Processing fluency,

'a colored perspective'

Researching the effect of a (dis)fluent product packaging color for sustainable products on consumer judgements

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15-06-2020

Master's thesis

"The future will be green, or not at all".

Jonathon Porritt

Preface

This master's thesis is written as a graduation research for the master Marketing (MSc) at Radboud University, Nijmegen. Although it is a master's in marketing, I always had a sustainability focus during my education. I wanted my master's thesis to have this combination as well, and that demanded me to search on a topic of my own instead of choosing a topic from an existing list. While my first idea, researching the color of sustainability, initially did not have enough depth, my supervisor helped me in finding the right addition; a processing fluency perspective.

Talking about my supervisor brings me to the luck that I had of being supervised by dr. N.V.T. Nina Belei, Assistant Professor of Marketing at the Institute for Management Research at Radboud University in Nijmegen. I say I had the luck deliberately for two reasons. First of all, it was almost a thesis on itself to get her to choose me, since she was really popular among students that wanted to have her as a supervisor. Her popularity is very understandable as I have experienced, which brings me to my second reason. Throughout the whole process Nina has guided me in delivering a master's thesis that I am proud of. From the very first beginning till the very end, she was communicative, kind, honest, helpful, and supportive. She demands the best that a student can give and helps in achieving that. Having such a supervisor with writing something difficult like a master's thesis is a privilege. Nina, thank you so much!

Next to her there are some other people that I would like to give credits to. I would like to thank prof. dr. J.M.M. Bloemer for her time and effort in being my second examiner. I hope, as she specifically said in the introduction lecture of the master Marketing, that she feels that this thesis is written by a future responsible marketing professional, educated at Radboud University.

Next to her I would like to thank my fellow student Festina Selmani for helping me in the master's thesis process, by reading my thesis components every time and helping me with questions. Last, I would like to thank my parents. My mother especially for helping me with reading my thesis and with the structure. Thanks to my father for trying to learn me to take a rest now and then and persevere whenever necessary. Thanks to both of giving me the opportunity to study at Radboud University.

Was signed,

15-06-2020

Pieter den Hertog

Abstract

The research at hand investigates the influence of product packaging color on consumer judgments regarding two different sustainable products. A theoretical perspective, processing fluency theory, is integrated in the design of this research by manipulating product packaging color while conducting an online experiment-based survey. The influence of a green product packaging color (fluent condition) respectively pink product packaging color (disfluent condition) is measured on a number of consumer judgement variables: *perceived familiarity*, *uniqueness*, *product liking* and *purchase likelihood* while controlling for *product type*. An online convenience sample is used in the Netherlands (N=165), which consists mainly of young and highly educated people from a Western culture. Results of this research indicate that a fluent product packaging color in terms of sustainability (green) leads to higher perceived familiarity than a disfluent product packaging color (pink). This research was not able to find paradoxical results regarding processing fluency, although expected based on previous studies. Another result of this study is the finding that females like the sustainable products more than males and also have a higher purchase likelihood for it.

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Chapter 1: Introduction

1.1 Introduction

Sustainability could be at its highest level of importance nowadays due to climate change, the Sustainable Development Goals of the United Nations, and the global Paris Agreement on climate change. Next to that, increased focus is paid towards ethical consumption, fair trade, and the global trend of "going green". Despite a lot of intentions, promises and attention on the matter of sustainability, the last global climate summit in Madrid 2019 was said to be a disaster (Luttikhuis, 2019). While countries and politics are having a hard time to concretize the intentions and promises regarding sustainability, businesses, and consumers themselves could also contribute in solutions towards more sustainability and should therefore not be forgotten.

One concrete solution from these parties could be the increase of *sustainable consumer behavior,* a concept with a variety of definitions but all commonly pointing in the same direction of lowering environmental impacts and the lesser utilization of natural resources. One specific definition of sustainable consumer behavior within that variety is " (…) actions that result in decreases in adverse environmental impacts as well as decreased utilization of natural resources across the lifecycle of the product, behavior, or service" (White, Habib, & Hardisty, 2019, p. 24).

Looking at sustainable consumer behavior from a consumer perspective, the actions needed for more sustainability, such as choosing the sustainable product instead of the non-sustainable one, could be a difficult thing to put into practice. It is known that a consumer in a supermarket can be exposed to over 20.000 products on average during an experience of less than 30 minutes (Keller, Apéria, & Georgson, 2012). On top of that, most consumers do not read sustainability reports and other related sustainability information (Barchiesi, Castellan, & Costa, 2018), probably due to information overload, lack of time and lack of mental effort available for it.

Several questions emerge from these difficulties around sustainable consumer behavior, such as how could consumers make the sustainable choice, by choosing the sustainable product, within this overwhelming variety of products, information, and stimuli? But also, looking at it from a business perspective, the question arises of how to get the attention of the consumer within that broad variety of products, information, and stimuli? These are all examples of questions that need elaborative answering and increased focus from academic research.

It is known that the buying behavior of consumers is influenced by their judgements, evaluations, and decision-making processes (Mantonakis, Galiffi, Aysan, & Beckett, 2013).

These judgements, evaluations and decision-making processes are on itself also prone to a diverse set of factors, the factor metacognitive experience being one of them. An important example of a metacognitive experience is the fluency of how new information considering the product can be processed (Schwarz, 2004). The concept mentioned here is called *processing fluency* in the academic literature, defined by "the subjective experience of how easy it is for people to process information" (Alter & Oppenheimer, 2009, p. 219).

Past research found a lot of positive effects regarding fluent information and processing contexts, for example that fluent information processing leads to liking, trustworthiness, and more confidence among respondents (Alter & Oppenheimer, 2009). Also, fluent processing can lead to more feelings of familiarity (Schwarz, 2004), which can result in favorable and interesting opportunities for businesses. A more practical example about processing fluency, derived by another study of Alter & Oppenheimer (2006), shows that companies with a more fluent name can outperform companies with a disfluent name on the stock market. It thereby shows, yet again, the importance of knowledge on processing fluency and its consequences in different contexts.

Shifting from the consumer perspective to the business perspective, one answer on how businesses can get the attention from the consumer within the broad variety of products, information, and stimuli, is throughout the use of product packaging. Product packaging is one of the most important consumer communication means according to Barchiesi et al., (2018). The importance of product packaging in reaching consumers is also confirmed by Keller et al., (2012), due to the fact that advertising is becoming less effective and the needed brand proliferation for businesses is on the rise. Product packaging and processing fluency can be a really interesting research combination since product packaging involves a lot of different elements which could be optimized in terms of processing fluency, for example the font that is used for product information, the color of that font or perhaps the color used for the product packaging itself.

Colors are known to have a significant and diverse set of effects in different contexts. Colors can influence our psychological feelings and responses. Moreover, colors influence the consumer liking of a product and can also serve as a tool for differentiating purposes (Hoyer, MacInnis, & Pieters, 2016; Keller et al., 2012). Going deeper into these differentiating purposes, especially important for marketing contexts, color usage is an essential element in designing a product packaging (Keller et al., 2012). Next to that, differentiating by the usage of color would also be a smart thing to do since consumers base their decisions on subtle cues, such as packaging color, at

the point-of-purchase moment too (Ooijen, Fransen, Verlegh, & Smit, 2017).

The usage of color on product packaging in order to improve processing fluency would relate to the category of perceptual fluency. Until now, only the general concept of processing fluency was mentioned in this introduction, but there are different types of processing fluency and these can be categorized; linguistic fluency and perceptual fluency are examples of these categories (Alter & Oppenheimer, 2009). Perceptual fluency is one of the most applicable categories concerning product labels (Mantonakis et al., 2013) and therefore product packaging too. This category of *perceptual fluency* relates to the visual clarity of the stimuli that can be processed by human beings (Mantonakis et al., 2013).

In general, most literature considering processing fluency indicates that fluent processing cues lead to positive product evaluations and more positive effects, in most situations (Alter & Oppenheimer, 2009; Mantonakis et al., 2013). Furthermore, metacognitive difficulty, which is caused by disfluent processing, has a negative effect according to more than 200 studies done on the subject (Pocheptsova, Labroo, & Dhar, 2010). Using a right packaging color, a color that matches the product's and/or brand associations, as a cue for fluent processing could therefore hypothetically lead to positive results and interesting implications.

Nevertheless, despite the general academic consensus between fluent processing and positive consequences, a remarkable exception can be found in this relationship concerning among others, certain products. Mantonakis et al., (2013) found in their study on the effects of processing fluency on taste perception evaluations, that disfluent cues considering hedonic products led to more positive evaluations. That contrasting finding was also found in the study done by Pocheptsova et al., (2010), where disfluent cognitive cues, increased the attractiveness for special-occasion products (Pocheptsova et al., 2010). According to these authors, metacognitive difficulty causes an appearance of uniqueness for the product and thereby increases attractiveness, which is important for hedonic products (Pocheptsova et al., 2010). It therefore seems that the relation between processing fluency and its consequences is moderated by product type and can differ in certain contexts. It would therefore be interesting and worth the effort to further explore this remarkable finding in a research with different contexts than the previous named studies.

The current research aims to further explore that remarkable finding with a different processing fluency cue (product packaging color) and with different products (sustainable products). Furthermore, this research studies the relationship between a disfluent processing cue (a

disfluent color), a fluent processing cue (a fluent color) and consumer judgements about the sustainable products, while considering the potential, but expected, moderation regarding product type (utilitarian vs. hedonic).

It can be expected that interesting differences come forward between the usage of a fluent and a disfluent packaging color, the differences between the resulting consumer judgements and the potential effect of product type. It can also be expected that a fluent product packaging color works well for the sustainable utilitarian product but also that the sustainable hedonic product needs a disfluent product packaging color. It would have most interesting complications for business when that conflicting result is, yet again, found by scientific research, but it will also further strengthen the knowledge about the 'paradox' itself, since only a few studies have found contradictory results.

Until now, no study specifically studied the usage of color as a fluency cue considering product packaging for sustainable products. Also, no research studied the relation between a disfluent and fluent color on the product packaging of sustainable products, while also accounting for the expected moderation of product type. This research will thereby meet the suggestions for future research stated by Pocheptsova et al., (2010), that more research into the consumption domain regarding metacognitive difficulty, caused by disfluent processing, is needed and if metacognitive difficulty increases the evaluation of hedonic products. On top of that, the research at hand will meet the suggestions stated by Mantonakis et al., (2013), that more insights are needed regarding purchase decisions concerning products with varying fluency cues. Finally, academic knowledge on the influence of packaging design on consumer behavior is limited (Van Ooijen et al., 2017).

This research will therefore make several key contributions to the academic knowledge and literature regarding processing fluency, sustainable consumer behavior, color usage in a marketing context and product packaging. First of all, it specifically contributes to the academic knowledge by researching a potential different processing fluency cue, namely product packaging color. Furthermore, the research at hand helps in gaining further insights into the relationship between a (dis)fluent cue (product packaging color) and its consequences on consumers judgements on two different sustainable products (one utilitarian and one hedonic product). Next to that, this research helps to gain insight into the potential moderation of product type (utilitarian vs. hedonic) on the relationship between perceptual fluency and consumer judgements. Finally, this research

contributes indirectly to the general academic knowledge on sustainable consumer behavior, color usage in a marketing context and product packaging because of the context in which the current research is executed.

Next to the theoretical contributions, this research will also have practical contributions and social value. It could help managers, marketeers, and businesses in choosing the right packaging color considering the type of sustainable product which could then eventually result in more sales and a better fit into consumer decision-making processes. A better fit of businesses that market sustainable products within consumer decision-making processes could eventually help consumers in making more sustainable choices, either unconscious or conscious. By stating this sequence of potential effects, the reasons for the research at hand to have a business perspective become clear. Consumers are thus expected to be affected indirectly throughout business decisions that follow the recommendations from this research. Concluding, more sales of sustainable products instead of non-sustainable ones will consequently have positive outcomes for society and sustainability in general.

1.2 Research aim and questions

The aim of the research at hand is threefold. First, to examine if product packaging color can serve as a processing fluency cue considering the product packaging of sustainable products. It can be expected that product packaging color as a cue is somewhat comparable with the cue and manipulation of background color as in the study done by Reber & Schwarz (1999), Unkelback (2007) and Werth & Strack (2003). It can also be expected that it is somewhat comparable with the cue and manipulation of font color in advertisements as in the study done by Pocheptsova et al., (2010). The second aim of this research is whether a fluent respectively disfluent product packaging color differ in the resulting consumer judgments about the sustainable products. This is something which is expected if we look at the results found by Pocheptsova et al., (2010) and Mantonakis et al., (2013). Third, to examine if a moderation effect exists in this relationship regarding product type (utilitarian vs. hedonic products), which was also found by Pocheptsova et al., (2010) and Mantonakis et al., (2013).

The following research question has been elaborated to reach the aims of this research:

- *1. What are the effects of a (dis)fluent product packaging color for sustainable products on consumer judgements?*

In order to answer the research question, the following sub questions have been elaborated:

- *2. What color(s) could serve as a (dis)fluent product packaging color regarding sustainable products?*
- *3. How can color(s) serve as a processing fluency cue considering the product packaging of sustainable products?*
- *4. What is the effect of a (dis)fluent product packaging color of a sustainable product on its perceived familiarity?*
- *5. What is the effect of a (dis)fluent product packaging color of a sustainable product on its preference by consumers?*
- *6. What is the effect of a (dis fluent product packaging of a hedonic sustainable product on its perceived exclusiveness?*
- *7. Does a moderation effect regarding product type exist in the relationship between product packaging color and consumer preference?*

Sub questions two and three will be answered in the literature review, which is chapter two. Sub question four, five, six and seven will be answered in the result section, which is chapter four. The primary research question will be answered in the conclusion of this research, chapter five.

1.3 Research outline

- Chapter two serves to elaborate and discuss the literature relevant for this research. The most relevant literature regarding the following concepts has been elaborated: consumer judgement and decision-making processes, metacognitive experiences, processing fluency, colors, and product packaging. The chapter ends with the hypotheses and the conceptual model.
- Chapter three serves to discuss the research methods chosen for the research at hand. First, the research strategy is discussed, second the chosen methods for analysis, then the methods of observing and sampling, the operationalization, research quality and the applicable research ethics will be discussed near the end of this chapter. Finally, the sample and construct validity and reliability of the control variable are elaborated.
- Chapter four serves to elaborate and show the found results.
- Chapter five contains in the following order: the conclusion, the discussion, research contributions, practical implications, limitations and future recommendations, and the closing paragraph.
- The reference list and the appendixes stand at the end of this research. The appendices include tables of operationalization, the pre-test survey, the experiment-based survey, elaboration of data analyses and SPSS output.

Chapter 2: Literature review

2.1 Consumer judgment and decision-making processes

According to White et al., (2019), one of the forms of sustainable consumer behaviour is the purchase decision of consumers for a sustainable product. For that to happen it is needed that businesses could deliver those sustainable products in the best way possible and fitting with consumer judgement and decision-making processes. Literature indicates that selling those sustainable products to the consumers can be a tough process though, for example in a supermarket where stimuli are overwhelming (Keller et al., 2012). In order to make the functioning of these complex processes clearer and to clarify the context of this research, discussed literature below will further elaborate concisely on consumer judgement and decision-making processes.

Consumers make use of extensive judgment and decision-making processes in their daily lives. While it is not the aim of this research to thoroughly elaborate these processes, which would be a research by itself, is it however necessary to concisely elaborate on the most important ones, in order to put the research subject into perspective and to know its place within the whole overview.

First to state, consumers have different judgment and decision-making processes, subdivided in high effort and low effort processes regarding both judgement and decision-making (Hoyer et al., 2016). Low effort processes are relevant when motivation, opportunity, and ability to process information are low. This relation is reversed for high effort processes, where motivation, opportunity, and ability to process information are high (Hoyer et al., 2016). An example of a situation where low effort processes is applicable is in the buying of apples, whereas the high effort processes are more relevant when buying an expensive wine for example.

Both the high and low effort processes are elaborated down below individually. These separate high and low process elaborations come together with an explanation where the research at hand falls within the model, in order to understand the context and potential influence of the central subject of this research.

Starting with high effort processes, consumers make *judgments* before making decisions in their behaviour. According to Hoyer et al., (2016), "judgments are evaluations or estimates regarding the likelihood that products and services possess certain features or will perform in a certain manner" (Hoyer et al, 2016, p. 208). Judgements are for example influenced by several biases such as prior brand evaluations and prior experiences. Concretely stated, if you want to buy

a certain exclusive wine and you already have positive experiences with that wine and/or with the brand, your judgements will probably be formed very positive.

After judgments are formed, consumer decision-making processes become active. *Decision-making* is defined as "making a selection among options or courses of action" (Hoyer et al., 2016, p. 208). Decision-making can further be divided in cognitive decision-making models or affective decision-making models. The differences lie in using respectively the consumers rational capabilities or their feelings, to decide which action or option the consumer eventually want to take.

During these decision-making processes, consumers are influenced by certain contextual effects. Hoyer et al., (2016) state that these contextual effects consist of consumer characteristics (such as metacognitive experiences), decision characteristics (such as the information format) and other people (people differ for example in their decision-making when other people are around) (Hoyer et al., 2016). For example, with the contextual effect of metacognitive experience, when information about the specifics of a wine is written in an unreadable handwriting instead of a clear font, it will probably influence your potential decision. Most interesting with this example, as we will see later in this literature review, is that it is not sure whether the difficulty of this metacognitive experience will have a positive or negative influence on this decision.

It is however expected that results from the research at hand will have assignable impact on high effort decision-making processes, because of this influence of metacognitive experiences in the model. As we will see later on, the central subject of this research falls within the contextual effect of metacognitive experiences, hence its assignable impact. Before the contextual effect of metacognitive experiences is discussed in more detail, the low effort processes are elaborated first.

As stated above, consumers also make use of low effort processes. Here again, judgements are formed before final decisions are made. Judgements in low effort situations are most of the time made by decision rules and heuristics (rules of thumb), such as the representativeness heuristic, which is quickly comparing the product with the category prototype (Hoyer et al., 2016). An example of how businesses use the representativeness heuristic is to make their product look like the category prototype in order to let consumers think that it is the same quality.

While there are some similarities between both the processes of high and low effort, such as that in both processes judgments are formed before decisions are made, there are also some differences to be found. Different from high effort processes is the fact that low effort processes

can either resolve in conscious or subconscious decision-making processes. Another difference is the context in which process is used, low effort processes in situations that don't require much effort (the buying of apples) and high effort processes where it is really needed (the buying of an expensive wine).

These conscious and subconscious decision-making processes have different implications. The conscious decision-making processes within low effort situations are more influenced by factors such as price or brand familiarity (Hoyer et al., 2016). Subconscious decision-making can be strongly influenced by external cues. These external cues, also called environmental stimuli, can consist of for example color and the logo of a brand. ==Both these conscious and subconscious processes within low effort decision-making are also interesting for this research, due to the familiarity factor and the influence of external cues such as color.== As will be stated later in the literature review, the central subject of this research is strongly connected with color usage and the concept of familiarity. Therefore, it is also expected that results from the research at hand will have assignable impact on low effort decision-making processes.

2.2 Metacognitive experiences

Metacognitive experience is defined as "how the information is processed beyond the content of the decision" (Hoyer et al., 2016, p. 224). A concrete clarification of the metacognitive experience definition can be found in the following example: imagine consumers are watching an advertising for orange juice, they will learn about its product information but at the same time they are prone to how that information can be processed. Information processing is influenced by some factors like how difficult the name of the orange juice is to remember, how long was the advertisement shown, how many times is the advertisement repeated and was it easy to see the product information or was it perhaps difficult. Metacognitive experience is not about that orange juice product information but rather how that information is processed (Hoyer et al., 2016).

The concept of metacognitive experiences is mostly divided between thought generation and recall difficulty on one hand and processing fluency on the other hand (Schwarz, 2004). Recall difficulty is for example the difficulty of remembering your five favorite holiday destinations, processing fluency is for example how easy you perceive information that is written in the font **STENCIL** or Candara Light. Recall difficulty and processing fluency were used in the examples above for the orange juice; like how difficult the name is to remember (recall difficulty) and was it easy to see the product information (processing fluency).

As stated above in the paragraphs on consumer judgement and decision-making, metacognitive experiences influence our high effort decision-making processes (Hoyer et al., 2016). Next to the known effect of metacognitive experience on decision-making processes directly, metacognitive experiences can even influence the consumer judgement processes themselves in some situations (Schwarz, 2004). The latter means that the whole concept of metacognitive experiences can even have a stronger effect on judgement and decision-making than was discussed until now.

The importance of metacognitive experience can also be seen in the extensive academic focus on it. For example, more than 200 studies alone have researched the relationship between metacognitive experience and consumer liking (Pocheptsova et al., 2010). Also, it is known that the components of recall difficulty and thought generation on the one hand and processing fluency on the other hand have different implications, results, and consequences (Schwarz, 2004), regarding a marketing perspective. Because of the extensiveness and present academic focus, it is important to demarcate this research and its literature review. From now on, it will be on the processing fluency part of metacognitive experience, thereby now elaborating the academic literature regarding processing fluency in the sections below.

2.3 Processing fluency

2.3.1 Concept definition

As mentioned before in this literature review, processing fluency is one of the central concepts within the research at hand. Scientific literature seems to have a broad consensus regarding the definition of processing fluency. The concept is generally defined in the same way, mentioning the ease of information processing for humans. Schwarz (2004) defines *processing fluency* as follows: "processing fluency pertains to the ease or difficulty with which new, external information can be processed" (Schwarz, 2004, p. 338). Alter and Oppenheimer (2009) define it as " (…) the subjective experience of how easy it is for people to process information" (Alter & Oppenheimer, 2009, p.224).

Also in more recent literature, the definition being used by academics for processing fluency remained the same: "Fluency is the subjective ease of attempting a cognitive task, induced by a variety of manipulations produced by many different stimuli (Mantonakis et al., 2013, p. 318) or processing fluency is "the ease with which people process information" (Davis, Horváth, Gretry, & Belei, 2019, p. 151). In short, processing fluency is about how easy one can process certain information.

2.3.2 Types of processing fluency

As proven by the information elaborated on above, there is a general academic consensus on the definition of processing fluency. The definition is remarkable enough, representative for what seems to be a small concept at first, but processing fluency also consists of multiple types of fluency itself (Alter & Oppenheimer 2009; Mantonakis et al., 2013).

Until know, research showed that processing fluency is part of the concept metacognitive experiences, the latter is then again part of contextual effects and all the concepts influence consumer judgement and decision-making, directly or indirectly. In the upcoming information section, it will become clear that processing fluency is a collective noun; several types of fluency actually exist. In these upcoming paragraphs will also become clear what type of fluency is central in this research and why it is the most applicable.

Alter & Oppenheimer (2009) provide in their article an extensive overview of all the different types of fluency and how they differ from each other. They argue that all the different types of fluency fall under the general subjective experience of fluency (Alter & Oppenheimer, 2009). According to the authors, there are some different types of fluency: Embodied Cognitive fluency, Higher Order Cognitive fluency, Linguistic fluency, Imagery fluency, Perceptual fluency, and Memory-Based fluency (Alter & Oppenheimer, 2009). A discussion of all the types of fluency would go beyond the scope of this research, for a full overview of all the types, their subcomponents, accessory research, and authors see Alter & Oppenheimer (2009).

According to Alter & Oppenheimer (2009), every type of processing fluency has the same influence on judgments and evaluations. In other words, types of processing fluency can differ but the consequences they cause are most of the time the same (Alter & Oppenheimer, 2009). The influence of processing fluency on judgments and evaluations is discussed later on in this literature review.

One of the aforementioned types of processing fluency is perceptual fluency. *Perceptual fluency* relates to visual clarity, to how easy stimuli are perceived in their physical form (Alter & Oppenheimer, 2009). According to Mantonakis et al., (2013), perceptual fluency relates to the visual clarity of the stimuli that is or can be processed by human beings. As we will also see later on in this literature review, perceptual fluency is the most applicable type of fluency for the research at hand because of the research context; studying the effects of product packaging color manipulation, which relates to visual clarity of the stimuli and therefore perceptual fluency.

Perceptual fluency is further divided by Alter & Oppenheimer (2009) in two subtypes: Temporal Perception and Physical Perception.

Temporal perceptual fluency is more concerned with the time and frequency the stimuli is being perceived or can be perceived (Alter & Oppenheimer, 2009). An example is the amount of time that a certain stimuli (such as a statement) is shown to respondents or if the stimuli (such as an advertisement) is shown repeatedly or only once.

The other subtype of perceptual fluency is physical perception. *Physical perception* is the manipulation of fluency by variation of the ease with which the stimuli can be processed. An example of physical perception is font manipulation (**STENCIL** or Candara Light) (Alter & Oppenheimer, 2009). Another example is the perceptual look of a product label (Mantonakis et al., 2013), for example the font used for information statements or the colors being used for the font.

2.3.3 Processing fluency cues

Before results and important literature are discussed concerning processing fluency respectively perceptual fluency effects, is it important to clarify the concept of fluency cues. As we will see down below in the paragraphs on the effects, there is a wide variety of processing fluency research, types, and different contexts in which the concept of processing fluency is embedded.

Research on processing fluency always consists of the manipulation of a certain cue. The word *cue* is widely used within metacognitive experience and processing fluency literature, which makes the understanding quite difficult. Therefore, the upcoming section will clarify where the word stands for, what it means within this literature context and will provide some examples.

The word cue itself means signal and can be used as noun or as a verb (Cambridge Dictionary, 2020). While the word cue is both used in metacognitive experience and processing fluency literature, the same is meant with the word in both contexts. A cue is meant, regarding both metacognitive experience and fluency literature, as a signal that is influencing the concept which it refers to.

As discussed in this literature review, processing fluency is part of metacognitive experience and is, because of its influence on it, a cue for metacognitive experience (Pocheptosva et al., 2010). Perceptual fluency is a type of processing fluency, it influences general processing fluency and is therefore a cue for processing fluency (Alter & Oppenheimer, 2009). Font color manipulation influences perceptual fluency and is therefore a cue for perceptual fluency (Alter &

Oppenheimer, 2009). To conclude, a cue could be interpreted as manipulator or influencing indicator.

2.3.4 Effects of processing fluency

An extensive amount of scientific literature is available on the concept of processing fluency. It is known that fluency can even have a stronger influence on judgements than the content that is being processed itself (Alter & Oppenheimer, 2009), the latter proving again the importance of the concept. Processing fluency generally has been found to have important effects on perceived truthfulness, liking and confidence (Alter & Oppenheimer, 2009). Although processing fluency can differ in a lot of varying situations and contexts, the three domains of perceived truthfulness, liking and confidence seem to be consistent across all those variety of studies existing (Alter & Oppenheimer, 2009). These consistent consequences of processing fluency are confirmed by multiple researches and authors (Davis et al., 2019).

As mentioned, one of the general domains where processing fluency leads to a positive effect is on perceived truthfulness. Stimuli that are processed in a fluent way have the consequence of being perceived as more true or accurate than stimuli that cannot be processed in a fluent way (Alter & Oppenheimer, 2009; Schwarz, 2004, Reber & Schwarz, 1999). Potential reasons for this are that higher processing fluency leads to feelings of familiarity which then results in judgments of truth (Reber & Schwarz, 2004).

A second domain influenced by processing fluency is the domain of liking. Fluent processing can lead to more favorable attitudes (Lee & Aaker, 2004), can cause greater liking than stimuli that can't be processed fluently (Alter & Oppenheimer, 2009) and actually any variable that increases processing fluency is expected to lead to more liking (Schwarz, 2004).

The third domain of the general results is feelings of confidence. The processing of fluent stimuli led to greater confidence, in diverse contexts, among consumers and respondents than situations where stimuli are processed disfluent (Alter & Oppenheimer, 2009).

Next to these three domains there are also some other findings in the academic literature regarding processing fluency. Fluent processing of instructions leads to a higher willingness to engage in the recommended behavior (Song & Schwarz, 2008), fluent processing of stimuli lead to feelings of familiarity (Schwarz, 2004) and stimuli that can be processed disfluently are found to be seen as more riskier than stimuli that can be processed fluently (Song & Schwarz, 2009).

2.3.5 Effects of perceptual fluency

As discussed in this literature review, perceptual fluency is one of the different types of processing fluency, where perceptual fluency stands for the visual clarity of the stimuli that are processed (Alter & Oppenheimer, 2009). Perceptual fluency is probably one of the most researched types of processing fluency (Alter & Oppenheimer, 2009) and research seems to be abundant about perceptual fluency. Most research thereby indicates that results from perceptual fluency research are quite the same as the general results for processing fluency in literature.

Perceptual fluency also results, just like processing fluency, in better consumer judgements and liking about the stimuli that are shown (Reber, Winkielman & Schwarz, 1998). Next to that, respondents like stimuli more if it can be easily processed, perceptually speaking, than difficult ones (Alter & Oppenheimer, 2009). Also, in the study done by Reber & Schwarz (1999), statements in highly visible colors were perceived as truer than statements in moderate visible colors, which again proves the influence of perceptual fluency on judgements. Finally, respondents reported lower levels of confidence when instructions were difficult to process because of perceptual processing reasons (Alter & Oppenheimer, 2009), which is again in line with the general results caused by processing fluency.

2.4 The potential paradox within processing fluency

As we have seen in the section above, processing fluency is represented in literature with academic consensus regarding its definition and its consistent general effects. Nevertheless, there are some exceptions to be found in the literature that seem to form a 'paradox' due to contradictory findings regarding metacognitive difficulty (caused by disfluent processing). Whereas the majority of literature claims that fluent processing is beneficial (Alter & Oppenheimer, 2009; Lee, 2001; Lee & Aaker, 2004; Reber & Schwarz, 1999; Reber & Schwarz, 2004; Schwarz, 2004; Song & Schwarz, 2008; Song & Schwarz, 2009), other studies have found beneficial implications for contexts that have disfluent processing (Davis et al., 2019; Labroo & Kim, 2009; Mantonakis et al., 2013; Pocheptsova et al., 2010).

Important to mention is that the consensus on processing fluency effects mostly occurs within research contexts where products, services and/or brands had utilitarian or ordinarily properties (Davis et al., 2019; Mantonakis et al., 2013; Pocheptsova et al., 2010). Davis et al., (2019) associate utilitarian brands with goal-oriented experiences where function and practical use are important, Mantonakis et al., (2013) associate utilitarian products with everyday products and

Pocheptsova et al., (2010) also discuss everyday products in their study and experiments. Some examples being used for everyday or utilitarian products are orange juice, everyday cheese, and normal chocolate bars.

As we will see later on, the paradoxical findings however, were found in research contexts were products and/or brands had hedonic properties. These paradoxical findings will be elaborated upon down below after some clear insights are given about disfluent processing and fluent processing.

A situation where disfluent processing arises (such as **a difficult to read font** or a font that is difficult to see due to its color) results in a difficulty of processing the related information that is communicated. *Disfluent processing* is therefore the reverse of fluent processing; it is the difficulty that we experience with processing the related information (Pocheptsova et al., 2010). *Fluent processing* is the ease we experience with processing the related information. Disfluent processing leads to metacognitive difficulty whereas fluent processing leads to metacognitive ease. As we have seen in the section on metacognitive experience, the latter concept of metacognitive experience is formed by the components of processing fluency, thought generation and recall difficulty. Disfluent processing therefore leads directly to metacognitive difficulty (Pocheptsova et al., 2010).

The paradox that will be referred to in this paragraph is mostly present for hedonic products and/or brands that seem to form an exception on the academic consensus regarding positive implications of fluent processing. As stated before, positive implications, instead of negative implications, have been found for disfluent processing contexts (Davis et al., 2019; Mantonakis et al., 2013; Pocheptsova et al., 2010). Some of these studies can be found in a food consumption context, but there are also other domains where the paradoxical findings were evident. These paradoxical findings seem to be even stronger and/or more evident because of these different domains.

To start with, two other studies outside a food consumption context are given as first examples where disfluent processing led to beneficial implications. Subsequently, studies with a food consumption context will be elaborated with their paradoxical findings.

The first example where disfluent processing leads to positive implications, which is paradoxical, is in the context of goal pursuit (Labroo & Kim, 2009). Labroo & Kim (2009) researched the effect of metacognitive difficulty in a situation of goal pursuit. Disfluent processing

led to more liking of the object that was seen as an instrument to reach the respondents goal. Respondents were primed with the goal of becoming a kinder person in the experiment by Labroo & Kim (2009). Thereafter, respondents were given either disfluent or fluent processing materials regarding information about a charity. The respondents that had disfluent processing materials (a difficult to read flyer), compared to respondents with the same circumstances but then with fluent processing materials (an easy to read flyer), donated more towards the charity.

Labroo & Kim (2009) explained this result by the fact that effort (caused by a disfluent processing situation) made the instrument for reaching their goal more likable and more valuable. Therefore, respondents were more willing to donate to charity because they thought, because of the disfluent processing material, that the instrument (charity) was more valuable to reach their goal (become a kinder person).

Another non-food example of the metacognitive difficulty paradox can be found in the study done by Davis et al., (2019), where tweets from hedonic brands scored better when they were difficult to read instead of easy to read. The latter implicating that hedonic brands get more engagement on Twitter when they used tweets perceived as difficult to read. Davis et al., (2019) explained this result by the assumption that consumers interpret difficult to read tweets as the brand being exclusive which is desirable for hedonic brands (Pocheptsova et al., 2010). Hedonic brands were associated in this study with pleasure, experience fulfilling and with important symbolic meanings.

As stated above, other studies also showed paradoxical findings of disfluent processing within a food consumption domain. The study done by Mantonakis et al., (2013) revealed findings where a disfluent cue enhanced the product evaluation of a hedonic product. Hedonic products were associated with being novel, exclusive, and not everyday products, which could be seen as the reverse of utilitarian products. The hedonic product used in this study was wine and the enhanced product evaluations consisted over a higher overall liking, a higher willingness to buy and a higher willingness to pay.

Next to that, Pocheptsova et al., (2010) found in their study that disfluent processing leads to an improved evaluation for special occasion products in two experiments. Special occasion products were here associated with being uncommon, exclusive, out of the ordinary and desirable (Pocheptsova et al., (2010). The hedonic products used in this study were chocolate truffles and

special cheese. Enhanced product evaluations consisted of among others, likelihood to buy and perceived uniqueness.

As one can see, all the above-mentioned studies revealed interesting and beneficial implications from situations with disfluent processing. Disfluent processing can lead to more liking of an instrument in a goal pursuing situation (Labroo & Kim, 2009) and hedonic products profit from disfluent cues (Mantonakis et al., 2013; Pocheptsova et al., 2010). Lastly, tweets from hedonic brands scored better in terms of engagement when they were difficult to read instead of easy to read (David et al., 2019).

These paradoxical findings are to some extent explained by the corresponding authors. The underlying reason for the paradoxical findings seems to be the effect that unfamiliarity creates. Unfamiliarity, which is created by disfluent processing, can lead to a consumer feeling of novelty, uniqueness, rarity, and exclusivity (Mantonakis et al., 2013; Pocheptsova et al., 2010). Those feelings of novelty, uniqueness, rarity, and exclusivity are especially important for hedonic products and/or brands (Davis et al., 2019; Mantonakis et al., 2013). Those feelings can then further increase desirability (Mantonakis et al., 2013) and product evaluations (Pocheptsova et al., 2010), which is most interesting for marketeers and businesses.

2.5 Product packaging color as fluency cue

The upcoming paragraphs of this literature review will elaborate on and demarcate to the cue used in the research at hand, product packaging color in a context of sustainable products. This section will firstly discuss literature regarding color usage within processing fluency research, color(s) in general, color(s) in a marketing context and the color (s) of sustainability. Second, this section will review literature concerning product packaging. Third and last, theoretical arguments are given for product packaging color being a valid fluency cue.

2.5.1 Colors

The usage of color as a fluency cue in processing fluency research is not totally new and can be found in a variety of studies. Next to the example of font manipulation from Alter & Oppenheimer (2009), color was also manipulated regarding processing fluency in the studies done by Pocheptsova et al., (2010), Reber & Schwarz (1999), Werth & Strack (2003) and Unkelback (2007). There are more studies to be found in literature but discussing them all would go beyond the scope of this research, therefore the most important and relating studies are discussed here.

To start with, Pocheptsova et al., (2010) used color in their study on processing fluency in order to manipulate font readability. The researchers used a black color for the easy to read font and a grey color for the difficult to read font. Second, Reber & Schwarz (1999), manipulated the visibility of statements shown on a white background by using different colors while presenting them. Highly visible colors against the white background were blue and red whereas moderately visible colors were green, yellow, and light blue (Reber & Schwarz, 1999). Third, Werth & Strack (2003), also used color to manipulate the visibility of statements on a background. These authors used yellow on a green background for easy visibility and yellow on a red background for difficult visibility (Werth & Strack, 2003). Finally, Unkelback (2007), used different contrasts of colors against a white background in order to manipulate processing fluency.

The usage of color in scientific research is of course not limited to the processing fluency literature alone. As we have seen above, colors are mostly used until now in processing fluency research with color manipulation of either fonts or backgrounds (Pocheptosva et al., 2010 ; Reber & Schwarz, 1999; Unkelback, 2007; Werth & Strack, 2003). Nevertheless, one of the distinctive contributions of this research is the usage of product packaging color in a processing fluency context for sustainable products, something that is not yet present in current academic literature.

Before that is discussed, is it important to firstly state how colors work in general and what their usage is in a marketing context, in order to clearly integrate them in a processing fluency research. Color is, next to for example package and lettering, one of the factors that influences visual perception of consumers, whereas color is one of the most important ones (Hoyer et al., 2016; Keller et al., 2012). Colors themselves can influence thoughts, feelings, and behaviors (Labrecque, Patrick, & Milne, 2013; Van Ooijen et al., 2017) and that makes them interesting and applicable addition to this research. On top of that, the integration of color usage in a marketing context is not abundant (Labrecque et al., 2013), which makes the contribution of the research at hand yet again more evident.

Considering the basics behind colors, a *color* is simply the light that reflects from an object when it is perceived (Barchiesi et al., 2016). We can further explain the concept of color by the components of hue, saturation, and lightness (Hoyer et al., 2016). The *hue* of a color is the pigment in the color, most of the times divided in the categories of warm (such as red) or cold (such as green) (Hoyer et al., 2016). *Color saturation* is the intensity or amount of pigment in a color and *color value* is the darkness or lightness of a color (Labrecque et al., 2013). All these components

are important for the large variety of influences that colors exercise.

It is an unexpected and remarkable given that the results from research about color usage in marketing contexts are not abundant since they are attributed to have significant influence in different situations. Colors can namely influence our psychological processes in addition to our liking of a product (Hoyer et al., 2016; Labrecque et al., 2013) and perceived product quality (Van Ooijen et al., 2017). Most important to state is that the influence of color is very often dependent by contextual factors, but colors definitely bring very interesting implications and opportunities for marketeers (Labrecque et al., 2013).

One of these potential opportunities is the usage of color in order to manipulate perceptual respectively processing fluency, the central component of this research. In order to use the product packaging color to manipulate processing fluency with two different sustainable products, we need to know the color of sustainability (representing the fluent color) and the colors that don't associate with sustainability (representing disfluent colors).

First to mention is that color associations in general are influenced by evolution, but also by culture and therefore sometimes differ among cultures (Labrecque et al., 2013). Therefore, it can be expected that results from scientific color research can't be generalized for the whole world. The literature discussed in the literature review at hand is mostly applicable to the Western society.

Second, there is a dominating academic consensus that the color green is mostly associated with sustainability (Barchiesi et al., 2016; DeLong & Goncu-Berk, 2012). The color green is then further mostly associated with environmental/ecological sustainability and not per se with social or economic sustainability (Barchiesi et al., 2016; DeLong & Goncu-Berk, 2012). Green is the color mostly used by marketeers for stimulating environmental consumption (Labrecque et al., 2013) and for messages regarding sustainability (DeLong & Goncu-Berk, 2012). Important to note here is that some authors state that green is becoming a cliché color for sustainability and potentially is losing its strength as ecological sustainability color (Barchiesi et al., 2016; DeLong & Goncu-Berk, 2012).

Next to that academic consensus, some authors also did their own research regarding the color of sustainability, perhaps to see if the color green is already losing its strength as sustainability representative in the world of colors. According to research from Barchiesi et al., (2016), respondents found green, white, and blue the best colors for symbolizing sustainability in the broad sense of the concept. Another research by DeLong & Goncu-Berk (2012) found that green, brown,

and white were the right colors for sustainability. It still seems that the color green is the color that has the strongest association with sustainability nowadays, no other sources indicate otherwise. Two sub questions regarding color were drafted in the introduction of this research. Those questions were about which color could serve as a fluent color and which as a disfluent color regarding the product packaging of sustainable products. The answers to those questions are as follows, based on the current state of literature: the color green would serve best as a fluent color considering the product packaging of a sustainable product. A disfluent color for the packaging of a sustainable product could be any color as long as it is not brown, white, or blue (Barchiesi et al., 2016; DeLong & Goncu-Berk 2012).

2.5.2 Product packaging

As stated above, packaging is also one of the factors influencing visual perception. We can define *packaging* as "the design of the container for the product in which it is displayed in a retail environment" (Winer & Dhar, 2014, p. 7). Packaging is important for a variety of reasons: identifying the organization or brand behind the product, conveying information, protection during distribution and helping with the usage and storage of the product in different situations (Keller et al., 2012). The first two functions of packaging, identifying the organization or brand and conveying information, are most applicable for the context of this research. Consumers sometimes make, either conscious or unconscious, judgements and inferences solely based on the package of the product, which further strengthens the reason to make sure the package is well deployed as a strategic instrument (Hoyer et al., 2016).

Packaging can be seen as a strategic instrument because it can form the basis of a differential advantage (Labrecque et al., 2013; Winer & Dhar, 2014). In line with that differential advantage, packaging can be used to outperform or differentiate from competitors or to get the attention from the customer in, for example, a highly competitive market or shelf situation (Winer & Dhar, 2014; Labrecque et al., 2013). Purchase consideration is sometimes also influenced by the color of the package (Labrecque et al., 2013) and it is even known that packaging changes can have a direct effect on sales of the product (Keller et al., 2012).

All these reasons indicate the importance of the right packaging with the right color. Understanding the importance of packaging, one can also see the function that color can serve in packaging design itself. Color can be used in packaging for a variety of communication functions, it is an integral element in package design (Barchiesi et al., 2016). Therefore, it is crucial to choose

the right packaging color to convey information. Finally, it is most important that both color and packaging are in line with what is consistently communicated in the marketing of the product or brand (Keller et al., 2012; Labrecque et al., 2013).

2.5.3 Product packaging color as a fluency cue

The upcoming paragraphs will elaborate on product packaging color being a valid manipulation cue for perceptual fluency. To start with, fluency in general can be manipulated with a very diverse set of variables/cues (Schwarz, 2004). The manipulation of the variable, the cue, will have the result that the identification and processing of the stimuli by the respondent is affected in speed and/or accuracy (Schwarz, 2004). An example is the background color on which the stimuli can be perceived (Alter & Oppenheimer, 2009). All different types of processing fluency come with different factors/cues available for manipulation. Perceptual fluency in particular, the central component of this research, can be manipulated by varying the ease with which respondents can process the target stimuli that is being researched (Alter & Oppenheimer, 2009). Concretely speaking, the manipulation at hand can either happen with the time duration or the physical perception of the stimuli. Corresponding examples are manipulating the background contrast of the stimuli shown (Reber et al., 1998) or the font color of the stimuli (Pocheptsova et al., 2010).

Theoretically speaking and proven by the studies above, the product packaging color of a sustainable product can therefore be used as a manipulation cue. It can be compared with the studies of Pocheptsova et al., (2010) where the color of the font was manipulated and Reber et al., (1998) where the background contrast was manipulated for fluency research.

Product packaging color can be used as a manipulation cue choosing different colors for the product packaging and thereby manipulating it, one fluent color (green) and one disfluent color (for example pink). Expected is that the fluent product packaging color will contribute to the perceptual fluency of the sustainable product whereas the disfluent product packaging color will decrease perceptual fluency of the sustainable product. With the latter information being put, the sub question whether product packaging color can serve as a processing fluency cue is hereby answered. More concrete information will be elaborated in the methods chapter, chapter 3.

2.6 Hypotheses and conceptual model

The following hypotheses have been elaborated based on the literature discussed in this chapter:

- *H1: Sustainable products using a packaging color perceived as fluent in the context of sustainability will be perceived as more familiar, compared to the same sustainable products using a packaging color perceived as disfluent for the context of sustainability.*

- *H2: A utilitarian sustainable product using a packaging color perceived as fluent in the context of sustainability will be preferred more, compared to the same utilitarian sustainable product using a color perceived as disfluent for the context of sustainability.*

- *H3: A hedonic sustainable product using a packaging color perceived as fluent in the context of sustainability will be preferred less, compared to the same hedonic sustainable product using a color perceived as disfluent for the context of sustainability.*

- *H4: A hedonic sustainable product using a packaging color perceived as fluent in the context of sustainability will be judged as less exclusive, compared to the same hedonic sustainable product using a color perceived as disfluent for the context of sustainability*

- *H5: A moderation effect of product type exist in the relationship between product packaging color of the sustainable products and consumer preference.*

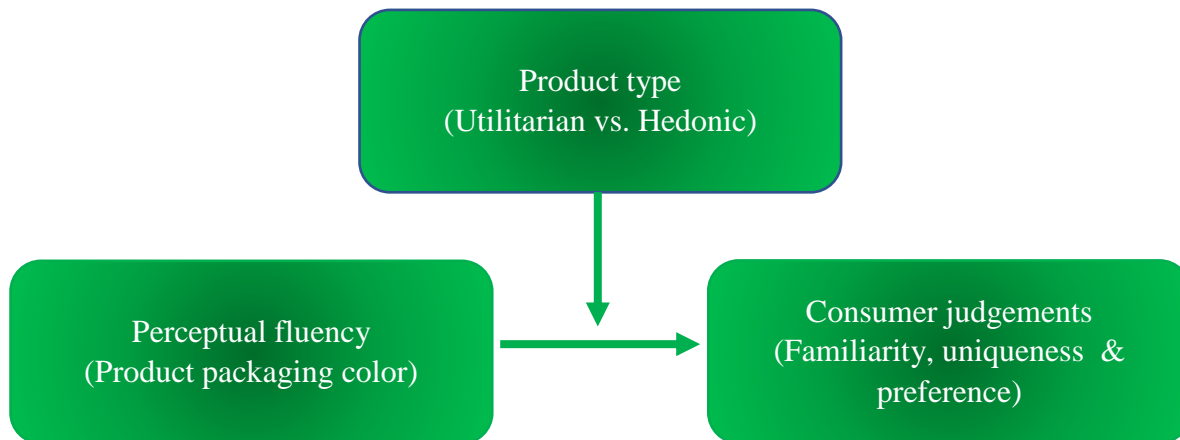These hypotheses come with the following accessory conceptual model:

Figure 1: Conceptual model

Chapter 3: Methods

3.1 Research strategy

The research at hand will make use of a quantitative approach in order to reach the research aims, research the hypotheses, and answer the corresponding research questions. The quantitative approach will consist of one pre-test and one accessory experiment-based survey. The pre-test has to be executed for a number of reasons. First, since this is the first study that manipulates perceptual fluency throughout product packaging color of sustainable products; the color(s) of sustainability is (are) not completely in consensus by academics, since green is potentially losing its strength as the color of sustainability (Barchiesi et al., 2016; DeLong & Goncu-Berk, 2012).

Second reason, product types respectively sustainable products have to be prechecked in order to use them in the experiment-based survey, thereby following the design of the studies done by Mantonakis et al., (2013) and Pocheptsova et al., (2010). More information regarding the pre-test will be given in a section below.

The experiment-based survey that this research will use is chosen in the design due to several implications. To start with, this research will measure the effect of an independent variable (product packaging color) on a dependent variable (consumer judgements), measured in multiple dimensions (familiarity, uniqueness, and preference). The latter means that it will check the hypotheses by comparing multiple objects in a statistic way, which is the basis for quantitative research (Vennix, 2011). The experiment-based survey is also chosen because of the fact that the objects (respondents) are comparable with each other. Moreover, the experiment-based survey will relate to the opinions, intentions, and attitudes of the respondents. Therefore, a survey is a valid and applicable choice (Vennix, 2011).

An experiment-based survey is also most applicable because the independent variable (perceptual fluency respectively product packaging color) will be manipulated, to research its effect on the dependent variable (consumer judgements). The manipulation of an independent variable to see its effect on a dependent variable with potential or expected causality, is a main characteristic for experimental research (Field, 2013). On top of that, an experiment-based survey is chosen because previous studies, that found interesting results for and that also form the basis for the study at hand, somewhat had the same study design (Mantonakis et al., 2013; Pocheptsova et al., 2010).

The experiment-based survey will be created with the latest version of Qualtrics (2020) and the corresponding data will be analyzed with the 26th version of IBM SPSS Statistics. The

survey will be made in English since it is expected that the population that can be reached in the most efficient and effective way all speak English, at least to a level sufficient to understand the pre-test respectively the survey-based experiment. The population sample can eventually be described extensively because the following variables will be added to the experiment-based survey: age (continuous interval variable), gender (binary variable), education (categorically nominal variable) and continent of living in most during the life of the respondent (nominal variable).

Also, the control variable of environmental attitude will be added to the experiment-based survey. It can be argued that people with high environmental attitudes can differ in their answers compared with people that have low environmental attitudes. Therefore, it is important to measure this variable in the experiment-based survey in order to improve the research quality.

The variable continent of living in most during life of the respondent, is both used to describe the sample as well as to check if no potential cultural biases will occur in the association regarding the color(s) of sustainability. The population sample in this study will be aimed at people from Western countries and it is known that the associations regarding color are also influenced by culture (Labrecque et al., 2013).

3.2 Methods for analysis

T-tests will be used in order to compare the means between two groups on applicable answers from respondents regarding the survey questions. This will concern paired sample t-tests, since many samples will be dependent on each other (for example the questions on being perceived as hedonic or utilitarian regarding the product of eggs) but also independent samples t-test (for example comparing the answers between the fluent and disfluent condition for hedonic products on exclusiveness. Also, using paired sample t-tests for validating product types in the pre-test is in line with the pre-test of Mantonakis et al., (2013).

A two-way ANOVA will be used to test hypothesis 1, since there are two group variables involved (two product types, and a fluent and disfluent condition). T-tests will be used to compare the means of the answers between the fluent and disfluent condition, thereby testing hypothesis 2, 3 and 4. Using a t-test comes with a few requirements that have to be met (Field, 2013): 1) the independent variable is measured on an interval or ratio scale, 2) respondents between groups are independent among each other and 3) the sample needs to be equal to or should have more than 30 respondents, based on the central limit theorem.

Factorial MANOVA will be used to test hypothesis 5, since multiple dependent variables are used (purchase likelihood and product liking). Requirements, conditions, and data analysis procedure for using an ANOVA respectively (Factorial) MANOVA will be discussed in chapter four, since their results will be integrated in that chapter.

3.3 Observing and sampling method

The research at hand is subject to time and financial limitations. Therefore, a sample will be drawn out of the whole object population. This sample will be derived by asking people on social media to fill in the pre-test respectively experiment-based survey, making it a convenience sample. The pre-test and the experiment-based survey will be distributed online in May 2020 via social media (WhatsApp, Facebook, LinkedIn, and E-mail) and will be filled in online by respondents. Drawing a sample out of a total object population can be sufficient for generalization of results when certain demands are met, such as sample size (Vennix, 2011).

Minimum sample size for the pre-test will be set at > 30 (because of the central limit theorem) to be able to use t-tests (Field, 2013). On top of that, a priori power analysis indicates, by calculations in G*Power (version 3.1.9.7), that for a power of 0.95 a sample size of 54 is needed (two-sided dependent t-tests, 0.5 effect size). Therefore, it is aimed to reach a pre-test sample size of 54. While distributing the survey to respondents comes the accessory question to share the survey online on the respondents' own social media and/or forward it to family and friends in order to reach as high as possible amount of respondents. The higher the amount of respondents, the higher the amount of results that are generalizable towards the object population (Vennix, 2011).

A pre-test sample size of 55 is obtained. Minimum sample size for the experiment-based survey will be set at a minimum of 120 since every group should at least have more than 30 respondents in order to conduct a (M) ANOVA (Hair, Black, Babin & Anderson, 2014). An experiment-based sample size of 165 is obtained. Both the pre-test and the experiment-based survey can be found in Appendix III respectively Appendix IV.

3.4 Operationalization

The full and extended operationalization of the research at hand can be found in Appendix II. The extended operationalization contains tables showing the corresponding constructs in the research respectively survey, their definitions, and the relating measurement instruments. This

operationalization section contains information regarding the usage of the sustainability definition, the pre-test respectively pre-test outcomes, and the experiment-based survey procedure.

Sustainability

The definition of sustainability for the study at hand is as follows: *"*Meet the needs of the present without compromising the ability of future generations to meet their needs" (Hart & Milstein, 2003, p.56). Sustainability will not be measured in this study and a table is therefore left out in the operationalization. The definition is only being used so respondents can choose their association color(s) for sustainability and to make up sustainability-oriented information regarding the products in the pre-test. The sustainable information is also made up with the definition of sustainable consumer behaviour in mind: " (…) actions that result in decreases in adverse environmental impacts as well as decreased utilization of natural resources across the lifecycle of the product, behavior, or service" (White, Habib, & Hardisty, 2019, p. 24).

Pre-test

A pre-test will be executed in order to verify that the experiment-based survey, measured after the pre-test, is valid and uses the right design needed to reach the research aim and answer the hypotheses. Potential respondents will be approached online via social media if they can fill in the pre-test. A valid and right design needs to be checked for a variety of cases:

  <u>Sustainability</u>: the definition used for sustainability in this research is given and respondents will be asked if they understand the definition. The pre-test indicated that 51 respondents understood the definition, two did not and two were not sure. Those four respondents all indicated that they understood the definition of sustainability after an extra information screen with elaborated examples was shown.

  <u>Sustainable products</u>: four products (two expected utilitarian and two expected hedonic) will be elaborated with made up information concerning the sustainability of the products and manufacturing processes. Respondents will be asked if the products, given that information concerning sustainability, are sustainable in their opinion. This is done by the following answer categories: Not at all (1) -Very much (5). In this way, the products are checked if they indeed represent sustainable products in the experiment-based survey later on. This check is needed because fictious products have to be made up since existing products can influence the dependent variables if the respondents already know the product(s). The sustainable information will be made

up with the definition of sustainable consumer behaviour as a basis: " (…) actions that result in decreases in adverse environmental impacts as well as decreased utilization of natural resources across the lifecycle of the product, behavior, or service" (White, Habib, & Hardisty, 2019, p. 24). Therefore, made up information such as "uses lesser agricultural space" or "has solar panels on the roof" can be interpreted as sustainability-oriented information.

Performing paired sample t-test for all the set of questions measuring sustainability perceptions of the products results in the following: expected utilitarian product Eggsta (M=3.96; SD=.98) is perceived as a more sustainable product than expected utilitarian product Mielk (M=3.51; SD=.98), (t (54) = 2.776; p=.01. Expected hedonic product Nature slices (M=3.16; SD=1.30) has no significant difference in being perceived as a sustainable product compared with expected hedonic product Heaven's Beans Factory (M=3.24; SD=.94), (t (54) = -.343; p=.73. Nevertheless, as the results indicate, the mean for Heaven's Beans is slightly higher and is therefore seen in this pre-test as most sustainable in the hedonic product category.

Product type: the products chosen for the pre-test need to be checked if they are indeed perceived as utilitarian or hedonic by respondents. This is fully in line with the pre-test done by Mantonakis et al., (2013) and Pocheptsova et al., (2010). Two products for the category of utilitarian products (eggs & plant-based milk) respectively hedonic products (potato crisps & chocolate) will be chosen for the pre-test. If one product of a category is found to be non-applicable, the other product functions as a potential reserve. Respondents will be asked the following two questions concerning all four products: *Given the information on utilitarian products and hedonic products, do you consider product X to be a utilitarian (hedonic) product?* Answers will be measured on a 5 point-scale (Strongly Agree=5, Agree=4, Undecided=3, Disagree=2, Strongly disagree=1).

Performing paired sample t-test for the set of questions measuring product type perception of eggs results in the following: eggs perceived as an utilitarian product (M=3.76; SD=.96), eggs perceived as a hedonic product (M=2.40; SD=1.07), (t (54) = 5.438; p<.001. These results indicate that participants view eggs significantly more as a utilitarian product than a hedonic product. Performing paired sample t-test for the set of questions measuring product type perception of a chocolate bar resulted in the following: chocolate bar perceived as an utilitarian product (M=1.80; SD=.87), chocolate bar perceived as a hedonic product ((M=4.31; SD=0.77), (t (54) = -11.824; p<.001. These results indicate that participants view a chocolate bar significantly more a hedonic

product than a utilitarian product.

Eggs and chocolate bars were tested first because of their highest perceived sustainability scores per expected product type. Also, since results indicate that eggs and a chocolate bar indeed fit in the expected product type group, it is not needed to analyze the two other products.

Color(s) of sustainability (and thereby disfluent and fluent product packaging color for sustainable products): fluent and disfluent colors in the context of sustainability also need to be pretested. Before the concerning question will be asked, respondents need to indicate if they were color blind or not, to make sure their answers are reliable. Only two respondents indicated that they were color blind and therefore didn't participate in the following question. After that, a variety of colors will be stated in the pre-test together with the question which color best symbolizes sustainability according to the respondents. Testing the colors for sustainability in this manner is in line with the pre-test on sustainability colors of Barchiesi et al., (2016). Results from the pre-test indicated that white (23 respondents), blue (29 respondents) and green (52 respondents) were the colors most associated with sustainability by the respondents.

Remaining cases: respondents will also be asked if they didn't comprehend some information given in the survey or if they have some recommendations. This is importance since unclarity could potentially bias results in the pre-test and consequently in the experiment-based survey. Only relevant recommendation from respondents was to use a lesser amount of text in the survey. This will not be changed since the text is seen as crucial for understanding the information in the survey.

Experiment-based survey procedure

Potential respondents will be approached online whether they are willing to fill in a short survey. The study at hand uses a two (product type, utilitarian vs. hedonic) x two (product packaging color, fluent vs. disfluent) between-subjects design. Although a within-subject design is in general a more powerful experimental design due to the minimalization of noise (Field, 2013), the between-subjects design is chosen for several reasons:

First of all, studies that found interesting results that formed the basis for this research also used a between-subjects design (Mantonakis et al., 2013; Pocheptsova et al., 2010). Second, because it is highly important for this research that no learning and/or transfer of knowledge occurs between the manipulations that participants will perceive. For example, the measurement of perceptual fluency manipulation could be influenced by the fact that participants feel they already

saw the same product packaging (let it be another color) and therefore process it more quickly. Another example, the dependent variable of familiarity could be influenced by a within-subjects design because participants would see the same product twice, which could result in biases in the data. A third but lesser important reason to choose for a between-subjects design is the fact that the survey is shorter in time and mental effort, and therefore more convenient to respondents. The latter could result in a lesser error in the results caused by boredom or decision tiredness by respondents.

Before respondents can start the experiment-based survey, they will be asked whether they are color blind to make sure the answers are reliable. If they are, they can't participate in the study because of invalid results. Next to that, the respondents will be asked if they participated in the pre-test. If so, they can't participate in the study because potential biases can occur, for example regarding familiarity questions. After these necessary validity measures come the questions that can describe the sample later on (like gender and age). Thereafter, respondents will be randomly assigned by the software of Qualtrics to fall either in the fluent or disfluent treatment group and with the utilitarian respectively hedonic sustainable product.

The sustainable products respectively products used per product type come from the results from the pre-test. Results indicated that eggs from Eggsta are most suited for the utilitarian sustainable product category, respectively a chocolate bar from Heaven's Bean Factory for the hedonic sustainable product category. Also, the fluent respectively disfluent product packaging color is determined by answers from the pre-test. Results from the pre-test indicate that green, blue, and white are the colors most associated with sustainability by respondents. Green will be chosen as packaging color for the fluent condition since most respondents choose that color as sustainability association. Pink will be chosen as packaging color for the disfluent condition because only one respondent in the pre-test associated that color with sustainability. Other disfluent colors for sustainability, supported by the pre-test, are not suitable due to lack of indifference (for example grey) or expected brand familiarity (purple-Milka brand, red- KitKat brand) which can result in biased data. Pink had no known or recognized association with a brand and is also suitable as a distinctive color and usable in Photoshop.

The experiment-based survey includes only one utilitarian product and one hedonic product in order to keep the survey not too long for respondents. After the randomization of the participants, participants will be shown the utilitarian product with a fluent (disfluent) product packaging color, together with the information concerning sustainability of the product/manufacturing process.

Using Qualtrics software, the amount of seconds that participants stay on that part of the survey is being measured and will be used as a perceptual fluency manipulation measurement instrument. Photoshop Software will be used to alter the color(s) of the product packaging. Other visuals (made up product name, brand logo, certification etc.) will also be present on the product packaging but kept constant between both conditions. Integrating these other visuals results in a more realistic product packaging. Only the hue of the color (the pigment of the color, green respectively purple) will be altered on the product packaging. This is because of the fact that lower color value is associated with higher product quality and can therefore potentially bias the results when also being manipulated (Van Ooijen et al., 2017).

After participants read the product information and see the product packaging, the participants will be asked questions regarding the dependent and independent variables. Last but not least, the control variable of environmental attitude will be measured by 5 statements that respondents have to answer. After that comes the end of the survey where respondents will be thanked for their participation.

3.5 Research quality: reliability, validity, and limitations

This section will elaborate on measures taken to obtain high research quality, both in reliability as well as in validity. Also, some limitations considering this research will be discussed. To start with, a minimum number of 30 respondents is set for the pre-test to achieve better reliability, a sample size of 55 is obtained. This first number for the pre-test is based on recommendations for research reliability as stated by Field (2013) and Hair et al., (2014). Sample size requirement is set at a minimum of 120 for the experiment-based survey, since 30 per group is the minimum in order to conduct a MANOVA (Hair et al., 2014). A sample size of 165 is obtained. The total amount of respondents is even higher than the minimum requirements, resulting in even better chances of finding results that can be generalized for the whole population (Vennix, 2011). The measurement items used in the experiment-based survey are made with the use of corresponding scientific literature and conducting an online survey has the consequences of more convenience for respondents and total anonymity, which also results in better reliability.

Research quality is also obtained by executing a pre-test, following the design of other relevant studies such as Mantonakis et al., (2013) and Pocheptsova et al., (2010). Reliability and validity are improved by asking respondents whether they are color blind and/or if they have participated in the pre-test (before starting with the experiment-based survey). Both could

potentially result in biases or errors in the data. Other measures taken for high research quality are adding the control variable of environmental attitude, which could potentially reduce the error term in the model (Hair et al., 2014) or the elimination of confounds (Field, 2013). Finally, testing the continent of living from respondents, asking in the pre-test for questions and or recommendations and no manipulation of the color value all increase the reliability and validity of the research at hand.

This research is also prone to some limitations. First of all, product involvement would also serve as a most interesting control variable in the research at hand. Due to the current length of the experiment-based survey and the extensiveness of product involvement scales (Michaelidou & Dibb, 2006), it was decided not to integrate this control variable into the study. Second limitation is the measurement for perceptual fluency. These measurements are not used before in scientific literature but adapted from previous researches, because product packaging color has not yet been researched before in the context that research does. A third limitation is the fact that the research at hand makes use of fictitious brands/products in an experimental context, instead of a realistic competitive environment as in the study by van Ooijen et al., (2017).

3.6 Research ethics

Research ethics are and have become increasingly important in academic contexts and research (Smith, 2003). Several principles, guidelines and codes of conduct exist in order to make scientific research ethically approved, guard respondents/participants against malpractice and keep science honest, clear, and pure. Principles, guidelines, and codes of conduct applicable for the research at hand will be elaborated in the paragraphs down below.

One of the precautionary measures mentioned here, is that researchers should inform participants about the research purpose, the expected duration time, and some procedures (Smith, 2003). Exactly this is stated in the introduction page of the pre-test and the experiment-based survey. Another precautionary measure for research ethics and integrity, is the participants right to decline or withdraw from the research by knowing its eventual consequences (Smith, 2003). Participants in this research are told in the introduction page (both pre-test and experiment-based survey) that they can decline and/or leave at any time, without any consequences whatsoever. The latter also indicates an applicable treatment of participants.

Moreover, the researcher of the study at hand has given extensive thought for foreseeable factors that can influence participants willingness to fill in the pre-test respectively experiment-

based survey and found no basis for discomfort, risk, or negative effects. This is in line with a good conduct of the researcher as well as the precautionary measures elaborated by Smith (2003).

Confidentiality is also highly important to integrate in forming a study design (Smith, 2003). This research guarantees confidentiality and anonymity by the absence of questions that can directly lead to the participants identity. Also, results will only be used for this study alone and data from the survey will not be shared with other parties.

Last but one, this study makes uses of an online survey design which results in total anonymity and convenience for participants. Lastly, participants are told that if any questions occur regarding to the survey, they can email the researcher personally and will get extensive answering.

3.7 Control variable validity and reliability

Factor analysis was used to check the control variable environmental attitude on convergent validity. The five items measuring environmental attitudes were included in the factor analysis. Factor analysis could be used since the Kaiser-Meyer-Olkin measure was 0.748 (above 0.5), Bartlett's Test of Sphericity was significant (<.001) and the items were measured in interval (Appendix VI). Therefore, all the assumptions for factor analysis are met (Field, 2013).

The communalities after extraction were all above 0.20 (Appendix VI), therefore sufficient (Hair et al. 2014). The items together explained 47.74% of the variance, which is on the low side since cumulative variance should be around 60% (Hair et al., 2014). The items all scored higher than 0.3 (Appendix VI) which indicates they are relevant and significantly higher than the minimum of 0.5 (Hair et al., 2014).

Checking the variable environmental attitude for scale reliability, by measuring its Cronbach's Alpha, resulted in a Cronbach's Alpha of $\alpha= 0.72$ (Appendix VI). This finding indicates a good reliability or at least sufficient (Field, 2013). No item deletion could have improved the reliability (Appendix VI).

Chapter 4: Results

4.1. Sample description

179 respondents participated in the experiment-based survey. twelve participants indicated that they also filled in the pre-test, so their answers are removed from the data due to potential bias in the results. Two participants indicated that they were color blind, so their answers have been removed as well for the same reason. The sample consisted of 76 males and 89 females. 164 participants indicated that they lived most in Europe during their lives, only one in North America. The sample size consisted mostly of people that have a scientific education (56.4%), preparatory education (21.2%) and higher professional education (13.9%). Most participants fell in the age category of 20 till 25 (70.4%). Minimum age was 18 and maximum age was 63. The result of this convenience sample was that a great share of the respondents is between 20 till 25 years old and higher educated.

4.2 Testing the hypotheses

This section contains the elaboration of all the hypotheses of the research at hand. These elaborations will be discussed in a numerical order. Every section will contain the hypothesis, the corresponding assumptions and the found results. Next to the hypotheses, the upcoming section will also contain the elaboration of the results considering the two measurement instruments used for processing fluency in this research. These were the amount of time (measured in seconds) that respondents stayed on the survey page where the fluent respectively disfluent condition was shown, and the question how respondents processed the information (easy-neutral-difficult to process). Additional hypotheses were elaborated for these two measurement instruments to check whether they indeed, significantly, tested processing fluency. This was done and needed since this study is the first in using product packaging color as a form of processing fluency manipulation. Hypotheses elaborated for the testing of these two "new" processing fluency measurements instruments were named hypothesis A, B, C and D.

4.2.1. Processing fluency measurement instruments

Hypothesis A: A utilitarian sustainable product using a packaging color perceived as fluent in the context of sustainability will be processed more quickly, relative to a utilitarian sustainable product using a packaging color perceived as disfluent for the context of sustainability.

T-tests could be used for testing all the hypotheses regarding processing fluency measurement instruments, since the sample size was always higher than 30 per variable (Appendix VI), the variable was always measured on an ratio scale (either in seconds or 1= difficult, 2=neutral and 3= easy to process) and lastly, respondents between the groups were independent among each other due to the between-subjects design of the experiment-based survey. Therefore, all the assumptions for t-tests were met (Field, 2013). The assumption of equal variances between groups was valid for hypotheses A, B, C and D since Levene's test was significant in every case (Appendix VI).

The difference between the fluent (Green, *M=22.92; SD=9.74*) and disfluent group (Pink, *M=22.06; SD=12.59*) in processing time for the utilitarian sustainable product of Eggsta was non-significant (*t* (78)=. 34; *p*=.73). Hypothesis A was therefore not supported. The utilitarian product with a fluent product packaging color (Green Eggsta) was not significantly processed quicker than the utilitarian product with a disfluent product packaging color (Pink Eggsta). Non-significantly, the Pink Eggsta (*M=22.06*) was even slightly quicker processed than Green Eggsta in this study (*M=22.92*).

Hypothesis B: *A utilitarian sustainable product using a packaging color perceived as fluent in the context of sustainability will be processed more easily, relative to a utilitarian sustainable product using a color perceived as disfluent for the context of sustainability.*

The difference between the fluent (Green, *M=2.63; SD=.54*) and disfluent group (Pink, *M=2.44; SD=.55*) in processing ease for the utilitarian sustainable product of Eggsta was non-significant (*t* (79) = 1.56; *p*=.12). Hypothesis B was therefore not supported. The utilitarian product with a fluent product packaging color (Green Eggsta) was not significantly processed easier than the utilitarian product with a disfluent product packaging color (Pink Eggsta). Non significantly, Green Eggsta (*M=2.63*) was perceived as easier to process than Pink Eggsta (*M=2.44*).

Hypothesis C: A hedonic sustainable product using a packaging color perceived as fluent in the context of sustainability will be processed more quickly, relative to a hedonic sustainable product using a color perceived as disfluent for the context of sustainability.

The difference between the fluent (Green, *M=17.50; SD=9.73*) and disfluent group (Pink, *M=18.77; SD=9.48*) in processing time for the hedonic sustainable product of HBF was non-significant (*t* (81) = .60; *p*=.55). Hypothesis C was therefore not supported. The hedonic product with a fluent product packaging color (Green HBF) was not significantly processed quicker than

the hedonic product with a disfluent product packaging color (Pink HBF). Non-significantly, Green Eggsta (*M*=17.50) was processed more quickly than Pink Eggsta (*M*=18.77).

Hypothesis D: *A hedonic sustainable product using a packaging color perceived as fluent in the context of sustainability will be processed more easily, relative to a hedonic sustainable product using a color perceived as disfluent for the context of sustainability.*

The difference between the fluent (Green, *M*=2.60*; SD*=.59*)* and disfluent group (Pink, *M*=2.60*; SD*=.54) in processing ease for the hedonic sustainable product of HBF was non-significant (*t* (82) =.00; *p*=1.00). <u>Hypothesis D was therefore not supported.</u> The hedonic product with a fluent product packaging color (Green HBF) was not significantly processed more easily than the hedonic product with a disfluent product packaging color (Pink HBF). Non-significantly, there was no difference between Green HBF (*M*=2.60) and Pink HBF (*M*=2.60)

Altogether, it seems that the processing fluency measurement instruments used in this study, did not function significantly. No significant differences have been found regarding the measurement instruments between the fluent and disfluent condition. This finding will be discussed with more detail in Chapter 5.

4.2.2. Manipulation of product packaging color and its effect on perceived familiarity
H1: Sustainable products using a packaging color perceived as fluent in the context of sustainability will be perceived as more familiar, compared to the same sustainable products using a packaging color perceived as disfluent for the context of sustainability.

A two-way ANOVA was conducted to test this hypothesis, since there were two group variables involved (two product types, and a fluent respectively disfluent condition). Conducting a two-way ANOVA comes with a few measurement requirements and assumptions that had to be met, which were elaborated first.

Considering the measurement requirements: at least one independent variable should be categorical, and the dependent variable should be metrically scaled (Hair et al., 2014). The dependent variable is here perceived familiarity and was measured on a 5-point interval scale (1= not at all familiar, 5=extremely familiar). The independent variables used are both categorical and nominal variables in their origin (utilitarian product type vs. hedonic product type, fluent vs. disfluent condition). In order to use them in SPSS, they had been given a numerical code (1=fluent condition, 2= disfluent condition, 3= utilitarian product and 4= hedonic product).

As stated above, conducting a two-way ANOVA came also with some assumptions next to

the measurement requirements (Hair et al., 2014). Only the assumptions for ANOVA that needed substantial debate were stated here, assumptions that were met and therefore did not need excessive answering in this section can be found in Appendix VI.

The first assumption was normality of the sampling distribution, which is usually not a problem if the sample size is bigger or greater than 30, due to the central limit theorem (Field, 2013). On the other hand, Hair et al., (2014), suggest that a normality check should always be present in the analysis considering metric variables. Executing a statistical normality check for the variable of familiarity indicated that the sampling distribution of familiarity was not normally distributed. Both the Kolmogorov-Smirnov ($p= <.001$) and Shapiro-Wilk-Test ($p= <.001$) were significant (Appendix VI), resulting in a rejection of the null-hypothesis of normal distribution and an indication that the data is not normally distributed. Transformation of the data by squaring, taking the square root, inversing, Log transformation or taking the Cube root was not reformative.

The results of these statistical tests for normality were not interpreted as the only valid criteria for checking the normality assumption. A combination of both visual and statistical normality checks is recommended (Field, 2013), and statistical tests are less useful with smaller sample sizes (Hair et al., 2014). On top of that, Field (2013) does not recommend these statistical normality tests in most cases at all. In line with these suggestions from literature, both the histogram, P-P plot and the skewness and kurtosis scores were also elaborated to check if the normality assumption was valid enough to execute a two-way ANOVA. These are considered to be the best visual checks for normality (Field, 2013; Hair et al., 2014).

The histogram indicated a positive (right) skewed distribution with a considerable amount of kurtosis (platykurtic) that did not seem to be very different from a normal distribution, except from the right skewness and the platykurtic shape (Appendix VI). The P-P plot showed that the points are not neatly on the line which indicated non-normality (Appendix VI), but again, the deviations were not considered to be very large. Lastly, scores for skewness and kurtosis were elaborated. The total variable of familiarity had the following statistics: *N*=165, *M*=2.24, *S*=.41, *SE Skewness*= .19 , *Kurtosis*=-1.21 and *SE of Kurtosis*=.38 (Appendix VI). The skewness (*S*=.41) and kurtosis (*K*=-1.21) values indicated an acceptable deviation from normality values (McNeese, 2016). Skewness values outside the range of -1 and +1, indicate a skewed distribution, at least substantially skewed to keep a close look on (Hair et al., 2014), The current skewness value was even lower. The kurtosis value of *K*=-1.21 was also within acceptable boundaries of -3 and +3 to

proceed (McNeese, 2016).

The statistical tests and the visual inspection of the data considering a normal sampling distribution for the variable familiarity, seemed to form the conclusion that de data was not normally distributed in a neat way but not excluded to use in the two-way ANOVA. The samples sizes among the groups were bigger than the minimum for the central limit theorem (Appendix V). Also, according to Field (2013), the F-statistic of ANOVA can be quite robust to non-normality if the group sizes are equal. Therefore, the conclusion was made that the normality assumption for executing an ANOVA is enough to continue.

The second assumption for executing an ANOVA was linearity between the dependent and independent variable(s). Scatterplots (Appendix VI) did not indicated a perfect linearity but also did not indicated non-linearity, so this assumption was sufficiently met.

The third assumption for executing an ANOVA was the independence of the data. This assumption was met because of the between-subjects design of the experiment-based survey.

The fourth assumption was the independence of the errors. The error terms should be normally distributed but also be uncorrelated. The error term was not neatly normal distributed (Appendix VI), but that was expected since the sampling distribution was not neatly distributed too, as assumption one already indicated above. The error terms were uncorrelated since the Durbin-Watson test had a value of 2.04 (Appendix VI) and has therefore no level of concern (Field, 2013). Both the assumptions of sample size and homogeneity of variance were met too (Appendix VI).

The results of the two-way ANOVA indicated that there was a significant difference in the perceived familiarity between the sustainable products with a fluent condition and the sustainable products with a disfluent condition (F (3,925); $p= .049$) (Appendix VI). Hypothesis 1 was therefore supported. Sustainable products using packaging colors perceived as fluent in the context of sustainability were perceived as more familiar, relative to sustainable products using packaging colors perceived as disfluent for the context of sustainability. This effect was however minimalistic ($\eta^2= .024$). No significant difference was found for product type ($p=.426$) or an interaction effect ($p=.868$).

4.2.3. Manipulation of product packaging color and its effect on consumer preference

T-tests were used to research the obtained data from the experiment-based survey to check hypothesis H2, H3 and H4. The assumptions for t-testing were elaborated only once since they

were the same for all three hypotheses.

T-test could be conducted since the sample sizes for hypothesis H2, H3 and H4 were all above 30 (Appendix V). The second assumption for t-testing was also met since all the dependent variables were measured on a ratio scale and the independent variables were given numerical codes, as described in the section above considering the ANOVA measurement requirements. Finally, respondents between the groups were independent among each other due to the between-subjects design of the experiment-based survey. Altogether, every assumption for T-testing was met (Field, 2013). The assumption of equal variances between groups was valid for hypotheses H2, H3 and H4, since Levene's test was significant in every case (Appendix VI).

H2: A utilitarian sustainable product using a packaging color perceived as fluent in the context of sustainability will be preferred more, compared to the same utilitarian sustainable product using a color perceived as disfluent for the context of sustainability.

The difference between the fluent (Green, *M=3.11; SD=*.98 and disfluent group (Pink, *M=3.37; SD=*.85) in consumer preference for the utilitarian sustainable product of Eggsta was non-significant (*t* (79) = -1,32; *p=* .89). Hypothesis 2 was therefore not supported. The utilitarian product with a fluent product packaging color (Green Eggsta) was not significantly preferred more than the utilitarian product with a disfluent product packaging color (Pink Eggsta). Non-significantly, Pink Eggsta (*M=*3.37) was preferred more than Green Eggsta (*M=*3.11).

H3:A hedonic sustainable product using a packaging color perceived as fluent in the context of sustainability will be preferred less, compared to the same hedonic sustainable product using a color perceived as disfluent for the context of sustainability.

The difference between the fluent (Green, *M=*3.29*; SD=*.89) and disfluent group (Pink, *M=*3.17*; SD=*.79) in consumer preference for the hedonic sustainable product of HBF was non-significant (*t* (82) =.65; *p=*.52). Hypothesis 3 was therefore not supported. The hedonic product with a fluent product packaging color (Green HBF) was not significantly preferred more than the hedonic product with a disfluent product packaging color (Pink HBF). Non-significantly, Green HBF (*M=*3.29) was preferred more than Pink HBF (*M=*3.17).

4.2.4 Manipulation of product packaging color and its effect on consumer preference
H4: A hedonic sustainable product using a packaging color perceived as fluent in the context of sustainability will be judged as less exclusive, compared to the same hedonic sustainable product using a color perceived as disfluent for the context of sustainability

The difference between the fluent (Green, *M*=2.40*; SD*=1.08) and disfluent group (Pink, *M*=2.21*; SD*=1.20) in special occasion score for the hedonic sustainable product of HBF was non-significant (*t* (82) =.76; *p*=. 45). <u>Hypothesis 4 was therefore not supported.</u> The hedonic product with a fluent product packaging color (Green HBF) was not significantly seen as less exclusive than the hedonic product with a disfluent product packaging color (Pink HBF). Non-significantly, Green HBF (*M*=2.40) was judged as more exclusive than the Pink HBF (*M*=2.21).

4.2.5 Moderation effect of product type regarding consumer preference
H5: A moderation effect of product type exist in the relationship between product packaging color of the sustainable products and consumer preference.
Factorial MANOVA was conducted to test hypothesis 5 since multiple dependent variables were used to measure the concept of consumer preference (purchase likelihood and product liking). Again, the multiple independent variables consisted of product type (utilitarian vs. hedonic) and the condition (fluent respectively disfluent). Requirements and assumptions for conducting a factorial MANOVA were elaborated first.

Hair et al., (2014) state that the independent variable(s) should be of categoric nature, whereas the dependent variables should have a continuous or interval level for conducting a factorial MANOVA. This measurement requirement was met since the independent variables had the following nominal categories (utilitarian vs. hedonic product and fluent vs. disfluent condition). In order to use them in SPSS, they had been given a numerical code of (1=fluent condition, 2= disfluent condition, 3= utilitarian product and 4= hedonic product). The dependent variables were here purchase likelihood and product liking, measured on a 5- point interval scale (1=extremely likely, 5= extremely unlikely, respectively 1=not at all, 5= very much).

Again, only the assumptions for factorial MANOVA that needed substantial debate were stated here, assumptions that were met and therefore don't need excessive answering in this section can be found in Appendix VI. The assumptions regarding sample size assumption, random and interval level data and independence of residuals were met (Appendix VI).

The fourth assumption was multivariate normality for the dependent variables (Field 2013; Hair et al., 2014). This assumption supposes in (factorial) MANOVA that the residuals have multivariate normality. Recommended by literature is to check for univariate normality of each variable and then assume for multivariate normality, since there is no direct test for multivariate normality (Field, 2013; Hair et al., 2014).

Normality of the dependent variables was checked in the same order as with ANOVA in the section above. Again, the central limit theorem could be assumed since the sample sizes are larger than 30 (Appendix V). Executing statistical normality checks for the variables of purchase likelihood and product liking indicated that the distributions are both not normally distributed. Both the Kolmogorov-Smirnov ($p=<.001$) and Shapiro-Wilk-Test ($p=<.001$) were significant for both variables (Appendix VI), resulting in a rejection of the null-hypothesis of normal distribution and indicating that the data was not normally distributed. No data transformation indicated an improvement considering normal distribution for both variables.

Yet again, the results of these statistical tests for normality were not to be interpreted as the only valid criterium for checking the normality assumption. In line with the suggestions from literature, as indicated in the normality section with the two-way ANOVA above, both the histogram, P-P plot and the skewness and kurtosis scores were elaborated also, to check if the data was valid enough considering the normality assumption for executing a Factorial MANOVA.

The histograms for both variables indicated a negative (left) skewed distribution that looked sufficiently like a normal distribution (Appendix VI). The P-P plots for both variables indicated that the points are either on the line or have small deviations from it. That indicated a level of normality that was considered to be at least sufficient (Appendix VI).

Scores for skewness and kurtosis were elaborated at last. The total variable of purchase likelihood had the following statistics: *N*=165, *M*=3.09, *Skewness*= -.306, *SE Skewness*= .189, *Kurtosis*=-.405 and *SE Kurtosis*=.376 (Appendix VI). The total variable of product liking had the following statistics: *N*=165, *M*=3.24, *Skewness*= -.371, *SE Skewness*= .189, *Kurtosis*=-.405 and *SE Kurtosis*=.376 (Appendix VI). All skewness and kurtosis values indicated acceptable deviations from normality values, all were within the boundaries of -3 and +3 (McNeese, 2016) and the skewness values were not substantially skewed since they are within the range of -1 and +1 (Hair et al., 2014; Appendix VI).The statistical tests and the visual inspection of the data considering normality for the variables purchase likelihood and product liking, seemed to form the conclusion that de data was not statistically normally distributed but visually sufficient enough to meet the assumption of normality. On top of that, the sample sizes among the groups were again bigger than the minimum for the central limit theorem. Finally, the fairly robustness of MANOVA for non-normality is also given by literature (Field, 2013; Hair et al., 2014). Therefore, the conclusion was made that the normality assumption for executing a factorial MANOVA was on its minimum

sufficient, but probably even good, since statistical tests for normality are not that recommended and usable for smaller sample sizes (Field, 2013; Hair et al., 2014).

Assumptions regarding linearity, homogeneity of variance and homogeneity of covariances were met (Appendix VI). Results of the factorial MANOVA indicated that there are no significant differences between the groups considering product type (p=.840) and condition (p=.779) (Appendix VI). Also, the results indicated that there was no significant interaction term and therewith no moderation effect (p=. 372) (Appendix VI). Hypothesis 5 was therefore not supported. No moderation effect of product type was found in the relationship between product packaging color of a sustainable product and consumer preference.

4.2.6 Influence of environmental attitude
As stated in chapter three of the research at hand, environmental attitude was added as a control variable in the research design. This had the function of potentially removing effects that modify the relationship between the categorical independent variables (condition and product type) and the dependent variables regarding consumer judgement (familiarity, purchase likelihood, product liking). Unfortunately, the variable of environmental attitude violated multiple assumptions for data analysis, which could not be fixed. Therefore, the variable has further been left out of this chapter and is elaborated in Appendix VI.

4.2.7 Influence of Gender
The role of gender was, for investigation purposes and the fact that environmental attitude couldn't be used as a covariate, also researched to see if that variable had some influence within the research at hand. A significant effect has been found on the influence of gender on both the dependent variables of product liking and purchase likelihood. All assumptions for conducting a MANOVA have been met (Appendix VI).

Results of the MANOVA indicated that there were significant differences between the groups (males and females) considering product liking (p=,001; η^2=,063) and purchase likelihood (p=<,001; η^2= ,076). These effects were however small. Females significantly liked the sustainable product used in this study more (M= 3.44) than males (M=3.00) and females also had a significantly higher purchase likelihood (M=3.34) than males (M=2.80) (Appendix VI).

Chapter 5: Conclusion

5.1 Conclusion

Although the large array of influences that processing fluency exercises on different domains, the demarcation of this study was to examine the effects of a processing fluency manipulation; by altering the product packaging color for two different sustainable products and thereby checking its effect on consumer judgements. Moreover, there was also a particular interest in the expected moderation of product type, in the relationship between a (dis)fluent packaging color in the context of sustainability and consumer judgements about the sustainable products. Multiple researches found paradoxical results considering processing fluency when a hedonic product type or brand was involved. This research therefore tried to gain more understanding into this potential paradox, by following a research design in line with the studies that found these paradoxical results.

The research at hand expected, as clarified in hypothesis 1, that a sustainable product with a fluent packaging color in the context of sustainability, would be perceived as more familiar relative to a sustainable product with a disfluent color. This hypothesis is <u>supported</u> by the data. This research has found that sustainable products that use a green packaging color, were perceived as more familiar than the same products that used pink as packaging color.

Hypothesis 2 elaborated the expectation that utilitarian sustainable products with a fluent packaging color in the context of sustainability, would be preferred more, relative to the same products with a disfluent packaging color. This hypothesis is <u>not supported</u> by the data. No differences have been found regarding consumer preference for utilitarian sustainable products using a green packaging color compared with the same product using a pink packaging color.

Hypothesis 3 of this study stated the opposite for hedonic products. This hypothesis involved the potential paradox in processing fluency, where product type was expected to have a moderation effect. It was thereby expected that a hedonic sustainable product that uses a fluent packaging color in the context of sustainability, would be preferred less than the same product using a disfluent color. Data did however <u>not support</u> this hypothesis.

It was hypothesized in hypothesis 4 of this research that a hedonic sustainable product that uses a fluent packaging color in terms of sustainability, would be judged as less exclusive than the same product with a disfluent color. This hypothesis is also <u>not supported</u> by this research.

The final expectation of the research at hand, clarified in hypothesis 5, <u>could not be supported</u> too. No moderation effect of product type was found in the relationship between product

packaging color of sustainable products and consumer preference.

In addition to the conclusions elaborated above, a not hypothesized finding was found for the influence of gender. Results indicated that females liked the sustainable products more than males and also had a higher purchase likelihood for the products. These findings will be compared and discussed later on in the discussion. For now, since all hypotheses have been answered, the main question of this research can be answered too and thereby the objective of the research at hand is achieved.

What are the effects of a (dis)fluent product packaging color for sustainable products on consumer judgements?

Sustainable products using a product packaging color perceived as fluent in the context of sustainability (green), are perceived as more familiar, than sustainable products using a disfluent product packaging color (pink).

5.2 Discussion

The manipulation of processing fluency played an interesting and sometimes even paradoxical role in the studies done by Davis et al., (2019), Labroo & Kim, (2009), Mantonakis et al., (2013) and Pocheptsova et al., (2010). Results of these studies indicated that disfluent processing (or metacognitive difficulty) led to positive implications, which is contradictory with the current theoretical consensus around the subject. These studies had in common, next to the paradoxical results, that a hedonic brand and/or product was involved. Nevertheless, except for these studies and their results, the academic consensus is that only fluent processing (or metacognitive ease) is beneficial (Alter & Oppenheimer, 2009; Lee, 2001; Lee & Aaker, 2004; Reber & Schwarz, 1999; Reber & Schwarz, 2004; Schwarz, 2004; Song & Schwarz, 2008; Song & Schwarz, 2009). The current research therefore tried to gain more understanding in this most interesting contradiction and the potential role of product type

To start with, it was expected that a fluent condition of processing fluency, manipulated by a fluent product packaging color (the color of green), would increase perceived familiarity compared with a disfluent product packaging color (the color of pink), for the same product. This expectation was met and is in line with current theory on processing fluency (Alter & Oppenheimer, 2009; Schwarz, 2004). Stimuli that can be processed fluently lead to feelings of familiarity and that is confirmed by this study.

Second, this research expected to find that utilitarian sustainable products that use a fluent packaging color in terms of sustainability (green), would be preferred more than the same product that uses a disfluent packaging color (pink). Findings of the research at hand did not indicate this, which is not in line with current theory on processing fluency. Normally, stimuli that can be processed fluently lead to more favorable attitudes (Lee & Aaker, 2004), can cause greater liking (Alter & Oppenheimer, 2009) and are also expected to do so (Schwarz, 2004). The absence of this relationship could be due to the fact that the processing fluency manipulation used here is questionable, which will be elaborated more in the limitation section. Another potential reason is the fact that the research at hand could have a statistical power that is too low and therefore not able to find small effects (Field, 2013), which is something also addressed at the limitation section.

Third, it was expected that the opposite was true regarding (dis)fluent processing and consumer preference for hedonic products. The latter meaning that a hedonic sustainable product would benefit from using a disfluent product packaging color, opposing the current academic consensus on disfluent processing and negative effects as a consequence. This expectation was developed based on the studies by Davis et al., (2019), Labroo & Kim, (2009), Mantonakis et al., (2013) and Pocheptsova et al., (2010), where disfluent processing conditions led to beneficial effects for hedonic products/brands. Findings of the research at hand did not support this expectation. Again, this could be due to a questionable functioning of the processing fluency manipulation, a statistical power that was too low or that a chocolate bar is not representative enough after all for a hedonic product. However, it could also be, despite the conflicting results found in earlier studies, that the relationship between hedonic products/brands, disfluent processing and beneficial effects is less strong and generalizable than expected. More research is needed for determining this, since theory is not yet well developed enough to conclude on the matter. This will also form the basis for future research suggestions later on in this chapter.

Fourth, the hypothesis was developed in this study that hedonic sustainable products using a fluent packaging color (green) in the context of sustainability, would be judged as less exclusive than the same product using a disfluent color (pink). This hypothesis was based on explanations given by the authors that found paradoxical results for processing fluency theory. According to these explanations, disfluent processing would create unfamiliarity which then results in consumer feelings of novelty, uniqueness, rarity, and exclusivity (Mantonakis et al., 2013; Pocheptsova et al., 2010). The research at hand was not able to confirm these explanations. Again, this could be

due to a questionable functioning of the processing fluency manipulation and a statistical power that was too low.

Fifth, a moderation effect of product type was expected in the relationship between product packaging color and consumer preference. As the sections above already discussed, utilitarian sustainable products were expected to relate with effects conform current processing fluency consensus, whereas hedonic sustainable products where expected to relate with paradoxical effects and join the studies proving a paradox within processing fluency for hedonic products/brands.

Nevertheless, these expectations were not met by the research at hand. The lack of this effect can be explained with, again, the probable misfunctioning of the processing fluency manipulation and a low statistical power. On the other hand, the lack of this effect can be expected since the research at hand was also not able to find a difference in perceived uniqueness for hedonic products. As explained by Mantonakis et al., 2013 and Pocheptsova et al., 2010, unfamiliarity can create consumer feelings of novelty, uniqueness, rarity, and exclusivity which potentially result in increased desirability and product evaluations. Since there was a lack of perceived uniqueness between the conditions of hedonic sustainable products, one can expect from literature that as a consequence the increased desirability and product evaluation are also missing.

Not hypothesized but found was the influence of gender in this study. Females liked the sustainable products more than males and also had a higher purchase likelihood. Whereas Davis et al., (2019), Labroo & Kim, (2009) and Pocheptsova et al., (2010), did not mention gender at all, Mantonakis et al., (2013) did not found gender to be of influence in their study. One should note on the other hand that the previous mentioned studies did not have a sustainability context, and that the influence of gender on consumer preference in the research at hand is totally in line with literature on gender and its influence on sustainable behavior (Brough, Wilkie, Ma, Isaac, & Gal, 2016).

5.2.1 Similarities and differences with existing literature

The research at hand is in some respects similar to the research design of Mantonakis et al., (2013) and Pocheptsova et al., (2010). This was deliberately set up in that way in order to maximize chances of finding paradoxical results again. Both this research as well as the previous named studies, conducted a pre-test before the actual experiment to test the used products, check for perceived product type, and design the processing fluency condition. Also, both these studies as well as the current research used a two x two experiment with a fluent respectively disfluent

condition. On top of that, the amount of respondents did not differ to much compared with the studies from Mantonakis et al., (2013) and Pocheptsova et al., (2010). Most of their experiments consisted of around 150 respondents as well. Finally, the dependent variables in this study are the same as most of the dependent variables in the studies done by Mantonakis et al., (2013) and Pocheptsova et al., (2010).

The current research is also different in some respects. Second, the research at hand used an online experiment-based survey, whereas Mantonakis et al., (2013) and Pocheptsova et al., (2010) conducted an offline experiment. This is especially interesting since it is known that an online experiment results in less socially desirable answers (Field, 2013). This has the consequence that the answers from respondents in the research at hand are even more valid than the answers given by respondents in the previous named studies. The research at hand is also different in the processing fluency manipulation that is used. No study before used the alteration of a product packaging color as processing fluency manipulation. On top of that, this research is also the first in integrating a sustainability perspective. Academic and practical contributions that can be derived from both the uniqueness and results of this study are elaborated down below.

5.3 Research contributions

The study at hand contributed to the academic literature in a variety of ways. First of all, it contributed to the academic literature on processing fluency and its effect on consumer judgements. This by trying to find the same paradoxical results related with hedonic products, as found by Mantonakis et al., (2013) and Pocheptsova et al., (2010). These paradoxical results needed more insights by conducting extra academic research (Pocheptsova et al., 2010) and more research was also needed regarding the purchase decisions of products with varying fluency cues (Mantonakis et al., 2013). Exactly this was conducted in the current research. On top of that, current consensus on processing fluency theory was tested in a consumer domain and this research validated again that fluent processing led to increased familiarity.

Another academic contribution that this research makes is the combination of processing fluency theory with product packaging color, by the usage of product packaging color as a fluency cue. Integrating product packaging color into the design of the research at hand was contributing to the academic literature for several reasons. Academic knowledge on the influence of packaging design on consumer behavior is limited (Van Ooijen et al., 2017) and color usage in a marketing research context is not abundant (Labrecque et al., 2013). The combination of using processing

fluency theory, trying to find the paradoxical results and the usage of product packaging color as a new fluency cue thereby have more than substantial academic contribution. Next to that, this study also contributes in some extent to practice, society, and the marketing discipline.

The research at hand is the first in using product packaging color as a processing fluency cue. It thereby saw as a first study, the potential practical value that could be derived of a right combination between processing fluency, product type and product packaging color. This is especially important since product packaging is one of the most important communication means for businesses in reaching consumers (Barchiesi et al., 2018; Keller et al., 2012). On top of that, advertising is becoming less effective, a rise in brand proliferation is present nowadays and consumers face a huge amount of products in for example a supermarket (Keller et al., 2012). Packaging can also be used strategically as the basis for a differential advantage (Labrecque et al., 2013; Winer & Dhar, 2014).

On top of that, the combination between product packaging and packaging color is even synergetic: colors are known to influence our feelings and responses (Keller et al., 2012), are an important part of product packaging and can even serve as a potential differentiator themselves (Hoyer, MacInnis, & Pieters, 2016; Keller et al., 2012). Businesses would therefore highly benefit with more knowledge on the combination of processing fluency, product type and product packaging color.

Next to the academic and practical contributions that this study makes is the societal contribution. The research at hand integrated a sustainability context in its research design. Whereas the academic and practical contribution remain the same, the knowledge derived from this study is most applicable to businesses that have a sustainability context too. If these businesses can sell more sustainable products with the knowledge derived from studies like the study at hand, society would benefit most likely by that potential increase in sustainable consumer behavior and sustainability as a consequence. The purchase decision of consumers for a sustainable products is namely one of the forms of sustainable consumer behavior (White et al., 2019).

5.4 practical implications

A variety of practical implications for managers and businesses can be derived from the research at hand and its results. First of all, it seems that consumers still associate the colors white, brown, blue, and especially green for sustainability, according to the pre-test conducted in the current research. This is in line with the current academic consensus on the colors of sustainability

(Barchiesi et al., 2016; DeLong & Goncu-Berk, 2012). Businesses and managers can use this finding for better branding, communication, and a better fit into the consumer decision-making process for selling their sustainable products. The fact that multiple colors are associated with sustainability have the advantage that businesses, that focus on sustainability, can still use packaging color as a differential advantage and brand proliferation, since multiple colors can be used what is validated by the research at hand.

Second, this study found that the usage of the color green with the product packaging for sustainable products leads to increased familiarity, compared with the usage of the color pink. This is especially interesting for business practice because feelings of familiarity perceived by consumers can have positive implications. The later statement is clearly indicated by literature. Increased familiarity is known to lead to greater attractiveness for everyday products (Davis et al., 2019; Pocheptosva et al., 2010) and increased familiarity lead to liking for the stimulus (Lee, 2001). Businesses selling sustainable products that can be characterized as everyday products would therefore highly benefit from usage of the color green in their product packaging.

Another interesting finding for practice as a result of this research is the fact that females liked the sustainable products better and indicated higher scores for buying it. This is in line with theory on the influence of gender on green purchasing (Brough, 2016). It could therefore be wise for businesses and managers to focus business activities considering sustainability on female target groups to maximize business outcomes and revenues.

5.5 Limitations and future research

The design and therewith the demarcation of this research come with the consequence that there are limitations for the research at hand. Next to that, the sample size and its characteristics bring some limitations as well and the processing fluency manipulation used in the research was questionable in its functioning. However, this will form the basis for future research opportunities.

The processing fluency manipulation used in the research at hand, product packaging color, was tested regarding its functioning. Methods used for testing were the amount of seconds that respondent stayed on the page where information was shown, relating to the sustainable products and the accessory product packaging, and a question thereafter asking respondents how difficult/easy it was to process the previous information given. As the results chapter indicated, no differences were found between these two methods for the different sustainable products and their fluent and disfluent conditions. This may lead to the conclusion that the altering of product

packaging color as fluency manipulation didn't work or didn't work good enough. Future research could test altering product packaging color as fluency manipulation, by using other measurement instruments to check its functionality and/or conduct a study with higher sample size.

On top of that, other fluent and disfluent colors could be used for research on processing fluency respectively the paradox within a sustainability context. Whereas this study used the colors green (fluent condition) and pink (disfluent condition), it could be that different colors will result in different outcomes. It would be interesting to check for other sustainability colors (blue, white, and brown) and to use other disfluent colors for a sustainability context (for example yellow or red) and to see if results differ among color.

Going deeper into the sample size restriction, future academic research could account for a higher sample size in order to have a better chance of finding smaller effects. The research at hand could have had a sample size that was too small, with low statistical power as a consequence. The sample size obtained here was close to the minimum needed for data analysis. A higher sample size could find smaller effects where this study was not able to find them.

Future research could also integrate other products while trying to gain further insights into processing fluency theory in a consumer domain, respectively the studies with paradoxical findings. It is thinkable that other products will bring different results concerning consumer judgements. The current state of research is not yet well developed enough to conclude whether there is or isn't a paradox within the concept of processing fluency. Although this research tried to deliver more insights into this, more research with different research contexts will still be needed to shed more light on the matter and to provide better understanding.

Subsequently, a different research context could also consist of other sample characteristics. The current sample consisted mainly of young and high educated people that grew up in a Western culture. It would be interesting to see for example if results differ within other age groups and cultures. It could be expected that people with a fairly young age and high education score different on the dependent variables than people that are older and lower educated. Literature also indicates that color associations are different per culture (Labrecque et al., 2013 . A chocolate bar in general is for example for older people maybe more unique or a special occasion product than for younger people. Also, it could be that older and/or lower educated people would have a lower product purchase likelihood and/or product liking for sustainable products, since sustainability is nowadays

more popular and trending than in the past, and sustainability opinions could be influenced by education level.

Another direction for future research considering the sample is, instead of using a convenience sample, to check for a more representative group in order to generalize for the whole population. This research was not able to do that because of its sample characteristics. Next to that, other research could take a more realistic competitive environment into account, as in the study by van Ooijen et al., (2017), which was another limitation of this research.

Last, processing fluency and the paradox can be tested, both with and without a sustainability perspective, with other ways of color usage. Product packaging color is only one potential processing fluency cue, other cues can be tested like color of an ad design, banner design or a website for example.

6.5 Closing paragraph

The research at hand was written and conducted in a time where the world faced an immense shock, being the Coronacrisis. This pandemic came with severe consequences, even closing Radboud University what only happened before in the Second World War. These disturbing times demanded extra creativity, perseverance, flexibility, and teamwork from everybody involved with this research. I am thereby grateful to everyone involved in the research at hand, and its process. It has been a journey where those demands were tested, knowledge has been gained and were it has been tried to use marketing as a tool to achieve a more sustainable world, by delivering knowledge and conducting research.

In my experience and to some extend proven by this research, marketing can be used as a tool to achieve more sustainable consumer behavior, with sustainability as a consequence (White et al., 2019) and thereby contributing to a better world. We have seen, during the Corona crisis, that we can all work together when it is necessary to face even the greatest challenges. We also know, based on an immense amount of sources, that the next challenge the world faces is the transition to a more sustainable world. I am proud that, fully in line with the objective of the Master Marketing at Radboud University in becoming a responsible marketing professional, I have endeavored to contribute to this. I'd like to end with the same words that stand in the beginning of this thesis,

"The future will be green, or not at all".

Jonathon Porritt

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Appendices

Appendix I: Relevance of academic marketing research into sustainable consumer behavior

" (…) research that deals with consumer behavior without considering the context in which it is embedded cannot claim to contribute to basic knowledge and remains little more than applied market research" (Csikszentmihalyi, 2000, p. 271). This (extra) appendix aims to honor this statement, while at the same time meet one of the goals of the master Marketing at Radboud University, becoming a responsible marketing professional (Radboud University, n.d.).

Some would say that marketing and sustainable consumer behavior are two opposites, which exist only as opponents instead of being possible reinforcing entities (Peattie & Peattie, 2009). For decades, perhaps centuries, our economies run on consumption and the need for it (Csikszentmihalyi, 2000). Our economies are dependent on consumption and consequently; consumption must grow in order to grow our economies. The current level of global consumption is not sustainable, with marketing often accused of functioning as an accelerator (Peattie & Peattie, 2009). It was already known in the year of 2000 that our consumption patterns were becoming way to high compared with the world's available resources (Csikszentmihalyi, 2000). Nowadays, warnings for that unsustainable global consumption pattern seem to rise exponentially; 4.1 planets are needed if the world will follow the average consumption pattern of the United States of America (McDonald, 2015). The common fact that we do not have multiple planets but just one, makes the point, yet again, evident for the needed change of consumer behaviour into sustainable consumer behaviour.

Despite the accusation against marketing being a reinforcing factor for the current state of un-sustainability, there is also another perspective which gives marketing a role in the much-needed shift from consumer behaviour into sustainable consumer behaviour and consequently more sustainability. Marketing knowledge and tools, let it be slightly adapted, could also be used to achieve sustainable consumer behaviour (Peattie & Peattie, 2009; White et al., 2019).

Where this perspective mostly started with marketing departments being responsible for identifying, targeting, and selling to a sustainable oriented consumer; nowadays the sustainable way of doing business seems to be perceived as crucial for the long-term survival of the whole organization (White et al., 2019). That shift of importance in integrating sustainability into the whole organization and strategy doesn't come as a surprise, literature is overwhelming regarding

the potential opportunities and the need for the combination of businesses and sustainability (Sharma, Iyer, Mehrotra, & Krishnan, 2010). Businesses that integrate for example sustainability into their core processes are likely to thrive and gain competitive advantage (Porter & Kramer, 2011). Also, from within the business perspective itself, perceived advantages of sustainability are quite extensive. An extensive study with accessory survey among CEO's, thought leaders and sustainability experts from the field, resulted in a large list of perceived practical advantages: improved company/brand image, savings in costs, satisfaction of employees, business/market/product innovations, increased cash flow and better stakeholder relations (Berns, M., Townend, A., Khayat, Z., Balagopal, B., Reeves, M., Hopkins, Michael S., & Kruschwitz, N. (2009).

The combination of business, sustainability and marketing therefore seems to be evident, both from the practical and the scientific perspective. More academic research into the usage of marketing for sustainable consumer behavior and consequently more sustainability, should therefore gain (and hopefully get) priority, also on Radboud University.

Appendix II: Tables of operationalization

Perceptual fluency

Independent variable of the study at hand. As discussed in chapter two of this research, perceptual fluency is divided into physical perception and temporal perceptual fluency. Only the physical perception part of processing fluency is applicable and relevant for this research, as discussed in chapter two, therefore temporal perceptual fluency is left out of the operationalization. Also stated in chapter two, the completion of perceptual fluency in this study is throughout product packaging color.

Construct	*Definition*	*Measurement*	*Adapted measurement*
Perceptual fluency	How easy stimuli are perceived in their physical form (Alter & Oppenheimer, 2009)	Respondents rated ease of reading (from difficult to read to easy to read) and the speed of reading (from read slowly to read quickly) (Pocheptsova et al., 2010)	Respondents will rate ease of processing (from easy to difficult to process)
		Amount of seconds it took for participants to see a statement in differing colors and their visibility (Reber & Schwarz, 1999).	Amount of seconds participants stay on the screen that shows the product(s) and the product packaging manipulation.
Physical perception	The manipulation of fluency by variation of the ease with which the stimuli can be processed (Alter & Oppenheimer, 2009)	As with perceptual fluency.	As with perceptual fluency.
Product packaging color	The color of the design of the container for the product in which it is displayed in a retail environment (adapted from Winer & Dhar, (2014))	As with perceptual fluency.	As with perceptual fluency.

Table 1: Operationalization perceptual fluency

Product type

Potential and expected moderation variable of the study at hand. Product type represents a group of products that fulfill the same need for a market or a market segment. As discussed in chapter two of this research, product type consists of two parts in this study: utilitarian and hedonic products.

Construct	Definition	Measurement	Adapted measurement
Utilitarian products	Products mainly used to satisfy practical or functional needs (Chang & Liu, 2012).	Do you consider product X to be a utilitarian product? (7-point scale, 1= not at all, 7= very much) (Mantonakis et al., 2013)	Do you consider product X to be a utilitarian product? (5-point scale, strongly agree=5, strongly disagree=1).
Hedonic products	Products that are consumed related to sensual pleasure, indulgence, desires, fun and enjoyment (Chang & Liu, 2012).	Do you consider product Y to be a hedonic product? (7-point scale, 1= not at all, 7= very much) (Mantonakis et al., 2013).	Do you consider product X to be a (hedonic) product? (5-point scale, Strongly Agree=5, Strongly disagree=1).

Table 2: Operationalization product type

Consumer judgements

Dependent variable of the study at hand. Consumer judgements is represented by the dimensions of familiarity, uniqueness, and preference. Preference is represented by the subdimensions purchase likelihood and overall liking.

Construct / Dimension	Definition	Measurement	Adapted measurement
Familiarity	The reflection in consciousness of mental representations of prior events resonating to a reoccurrence of those events (Whittlesea, 1993).	Familiarity was measured on a 7-point scale (1= not at all, 7=very familiar) (Mantonakis et al., 2013).	Familiarity will be measured on a 5-point scale ((1= not at all familiar, 5=extremely familiar)
Familiarity [adapted]	The reflection in consciousness of mental representation of prior products resonating to a reoccurrence of those products.	As with familiarity.	As with familiarity.
Uniqueness	The extent to which the customer regards the product as different from other products in the same category (Tian, Bearden & Hunter, 2001).	Asking respondents to express agreement whether product X is for special-occasion (infrequent) consumption (1= not at all, 7= very much) (Pocheptosva et al., 2010).	Do you think product X is for special-occasion (infrequent) consumption? (1=not at all, 5= very much)
Preference	The fact of people liking or wanting one thing more than another (Cambridge Dictionary, 2020).	Purchase likelihood (1=not all likely, 9= very likely) (Pocheptsova et al., 2010)	How likely is it that you will buy product x? (1=extremely likely, 5= extremely unlikely)
		Overall, how much do you like product x? (1= not at all, 7= very much) (Mantonakis et al., 2013)	Overall, how much do you like product x? (1=not at all, 5= very much)
Preference [adapted]	People liking or wanting one product more than another	As with preference.	

[adapted from (Cambridge Dictionary, 2020)]	As with preference.	

Table 3: Operationalization consumer judgements

Environmental attitude

Control variable of the study at hand. Environmental attitude is represented and measured by five items that indicate respondents views on nature/environmental attitude. These five items are derived by the study of Corral-Verdugo, Carrus, Bonnes, Moser & Sinha (2008). These authors developed a scale that examines the strength of the respondents view on human progress being dependent on nature conservation and the scale is used in multiple studies (Van der Moere, Blanchemanche, Bieberstein, Marette, & Roosen (2011). Original answer options of the scale (totally disagree-totally agree) are replaced with other answering options (strongly agree-strongly disagree) in order to keep the experiment-based survey clear for respondents by keeping the answering options as much as possible the same.

Construct	*Definition*	*Measurement*	*Adapted measurement*
Environmental attitude	"The extent to which people view human progress as dependent on the preservation of nature" (Vandermoere et al., 2011)	1. Human beings can progress only by conserving nature's resources 2. Human beings can enjoy nature only if they make wise use of its resources 3. Human progress can be achieved only by maintaining ecological balance 4. Preserving nature now means ensuring the future of human beings 5. We must reduce our consumption levels to ensure well-being of the present and future generations (Coral-Verdugo et al., 2008)	[No adaptations]

Table 4: Operationalization environmental attitude

Appendix III: Pre-test design

Intro

Dear respondent,

This pre-test is part of setting up a study regarding marketing and sustainability. It is no problem if you are not familiar with marketing, sustainability, or anything related. Information that you will need to know is explained briefly and comprehensively together with the questions.

This research is being conducted by a master student Marketing from Radboud University in Nijmegen. Your answers will only be used for this pre-test and will not be provided to third parties. There is of course no obligation to fill in this survey and you can leave whenever you want to, without any consequences. Your privacy is fully guaranteed, and your participation remains completely anonymous. Completing the pre-test takes maximum around 10 minutes, but in most cases even shorter.

Thank you in advance for your participation, it really helps me a lot!

Pieter den Hertog

If you have any questions you can e-mail me on pieterdenhertog@hotmail.com

Radboud University

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Sustainability

Sustainability has become a word that is widely used and is prone to a diverse set of definitions.

The definition of sustainability in this pre-test is as follows:

"Meet the needs of the present without compromising the ability of future generations to meet their needs" (Hart & Milstein, 2003)

The definition will always be given when needed in this pre-test.
1. *Do you understand the definition of sustainability in this pre-test?*
o   Yes → Respondents go to Sustainable products.
o   No → Respondents go to Explanation definition.
o   I don't know → Respondents go to Explanation definition.

-----PAGE BREAK-----

You indicated that you do not know or do not understand the definition of sustainability that is used in this pre-test. Please let me try to explain it one more time.

The definition used is as follows: "Meet the needs of the present without compromising the ability of future generations to meet their needs" (Hart & Milstein, 2003).

This simply means that we fulfill or satisfy our current needs, without using it in such a way that future generations cannot fulfill or satisfy their needs. For example, we use fresh water in such a way now that our grandchildren also have the availability of fresh water and can use it too.

Is the definition of sustainability, used in this pre-test, now clear for you? The definition will always be given when needed :)

o   Yes → Respondents go to Sustainable products.
o   No → Respondents go to end of pre-test.

-----PAGE BREAK-----

Sustainable products
Below you will find four products together with some information concerning their efforts on sustainability. Please answer with yes if you think this is a sustainable product, please answer no if you think this is a non-sustainable product. You can choose an answer by clicking on the circle.

The definition of sustainability in this pre-test is still as follows:
"Meet the needs of the present without compromising the ability of future generations to meet their needs" (Hart & Milstein, 2003,

Product 1: Eggs from Eggsta
Suppose Eggsta is an egg producer that is certified with the three-star better life quality mark from the Dutch Animal Protection, feeds chickens with residual products from for example bakeries, produces co-2 neutral and has solar panels on the roof of the farms.

2. *Is this a sustainable product in your opinion?*
o   Not at all
o   Only a little
o   To some extent
o   Much
o   Very much

Product 2: Plant-based milk from Mielk
Mielk is a plant-based milk producer that uses, among other ingredients, oats for their milk instead of normal cow milk. The ingredients from Mielk's plant-based milk are only plant-based and have therefore a lesser impact on co2 emissions and need less agricultural space compared to cow milk.

3. Is this a sustainable product to your opinion?
o Not at all
o Only a little
o To some extent
o Much
o Very much

Product 3: Potato crisps from Nature slices
Nature slices is a producer of potato crisps. They use potatoes that are biologically certified, their distribution is co2 compensated and the leftovers/waste materials from the production go, as pig food, to farmers near the factory.

4. Is this a sustainable product to your opinion?
o Not at all
o Only a little
o To some extent
o Much
o Very much

Product 4: Chocolate from Heaven's Bean Factory
Heaven's Bean Factory is a producer of chocolate bars that are biologically and fair trade certified. They donate 10% of their profit to a charity and the distribution of the bars is co2 compensated.

5. Is this a sustainable product to your opinion?
o Not at all
o Only a little
o To some extent
o Much
o Very much

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Products differ in their type. We have for example utilitarian products and hedonic products:
→ Utilitarian products are products mainly used to satisfy your practical or functional needs, such as a bottle of water to satisfy thirst.
→ Hedonic products are consumed because of sensual pleasure, indulgences, desires, enjoyments and fun such as designer clothes to satisfy your desires or eating popcorn because it tastes good while watching a movie.

6. Given the information on utilitarian products and hedonic products, do you consider eggs to be a utilitarian product?
o Strongly Agree
o Agree

o Undecided
o Disagree
o Strongly Disagree

7. *Given the information on utilitarian products and hedonic products, do you consider eggs to be a hedonic product?*
o Strongly Agree
o Agree
o Undecided
o Disagree
o Strongly Disagree

8. *Given the information on utilitarian products and hedonic products, do you consider plant-based milk to be a utilitarian product?*
o Strongly Agree
o Agree
o Undecided
o Disagree
o Strongly Disagree

9. *Given the information on utilitarian products and hedonic products, do you consider plant-based milk to be a hedonic product?*
o Strongly Agree
o Agree
o Undecided
o Disagree
o Strongly Disagree

10. *Given the information on utilitarian products and hedonic products, do you consider potato crisps to be a utilitarian product?*
o Strongly Agree
o Agree
o Undecided
o Disagree
o Strongly Disagree

11. *Given the information on utilitarian products and hedonic products, do you consider potato crisps to be a hedonic product?*
o Strongly Agree
o Agree
o Undecided
o Disagree

o Strongly Disagree

12. *Given the information on utilitarian products and hedonic products, do you consider a chocolate bar to be a utilitarian product?*
o Strongly Agree
o Agree
o Undecided
o Disagree
o Strongly Disagree

13. *Given the information on utilitarian products and hedonic products, do you consider a chocolate bar to be a hedonic product?*
o Strongly Agree
o Agree
o Undecided
o Disagree
o Strongly Disagree

-----PAGE BREAK-----

The following question is about colors. Therefore, if you are color blind, I sincerely thank you for your participation in this pre-test and ask you to choose yes in the upcoming question, which is then the end of this pre-test for you. If you are not color blind, please indicate with no. I would like to ask you one more question.

14. *Are you color blind?*
o No
o Yes

-----PAGE BREAK-----

The next question is about the color(s) of sustainability. The definition of sustainability in this pre-test is still as follows:

"Meet the needs of the present without compromising the ability of future generations to meet their needs" (Hart & Milstein, 2003,

15. *Please indicate, given the definition of sustainability, which color(s) to your opinion best symbolize sustainability?*

You can select more answers!

o White	o Red	o Purple
o Black	o Orange	o Brown
o Grey	o Yellow	o Pink
o Blue	o Green	

16. Do you have any recommendations or questions regarding this pre-test? For example, was anything unclear to you, did you not comprehend a question or were some words unclear? Click on → to go further.

-----PAGE BREAK-----

→ *This is the end of the pre-test. Thanks a lot for your participation!*

If you have any questions, please email me on pieterdenhertog@hotmail.com

Appendix IV: Experiment-based survey design

Intro

Dear Sir / Madam,

This survey is part of my graduation research regarding marketing and sustainability at the Radboud University in Nijmegen. It is no problem if you are not familiar with marketing, sustainability, or anything related. Information that you will need to know is explained briefly and comprehensively, together with the questions.

Your answers will only be used for this survey and will not be provided to third parties. There is of course no obligation to fill in this survey and you can leave whenever you want to, without any consequences. Your privacy is fully guaranteed, your participation remains completely anonymous and no answers can lead back to you as a person. Completing the survey takes approximately ten minutes but is in most cases shorter.

Thank you in advance for your participation, it helps me with obtaining my master's degree!

Kind regards,

Pieter den Hertog

If you have any questions you can e-mail me on pieterdenhertog@hotmail.com

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(Validity questions)

1. Have you been taking part in my pre-test some days ago?

o No

o Yes [If yes, respondents are sincerely thanked again for their willingness, but are informed they can't participate in this survey due to potential biases in the results].

2. Are you color blind?

o Yes [If yes, respondents are sincerely thanked for their willingness to participate but are informed they can't participate in this survey due to questions regarding color and potential errors in the results.]

o No

(Sample description questions)
3. What is your gender?
o Male
o Female
o Other

4. What is your highest level of education (with a diploma)?

o Primary education (Primary school)

o Primary / preparatory vocational education (VMBO)

o Higher general secondary education (HAVO)

o Preparatory academic education (VWO)

o Vocational secondary education (MBO)

o Higher professional education (HBO)

o Scientific education (WO)

5. What is your age?

┌─────────────────────────────┐
│   │
│   │
└─────────────────────────────┘

6. Which part of the world have you lived in the most during your whole life?

o North America

o South America

o Africa

o Europe

o Asia

o Oceania

o Other

-----PAGE BREAK-----

→ [Randomization of participants to fluent or disfluent group and utilitarian or hedonic sustainable product, by software of Qualtrics].

→ [Qualtrics software measures the amount of seconds participants stay on this part of the survey, which is the first measurement of perceptual fluency manipulation].

(Utilitarian product)

Eggsta is an egg producer that is certified with the three-star better life quality mark from the Dutch Animal Protection, feeds chickens with residual products from for example bakeries, produces co-2 neutral and has solar panels on the roof of the farms. Their product packaging looks like this [respondents see only one picture, either with the fluent or with disfluent product packaging color]:

Fluent packaging color

Disfluent packaging color

[Participants can click on continue for a new page and then the measurement of seconds stops with the Qualtrics software]

-----PAGE BREAK-----

(Second measurement of perceptual fluency manipulation)

7. *Please indicate how you processed the information just given to you considering product X:*

o   Easy to process

o   Neutral to process

o   Difficult to process

8. How familiar do you perceive product x to be?

o   Not at all familiar

o   Slightly familiar

o   Somewhat familiar

o   Moderately familiar

o   Extremely familiar

9. How likely is it that you will buy product x?

o   Extremely unlikely

o   Unlikely

o   Neutral

o   Likely

o   Extremely likely

10. Overall, how much do you like product x?

o   Not at all

o   Only a little

o   To some extent

o   Rather much

o   Very much

-----PAGE BREAK-----

→ [Qualtrics software measures again the amount of seconds participants stay on the following part of the survey]

(Hedonic product)

Heaven's Bean Factory is a producer of chocolate bars that are biologically and fair trade certified. They donate 10% of their profit to a charity and the distribution of the bars is co2 compensated. Their product packaging looks like this:

Fluent condition:

Disfluent condition:

[A new page comes up when participants click on continue and then the measurement of seconds stops again with the Qualtrics software]

-----PAGE BREAK-----

11. Please indicate how you processed the information just given to you considering product X:

o   Easy to process

o   Neutral to process

o   Difficult to process

12. How familiar do you perceive product x to be?

o   Not at all familiar

o   Slightly familiar

o   Somewhat familiar

o   Moderately familiar

o   Extremely familiar

13. Do you think product X is for special-occasion (infrequent) consumption?

o   Not at all

o   Only a little

o   To some extent

o   Rather much

o   Very much

14. How likely is it that you will buy product x?

o   Extremely unlikely

o   Unlikely

o   Neutral

o   Likely

o   Extremely likely

15. Overall, how much do you like product x?

o   Not at all

- o Only a little

- o To some extent

- o Rather much

- o Very much

-----PAGE BREAK-----

Almost there! Please indicate you answer on the following 5 statements:

16. Human beings can progress only by conserving nature's resources

- o Strongly disagree

- o Disagree

- o Undecided

- o Agree

- o Strongly agree

17. Human beings can enjoy nature only if they make wise use of its resources

- o Strongly Agree

- o Agree

- o Undecided

- o Disagree

- o Strongly Disagree

19. Human progress can be achieved only by maintaining ecological balance

- o Strongly Agree

- o Agree

- o Undecided

- o Disagree

- o Strongly Disagree

20. Preserving nature now means ensuring the future of human beings

o Strongly Agree

o Agree

o Undecided

o Disagree

o Strongly Disagree

21. We must reduce our consumption levels to ensure well-being of the present and future generations

o Strongly Agree

o Agree

o Undecided

o Disagree

o Strongly Disagree

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→ This is the end of the survey. Thank you very much for filling it in!!

If you have any questions, you can always email me on pieterdenhertog@hotmail.com

Appendix V: Descriptive analysis

Construct	N	M	SD
Timing Green Eggsta	37*	22.92	9.74
Timing Pink Eggsta	43	22.06	12.59
Timing Green HBF	41**	17.50	9.73
Timing Pink HBF	42	18.77	9.48
Information Processing Green Eggsta	38	2.63	0.54
Information Processing Pink Eggsta	43	2.44	0.55
Information Processing Green HBF	42	2.60	0.59
Information Processing Pink HBF	42	2.60	0.54
Familiarity Green Eggsta	38	2.34	1.32
Familiarity Pink Eggsta	43	2.00	1.15
Familiarity Green HBF	42	2.52	1.17
Familiarity Pink HBF	42	2.12	1.19
Purchase likelihood Green Eggsta	38	3.03	0.82
Purchase likelihood Pink Eggsta	43	3.23	1.11
Purchase likelihood Green HBF	42	3.05	1.04
Purchase likelihood Pink HBF	42	3.05	0.88
Liking Green Eggsta	38	3.11	0.98
Liking Pink Eggsta	43	3.37	0.85
Liking Green HBF	42	3.29	0.89
Liking Pink HBF	42	3.17	0.79
Special Occasion Score Green HFB	42	2.4	1.08
Special Occasion Score Pink HBF	42	2.21	1.2
Environmental Attitude	165	20.01	3.17

* One outlier was deleted of 195.57 seconds.

** One outlier was deleted of 1054 seconds.

While interpreting the descriptive statistics figure, one should be aware of the fact that the quantitative measurement in SPSS is sometimes different per variable. This comes with the consequence that means and standard deviations can differ a lot. Timing constructs are measured in seconds, information processing in numbers (easy to process=3, neutral to process=2, difficult to process=1), environmental attitude in numbers (5 items added together, every item strongly agree=5, agree=4, undecided=3, disagree=2, strongly disagree=1) and the remaining items also in the same scoring order, replaced with extremely likely- extremely unlikely, very much-not at all and extremely familiar till extremely unfamiliar.

Appendix VI: SPSS output

Chapter 3: Factor Analysis Environmental Attitude (control variable)

➡ Factor Analysis

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,748
Bartlett's Test of Sphericity	Approx. Chi-Square	151,392
	df	10
	Sig.	,000

Communalities

	Initial	Extraction
Almost there! Please indicate you answer on the following 5 statements: Huma nbeings can progress only by conserving nature's resources	1,000	,514
Human beings can enjoy nature only if they make wise use of its resources.	1,000	,471
Human progress can be achieved only by maintaining ecological balance.	1,000	,617
Preserving nature now means ensuring the future of human beings.	1,000	,443
We must reduce our consumption levels to ensure well-being of the present and future generations.	1,000	,342

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2,387	47,743	47,743	2,387	47,743	47,743
2	,837	16,731	64,474			
3	,696	13,911	78,385			
4	,641	12,813	91,197			
5	,440	8,803	100,000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component 1
Almost there! Please indicate you answer on the following 5 statements: Huma nbeings can progress only by conserving nature's resources	,717
Human beings can enjoy nature only if they make wise use of its resources.	,686
Human progress can be achieved only by maintaining ecological balance.	,785
Preserving nature now means ensuring the future of human beings.	,666
We must reduce our consumption levels to ensure well-being of the present and future generations.	,585

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Reliability Statistics

Cronbach's Alpha	N of Items
,722	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Almost there! Please indicate you answer on the following 5 statements: Huma nbeings can progress only by conserving nature's resources	16,37	6,039	,510	,668
Human beings can enjoy nature only if they make wise use of its resources.	16,10	6,893	,487	,673
Human progress can be achieved only by maintaining ecological balance.	16,11	6,464	,596	,629
Preserving nature now means ensuring the future of human beings.	15,88	7,200	,456	,685
We must reduce our consumption levels to ensure well-being of the present and future generations.	15,81	7,840	,376	,712

Chapter 4: Hypothesis A

Results from the independent samples t-test indicated that the assumption of equal variances between the groups was valid since Levene's Test was non-significant ($p=.697$). Therefore, the null hypothesis of equal variance between groups was not rejected.

➜ T-Test

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
TotalTiming	1,00	37	22,9168	9,73970	1,60120
	2,00	43	22,0594	12,59246	1,92033

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
TotalTiming	Equal variances assumed	,153	,697	,336	78	,737	,85734	2,54850	-4,21633	5,93101
	Equal variances not assumed			,343	77,179	,733	,85734	2,50030	-4,12121	5,83589

Chapter 4: Hypothesis B

Results from the independent samples t-test indicated that the assumption of equal variances between the groups was valid since Levene's Test was non-significant ($p=.42$). Therefore, the null hypothesis of equal variance between groups was not rejected.

➜ T-Test

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Please indicate how you processed the information just given to you considering the eggs from Egsta	1,00	38	2,63	,541	,088
	2,00	43	2,44	,548	,084

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Please indicate how you processed the information just given to you considering the eggs from Egsta	Equal variances assumed	,646	,424	1,564	79	,122	,190	,121	-,052	,431
	Equal variances not assumed			1,565	77,998	,122	,190	,121	-,052	,431

Chapter 4: Hypothesis C

Results from the independent samples t-test indicated that the assumption of equal variances between the groups was valid since Levene's Test is significant (*p*=.91). Therefore, the null hypothesis of equal variance between groups was not rejected.

➡ T-Test

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Timing - Page Submit	1,00	41	17,5001	9,72562	1,51889
	2,00	42	18,7733	9,47918	1,46267

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower		Upper
Timing - Page Submit	Equal variances assumed	,014	,907	-,604	81	,548	-1,27326	2,10799	-5,46751		2,92099
	Equal variances not assumed			-,604	80,798	,548	-1,27326	2,10865	-5,46898		2,92246

Chapter 4: hypothesis D

Results from the independent samples t-test indicated that the assumption of equal variances between the groups was valid since Levene's Test was non-significant (*p*=.70). Therefore, the null hypothesis of equal variance between groups was not rejected.

T-Test

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Please indicate how you processed the information just given to you considering the chocolate bar from Heaven's Bean Factory.	1,00	42	2,60	,587	,091
	2,00	42	2,60	,544	,084

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower		Upper
Please indicate how you processed the information just given to you considering the chocolate bar from Heaven's Bean Factory.	Equal variances assumed	,148	,701	,000	82	1,000	,000	,123	-,246		,246
	Equal variances not assumed			,000	81,526	1,000	,000	,123	-,246		,246

Chapter 4: hypothesis 1

Assumptions of ANOVA: Normality

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Famtotal	,247	165	,000	,834	165	,000

a. Lilliefors Significance Correction

Histogram

Mean = 2,24
Std. Dev. = 1,216
N = 165

Normal P-P Plot of Famtotal
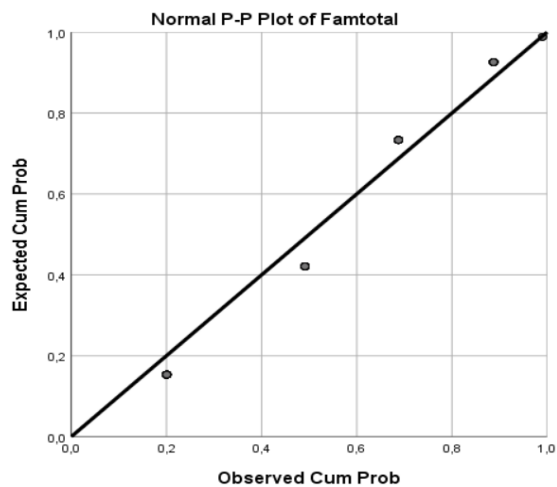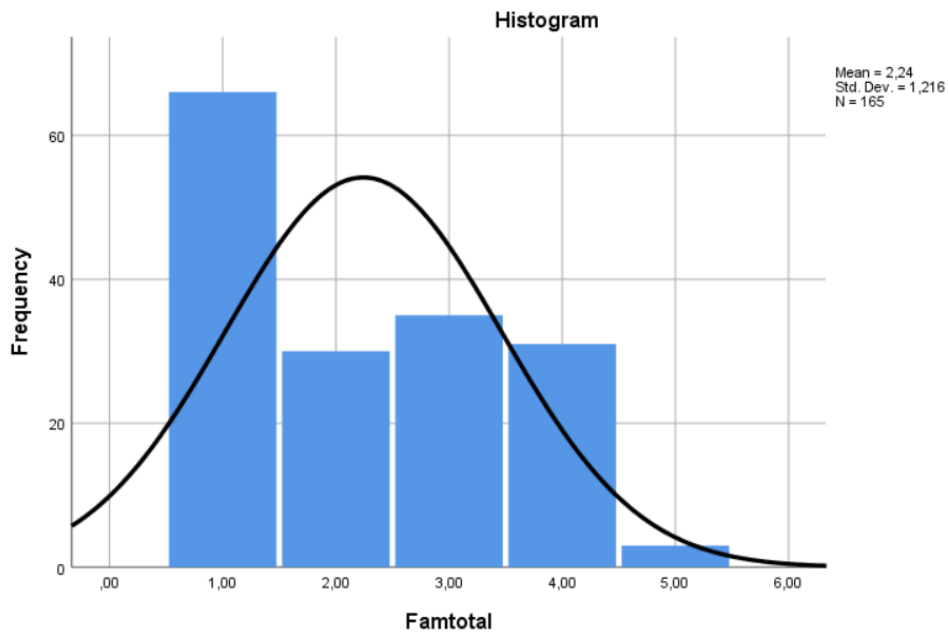
→ Frequencies

Statistics

Famtotal

N	Valid	165
	Missing	0
Mean		2,2424
Skewness		,410
Std. Error of Skewness		,189
Kurtosis		-1,207
Std. Error of Kurtosis		,376

Chapter 4: ANOVA linearity assumption
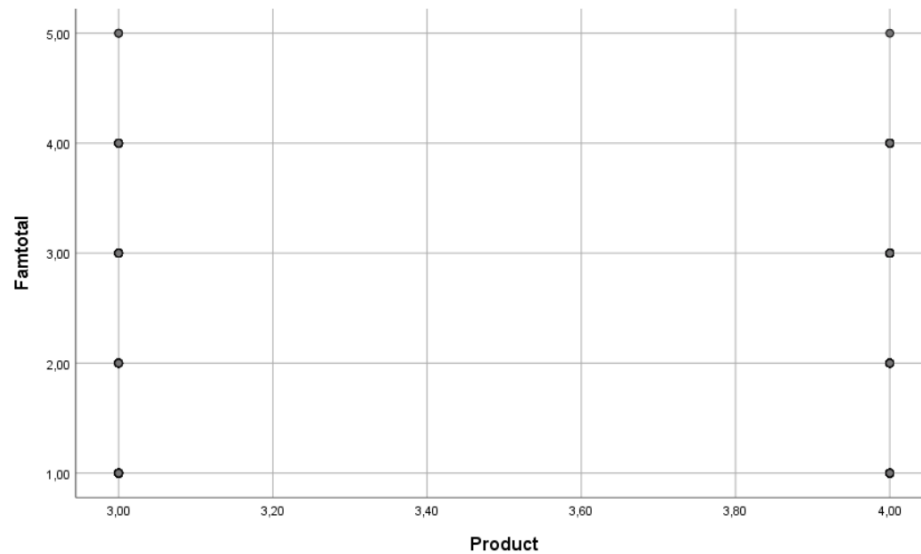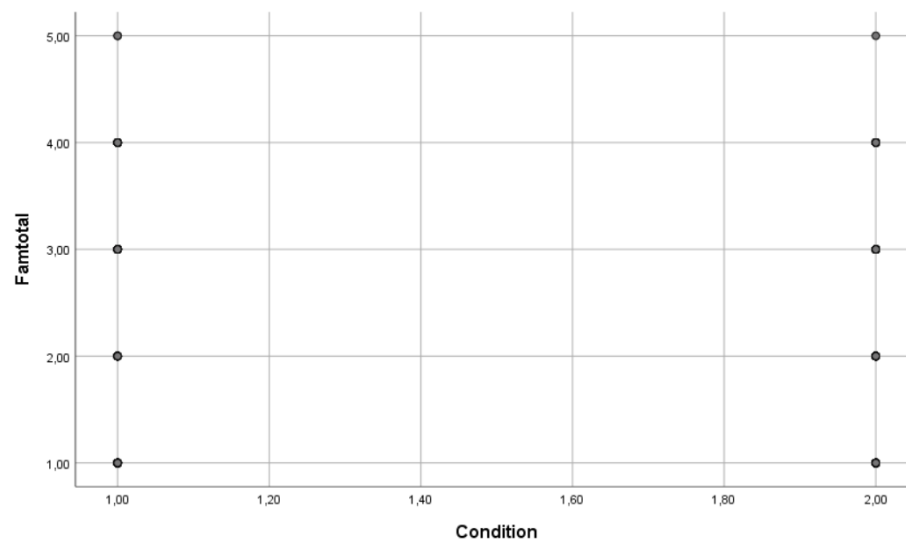
ANOVA assumption: correlation of error terms

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,000[a]	,000	-,012	,99691	2,041

a. Predictors: (Constant), Product, Condition

b. Dependent Variable: Standardized Residual for Famtotal

Assumptions of ANOVA: normality of error terms

Normal Q-Q Plot of Standardized Residual for Famtotal
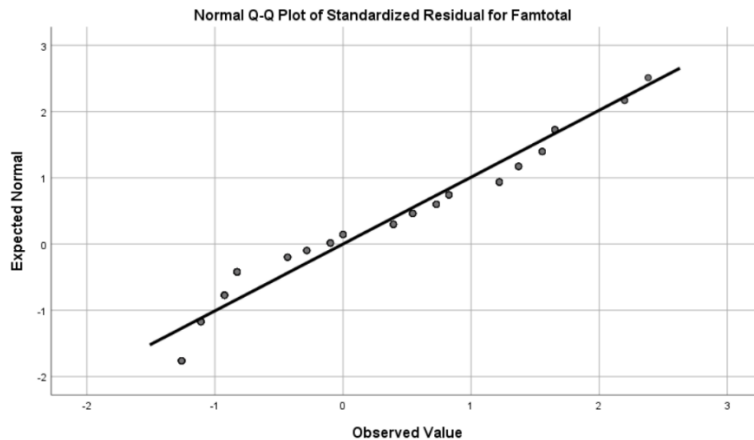
Chapter 4: ANOVA sample size assumption

The fifth assumption was a sample size of at least 30 per group. As Appendix V indicates, the sample sizes are respectively 38, 43, 42 and 42, which was more than sufficient for this assumption.

Chapter 4: ANOVA homogeneity of variance assumption

The sixth assumption was the homogeneity of variance. Results indicated that the assumption of equal variances between the groups was valid since Levene's Test was non-significant ($p=.48$). Therefore, the null hypothesis of equal variance between groups was not rejected and this assumption was met, and the two-way ANOVA could proceed.

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Famtotal

F	df1	df2	Sig.
,830	3	161	,479

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Condition + Product

Chapter 4: ANOVA output

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Condition	1,00	Fluent condition	80
	2,00	Disfluent condition	85
Product	3,00	Utilitarian	81
	4,00	Hedonic	84

Descriptive Statistics

Dependent Variable: Famtotal

Condition	Product	Mean	Std. Deviation	N
Fluent condition	Utilitarian	2,3421	1,32086	38
	Hedonic	2,5238	1,17366	42
	Total	2,4375	1,24111	80
Disfluent condition	Utilitarian	2,0000	1,15470	43
	Hedonic	2,1190	1,19353	42
	Total	2,0588	1,16857	85
Total	Utilitarian	2,1605	1,23952	81
	Hedonic	2,3214	1,19397	84
	Total	2,2424	1,21551	165

Levene's Test of Equality of Error Variances[a,b]

		Levene Statistic	df1	df2	Sig.
Famtotal	Based on Mean	,819	3	161	,485
	Based on Median	,446	3	161	,721
	Based on Median and with adjusted df	,446	3	155,761	,721
	Based on trimmed mean	,772	3	161	,511

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Dependent variable: Famtotal

b. Design: Intercept + Condition + Product + Condition * Product

Tests of Between-Subjects Effects

Dependent Variable: Famtotal

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6,869[a]	3	2,290	1,566	,200	,028
Intercept	830,631	1	830,631	568,022	,000	,779
Condition	5,739	1	5,739	3,925	,049	,024
Product	,931	1	,931	,636	,426	,004
Condition * Product	,040	1	,040	,028	,868	,000
Error	235,434	161	1,462			
Total	1072,000	165				
Corrected Total	242,303	164				

a. R Squared = ,028 (Adjusted R Squared = ,010)

Estimated Marginal Means

1. Grand Mean

Dependent Variable: Famtotal

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
2,246	,094	2,060	2,432

Estimates

Dependent Variable: Famtotal

Condition	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Fluent condition	2,433	,135	2,166	2,700
Disfluent condition	2,060	,131	1,800	2,319

Pairwise Comparisons

Dependent Variable: Famtotal

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
Fluent condition	Disfluent condition	,373*	,188	,049	,001	,746
Disfluent condition	Fluent condition	-,373*	,188	,049	-,746	-,001

Based on estimated marginal means

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

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Dependent Variable: Famtotal

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	5,739	1	5,739	3,925	,049	,024
Error	235,434	161	1,462			

The F tests the effect of Condition. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

3. Product

Estimates

Dependent Variable: Famtotal

Product	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Utilitarian	2,171	,135	1,905	2,437
Hedonic	2,321	,132	2,061	2,582

Pairwise Comparisons

Dependent Variable: Famtotal

(I) Product	(J) Product	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Utilitarian	Hedonic	-,150	,188	,426	-,523	,222
Hedonic	Utilitarian	,150	,188	,426	-,222	,523

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Univariate Tests

Dependent Variable: Famtotal

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	,931	1	,931	,636	,426	,004
Error	235,434	161	1,462			

The F tests the effect of Product. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

4. Condition * Product

Dependent Variable: Famtotal

Condition	Product	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Fluent condition	Utilitarian	2,342	,196	1,955	2,730
	Hedonic	2,524	,187	2,155	2,892
Disfluent condition	Utilitarian	2,000	,184	1,636	2,364
	Hedonic	2,119	,187	1,751	2,488

Estimated Marginal Means of Famtotal

84
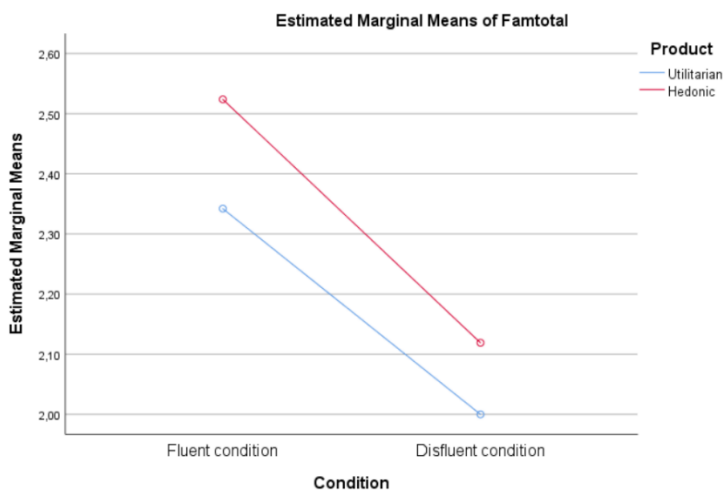
Chapter 4: hypothesis 2

Results from the independent Samples Test indicated that the assumption of equal variances between the groups was valid since Levene's Test was non-significant ($p=.88$). Therefore, the null hypothesis of equal variance between groups was not rejected and the analysis could proceed.

T-Test

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Preference	Fluent	38	3,1053	,98061	,15908
	disfluent	43	3,3721	,84581	,12898

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Preference	Equal variances assumed	,020	,888	-1,315	79	,192	-,26683	,20293	-,67075	,13709
	Equal variances not assumed			-1,303	73,614	,197	-,26683	,20480	-,67493	,14127

Chapter 4: hypothesis 3

Results from the independent samples t-test indicated that the assumption of equal variances between the groups was valid since Levene's Test was significant ($p=.27$). Therefore, the null hypothesis of equal variance between groups was not rejected and the analysis could proceed.

→ T-Test

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Preference	Fluent	42	3,2857	,89131	,13753
	Disfluent	42	3,1667	,79378	,12248

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Preference	Equal variances assumed	1,258	,265	,646	82	,520	,11905	,18417	-,24732	,48541
	Equal variances not assumed			,646	80,923	,520	,11905	,18417	-,24739	,48548

Chapter 4: hypothesis 4

Results from the independent samples t-test indicated that the assumption of equal variances between the groups was valid since Levene's Test was non-significant (p=.357). Therefore, the null hypothesis of equal variance between groups was not rejected and the analysis could proceed.

➡ **T-Test**

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
SOTOTAL	Fluent	42	2,4048	1,08334	,16716
	Disfluent	42	2,2143	1,20032	,18521

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
SOTOTAL	Equal variances assumed	,859	,357	,763	82	,447	,19048	,24949	-,30585	,68680
	Equal variances not assumed			,763	81,153	,447	,19048	,24949	-,30593	,68688

Chapter 4: Factorial MANOVA sample size assumption

The first assumption for conducting a factorial MANOVA was a sufficient sample size. According to Hair et al., (2014) the sample size should be greater than the number of variables, should consist of at least 20 per group and another recommendation is that the sample sizes should approximately have the same sizes. This assumption was met since the groups contain 38, 43, 42, 42, 38, 43, 42 and 42 respondents (Appendix V).

Chapter 4: Factorial MANOVA random and interval level data

A second assumption was the collection of sampling data that is random and measured on interval level (Field, 2013). This assumption was also met because of the between-subjects design of the study and the collection of data was being measured on an interval level.

Chapter 4: Factorial MANOVA independence of residuals assumption

The third assumption was that the residuals should be statistical independent (Field, 2013). Theoretically speaking it was assumed that the residuals are statistical independent due to the between-subjects design of the study and the fact that no participants have been counted double. This is statistically confirmed by executing two Durbin-Watson tests for both independent variables which scores indicated independence of residuals (Field, 2013).

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,069[a]	,005	-,007	,97149	2,067

a. Predictors: (Constant), Condition, Producttype

b. Dependent Variable: Buylikelihood

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,042[a]	,002	-,011	,88038	1,938

a. Predictors: (Constant), Condition, Producttype

b. Dependent Variable: ProductLiking

Chapter 4: Factorial MANOVA: normality assumption

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Buylikelihood	,202	165	,000	,895	165	,000
ProductLiking	,242	165	,000	,872	165	,000

a. Lilliefors Significance Correction

Buylikelihood

ProductLiking

Normal Q-Q Plot of Buylikelihood
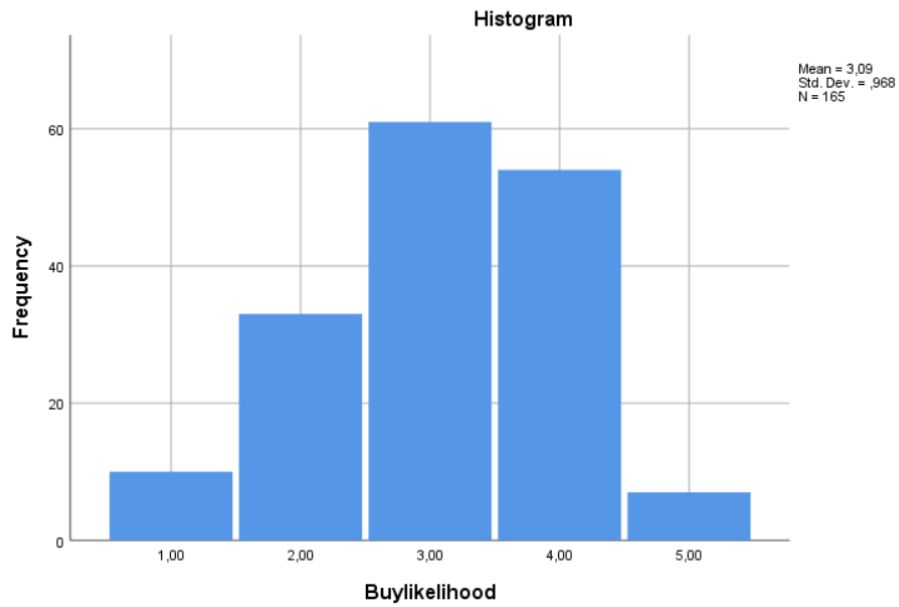
Normal Q-Q Plot of ProductLiking
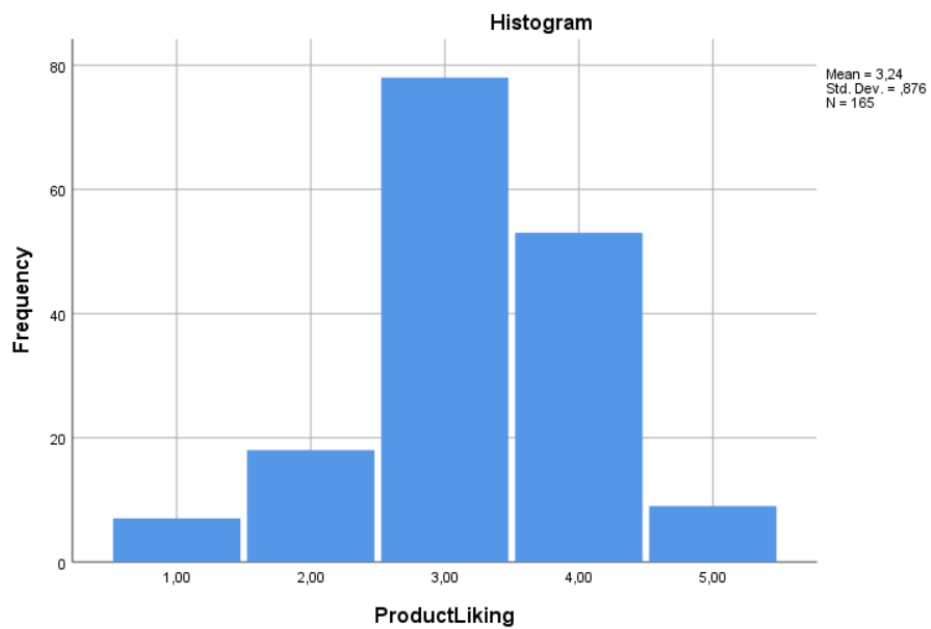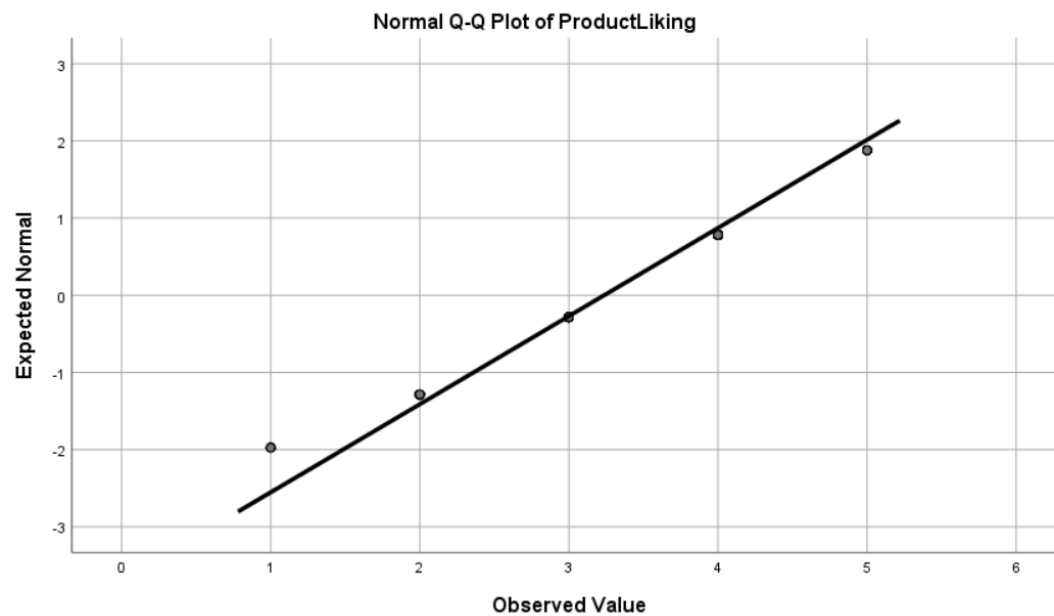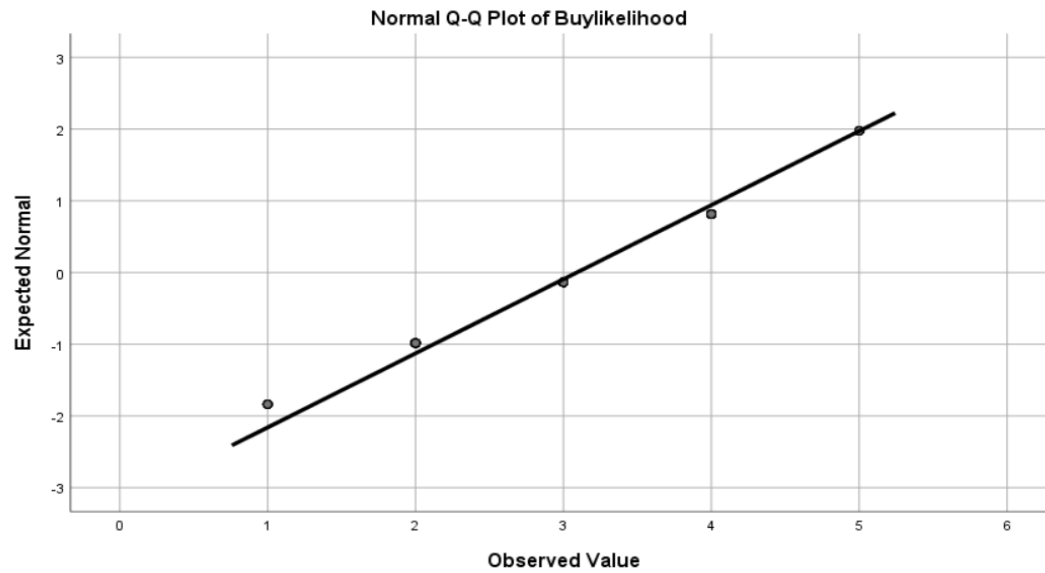
Frequencies

Statistics

		Buylikelihood	ProductLiking
N	Valid	165	165
	Missing	0	0
Mean		3,0909	3,2364
Std. Deviation		,96789	,87576
Skewness		-,306	-,371
Std. Error of Skewness		,189	,189
Kurtosis		-,405	,412
Std. Error of Kurtosis		,376	,376

Chapter 4: Factorial MANOVA linearity assumption

The fifth assumption was linearity between the dependent and independent variables. Scatterplots (Appendix VI) indicated no non-linearity so this assumption was met.
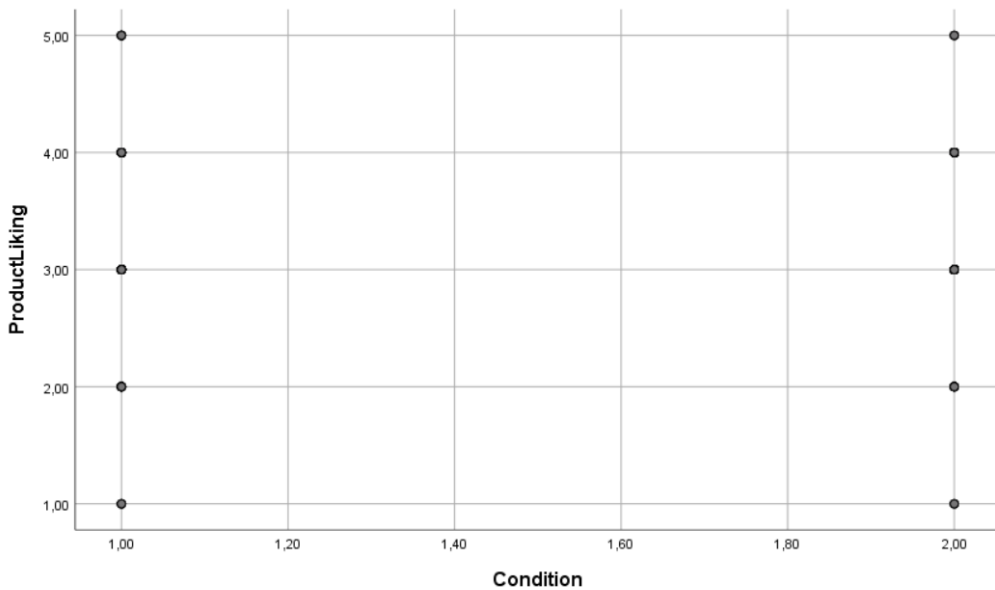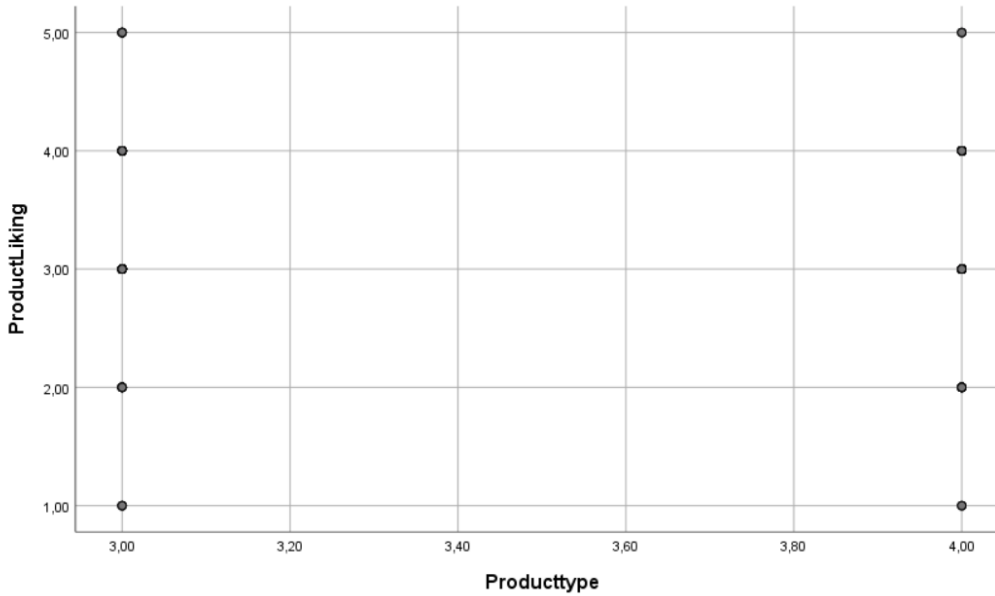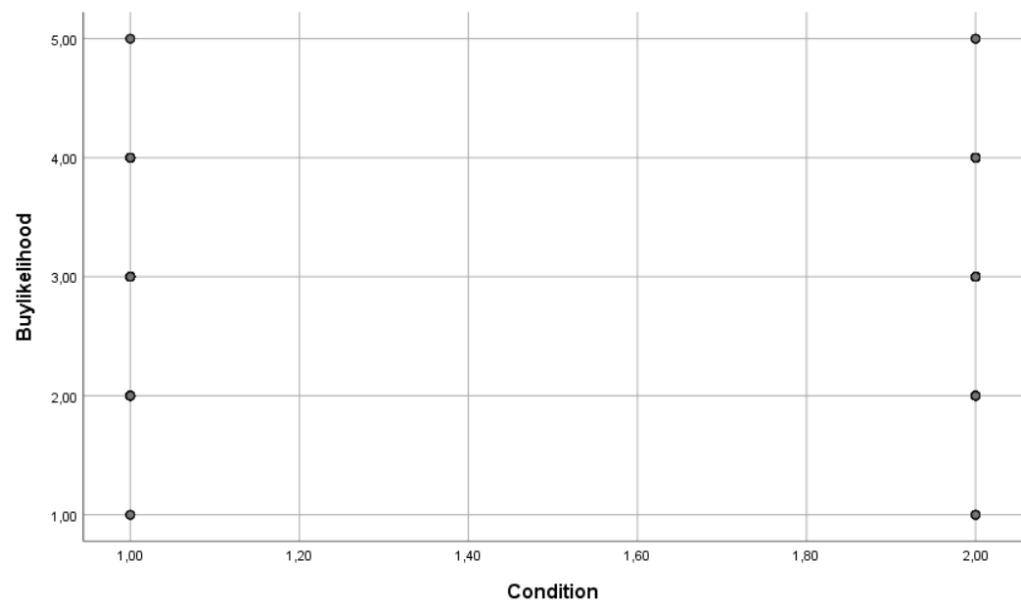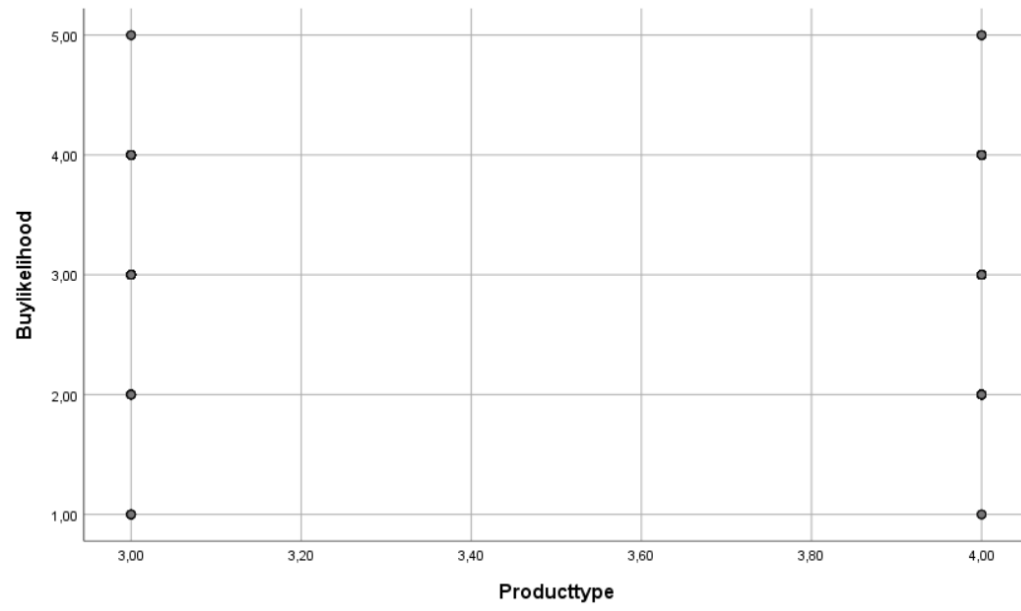
Producttype

Condition

Chapter 4: Factorial MANOVA homogeneity of covariance assumption

The sixth assumption was homogeneity of variances and covariances. Results of conducting a factorial MANOVA indicated that there was homogeneity of covariances, since the Box's test of Equality of Covariance Matrices indicated a non-significance of $p=.139$. Therefore, it was concluded that the groups did not have equal covariance matrices.

Box's Test of Equality of Covariance Matrices[a]

Box's M	13,881
F	1,508
df1	9
df2	285909,943
Sig.	,139

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + Producttype + Condition + Producttype * Condition

Chapter 4: Factorial MANOVA homogeneity of variance assumption

Results from the factorial MANOVA also indicated that there was homogeneity of variance; Levene's tests across all different means were all found to be non-significant with p values higher than .05. Therefore, the null hypothesis of equal variance between groups was not rejected and this assumption was met.

Levene's Test of Equality of Error Variances[a]

		Levene Statistic	df1	df2	Sig.
ProductLiking	Based on Mean	,404	3	161	,750
	Based on Median	,271	3	161	,846
	Based on Median and with adjusted df	,271	3	156,383	,846
	Based on trimmed mean	,287	3	161	,835
Buylikelihood	Based on Mean	2,356	3	161	,074
	Based on Median	2,230	3	161	,087
	Based on Median and with adjusted df	2,230	3	157,303	,087
	Based on trimmed mean	2,103	3	161	,102

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Producttype + Condition + Producttype * Condition

Chapter 4: Factorial MANOVA results

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	,941	1266,099[b]	2,000	160,000	,000	,941
	Wilks' Lambda	,059	1266,099[b]	2,000	160,000	,000	,941
	Hotelling's Trace	15,826	1266,099[b]	2,000	160,000	,000	,941
	Roy's Largest Root	15,826	1266,099[b]	2,000	160,000	,000	,941
Producttype	Pillai's Trace	,002	,174[b]	2,000	160,000	,840	,002
	Wilks' Lambda	,998	,174[b]	2,000	160,000	,840	,002
	Hotelling's Trace	,002	,174[b]	2,000	160,000	,840	,002
	Roy's Largest Root	,002	,174[b]	2,000	160,000	,840	,002
Condition	Pillai's Trace	,003	,250[b]	2,000	160,000	,779	,003
	Wilks' Lambda	,997	,250[b]	2,000	160,000	,779	,003
	Hotelling's Trace	,003	,250[b]	2,000	160,000	,779	,003
	Roy's Largest Root	,003	,250[b]	2,000	160,000	,779	,003
Producttype * Condition	Pillai's Trace	,012	,994[b]	2,000	160,000	,372	,012
	Wilks' Lambda	,988	,994[b]	2,000	160,000	,372	,012
	Hotelling's Trace	,012	,994[b]	2,000	160,000	,372	,012
	Roy's Largest Root	,012	,994[b]	2,000	160,000	,372	,012

a. Design: Intercept + Producttype + Condition + Producttype * Condition

b. Exact statistic

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	ProductLiking	1,752[a]	3	,584	,758	,519	,014
	Buylikelihood	1,179[b]	3	,393	,415	,743	,008
Intercept	ProductLiking	1720,105	1	1720,105	2232,818	,000	,933
	Buylikelihood	1570,358	1	1570,358	1658,347	,000	,912
Producttype	ProductLiking	,006	1	,006	,008	,927	,000
	Buylikelihood	,276	1	,276	,291	,590	,002
Condition	ProductLiking	,225	1	,225	,292	,590	,002
	Buylikelihood	,438	1	,438	,462	,498	,003
Producttype * Condition	ProductLiking	1,532	1	1,532	1,989	,160	,012
	Buylikelihood	,438	1	,438	,462	,498	,003
Error	ProductLiking	124,030	161	,770			
	Buylikelihood	152,458	161	,947			
Total	ProductLiking	1854,000	165				
	Buylikelihood	1730,000	165				
Corrected Total	ProductLiking	125,782	164				
	Buylikelihood	153,636	164				

a. R Squared = ,014 (Adjusted R Squared = -,004)

b. R Squared = ,008 (Adjusted R Squared = -,011)

Chapter 4: Factorial MANCOVA: environmental attitude

Environmental attitude was a statistical independent variable and therefore suited as a control variable (Hair et al., 2014). Testing the effect of multiple groups (categorical dependent variables) on multiple independent variables (of continuous or interval level) while adding a control variable (of continuous or interval level) is named the analysis of factorial MANCOVA (Hair et al., 2014).

Using a factorial MANCOVA for analysis came with some measurement requirements and assumptions. A factorial MANCOVA can be seen as a combination of factorial MANOVA and ANCOVA and generally has the same assumptions as a factorial MANOVA, plus some individual assumptions regarding the covariate (Field, 2013; Hair et al., 2014).

The first assumption was that of normality. Statistical normality checks for the variable of environmental attitude indicated that the distribution was not normally distributed. Both the Kolmogorov-Smirnov (p= <.005) and Shapiro-Wilk-Test (p=.001) were significant (Appendix VI), resulting in rejection of the null-hypothesis of normal distribution and indication that the data was not normally distributed. Again, just as with the normality assumptions in the sections above, visual inspection is also recommended and used to conclude for normality. The histogram (Appendix VI) indicated a distribution that looked similar to a normal distribution. The P-P plot (Appendix VI) showed only some deviations in the beginning, the rest fell neatly on the line, indicating normal distribution. Skewness score (S=-.431) and kurtosis score (K=.164) fell neatly within the boundaries for normal distribution (McNeese, 2016). On top of that, the sample size (N=165) was also larger than 30, which made the central limit theorem also applicable.

It was therefore concluded that the variable of environmental attitude was at least sufficiently normally distributed for continuing the analysis. Assumptions regarding linearity, independence, level of variable and independence of covariate were met (Appendix VI).

Results of the two-way ANOVA further indicated that there were no significant differences in environmental attitude regarding the groups: condition (F=.978; p=.324) and product (F=.053; p=.818) (Appendix VI). However, important to note is that a significant interaction effect was found between condition and product (F=4,429; p=.037). This effect was however minimalistic (η^2= ,027). Consequently, the assumption of independence of the covariate was violated.

The sixth, specific and last assumption for factorial MANCOVA was the homogeneity of regression slopes between the covariate and the independent variables (Field, 2013). This could be tested by doing a preliminary factorial MANCOVA and thereby checking the interaction terms for

the covariate. If the interaction terms were significant then the assumption was violated, if the interaction terms were insignificant the assumption was met (Field, 2013).

Both assumptions of homogeneity of covariances and homogeneity of variance were met (Appendix VI). Therefore, analyzing the original assumption, homogeneity of regression slopes, proceeded. The results of the preliminary factorial MANCOVA indicated a significant interaction term for environmental attitude*condition for the dependent variable of purchase likelihood ($p=.044$; $\eta^2 = .025$) (Appendix VI). Therefore, it was concluded that the assumption homogeneity of regression slopes was also violated. Consequently, the variable of environmental attitude could not be used as a covariate, since two specific assumptions were violated for using environmental attitude as a covariate in a factorial MANCOVA.

Chapter 4: Factorial MANCOVA normality assumption

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TotalEA	,088	165	,004	,960	165	,000

a. Lilliefors Significance Correction

Histogram

Mean = 20,07
Std. Dev. = 3,172
N = 165

Normal Q-Q Plot of TotalEA
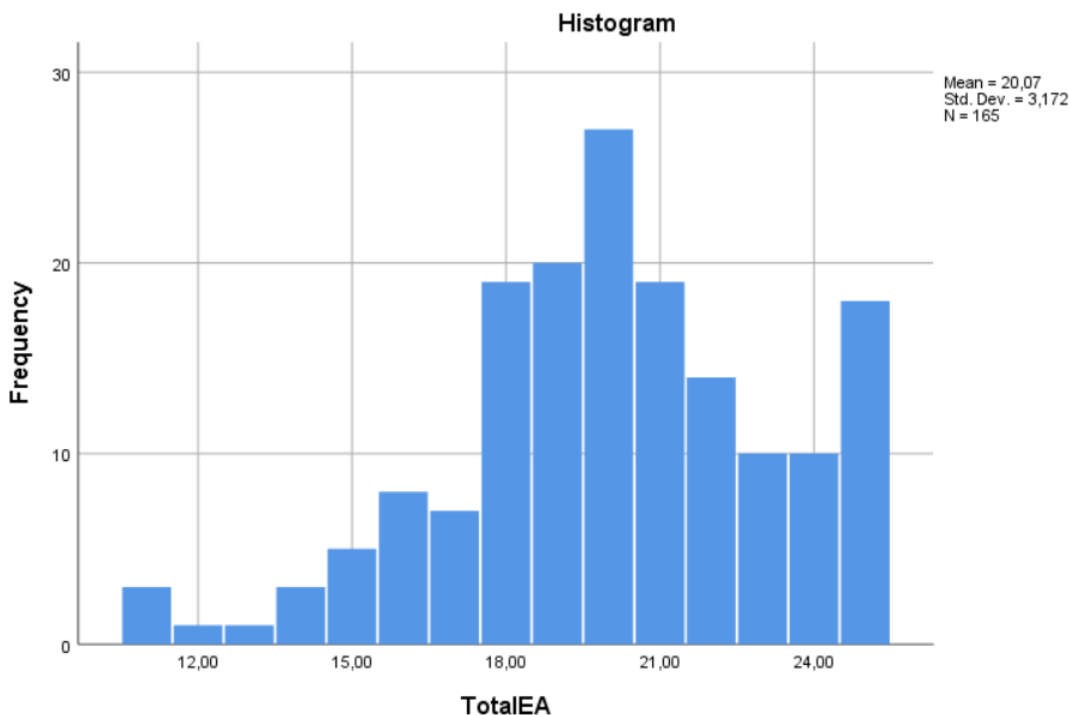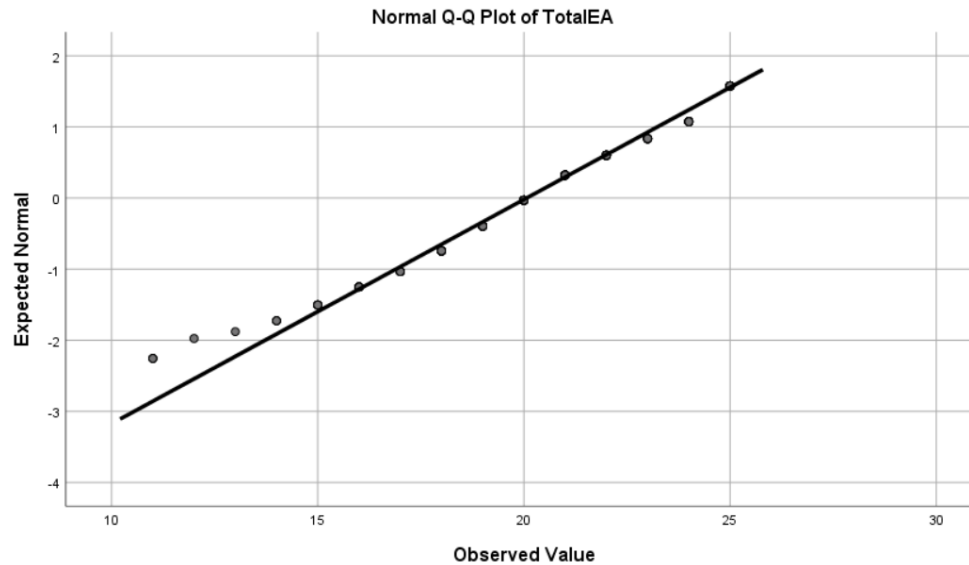
Descriptives

			Statistic	Std. Error
TotalEA	Mean		20,0667	,24695
	95% Confidence Interval for Mean	Lower Bound	19,5791	
		Upper Bound	20,5543	
	5% Trimmed Mean		20,2088	
	Median		20,0000	
	Variance		10,063	
	Std. Deviation		3,17216	
	Minimum		11,00	
	Maximum		25,00	
	Range		14,00	
	Interquartile Range		4,00	
	Skewness		-,431	,189
	Kurtosis		,164	,376

Chapter 4: Factorial MANCOVA linearity assumption

A second assumption was linearity between the dependent and independent variables. Scatterplots (Appendix VI) for environmental attitude and the dependent variables indicated no non-linearity so this assumption was met.

Partial Regression Plot
Dependent Variable: ProductLiking

Partial Regression Plot
Dependent Variable: Buylikelihood
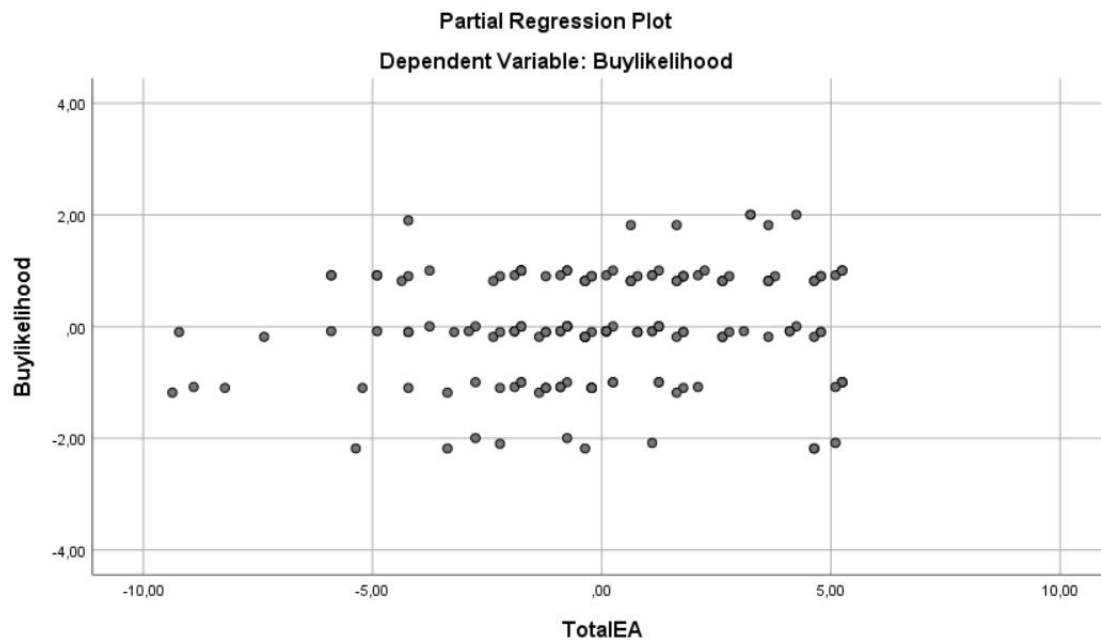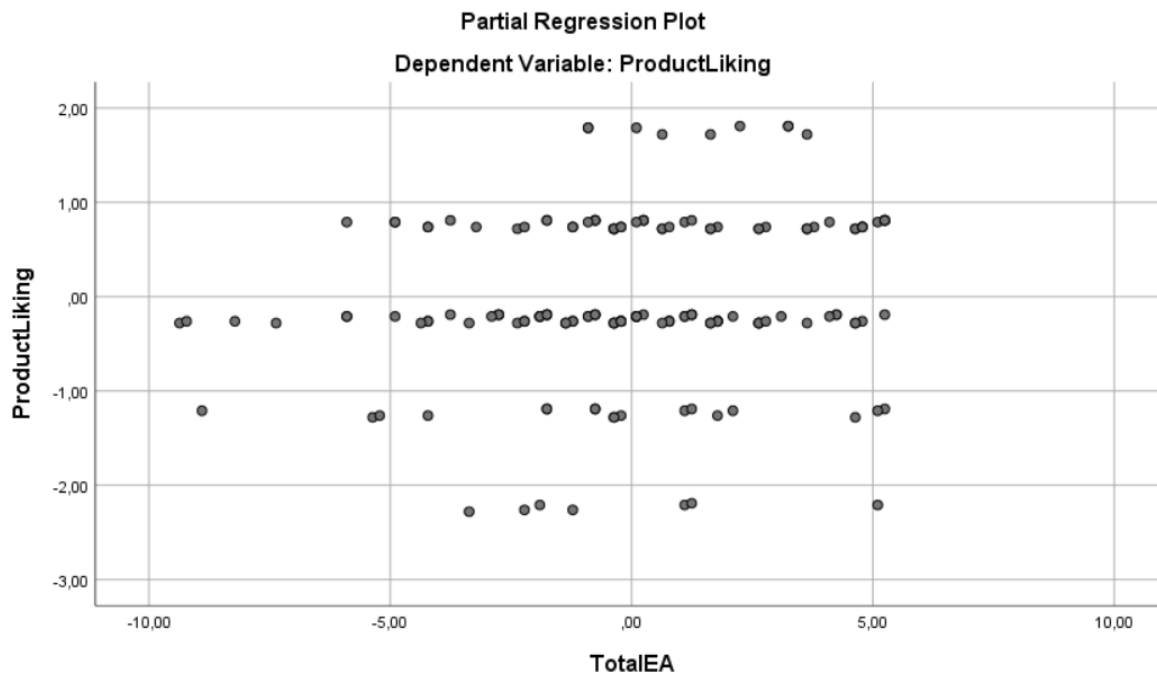
Chapter 4: Factorial MANCOVA independence assumption

A third assumption was independence. This assumption was met because of the between-subjects design of the experiment-based survey, no participants were counted double and no learning effects could have occurred. This was statistically confirmed by executing a Durbin-Watson tests for

environmental attitude which scored sufficiently, representative for independence of residuals (Field, 2013; Appendix VI).

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,211[a]	,045	,027	3,12925	1,682

a. Predictors: (Constant), Buylikelihood, Famtotal, ProductLiking

b. Dependent Variable: TotalEA

Chapter 4: Factorial MANCOVA: level of variable assumption

The fourth assumption was the level of the control variable. This assumption was met since Environmental Attitude was measured with a continuous measurement scale, (1=strongly disagree, 5=strongly agree).

Chapter 4: Factorial MANCOVA independence of covariate assumption

Finally, the fifth and specific assumption for Factorial MANCOVA, was the independence of the covariate regarding the treatment effect (Field, 2013). This was tested by running a two-way ANOVA with the control variable acting as dependent variable. Results of executing a two-way ANOVA indicated that the assumption of equal variances between the groups was valid since Levene's Test was non-significant (p=,92). Therefore, the null hypothesis of equal variance between groups was not rejected and the results of the ANOVA were interpreted further.

Levene's Test of Equality of Error Variances[a,b]

		Levene Statistic	df1	df2	Sig.
TotalEA	Based on Mean	,173	3	161	,915
	Based on Median	,176	3	161	,912
	Based on Median and with adjusted df	,176	3	156,055	,912
	Based on trimmed mean	,162	3	161	,922

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Dependent variable: TotalEA

b. Design: Intercept + Condition + Product + Condition * Product

Tests of Between-Subjects Effects

Dependent Variable: TotalEA

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	53,861[a]	3	17,954	1,811	,147	,033
Intercept	66144,569	1	66144,569	6670,782	,000	,976
Condition	9,696	1	9,696	,978	,324	,006
Product	,527	1	,527	,053	,818	,000
Condition * Product	43,916	1	43,916	4,429	,037	,027
Error	1596,406	161	9,916			
Total	68091,000	165				
Corrected Total	1650,267	164				

a. R Squared = ,033 (Adjusted R Squared = ,015)

Chapter 4: Factorial MANCOVA homogeneity of regression slopes assumption

Results of conducting the preliminary factorial MANCOVA indicated that there was homogeneity of covariances, since the Box's test of Equality of Covariance Matrices indicated a non-significance of $p=$,22 (Appendix VI). Therefore, it was concluded that the groups did not have equal covariance matrices.

Box's Test of Equality of Covariance Matrices[a]

Box's M	23,007
F	1,235
df1	18
df2	89848,923
Sig.	,222

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design:
Intercept +
Condition +
Product +
TotalEA +
Condition *
TotalEA +
Product *
TotalEA

Results from the preliminary factorial MANCOVA also indicated that there was homogeneity of variance. Levene's tests across all different dependent variables were all found to be non-significant with p values higher than .05 (Appendix VI). Therefore, the null hypothesis of equal variances between groups was not rejected and interpreting the results proceeded.

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
Famtotal	,360	3	161	,782
ProductLiking	,274	3	161	,844
Buylikelihood	1,696	3	161	,170

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Condition + Product + TotalEA + Condition * TotalEA + Product * TotalEA

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Famtotal	10,414[a]	5	2,083	1,428	,217	,043
	ProductLiking	5,750[b]	5	1,150	1,523	,185	,046
	Buylikelihood	8,135[c]	5	1,627	1,778	,120	,053
Intercept	Famtotal	28,640	1	28,640	19,638	,000	,110
	ProductLiking	21,292	1	21,292	28,205	,000	,151
	Buylikelihood	20,259	1	20,259	22,139	,000	,122
Condition	Famtotal	3,471	1	3,471	2,380	,125	,015
	ProductLiking	1,343	1	1,343	1,779	,184	,011
	Buylikelihood	3,338	1	3,338	3,648	,058	,022
Product	Famtotal	,177	1	,177	,121	,728	,001
	ProductLiking	,263	1	,263	,348	,556	,002
	Buylikelihood	,272	1	,272	,297	,586	,002
TotalEA	Famtotal	,865	1	,865	,593	,442	,004
	ProductLiking	3,227	1	3,227	4,275	,040	,026
	Buylikelihood	2,596	1	2,596	2,837	,094	,018
Condition * TotalEA	Famtotal	2,380	1	2,380	1,632	,203	,010
	ProductLiking	1,527	1	1,527	2,023	,157	,013
	Buylikelihood	3,781	1	3,781	4,132	,044	,025
Product * TotalEA	Famtotal	,374	1	,374	,257	,613	,002
	ProductLiking	,291	1	,291	,386	,535	,002
	Buylikelihood	,251	1	,251	,274	,601	,002
Error	Famtotal	231,889	159	1,458			
	ProductLiking	120,032	159	,755			
	Buylikelihood	145,501	159	,915			
Total	Famtotal	1072,000	165				
	ProductLiking	1854,000	165				
	Buylikelihood	1730,000	165				
Corrected Total	Famtotal	242,303	164				
	ProductLiking	125,782	164				
	Buylikelihood	153,636	164				

a. R Squared = ,043 (Adjusted R Squared = ,013)

b. R Squared = ,046 (Adjusted R Squared = ,016)

c. R Squared = ,053 (Adjusted R Squared = ,023)

Chapter 4: MANOVA GENDER

MANOVA was conducted to test the influence of gender on the dependent variables of product liking and purchase likelihood. MANOVA could be used since the independent variable was of categoric nature (male-female) and the dependent variables (product liking and purchase likelihood) were of interval level. Other assumptions have been discussed in the sections above and are therefore not elaborated again.

Results of conducting the MANOVA indicated that there was homogeneity of covariances, since the Box's test of Equality of Covariance Matrices indicated a non-significance of $p= .438$ (Appendix VI). Therefore, it was concluded that the groups did not have equal covariance matrices. Results from the factorial MANOVA also indicated that there was homogeneity of variance; Levene's tests across all different means were all found to be non-significant with p values higher than .05. (Appendix VI). Therefore, the null hypothesis of equal variances between groups was not rejected.

Chapter 4: Influence of Gender MANOVA homogeneity of covariance assumption

Box's Test of Equality of Covariance Matrices[a]

Box's M	2,752
F	,905
df1	3
df2	24619579,13
Sig.	,438

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + S1_Gender

Chapter 4: Influence of Gender MANOVA homogeneity of variance assumption

Levene's Test of Equality of Error Variances[a]

		Levene Statistic	df1	df2	Sig.
ProductLiking	Based on Mean	2,848	1	163	,093
	Based on Median	1,683	1	163	,196
	Based on Median and with adjusted df	1,683	1	161,457	,196
	Based on trimmed mean	2,658	1	163	,105
Buylikelihood	Based on Mean	1,041	1	163	,309
	Based on Median	1,356	1	163	,246
	Based on Median and with adjusted df	1,356	1	154,956	,246
	Based on trimmed mean	1,177	1	163	,279

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + S1_Gender

Chapter 4: Influence of Gender MANOVA Results

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	,944	1365,107[b]	2,000	162,000	,000	,944
	Wilks' Lambda	,056	1365,107[b]	2,000	162,000	,000	,944
	Hotelling's Trace	16,853	1365,107[b]	2,000	162,000	,000	,944
	Roy's Largest Root	16,853	1365,107[b]	2,000	162,000	,000	,944
S1_Gender	Pillai's Trace	,090	8,018[b]	2,000	162,000	,000	,090
	Wilks' Lambda	,910	8,018[b]	2,000	162,000	,000	,090
	Hotelling's Trace	,099	8,018[b]	2,000	162,000	,000	,090
	Roy's Largest Root	,099	8,018[b]	2,000	162,000	,000	,090

a. Design: Intercept + S1_Gender

b. Exact statistic

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	ProductLiking	7,872[a]	1	7,872	10,882	,001	,063
	Buylikelihood	11,709[b]	1	11,709	13,448	,000	,076
Intercept	ProductLiking	1699,217	1	1699,217	2349,013	,000	,935
	Buylikelihood	1545,309	1	1545,309	1774,752	,000	,916
S1_Gender	ProductLiking	7,872	1	7,872	10,882	,001	,063
	Buylikelihood	11,709	1	11,709	13,448	,000	,076
Error	ProductLiking	117,910	163	,723			
	Buylikelihood	141,927	163	,871			
Total	ProductLiking	1854,000	165				
	Buylikelihood	1730,000	165				
Corrected Total	ProductLiking	125,782	164				
	Buylikelihood	153,636	164				

a. R Squared = ,063 (Adjusted R Squared = ,057)

b. R Squared = ,076 (Adjusted R Squared = ,071)

Descriptive Statistics

	What is your gender?	Mean	Std. Deviation	N
ProductLiking	Male	3,0000	,83267	76
	Female	3,4382	,86544	89
	Total	3,2364	,87576	165
Buylikelihood	Male	2,8026	,84884	76
	Female	3,3371	,99936	89
	Total	3,0909	,96789	165