.730 |
| Exciting | Student's t | 11.26 | 399 | < .001 | 0.522 | Cohen's d | 0.563 |
| Safe | Student's t | 35.63 | 399 | < .001 | 1.330 | Cohen's d | 1.781 |
| Display | Student's t | 15.37 | 399 | < .001 | 0.710 | Cohen's d | 0.769 |
| Innovative | Student's t | 21.72 | 399 | < .001 | 0.900 | Cohen's d | 1.086 |
| Fear | Student's t | -5.63 | 399 | < .001 | -0.130 | Cohen's d | -0.281 |
| Hope | Student's t | 14.62 | 399 | < .001 | 0.527 | Cohen's d | 0.731 |
| Guilt | Student's t | -10.98 | 399 | < .001 | -0.370 | Cohen's d | -0.549 |
| Pride | Student's t | 13.29 | 399 | < .001 | 0.450 | Cohen's d | 0.664 |

*Note. $H_a \mu \neq 3$ (neutral value)*

# B6: Correlation analysis

Correlation Matrix

| | | Product choice | Gift | Willingness to pay | Age | price | GreenID (mean) | effective | positive_individual | self_signaling | feminine | design | exciting | safe | display | innovative | Fear | Hope | Guilt | Pride |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product choice | Spearman's rho | — | | | | | | | | | | | | | | | | | | |
| | df | — | | | | | | | | | | | | | | | | | | |
| | p-value | — | | | | | | | | | | | | | | | | | | |
| Gift | Spearman's rho | 0.570*** | — | | | | | | | | | | | | | | | | | |
| | df | 398 | — | | | | | | | | | | | | | | | | | |
| | p-value | <.001 | — | | | | | | | | | | | | | | | | | |
| Willingness to pay | Spearman's rho | 0.520*** | 0.450*** | — | | | | | | | | | | | | | | | | |
| | df | 398 | 398 | — | | | | | | | | | | | | | | | | |
| | p-value | <.001 | <.001 | — | | | | | | | | | | | | | | | | |
| Age | Spearman's rho | −0.110* | 0.039 | −0.050 | — | | | | | | | | | | | | | | | |
| | df | 398 | 398 | 398 | — | | | | | | | | | | | | | | | |
| | p-value | 0.028 | 0.438 | 0.317 | — | | | | | | | | | | | | | | | |
| price | Spearman's rho | −0.120* | 0.001 | 0.166*** | 0.044 | — | | | | | | | | | | | | | | |
| | df | 398 | 398 | 398 | 398 | — | | | | | | | | | | | | | | |
| | p-value | 0.016 | 0.981 | <.001 | 0.377 | — | | | | | | | | | | | | | | |
| GreenID (mean) | Spearman's rho | 0.475*** | 0.397*** | 0.444*** | 0.039 | −0.068 | — | | | | | | | | | | | | | |
| | df | 398 | 398 | 398 | 398 | 398 | — | | | | | | | | | | | | | |
| | p-value | <.001 | <.001 | <.001 | 0.437 | 0.177 | — | | | | | | | | | | | | | |
| effective | Spearman's rho | 0.511*** | 0.347*** | 0.360*** | −0.071 | −0.189*** | 0.355*** | — | | | | | | | | | | | | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | — | | | | | | | | | | | | |
| | p-value | <.001 | <.001 | <.001 | 0.158 | <.001 | <.001 | — | | | | | | | | | | | | |
| positive_individual | Spearman's rho | 0.335*** | 0.302*** | 0.401*** | −0.014 | 0.062 | 0.389*** | 0.185*** | — | | | | | | | | | | | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — | | | | | | | | | | | |
| | p-value | <.001 | <.001 | <.001 | 0.776 | 0.214 | <.001 | <.001 | — | | | | | | | | | | | |
| self_signaling | Spearman's rho | 0.506*** | 0.374*** | 0.450*** | −0.058 | 0.001 | 0.461*** | 0.278*** | 0.568*** | — | | | | | | | | | | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — | | | | | | | | | | |
| | p-value | <.001 | <.001 | <.001 | 0.251 | 0.981 | <.001 | <.001 | <.001 | — | | | | | | | | | | |
| feminine | Spearman's rho | −0.112* | −0.038 | −0.094 | −0.012 | 0.055 | −0.096 | −0.257*** | 0.077 | 0.041 | — | | | | | | | | | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — | | | | | | | | | |
| | p-value | 0.025 | 0.446 | 0.060 | 0.816 | 0.273 | 0.055 | <.001 | 0.123 | 0.409 | — | | | | | | | | | |
| design | Spearman's rho | 0.382*** | 0.317*** | 0.312*** | 0.023 | 0.025 | 0.318*** | 0.181*** | 0.300*** | 0.391*** | 0.093 | — | | | | | | | | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — | | | | | | | | |
| | p-value | <.001 | <.001 | <.001 | 0.644 | 0.622 | <.001 | <.001 | <.001 | <.001 | 0.062 | — | | | | | | | | |
| exciting | Spearman's rho | 0.513*** | 0.353*** | 0.513*** | −0.069 | −0.062 | 0.432*** | 0.425*** | 0.371*** | 0.490*** | −0.027 | 0.412*** | — | | | | | | | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — | | | | | | | |
| | p-value | <.001 | <.001 | <.001 | 0.166 | 0.218 | <.001 | <.001 | <.001 | <.001 | 0.585 | <.001 | — | | | | | | | |
| safe | Spearman's rho | 0.361*** | 0.330*** | 0.380*** | 0.115* | 0.043 | 0.275*** | 0.093 | 0.349*** | 0.496*** | 0.052 | 0.383*** | 0.375*** | — | | | | | | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — | | | | | | |
| | p-value | <.001 | <.001 | <.001 | 0.022 | 0.390 | <.001 | 0.062 | <.001 | <.001 | 0.299 | <.001 | <.001 | — | | | | | | |
| display | Spearman's rho | 0.451*** | 0.407*** | 0.449*** | 0.005 | −0.031 | 0.400*** | 0.303*** | 0.471*** | 0.572*** | 0.100* | 0.523*** | 0.497*** | 0.425*** | — | | | | | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — | | | | | |
| | p-value | <.001 | <.001 | <.001 | 0.922 | 0.537 | <.001 | <.001 | <.001 | <.001 | 0.045 | <.001 | <.001 | <.001 | — | | | | | |
| innovative | Spearman's rho | 0.308*** | 0.270*** | 0.394*** | 0.076 | 0.071 | 0.286*** | 0.204*** | 0.458*** | 0.475*** | 0.131** | 0.354*** | 0.372*** | 0.489*** | 0.475*** | — | | | | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — | | | | |
| | p-value | <.001 | <.001 | <.001 | 0.131 | 0.158 | <.001 | <.001 | <.001 | <.001 | 0.009 | <.001 | <.001 | <.001 | <.001 | — | | | | |
| Fear | Spearman's rho | −0.194*** | −0.218*** | −0.153** | −0.117* | −0.033 | −0.141** | −0.009 | −0.117* | −0.194*** | −0.146** | −0.163** | −0.193*** | −0.248*** | −0.220*** | −0.152** | — | | | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — | | | |
| | p-value | <.001 | <.001 | 0.002 | 0.019 | 0.515 | 0.005 | 0.850 | 0.019 | <.001 | 0.004 | 0.001 | <.001 | <.001 | <.001 | 0.002 | — | | | |
| Hope | Spearman's rho | 0.332*** | 0.304*** | 0.377*** | 0.012 | 0.033 | 0.365*** | 0.201*** | 0.424*** | 0.510*** | 0.103* | 0.304*** | 0.416*** | 0.395*** | 0.477*** | 0.440*** | −0.238*** | — | | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — | | |
| | p-value | <.001 | <.001 | <.001 | 0.813 | 0.516 | <.001 | <.001 | <.001 | <.001 | 0.040 | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | — | | |
| Guilt | Spearman's rho | −0.214*** | −0.247*** | −0.152** | −0.056 | 0.027 | −0.257*** | 0.032 | −0.302*** | −0.449*** | −0.139** | −0.226*** | −0.190*** | −0.314*** | −0.222*** | −0.208*** | 0.332*** | −0.452*** | — | |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — | |
| | p-value | <.001 | <.001 | 0.002 | 0.265 | 0.588 | <.001 | 0.527 | <.001 | <.001 | 0.005 | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | — | |
| Pride | Spearman's rho | 0.291*** | 0.217*** | 0.281*** | 0.043 | −0.051 | 0.321*** | 0.109* | 0.376*** | 0.527*** | 0.124* | 0.286*** | 0.349*** | 0.364*** | 0.413*** | 0.345*** | −0.219*** | 0.546*** | −0.478*** | — |
| | df | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | — |
| | p-value | <.001 | <.001 | <.001 | 0.390 | 0.307 | <.001 | 0.029 | <.001 | <.001 | 0.013 | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | — |

*Note.* * p < .05, ** p < .01, *** p < .001

# B7: Influence of demografic variables and price perception

**Test of gender:**

Contingency Tables - Product choice

| Product choice | | Male | Female | Total |
|---|---|---|---|---|
| | | **Sex** | | |
| Sera | Observed | 71 | 52 | 123 |
| | % within row | 57.7 % | 42.3 % | 100.0 % |
| Eco-Sera | Observed | 125 | 140 | 265 |
| | % within row | 47.2 % | 52.8 % | 100.0 % |
| Total | Observed | 196 | 192 | 388 |
| | % within row | 50.5 % | 49.5 % | 100.0 % |

Nominal - Product choice

| | Value |
|---|---|
| Phi-coefficient | 0.0982 |
| Cramer's V | 0.0982 |

χ² Tests - Product choice

| | Value | df | p |
|---|---|---|---|
| χ² | 3.74 | 1 | 0.053 |
| N | 388 | | |

Contingency Tables - Product choice as gift

| Gift | | Male | Female | Total |
|---|---|---|---|---|
| | | **Sex** | | |
| Sera | Observed | 59 | 40 | 99 |
| | Expected | 50.0 | 49.0 | 99.0 |
| Eco-Sera | Observed | 137 | 152 | 289 |
| | Expected | 146.0 | 143.0 | 289.0 |
| Total | Observed | 196 | 192 | 388 |
| | Expected | 196.0 | 192.0 | 388.0 |

χ² Tests - Product preference as gift

| | Value | df | p |
|---|---|---|---|
| χ² | 4.38 | 1 | 0.036 |
| N | 388 | | |

Nominal - Product preference as gift

| | Value |
|---|---|
| Phi-coefficient | 0.0982 |
| Cramer's V | 0.0982 |

## Test of education level:

Contingency Tables - Product preference

| Product choice | | Education level | | |
|---|---|---|---|---|
| | | Low level | High level | Total |
| Sera | Observed | 18 | 107 | 125 |
| | Expected | 17.9 | 107 | 125 |
| Eco-Sera | Observed | 39 | 235 | 274 |
| | Expected | 39.1 | 235 | 274 |
| Total | Observed | 57 | 342 | 399 |
| | Expected | 57.0 | 342 | 399 |

$\chi^2$ Tests- Product preference

| | Value | df | p |
|---|---|---|---|
| $\chi^2$ | 0.00194 | 1 | 0.965 |
| N | 399 | | |

Nominal- Product preference

| | Value |
|---|---|
| Phi-coefficient | 0.00221 |
| Cramer's V | 0.00221 |

Contingency Tables - Product preference as gift

| Gift | | Education - Transformed | | |
|---|---|---|---|---|
| | | Male | Female | Total |
| Sera | Observed | 20 | 80 | 100 |
| | Expected | 14.3 | 85.7 | 100 |
| Eco-Sera | Observed | 37 | 262 | 299 |
| | Expected | 42.7 | 256.3 | 299 |
| Total | Observed | 57 | 342 | 399 |
| | Expected | 57.0 | 342.0 | 399 |

$\chi^2$ Tests - Product preference as gift

| | Value | df | p |
|---|---|---|---|
| $\chi^2$ | 3.56 | 1 | 0.059 |
| N | 399 | | |

Nominal- Product preference as gift

| | Value |
|---|---|
| Phi-coefficient | 0.0944 |
| Cramer's V | 0.0944 |

# B8: Regression analyses with Green Consumption Values

**Product choice with Green Consumptions Values as potential moderator:**

Model Fit Measures - Product choice

| | | | | | Overall Model Test | | |
|---|---|---|---|---|---|---|---|
| **Model** | **Deviance** | **AIC** | **BIC** | **R²N** | **χ²** | **df** | **p** |
| 1 | 207 | 263 | 374 | 0.725 | 290 | 27 | < .001 |

Model Coefficients - Product choice

| **Predictor** | **Estimate** | **SE** | **Z** | **p** | **Odds ratio** |
|---|---|---|---|---|---|
| Intercept | -9.6617 | 13.837 | -0.6983 | 0.485 | 6.37e-5 |
| Effective | 1.8443 | 1.272 | 1.4495 | 0.147 | 6.324 |
| Positive individual | -0.4985 | 1.591 | -0.3132 | 0.754 | 0.607 |
| Self-signaling | -0.3963 | 1.575 | -0.2516 | 0.801 | 0.673 |
| Feminine | 0.2073 | 1.062 | 0.1952 | 0.845 | 1.230 |
| Design | 1.1961 | 1.139 | 1.0505 | 0.293 | 3.307 |
| Exciting | 1.4117 | 1.632 | 0.8652 | 0.387 | 4.103 |
| Safe | -0.5031 | 1.370 | -0.3673 | 0.713 | 0.605 |
| Display | -0.0429 | 1.530 | -0.0280 | 0.978 | 0.958 |
| Innovative | 0.5646 | 1.197 | 0.4716 | 0.637 | 1.759 |
| Fear | -1.9996 | 2.820 | -0.7091 | 0.478 | 0.135 |
| Hope | 1.3284 | 1.982 | 0.6704 | 0.503 | 3.775 |
| Guilt | -0.0921 | 1.712 | -0.0538 | 0.957 | 0.912 |
| Pride | -0.1208 | 1.939 | -0.0623 | 0.950 | 0.886 |
| Green CV | -0.1678 | 2.960 | -0.0567 | 0.955 | 0.846 |
| effective ✳ Green CV | -0.0273 | 0.264 | -0.1032 | 0.918 | 0.973 |
| Positive individual ✳ Green CV | 0.1710 | 0.341 | 0.5018 | 0.616 | 1.187 |
| Self-signaling ✳ Green CV | 0.3428 | 0.335 | 1.0244 | 0.306 | 1.409 |
| Feminine ✳ Green CV | -0.1139 | 0.223 | -0.5098 | 0.610 | 0.892 |
| Design ✳ Green CV | -0.1044 | 0.236 | -0.4430 | 0.658 | 0.901 |
| Exciting ✳ Green CV | -0.1181 | 0.334 | -0.3532 | 0.724 | 0.889 |
| Safe ✳ Green CV | 0.3163 | 0.295 | 1.0731 | 0.283 | 1.372 |
| Display ✳ Green CV | 0.0237 | 0.313 | 0.0758 | 0.940 | 1.024 |
| Innovative ✳ Green CV | -0.1309 | 0.259 | -0.5057 | 0.613 | 0.877 |
| Fear ✳ Green CV | 0.2171 | 0.591 | 0.3674 | 0.713 | 1.243 |
| Hope ✳ Green CV | -0.3617 | 0.412 | -0.8770 | 0.380 | 0.697 |
| Guilt ✳ Green CV | -0.0245 | 0.355 | -0.0690 | 0.945 | 0.976 |
| Pride ✳ Green CV | -0.0773 | 0.413 | -0.1875 | 0.851 | 0.926 |

*Note. Estimates represent the log odds of "Product choice = Eco-Sera" vs. "Product choice = Sera"*

**Product choice as gift with Green Consumptions Values as potential moderator:**

Model Fit Measures - Gift

| | | | | | Overall Model Test | | |
|---|---|---|---|---|---|---|---|
| Model | Deviance | AIC | BIC | $R^2_N$ | $\chi^2$ | df | p |
| 1 | 266 | 322 | 433 | 0.546 | 184 | 27 | < .001 |

Model Coefficients - Gift

| Predictor | Estimate | SE | Z | p | Odds ratio |
|---|---|---|---|---|---|
| Intercept | -13.9171 | 13.626 | -1.021 | 0.307 | 9.03e-7 |
| Effective | -0.8961 | 0.856 | -1.047 | 0.295 | 0.4081 |
| Positive individual | 0.6313 | 1.083 | 0.583 | 0.560 | 1.8801 |
| Self-signaling | -1.2252 | 1.205 | -1.017 | 0.309 | 0.2937 |
| Feminine | -0.4720 | 0.821 | -0.575 | 0.565 | 0.6237 |
| Design | 1.3905 | 0.769 | 1.808 | 0.071 | 4.0168 |
| Exciting | 1.6329 | 1.145 | 1.427 | 0.154 | 5.1188 |
| Safe | 1.9119 | 1.092 | 1.751 | 0.080 | 6.7658 |
| Display | 0.3476 | 1.273 | 0.273 | 0.785 | 1.4156 |
| Innovative | -0.2606 | 1.004 | -0.260 | 0.795 | 0.7706 |
| Fear | -1.1300 | 3.560 | -0.317 | 0.751 | 0.3230 |
| Hope | 3.4291 | 1.694 | 2.025 | 0.043 | 30.8488 |
| Guilt | 0.1880 | 1.506 | 0.125 | 0.901 | 1.2068 |
| Pride | -2.5661 | 1.529 | -1.679 | 0.093 | 0.0768 |
| Green CV | 2.9404 | 2.839 | 1.036 | 0.300 | 18.9227 |
| **Effective ✻ Green CV** | **0.3718** | **0.179** | **2.071** | **0.038** | **1.4503** |
| Positive individual ✻ Green CV | -0.0530 | 0.239 | -0.222 | 0.824 | 0.9483 |
| Self-signaling ✻ Green CV | 0.2896 | 0.260 | 1.114 | 0.265 | 1.3359 |
| Feminine ✻ Green CV | 0.0898 | 0.177 | 0.507 | 0.613 | 1.0940 |
| Design ✻ Green CV | -0.2203 | 0.163 | -1.352 | 0.176 | 0.8023 |
| Exciting ✻ Green CV | -0.3423 | 0.240 | -1.429 | 0.153 | 0.7101 |
| Safe ✻ Green CV | -0.2873 | 0.236 | -1.215 | 0.224 | 0.7503 |
| Display ✻ Green CV | 0.0566 | 0.264 | 0.215 | 0.830 | 1.0582 |
| Innovative ✻ Green CV | 0.0272 | 0.219 | 0.124 | 0.901 | 1.0276 |
| Fear ✻ Green CV | -0.0892 | 0.755 | -0.118 | 0.906 | 0.9147 |
| Hope ✻ Green CV | -0.6936 | 0.357 | -1.941 | 0.052 | 0.4998 |
| Guilt ✻ Green CV | -0.1742 | 0.302 | -0.578 | 0.563 | 0.8401 |
| Pride ✻ Green CV | 0.4316 | 0.317 | 1.361 | 0.174 | 1.5398 |

*Note. Estimates represent the log odds of "Gift = Eco-Sera" vs. "Gift = Sera"*

**Willingness to Pay with Green Consumptions Values as potential moderator:**

Model Fit Measures - Willingness to pay

| Model | R | R² | Adjusted R² | AIC | BIC | Overall Model Test | | | |
|-------|---|----|-----|-----|-----|---|---|---|---|
| | | | | | | F | df1 | df2 | p |
| 1 | 0.679 | 0.461 | 0.422 | 672 | 788 | 11.8 | 27 | 372 | < .001 |

Model Coefficients - Willingness to pay

| Predictor | Estimate | SE | t | p | Stand. Estimate |
|-----------|----------|----|----|---|-----------------|
| Intercept | 3.03476 | 1.6354 | 1.8557 | 0.064 | |
| Effective | 0.08306 | 0.1399 | 0.5938 | 0.553 | 0.11755 |
| Positive individual | 0.16524 | 0.1666 | 0.9920 | 0.322 | 0.11780 |
| Self-signaling | -0.58672 | 0.1958 | -2.9959 | 0.003 | 0.05227 |
| Feminine | -0.29803 | 0.1375 | -2.1679 | 0.031 | -0.09007 |
| Design | -0.00708 | 0.1270 | -0.0558 | 0.956 | 0.00745 |
| Exciting | 0.13928 | 0.1742 | 0.7997 | 0.424 | 0.19828 |
| Safe | 0.12592 | 0.1673 | 0.7527 | 0.452 | 0.10928 |
| Display | 0.10081 | 0.1732 | 0.5821 | 0.561 | 0.06554 |
| Innovative | 0.47061 | 0.1412 | 3.3324 | < .001 | 0.10382 |
| Fear | -0.04504 | 0.3293 | -0.1368 | 0.891 | -0.05284 |
| Hope | -0.04604 | 0.2298 | -0.2004 | 0.841 | 0.06878 |
| Guilt | -0.14562 | 0.2497 | -0.5831 | 0.560 | 0.06915 |
| Pride | -0.01102 | 0.2327 | -0.0474 | 0.962 | -0.04361 |
| Green CV | -0.34333 | 0.3133 | -1.0957 | 0.274 | 0.17703 |
| Effective ✳ Green CV | -4.93e−4 | 0.0272 | -0.0182 | 0.986 | -9.32e−4 |
| Positive individual ✳ Green CV | -0.01152 | 0.0343 | -0.3359 | 0.737 | -0.01621 |
| **Self-signaling ✳ Green CV** | **0.12835** | **0.0406** | **3.1632** | **0.002** | **0.19258** |
| Feminine ✳ Green CV | 0.04553 | 0.0274 | 1.6598 | 0.098 | 0.07203 |
| Design ✳ Green CV | 0.00247 | 0.0255 | 0.0968 | 0.923 | 0.00470 |
| Exciting ✳ Green CV | 0.00256 | 0.0343 | 0.0745 | 0.941 | 0.00433 |
| Safe ✳ Green CV | -0.00444 | 0.0348 | -0.1277 | 0.898 | -0.00605 |
| Display ✳ Green CV | -0.01023 | 0.0344 | -0.2978 | 0.766 | -0.01723 |
| **Innovative ✳ Green CV** | **-0.07750** | **0.0293** | **-2.6460** | **0.008** | **-0.11714** |
| Fear ✳ Green CV | -0.00736 | 0.0594 | -0.1239 | 0.901 | -0.00621 |
| Hope ✳ Green CV | 0.02312 | 0.0436 | 0.5303 | 0.596 | 0.03043 |
| Guilt ✳ Green CV | 0.04439 | 0.0458 | 0.9696 | 0.333 | 0.05458 |
| Pride ✳ Green CV | -0.00706 | 0.0436 | -0.1618 | 0.872 | -0.00872 |