Ethical Consumerism in The Cosmetics Industry: Measuring how Important Sustainability is to The Female Consumer.

Using Conjoint Analysis to Measure the Utility Given to Sustainability Attributes of Cosmetic Packaging as a Function of Consumer's Sustainability Engagement Level

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Petra Caruana

Bachelor Thesis, Communication Science
University of Twente, The Netherlands
Department: Behavioural, Management & Social Sciences
Supervisor: Thomas Van Rompay / t.j.l.vanrompay@utwente.nl
Email Author: p.caruana@student.utwente.nl
Student Number: s1930281
Date: 26 June 2020

Abstract

Previous research on the relationship between consumer sustainability consciousness and purchasing choices in favour of sustainably packaged makeup products is mixed. This study uses online Conjoint Analysis and an environmental sustainability consciousness questionnaire to measure the extent that environmental sustainability consciousness predicts the relative importance female consumers attribute to sustainably packaged eyeshadow palettes. A fake eyeshadow product, Aurora Gold, is used to simulate a market study without alerting the participants to the true intention of measuring sustainability consciousness. The results confirm that women's environmental sustainability consciousness does predict the utility women derive from sustainable makeup packaging and therefore women's purchasing choice. However, this relationship is limited in that the environmental sustainability consciousness factor only explains 7.2% of the relative importance given to sustainable packaging. Further analysis on the research data shows that as the frequency of makeup use increases, the importance given to sustainable packaging in relation to the other product attributes decreases. Moreover, a high proportion of favourite makeup brands indicated do not offer sustainably packaged eyeshadow palette alternatives and post-survey interviews highlight a sense of consumer helplessness in increasing sustainable product consumption. This may indicate a consumer demand for market changes that they believe should be led by cosmetic producers, and the expectation of government authority action in improving the availability of sustainable alternatives.

Keywords: cosmetic packaging; sustainability; sustainability consciousness; conjoint analysis; buying motivation

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Introduction

An understanding of the importance consumers place on sustainable makeup packaging, and why, is of critical importance to the Toly Group and its customer base. Toly Group is the World's leading makeup packaging company and the results of this thesis are intended to guide the Toly Group in its R&D and marketing effort. Toly needs to decide whether, and how, to continually assess consumer sustainability engagement, to evaluate if, and when, to invest more in sustainable packaging R&D, production and promotion. A Toly Group profile and a Heri Cosmetics profile, both supporting this thesis, are set out in Appendix 1.

Management discussions highlight that cosmetic product packaging largely requires plastic moulding, and durable plastic is the most used material. This is not considered to be environmentally friendly (sustainable packaging) but, in many cases, nor are some alternatives that also require a large carbon footprint to produce, such as for products containing metals. Customers (the brands) seem to be undecided on environmentally sustainable packaging. When environmentally friendly materials are used, such as compressed cardboards/paper, metal strips are added to the base to create a heavier / premium feel, thus defeating the original purpose.

Human beings have more than doubled demand on Earth's resources in the truly short time span of the last 50 years. Nevertheless, sustainability has been an issue, whether humans have been aware of this or not since the beginning of time. Sustainability is defined as an approach to society and business that considers economic, environmental, and social issues in a balanced, holistic, and long-term way to benefit current and future generations of people (Elkington 1998; World Commission on Environment and Development 1987). Sustainability can also be understood as meeting the needs of today without damaging tomorrow. In 1987 the United Nations, in its *Our Common Future* report went further to suggest that

development is acceptable but must be sustainable, that is, it should meet the needs of the poor whilst avoiding negative environmental impacts.

To this end, the waste generated by consumer product packaging has become a global issue, including for cosmetic and personal care products. The economic importance of such products cannot be overstated as this ranked in the top six categories of private household consumption.

In Germany alone, these products generated eur13bn in sales in 2013, and in the USA eur440bn by 2016. Since packaging is typically discarded after product use it simply adds to the carbon footprint and other environmental implications of the product. According to Eurostat estimates, 88mn tonnes of domestic packaging waste was generated in 2017. Using ecologically designed packaging improves the overall product sustainability and this seems to be a logical strategy, especially since consumers believe that avoiding excessive plastic unrecyclable packaging had the strongest impact on the environment (Magnier and Schoormans, 2015).

Common consent now is that, during these last 30 years or so, there is an increased awareness of the threat posed globally by human induced greenhouse effects leading to climate change, thereby leading to increased sustainability debate (BBC News, Aug 2008). Prof. Cohen (Huffpost, 2015) is even more positive. He reports that awareness has increased in the last 10 years as more people, mainly in developed countries, understand the need to sustainably manage Earth's resources and ecosystems. As a result, not only are activists pushing governments and corporations to pay more attention to forests, but also there is a paradigm shift in community, household, and individual behaviour. People are now more aware of air quality, waste separation, and so on. He states that this is not a temporary fad but a durable change in values that has an impact on corporate goals of profit, market share and return on equity.

How is consumer decision-making impacted by sustainability information and awareness? O'Rourke and Ringer (2015) present an empirical analysis of the impact of sustainability information on consumer purchase intent. They find that purchase intent varies by product category, consumer type, information quality and any related issues related to the product, such as for health, environment, and social responsibility.

O'Rourke and Ringer (2015) also show that many consumers are unaffected by sustainability information. Indeed, for a number, a product deemed to be more sustainable may decrease purchasing intent. These negative perceptions are based around concerns that green products are more expensive, and of lower quality, than conventional products. Moreover, consumers seem to doubt whether using 'green' products will have an appreciable impact on environmental problems.

This creates a frustrating paradox for business organisations planning to improve the sustainability of their product design and composition. It seems that few consumers who profess positive eco-friendly attitudes follow this up with purchase behaviour. Indeed, surveys show that whilst fully 65% of participants state they want to purchase purpose-driven brands that advocate sustainability, only 26% do so. Unilever estimate that fully 70% of its carbon footprint depends on the products customers choose (White et al, 2019).

Research in this personal care product area is scarce. Other categories, such as food and organic products, are better researched, and consumers here cite health and taste as the primary motivators for purchasing these alternatives (Thøgersen, de Barcellos, Gattermann Perin, & Zhou, 2015).

To understand this paradox better this research surveys the female consumer attitude towards sustainable packaging attributes of cosmetic products through six research objectives, specifically:

1. measuring the utility female consumers attribute to the packaging material of cosmetic products, specifically the relative importance consumers place on recyclable material packaging with respect to other product attributes in a simulated purchase process.

2. measuring the environmental sustainability consciousnesses of the female consumers making the purchase choices.

3. measuring the relationship between the consumers' stated environmental sustainability awareness and sustainability engagement, that is, the consumers' environmental sustainability consciousness and the importance given to sustainable attributes of cosmetic packaging in a buying event. The hypothesis being tested here is:

   H1: a higher consumer environmental sustainability consciousness will result in greater importance given to sustainability attributes of cosmetic packaging.

   This hypothesis requires measurement of two factors, the importance female customers place on environmental sustainability (research question 2) and the relative utility they derive from sustainable packaging in makeup products (research question 1).

4. measuring for differences in relative utility in the sustainable attributes of cosmetic packaging in a buying event by frequency of makeup usage.

5. understanding the choices made by female respondents in the simulated purchase exercise.

6. measuring the market availability of sustainable makeup product alternatives produced by the favourite brands indicated through this research, since, this has real-world implications on buying behaviour.

Theoretical Framework

In measuring the relationship between the consumers' stated environmental sustainability consciousness, and the importance given to sustainable attributes of cosmetic packaging in a buying event, it is necessary to first understand the buying process and the consumers' attitudinal behaviours. Specifically, how does a consumer behave during a purchasing event, especially when buying cosmetics as a category of fast-moving goods? What are the motivations in play during such a buying event? Can sustainability consciousness be a motivator? What is the function of cosmetic packaging in practice and during the buying event? How does the sales / distribution channel for cosmetics products effect the buyer's behaviour and motivations?

Purchase behaviour

Carrigan and Attalla (2001) report that up to 2001, the great majority of consumers declared themselves to be aware of environmental issues, but this did not motivate them to purchase more sustainable products. This was surprising then since, in the context of personal care, sustainable products had attributes that avoid toxic substances, such as parabens and phthalates, or reduce environmental effects, such as by reducing microplastics, water consumption or petroleum derived substances, and reducing the impact on animal welfare, such as by forgoing genetic manipulation and animal testing.

Sector growth rates remain low due to price competition. However, the market for sustainable products was seen to offer huge potential for both manufacturers and retailers, even though despite the anticipated trends, very few consumers were using sustainable personal care products. This, therefore, creates an urgent need to understand consumer perception of sustainability and purchasing motives. What is the consumers' perception of what is sustainable, and which product attributes satisfy their purchasing motives, specifically in the cosmetics industry? (Eberhart and Naderer, 2017)

Consumer motivation

The term motive refers to the reason why a given behaviour occurs. In exploring consumer motive to engage in green consumerism, Moisander (2007) notes that this is a heavy responsibility for any single individual to bear as part of a private lifestyle project. In public discourse consumers are still expected to be sustainability-conscious decision makers, carefully monitoring their purchasing practices, knowing the options available and engaging in reuse, recycling, etc. Often, consumers are also expected to influence their peers and to be civically active and engaged towards the cause. For most people this is probably a huge ask making the issue ethically complex. This is also especially when environmentally responsible behaviour involves difficult motivational conflicts arising from incompatibility of collective goals to individual consumer's self-interest benefits. (Moisander, 2007)
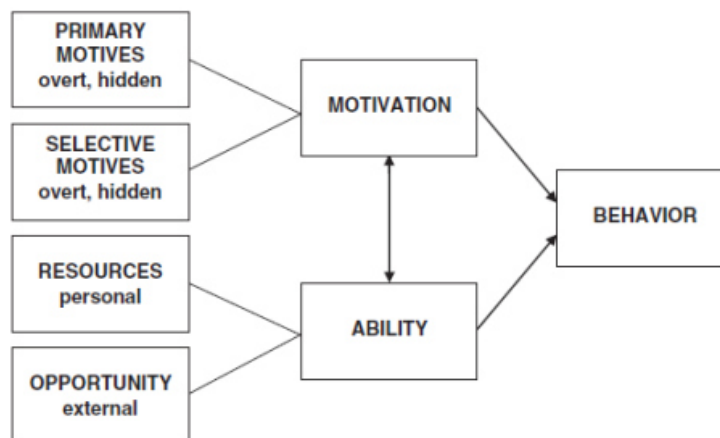
Figure 1: Motivation and behaviour

Moisander (2007) sets out two components, strength, and direction of motivation, to determine the consumer's behaviour. The figure above explains the relationship components leading to behaviour and is in line with most consumer motivation studies that hold that consumer behaviour is purposive. This means that people aim to satisfy their needs or to attain their goals. However, the associated motives can be both overt and covert. This means

that whilst one motive may be purposive (overt), the consumer may not even be aware of other subconscious (covert) motives during a purchase.

Consumers also expect that their choices will satisfy their motives and that these decisions will be made quickly and with minimal effort. This means that the assumption that consumers will analyse sustainability information systematically, because this is consistent with the environmental concerns they express, is probably not correct, or at least is not a straightforward process of consumer rational deliberation. When products are purchased repeatedly, and are relatively unimportant, consumers are assumed to heuristically process information. These are conscious, or unconscious, decision-making strategies that save time and reduce complexity of personal choice situations (Gigerenzer and Brighton, 2009). Heuristics explain the ability of consumers to make accurate inferences from limited observations even within an uncertain environment. A heuristic process is a satisficing process, seeking a good-enough solution rather than seeking an optimal solution (Gigerenzer & Brighton, 2009). This is also explained as bounded rationality which views decision-making as a fully rational process of finding an optimal choice given the information available. It is the idea that when individuals make decisions, rationality is limited by the potential interpretations and leeway of the decision problem, the cognitive limitations of the mind, and the time available to make the decision. Therefore, consumers are satisficers, seeking a satisfactory solution rather than an optimal one. (Simon, 1957)

Eberhard and Naderer (2017) find that three critical factors build on each other to result in more sustainable consumer choices. First is that consumers' need to be aware of the environmental and social consequence of their consumption, and they must be in a motivated state about this so that they feel they must act. Then consumers need to be competent in assessing product sustainability for which they will use simple decision heuristics. Third, consumers need to be able to identify alternatives to choose from. Only when products are

evaluated positively and satisfy consumer motives do they become acceptable choices. This has marketing and communication implications in the selection of heuristic cues as enablers for more sustainable decisions (Eberhart and Naderer, 2017).

The authors then categorise consumers as *Unreflecting*, *Limited* and *Responsible* consumers. Unreflecting consumers have low sustainability awareness of personal care products and do not have a heuristic strategy to identify and choose more sustainable products. Limited consumers have a weak understanding of sustainability and associate this with environmental protection and preservation. Limited consumers tend to ignore sustainable product attributes at the point of sale. Responsible consumers have the best appreciation of sustainability, understanding the impact of their choices. They tend to prefer cruelty free products, fairness in bringing the product to market, and natural products, and are highly conscientious of resource usage (Eberhart and Naderer, 2017).

Limited and Responsible consumers have developed individual problem-solving strategies to satisfy their sustainable product motives so that they will fall on to heuristic strategies to infer the sustainability of a product. Again, the cues at different touchpoints, such as product labelling, advertising, and in-store displays, can support the heuristic purchase process (Eberhart and Naderer, 2017).

Twinned to this is the classification of cosmetics as a hedonic product category, consumed for its hedonic benefits, including increased self-esteem, and feelings of attractiveness. This increases the occurrence of consumer impulse buying (Tinne, 2010). Consumer impulse buying is influenced by promotional activities, consumer personality, age, consumer mood, perceived risk such as the item price to consumer income ratio, etc. (Lucas & Koff, 2014, and Gerbing et al., 1987). Rook (1987) pointed out that the sudden urge to buy is likely to be triggered by a visual confrontation with a product. This study defines the impulse buying tendency as a four-step process. First is the feeling of an overwhelming force

emanating from the product and an intense feeling of needing to buy the product immediately. Then there is the consumers' tendency to buy spontaneously and unreflectively. This triggers an emotional reaction which is ambiguous and out of control. Finally, a strong impulse to buy a product immediately is generated, often without much deliberation.

The function of packaging on motivation

We can see that packaging has several functions beyond product protection and transportation. It is also an information source to consumers in evaluating the sustainability of a product or brand, especially in fast moving consumer goods (FMCG). The visual information on the package as well as the packaging design and materials used gives the product personality, signals sustainability and influences consumer reaction. However, research shows that the influence of ecological packaging design elements on consumer preference strongly depends on the consumers' level of environmental concern (Orth and Malkewitz, 2008).

Purchase setting impact on motivation

The store environment is seen to be critical to positive purchase motivations. Fully 73% of purchasing decisions are made in-store. Promotions and price markdowns are two influential dimensions of the in-store marketing. However, even this environment is changing over time as many of these marketing dimensions are being replicated online. Moreover, taking the experience gained during the last recession, we should expect fickle shoppers again resulting in heavy discounting and substantial promotions, improving sales but depressing profits. Retail strategy, including promotion mix decisions, will therefore again become critical as consumers will come to expect these (Fam et al., 2011)

The global beauty market is a $532 billion business where, historically, large legacy brands have ruled the industry, both in market share and in prestige. However, digital brands are now the big growth sector, particularly in colour cosmetics, a category well suited to

digital marketing because of its visual nature. From 2008 to 2016, colour-cosmetics challenger brands grew by 16 percent a year, four times as fast as legacy companies. They now account for 10 percent of the colour-cosmetics market, up from 4 percent in 2008 (Hudson & Moulton, 2018).
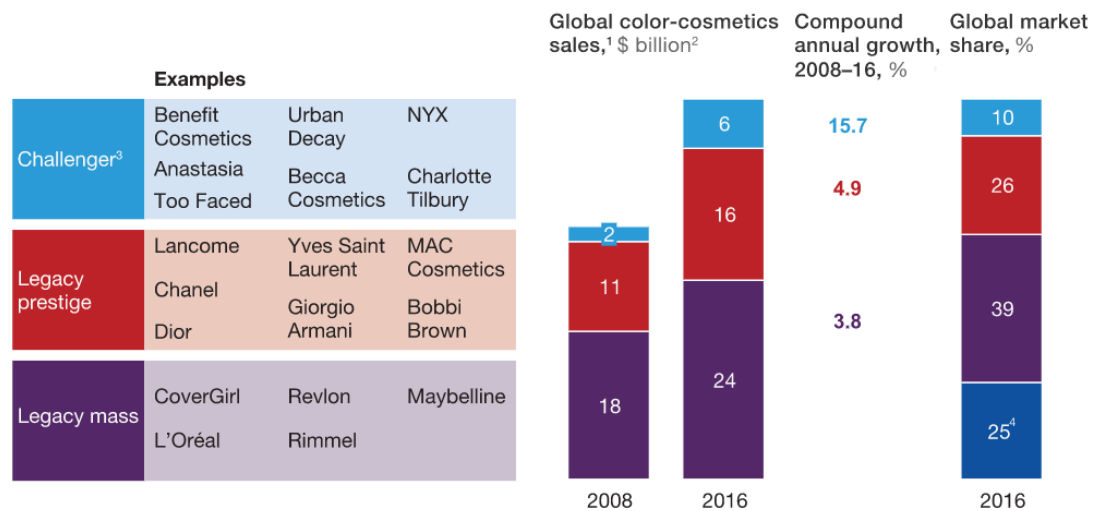
Figure 2: Growth in cosmetics digital brands to 2016

Hudson and Moulton (2018) link this trend to the evolving product and shopping preferences of the millennial generation devotion to social media, and are three times more likely than baby boomers to assume that newer brands are better or more innovative and three times more likely to say they typically learn about new products or brands from social media.

Traditional marketing channels, such as in-store displays, print advertising, and television commercials, therefore influence millennials less. As beauty consumers, they are quick to try new products, and they change their preferences often. They expect to be able to try anything once, free of charge. They crave newness in beauty and want the experience to be fun and prefer informal interactions. This is critical for marketing communications and messaging to this market sector (Hudson & Moulton, 2018).

Sustainability consciousness

There is a lot of research measuring various factors of consumer sustainability consciousness, including proxies intended to indicate a measure for such consciousness. Further on we look at research by the SB Index Brand report for 2020 and others.

The concept of sustainability consciousness has its roots in sustainable development and is based on the three pillars of sustainable development. These pillars commenced with Agenda 21 document for the UN millennium development goals to be achieved by 2030. More explicit themes have been defined since. Whilst these goals are societal, the UNESCO 2015 framework proposed individual subthemes and determined that these dimensions should be expressed in terms of individual's knowledge, attitude, and behaviour (Michalos et Al., 2011).

Consciousness, or the concept of consciousness, is often used synonymously with self-consciousness in terms of how a person differentiates himself from the surrounding world. It is also used to refer to wakefulness in all its implications. It also means knowledge in terms of one being conscious of something and can be referred to as experience itself. (Gericke et. At., 2018)

Sustainability consciousness, therefore, refers to the awareness or experience of sustainability matters. These may include experiences and perceptions that an individual may associate with himself, such as for beliefs, feelings, and actions. Furthermore, if a perception becomes consciousness when sufficiently integrated to be disseminated in the brain, then a person's sustainability consciousness may be measured using a questionnaire instrument including explicit questions on sustainability issues. This, therefore, makes the concept of sustainability consciousness operational (Gericke et. At., 2018).

Sustainability product purchase trends

The Stern Centre for Sustainable Business (Stern CSB, 2019) reports that whilst all products are gaining from sustainability marketing over time, categories that demand high functionality (e.g. detergent) do not have a large percentage of sustainable purchases, whilst categories with low functionality demands (e.g. salty snacks) have a higher percentage of sustainable purchases. This, therefore, could be interpreted to mean that cosmetics should be expected to lag other consumer packaged goods (CPG) categories in sustainability product market share growth.

The Sustainable Brand Index for the Netherlands (SB Insight, 2020) sets out a sustainability brand index ranking that reports the Body Shop in the 20th place to become the highest ranked cosmetic brand overall, and L'Oréal ranked at 160 with practically no other cosmetic brand in between. This can be read to be a poor showing and possibly an opportunity to increase sustainable cosmetic product offerings, depending on consumer preferences in this regard.

Having seen what drives consumer behaviour and the manner in which purchase decisions are taken for buying of hedonic, non-frequent, consumer goods, specifically cosmetics, we can measure whether sustainability consciousness is a motivator to female consumers when selecting eyeshadow makeup products.

This thesis answers six questions through primary research. It revolves around the measurement of the relationship between female consumers stated environmental sustainability consciousness, and the importance that the female consumer gives to sustainable attributes of cosmetic packaging when purchasing. We have seen the motivations and the product and purchase environment characteristics that effect the buying decision to be able to design an effective research method.

Methodology

To keep the research as close as possible to a real buying event, specific characteristics were designed into the research method and scale to test consumer purchase preferences. The overall method is set out in the table below:

No	Objective	Method	Instrument	Reliability
1	Measure consumer utility derived from recyclable packaging material relative to other product attributes (Factor 1)	Conjoint Analysis (CA)	Multi-part online survey through Conjoint.ly	McFadden's pseudo-R^2 to calculate goodness of fit with R^2=58%.
2	Measure consumer environmental sustainability consciousness (Factor 2)	Environmental Sustainability Consciousness questionnaire (ESCQ)		Cronbach's Alpha =0.76 after removing one of the questions.
3	Test the hypothesis that a higher consumer environmental sustainability consciousness (X) will result in greater importance given to sustainability attributes of cosmetic packaging (Y).	Regression analysis for Sustainability Consciousness and Packaging Material Attribute Utility		See CA and ESCQ
4	Measure differences in objective 1 above for different frequencies of makeup usage.	Conjoint Analysis (CA)		McFadden's pseudo-R^2 to calculate goodness of fit with R^2=58%.
5	Understand the choices made in the simulated purchase exercise.	Post-survey interviews	Semi-structured interviews	Inter-rater reliability with Cohen's Kappa of 0.91
6	Measure the market availability of sustainable makeup product alternatives produced by the favourite brands indicated.	Market research	Online analysis of brand producer official websites	NA

Table 1: Research objectives, method, instrument, and reliability measures.

In summary, this consists of a single multi-part survey instrument containing a conjoint analysis and an environmental sustainability consciousness questionnaire, followed up by a series of post-survey interviews, and brand product research into sustainable product offerings.

Design preparation

To assist in the instrument design discussions were held to confirm Toly's understanding and the results of consumer market research on sustainable packaging the company has purchased or conducted.

To make the survey as close to a real purchase event as possible when in-store testing is not possible, or legal currently, Conjoint Analysis is used. Also, this part of the survey precedes the Environmental Sustainability Consciousness questionnaire so as not to draw attention the sustainability focus of this research since this may influence the participants' heuristic process to expressing preferences in a way that would not be mirrored in a real-life environment. The full instrument design is set out in Appendix 3 - Survey instrument design.

Factors created through the two instruments in a single survey are then analysed to measure the relationship between respondent product packaging material attribute importance (factor 1) and environmental sustainability consciousness (factor 2).

This relationship is then explored further through post-survey interviews with a sample of the participants.

Participants

Permission to conduct the study was obtained from the university's ethics committee (see: https://www.utwente.nl/en/bms/research/ethics/). An initial 78 people were contacted via Facebook, Instagram, and WhatsApp to use the link and support my research. Other Facebook groups were also contacted, such as Beauty Game (45k followers), to also encourage participation. Finally, a few students from the University of Twente Sona system also participated.

There were 246 participants who completed the survey and were deemed acceptable (Conjoint.ly tests for response quality by measuring the time to reply, where too fast replies

are excluded as low-quality replies). This included 6 participants who declared themselves as being male or other and were also excluded from the respondent list to bring the participants total to 240 females.

Most participants are in the youngest 18 to 25 age group (59.6%) with a fairly even spread across other groups (Table 2: Respondent age groups). The participants' frequency of makeup use is fairly spread with frequent usage in the main (45.4%) (Table 3: Respondent frequency of makeup use). Only 3.3% of participants claim not to use makeup signifying good product knowledge across most participants (96.7%). 4.6% of participants claim to be professional make-up artists, making for an interesting, albeit small group (Table 4: Participants who are professional makeup artists).

Demographics: Age Group

		Frequency	Percent	Valid Percent	Cumulative Percent
	18 to 25	143	59.6	59.6	59.6
	26 to 35	27	11.3	11.3	70.8
Valid	36 to 50	27	11.3	11.3	82.1
	50+	43	17.9	17.9	100.0
	Total	240	100.0	100.0	

Table 2: Respondent age groups

Frequency of makeup use

		Frequency	Percent	Valid Percent	Cumulative Percent
	Daily	69	28.8	28.8	28.8
	Frequently	109	45.4	45.4	74.2
Valid	Special occasions	54	22.5	22.5	96.7
	Never	8	3.3	3.3	100.0
	Total	240	100.0	100.0	

Table 3: Respondent frequency of makeup use

Professional makeup artist

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	229	95.4	95.4	95.4
Valid	Yes	11	4.6	4.6	100.0
	Total	240	100.0	100.0	

Table 4: Participants who are professional makeup artists

Table 5 sets out the spread of referrer systems through which participants arrived at the survey. Facebook was the best referral system (45.4%) although in 35.8% of the cases no referral system was recorded.

Referrer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None recorded	86	35.8	35.8	35.8
	http://instagram.com/	31	12.9	12.9	48.8
	https://messenger.com/	2	.8	.8	49.6
	https://utwente.sona-systems.com	12	5.0	5.0	54.6
	https://www.facebook.com/	109	45.4	45.4	100.0
	Total	240	100.0	100.0	

Table 5: Referral systems

Post-survey interviews were conducted to further understand the results of the survey from a respondent point of view. Five interviews were carried out with the following participants:

PARTICIPANT NO.	NATIONALITY	OCCUPATION	AGE GROUP
1	Maltese	Student	18-25
2	Maltese	Yoga instructor	30-35
3	Maltese	Student	18-25
4	Maltese	Home maker	50+
5	German	Student	18-25

Table 6: Post-survey interview participants

Multi-Part Survey Instrument

The online multi-part instrument was created in line with the framework literature reviewed. It included a passive consent form to create a single flowing online session. The instrument itself was kept light and the response time at a quick 6 to 8 minutes. The initial questionnaire asked very few personal questions and was interspersed with fun and motivational quotes and pictures. Then this switched to the Conjoint Analysis exercise with four attributes of two levels each, giving rise to a design with seven choice tasks of three products each.

The Conjoint Analysis exercise was then followed by a nine-item questionnaire, using a Likert scale throughout, to measure environmental sustainability consciousness. This sequence of the Conjoint Analysis followed by the questionnaire was critical so as not to alert the participants on the true objective of the survey instrument.

The entire survey instrument consists of:

1. a short questionnaire with 5 items (Q3, 4, 5, 6, 7 – see Appendix 3 - Survey instrument design), capturing consumer demographic and cosmetic use variables.

2. Conjoint Analysis choice tasks using a specialised on-line service (Conjoint.ly) covering four key attributes including price, and two levels per attribute. This resulted in a design with seven choice tasks of three product variations each (Q9).

3. This is followed by an environment sustainability consciousness questionnaire with nine items measuring participant knowingness (Q11, 12, 13), attitude (Q14, 15, 16) and behaviour (Q17, 18, 19) towards environmental sustainability. This is an extract of the short version survey instrument prepared by Gericke et al. using a 5-point Likert scale as explained below.

The research instrument was piloted several times to be released to participants. The layout included images related to the attributes to maintain respondent interest levels and product differentiation on screen. The instrument itself was made available through Conjoint.ly at https://run.conjoint.ly/study/70831/hpgahayg12. Convenience sampling was used initially followed by snowball sampling where participants were asked to circulate the participation email note to family and friends.

Survey instrument - Conjoint Analysis

The online design was necessary due to the current Coronavirus pandemic and related distancing rules and lockdowns. A simulated purchase environment with prototype cosmetic

packaging produced by Toly would have been more natural as the prototype packages would have conveyed more attributes than is possible on-line. Nevertheless, this would also have meant that far fewer responses would have been possible in the time constraints of face-to-face sessions.

Care was afforded to ensure that the user enjoyed the survey experience using UX elements to add a touch of realism and motivation. For example, prior to the start of the Conjoint Analysis, the following introduction to the Conjoint Analysis exercise, including the instruction, and a depiction of a cosmetic store setting, was presented:

Aurora Gold Eyeshadow Palette

Welcome to my makeup shop. You have asked for a high quality Aurora Gold eyeshadow palette. Aurora Gold eyeshadows are highly pigmented, multipurpose and easy to blend. In the next 7 rounds I will offer you three eyeshadow palettes to choose your preferred one in each.

Each round is independent (pretend you've walked into my shop again) and I will offer you three new palettes in each successive round. Please choose your preferred one in each round.

Go back   Continue

Figure 3: Cosmetic store environment and Conjoint Analysis exercise explanation (Q8)

To make the online instrument as realistic as possible participants were told that this is market research for a new brand called Aurora Gold, an invented (fake) brand to simulate a purchasing decision. A description of the brand product intentions, such as being a multi-purpose make-up with other differentiating make-up characteristics, was created. A semi-structured interview was also held with a make-up producer, a customer of the Toly Group, for guidance on how to present the Aurora Gold brand created for this thesis research.

Eyeshadow was selected as the representative makeup product since this is an essential part of a woman's cosmetic kit. It is also indicated by Toly Group and Heri

Cosmetics as a main and critical product line of any makeup brand. Moreover, eyeshadow lends itself to this study since the main packaging is also the pigment palette container. This product type can be made available in disposable non-recyclable plastic material packaging as well as recyclable cardboard material, and therefore using eyeshadow in the conjoint analysis is entirely credible to consumer participants.

The makeup product itself is described through four product attributes as set out in Table 7 below. These are some of the important attributes a woman would likely consider when purchasing eyeshadow and include the number of pigment pans in the palette, the material the palette is made of (this is the key attribute to this study), the accessories included in the product such as for a mirror, and price.

The Conjoint Analysis method selected is the choice based conjoint design (CBC), the most common type of discrete choice experiments. This is typically used for feature selection for new products, and testing branding, packaging, and advertising claims. The method uncovers consumers' preferences and is applicable when discovering the type of product consumers are likely to buy, and what consumers value the most (and least) about a product. It is commonplace in market research because CBC interviews closely mimic the purchase process for products in competitive contexts (Orme, 2014). The full explanation of this method is set out in Appendix 4 – Conjoint Analysis.

Through this method, participants are shown seven choice tasks. A choice task is a set of three products to choose one (see figure below).
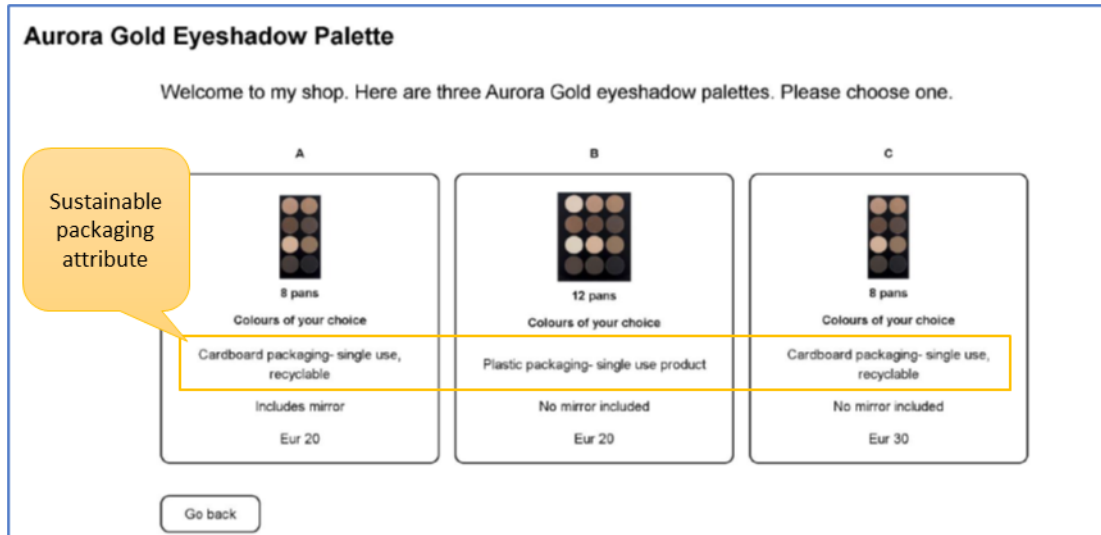
Figure 4: Conjoint Analysis – single choice task of three products to choose one,

Sixteen different eyeshadow products are displayed through the seven choice tasks. These products are consistently described through four product attributes, that is, palette size, package material, accessories and price. Each attribute can be one of two attribute levels as set out in Table 7 below. The sixteen different Aurora Gold eyeshadow products are a pre-set combination, or mix, of attribute levels selected for this experiment, and are shown to the different participants in the same sequence of seven choice tasks.

AURORA GOLD MAKEUP PRODUCT DESIGN

ATTRIBUTE	Attribute levels
PALETTE SIZE	1. 8 pans (colours of your choice) 2. 12 pans (colours of your choice)
PACKAGE MATERIAL	1. Plastic packaging – single use product 2. Cardboard packaging – single use, recyclable
ACCESSORIES	1. Includes mirror 2. No mirror included
PRICE	1. Eur20 2. Eur30

Table 7: Conjoint Analysis design - attributes and levels

The inclusion of a price attribute is important to the CBC experiment, as price has two distinct functions. Consumers use price as a signal of product quality (informational role) and as a financial constraint in choosing it (allocative role) (Gustafsson, 2007). In this exercise, only the net effect of the two roles of price is estimated.

All the product attributes and their levels selected in designing the Aurora Gold eyeshadow palettes are the stimuli that will instigate the participants' buying behaviour. The product choices they make are then analysed for the trade-offs they made during the 'buying' process to be able to compute the relative utility, measured in utils, participants are placing on each product attribute and attribute level. The intention is to analyse the importance respondents give to the packaging attribute and specifically to the recyclable cardboard level, compared to the other attributes.

Survey instrument - Environmental Sustainability Consciousness Questionnaire (ESCQ)

The final part of the multi-part survey instrument is the Environmental Sustainability Consciousness Questionnaire (ESCQ). This is an extract of the refined instrument prepared by Gericke et. al. (2018) and is based on the original scale developed by Michalos et. al. (2011) for educational research among students in Manitoba, Canada. The questionnaire is theoretically and empirically developed based on UNESCO's definition of sustainability development. The original questionnaire is used to measure individual's environmental, social, and economic knowingness, attitudes, and behaviour along nine valid and reliable subscales. The knowingness, attitude and behaviour constructs lead to the sustainability consciousness construct to form a holistic approach in investigating consumer cognitive and affective views of sustainable development.

Gericke et Al. (2018) reviewed the original 9 factor, 49 item scale and shortened this using factor analysis to a 9 factor, 27 item scale using a Likert scale throughout. Whilst retaining excellent psychometric quality, the instrument is far more accessible and operational.

The scale developed for this thesis is an extract of the Gericke shortened questionnaire, limited to 3 factors for environmental sustainability consciousness, with 9

items covering sustainability knowingness, sustainability attitudes and sustainability

behaviour (see table below).

Environmental Sustainability Consciousness Questionnaire (ESCQ)	
Sustainability Knowingness – Factor 1	
1	Reducing water consumption is necessary for sustainable development.
2	Preserving the variety of living creatures is necessary for sustainable development (preserving biological diversity).
3	For sustainable development, people need to be educated in how to protect themselves against natural disasters.
Sustainability Attitudes – Factor 2	
4	I think that using more natural resources than we need does not threaten the health and well-being of people in the future. *(NEGATIVE inverted in analysis)*
5	I think that we need stricter laws and regulations to protect the environment.
6	I think that it is important to take measures against problems which have to do with climate change.
Sustainability Behaviour – Factor 3	
7	I recycle as much as I can.
8	I always separate food waste before putting out the rubbish when I have the chance.
9	I have changed my personal lifestyle in order to reduce waste (e.g., throwing away less food or not wasting materials).

Table 8: Environmental sustainability consciousness factors

The ESCQ is being used to construct the Environment Sustainability Consciousness

composite index factor as set out in the diagram below:
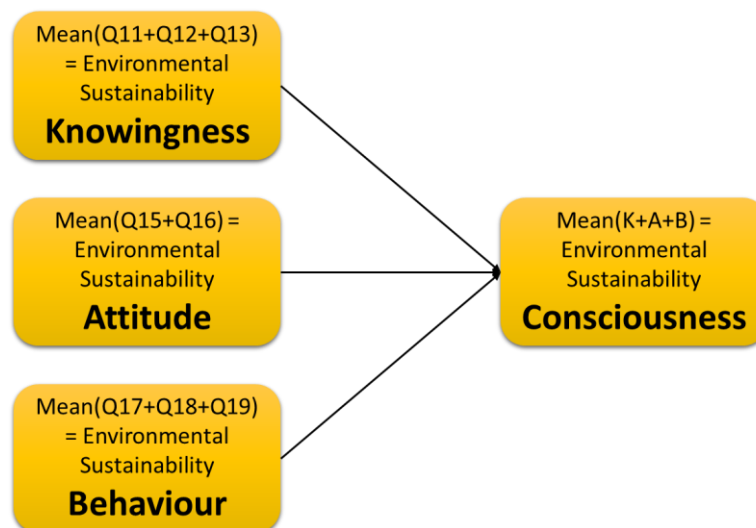
Figure 5: Environment Sustainability Consciousness composite index factor

This is possible since the questionnaire is a summative scale. Also, as explained by

Michalos et. al. the composite indices for Knowingness (K) and Attitude (A) could only

explain 14% of the Behaviour (B) composite index indicating that other factors are at play. Therefore, all three composite indices are being used in the calculation of the Consciousness (C) composite index such that Behaviour is being treated as another independent variable.

Post-survey questionnaires

Once the survey was closed, this was followed by a short-structured interview, with a sample of participants, to understand the reasoning behind their attribute and attribute level preferences expressed in the research.

Five interviews were carried out via Skype and Zoom. The interviews were coded and analysed using Atlas.ti. The interview script, and codebook are set out in Appendix 7 – Post-Survey Interviews.

Since the research results are anonymised, there is no link between these interviews and the actual responses. Nevertheless, enough interviews were carried to enable triangulation to existing research and the survey results.

Brand sustainable product alternatives market research

The participants' favourite brands are recorded through the multi-part survey and used to measure and tabulate the market availability of alternative sustainable products for these brands. In all cases, the official website of each brand was searched for sustainable product offerings and a marketing emphasis on package or product sustainability.

Reliability

A summary of reliability measures is set out in Table 1 above. More detail is provided below.

Conjoint analysis

The reliability of the Conjoint Analysis portion of the scale is calculated by Conjoint.ly using McFadden's pseudo-R^2 to calculate goodness of fit. In this case the

R²=58%, considered to be a medium fit. In general, a strong goodness of fit (pseudo-R² value of over 65%) indicates that respondents have clear preferences for features. A weak goodness of fit (pseudo-R² value of under 45%) suggests that respondents' choices are more arbitrary.

Environmental Sustainability Consciousness Questionnaire

There are 240 valid cases for the 9 item ESCQ portion of the multi-part survey. Reliability using the Cronbach reliability coefficient of alpha = 0.668 is calculated using SPSS for these scale items measuring knowingness (Q11,12,13), attitude (Q14, 15, 16) and behaviour (Q17, 18, 19) and in turn consciousness factors (see the table below).

Reliability Statistics

Cronbach's Alpha	N of Items
.668	9

Table 9: Environmental Sustainability Scale - Cronbach scale reliability measure

Generally speaking, alpha coefficients above 0.70 are regarded as acceptable and the result here falls slightly short. This seems to be emanating from Q14 which was negatively coded (and reversed for analysis) indicating some respondents may have misread the question. If this item were deleted Cronbach's alpha for the scale would increase to 0.76, bringing this into a more acceptable range. Q14 is therefore being disregarded for the remainder of this project.

Post survey interviews

For the post-survey interviews, inter-coder reliability was carried out through a fellow student coder where fragments from the first three transcripts (total 20% of all transcripts) were separately coded and compared. Cohen's Kappa was then computed for reliability, resulting in a value of 0.91.

Results

A summary table linking the results below to the six research objectives is set out

below. This is followed by detailed explanations leading to the highlighted results.

No	Objective	Method	Key finding
1	Measure consumer utility derived from recyclable packaging material relative to other product attributes (Factor 1)	Conjoint Analysis (CA)	Cardboard packaging material attribute level importance of 32.9% (or 2.34 utils) relative to all other eyeshadow product attributes, equal to price attribute importance of 32.4%.
2	Measure consumer environmental sustainability consciousness (Factor 2)	Environmental Sustainability Consciousness questionnaire (ESCQ)	The mean composite Environment Sustainability Consciousness measure is a relatively high 4.42 out of the maximum response of 5 on the Likert scale.
			Highest scores were for climate change measures, the need for better environment protection legislation, sustaining biological diversity. Lowest was for personal lifestyle changes. Nevertheless all scores were high.
3	Test the hypothesis that a higher consumer environmental sustainability consciousness (X) will result in greater importance given to sustainability attributes of cosmetic packaging (Y).	Regression analysis for Sustainability Consciousness and Packaging Material Attribute Utility	Participants with greater environmental sustainability consciousness placed more importance on sustainable packaging when purchasing makeup products ($F(1,238) = 18.509$, $p < .000$), with an R^2 of 0.072.
			Environmental consciousness only explains 7.2% of purchase motivation factors.
4	Measure differences in objective 1 above for different frequencies of makeup usage.	Conjoint Analysis (CA)	Cardboard packaging material attribute level importance by frequent and professional users drops to 27% from 33%, relative to all other eyeshadow product attributes.
5	Understand the choices made in the simulated purchase exercise.	Post-survey interviews	Limited importance given to purchasing sustainable makeup products because: • Is largely unavailable on the market. • Makeup is not purchased often and lasts a long time, so consumers do not think of environmental consequences when purchasing. • Feel that this is a brand producer issue and it is producers who should initiate change.
6	Measure the market availability of sustainable makeup product alternatives produced by the favourite brands indicated.	On-line market research	88% of favourite brands do not offer sustainable eyeshadow makeup products as an alternative to the current range. This affects 69% of respondents.

Table 10: Research objectives, method, and summary results

Research question 1 – Attribute utility measured through conjoint analysis

Conjoint analysis is part of the multi-part survey instrument to measure what

consumers value across the attributes and levels of the makeup product variants they selected.

The intention was to measure the utility derived from the recyclable packaging material relative to other product attributes. This measure is then used as one of the factors, the dependent variable, in the linear regression analysis answering research question 3.

The Conjoint Analysis survey results are filtered to include female participant results only. The makeup product attribute utilities, in utils, derived on average by all female participants, is set out in Table 11, leading to the relative importance for the full female participant group in Figure 6.

Female respondents

Attribute level part-worths

Attribute	Level	Relative utility
Palette size	12 pans	1.56
Palette size	8 pans	-
Package design	Cardboard	2.34
Package design	Plastic	-
Accessories	Mirror	0.91
Accessories	No mirror	-
Price	eur20	2.31
Price	eur30	-

Table 11: Attribute level utility - all female respondent group
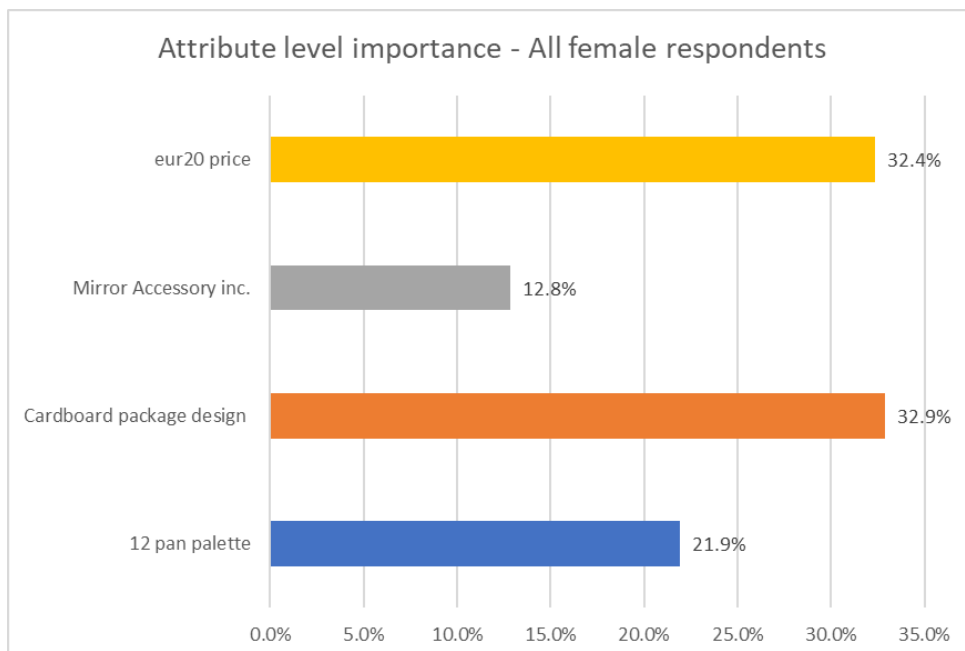
Figure 6: Attribute importance - all female respondents

This shows that package design (cardboard or plastic) and price (eur20 or eur30) have practically equal importance to the group at 32.9% and 32.4% respectively, relative to all attribute levels in the conjoint analysis design. The figure above shows that the importance given to the cardboard packaging is 32.9%, practically the same as for the lower eur20 price level. The maximum utility possible for any one attribute or level is 75% under this design. This assumes that all participants focus on the same attribute with every choice task.

A wider analysis of the data is set out in Appendix 5 – Further analysis of participant data and hypothesised relationship. Here the Conjoint Analysis results are further analysed by age groups, frequency of makeup use and whether the participant is a professional makeup artist or not.

Research question 2 - Environmental Sustainability Consciousness measured through the ESCQ

The results to the ESCQ are a measure of the respondents' environmental sustainability consciousness. The measure is used as another factor, the independent variable, in the linear regression analysis answering research question 3.

The table below sets out the mean responses for the Environmental Sustainability Consciousness Questionnaire for all female respondents. The mean response for all female respondents of the composite Environment Sustainability Consciousness measure is a high 4.42 out of the maximum response of 5 on the Likert scale.

The highest scale scores are for the importance of measures to manage climate change (4.73), the need for stricter laws and regulations to protect the environment (4.66), and preserving biodiversity for sustainable development (4.66). The lowest scored item is having made a change to personal lifestyle to reduce waste (4.08).

Environmental Sustainability Consciousness Questions	Mean	Max
Q11: Reducing water consumption is necessary for sustainable development	4.35	5
Q12: Preserving the variety of living creatures is necessary for sustainable development (preserving biological diversity).	4.66	5
Q13: For sustainable development, people need to be educated in how to protect themselves against natural disasters.	4.14	5
Q15: I think that we need stricter laws and regulations to protect the environment.	4.66	5
Q16: I think that it is important to take measures against problems which have to do with climate change.	4.73	5
Q17: I recycle as much as I can	4.32	5
Q18: I always separate food waste before putting out the rubbish when I have the chance.	4.41	5
Q19: I have changed my personal lifestyle in order to reduce waste (e.g., throwing away less food or not wasting materials).	4.08	5

Table 12: Mean ESCQ responses - all female participants

Research question 3 - Environmental sustainability consciousness as predictor to sustainable packaging attribute importance

Linear regression analysis was calculated to predict Relative Importance of Cardboard Recyclable Packaging (relative to all attribute levels in this conjoint analysis design) based on Environmental Sustainability Consciousness for all female respondents.

The dependent variable, Relative Importance of Cardboard Recyclable Packaging was measured through the conjoint analysis to answer research question 1. Relative Importance is measured in utils (utility) and can be represented in percentage terms with respect to all other product attributes. Utils are treated here as an interval scale.

The independent variable, Environment Sustainability Consciousness was measured through the ESCQ to answer research question 2. Consciousness is derived from the other

scale questions which are measured on a Likert Scale from 1 to 5 and is treated here as an interval scale.

The equation tested is therefore:

$y = b_0 + b_1x + e$ which can also be written as:

Relative Importance of Cardboard Recyclable Packaging $= b_0 + b_1$(Environment Sustainability Consciousness) $+ e$

The result confirms H1, that the main effect of Environment Sustainability Consciousness on Relative Importance of Cardboard Recyclable Packaging was significant $(F(1,238) = 18.509, p < .000)$, with an R^2 of 0.072, showing that participants with greater environmental sustainability consciousness placed more importance on sustainable packaging when purchasing makeup products.

Participants' Relative Importance of Cardboard Recyclable Packaging is equal to -0.417 + 0.155 (Environmental Sustainability Consciousness) utils, when Environmental Sustainability Consciousness is measured as a compound index through the ESCQ. Relative Importance of Cardboard Recyclable Packaging increased 0.155 utils for each 1unit increase in Environmental Sustainability Consciousness.

Nevertheless, participants' Environmental Sustainability Consciousness only predicts 7.2% of variability in Relative Importance of Cardboard Recyclable Packaging.

Research question 4 – Changes to attribute importance by frequency of makeup usage

Exploring the results of the Conjoint Analysis measures found that, in general, less importance was given to sustainable cardboard packaging, with respect to all product attributes, the more frequently the participant uses makeup. This finding is true irrespective if the user is a professional makeup artist or a normal user.

The relative importance attributed by daily makeup users is 27%, compared to the average for all consumers (33%), and compared to the average for 'occasional' makeup users (35%). See Figure 7 below.
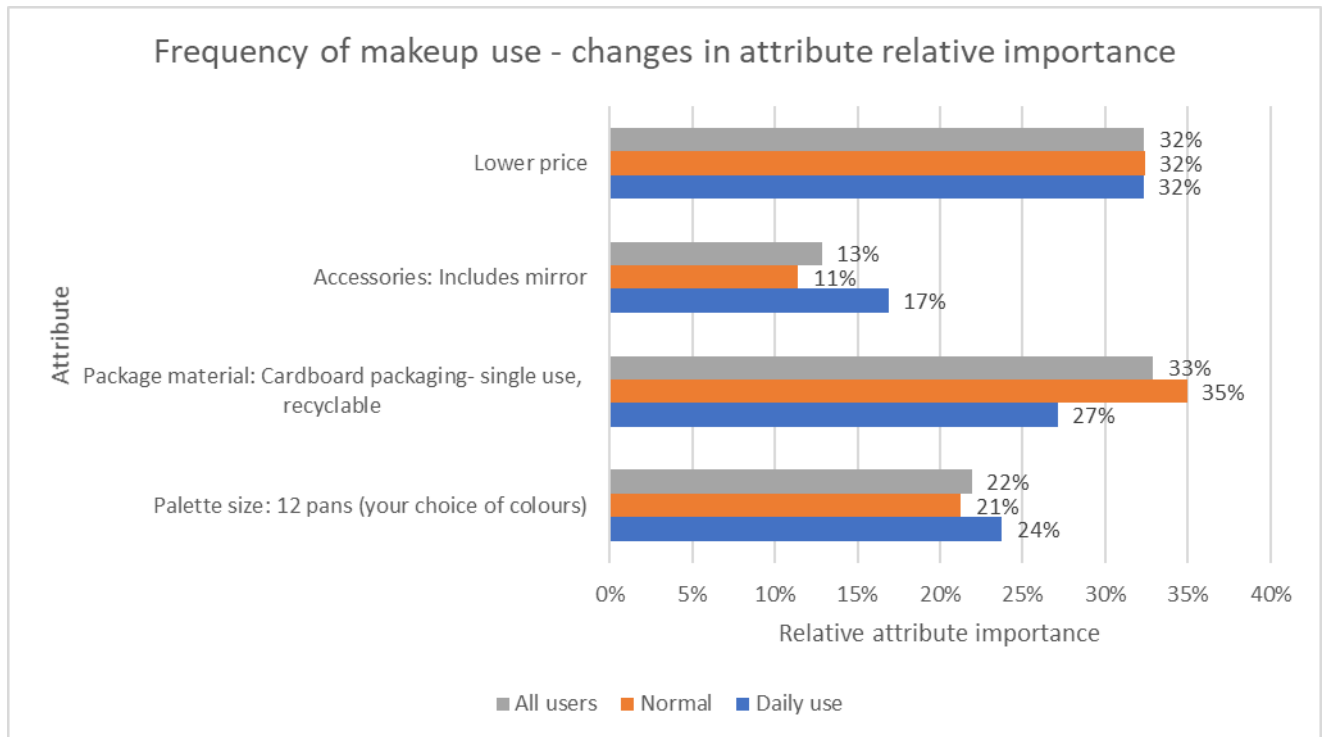
Figure 7: Frequency of makeup use - changes to attribute importance

Research question 5 - Post survey interviews

To understand the results from the multi-part survey, post-survey interviews were carried with a sample of female participants who had completed the survey.

Three of the five women wear makeup frequently while the other two do not wear makeup often. These women were chosen to be interviewed as they were the first ones to agree to participate.

Code frequency	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Totals
1.1 Cruelty free	1	2	1	0	0	4
1.2 Sustainable packaging	0	0	0	0	0	0
1.3 Sustainable ingredients	0	0	0	0	1	1
1.4 Price	1	0	1	1	0	3
1.5 Brand	0	0	0	1	0	1

Code frequency	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Totals
1.6 Quality	0	3	2	1	0	6
2.1 Paper	0	0	0	0	1	1
2.4 Sustainable packaging is looked for in other products	1	1	1	1	0	4
3.1 Unavailability	2	1	2	0	1	6
3.2 Impulse purchase	1	0	1	0	1	3
3.3 Apathy	0	1	1	0	1	3
3.4 Price	0	0	0	0	1	1
3.5 Frequency of purchase	0	2	2	1	0	5
3.6 Lack of sustainable packaging awareness	0	1	0	0	0	1
4.1 Brands	0	1	1	1	1	4
4.3 Both	1	0	0	0	0	1
Totals	7	12	12	6	7	44

Table 13: Post-survey interviews code frequency analysis

In summary, the key findings explaining the survey results, specifically research objectives 1, 3 and 4, are that consumers do not consider buying sustainably packaged makeup products mainly because such alternatives are unavailable when purchasing. Also, makeup is not purchased often, and an item lasts a relatively long time, so that during a purchase, consumers do not take the environmental consequences into consideration. Furthermore, participants felt it is the brand producer's responsibility to initiate change and start selling sustainable makeup.

As shown in Table 13 above, the interviewees spoke most about sustainable product unavailability when asked why sustainability does not come to mind when purchasing makeup. It is very difficult and, in some cases, impossible to find sustainably packaged makeup leaving consumers no choice but to go for the unsustainably packaged cosmetics. The second most popular code is frequency of purchase which shows that makeup is not a regularly bought product, "people buy cosmetics much less than they buy food" participant 3, "I very rarely buy and make use of makeup" participant 2, This is because, makeup is not a

frequent purchase like food, or consumed in great volume, therefore sustainable cosmetic packaging is neither apparent nor thought of during the purchasing process. With such lack in purchase frequency, this may also be the reason why consumers do not think about sustainability when purchasing makeup. One participant even said, "It never crossed my mind to be honest" with "it" referring to purchasing sustainably packaged cosmetics. This dilemma brings about the third most used code in this section, apathy. The indifference shown towards sustainability when purchasing makeup is not uncommon with one participant even pointing out that "a lot of people don't really care what's in their makeup".

At the start of the interviews, when asked about what attributes are largely looked for purchasing makeup, the codes quality, price, and cruelty free were most used. In this case, quality was defined differently by each participant with one referring to the consistency and pigmentation of the product, and another participant defining quality as something that will not irritate her skin. When talking about price, all participants said that they look out for it so as not to purchase something too expensive. Cruelty free is a term meaning that no animals were harmed in the process of the product. The participants who mentioned looking for cruelty free cosmetics all spoke in a tone that suggests that this attribute is of great importance to them. Cruelty free was mentioned four times whereas sustainable packaging was not mentioned at all by any of the participants.

Finally, in the last section of the interview, the participants were asked who would need to initiate change and make sustainably packaged goods more available. Four out of the five participants said the change needs to come from the brands, while the fifth said both the brands and the public need to initiate change. The other four all commented how the brands have power and the ability to make the change possible with one participant saying, "…if the brands just change it, then the people will have to get with it you know? And when a lot of brands change their packaging, there isn't really anything the customer can do. So, if it's

really big brands like L'Oréal, or like these kinds of brands, people would still buy the makeup with the sustainable packaging." A couple of participants remarked that it is up to the brands to initiate change and the consumers to then follow and choose the sustainable options.

The relevant code book is in Appendix 7 – Post-Survey Interviews.

Research question 6 - Makeup brand sustainable product availability

The favourite makeup brands listed by respondents were analysed through the official brand websites to determine which brands gave importance to sustainability.

Figure 8 shows that 88% of the brands mentioned do not carry a sustainable eyeshadow makeup product. Figure 9 shows that 69% of the respondents indicated favourite makeup brands that do not offer sustainable products. 17% of respondents did not indicate a favourite brand.
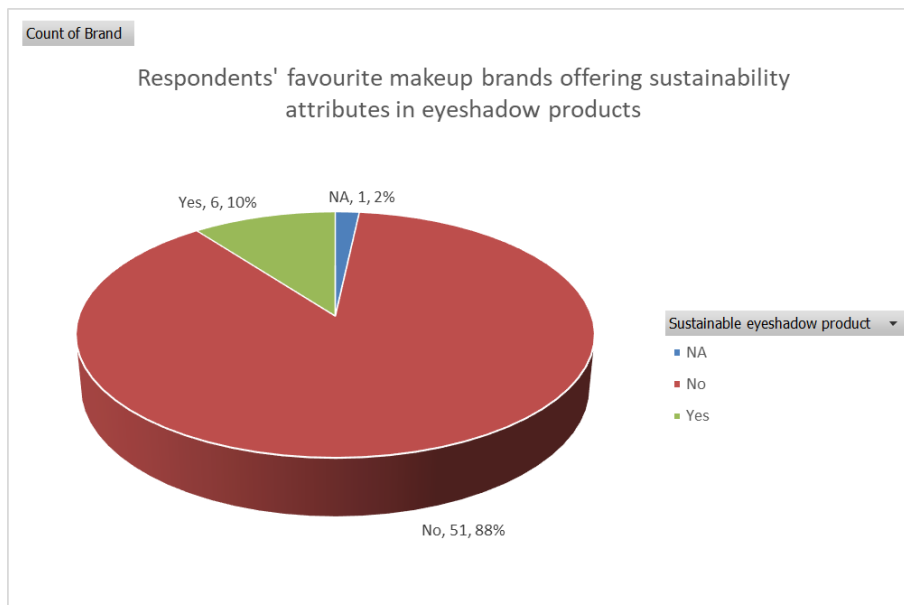
Figure 8: Count of favourite makeup brands with sustainable product offerings

Sum of Respondents

Respondents' favourite makeup brands offering sustainability attributes in eyeshadow products - by respondents

Yes, 33, 14%

NA, 41, 17%

Sustainable eyeshadow product

- NA
- No
- Yes

No, 166, 69%
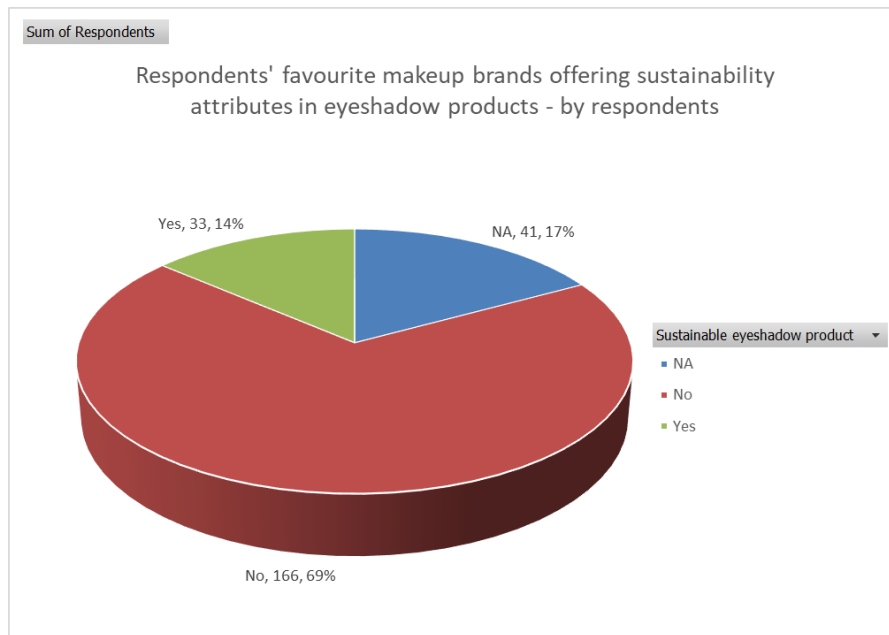
Figure 9: Favourite makeup brands with sustainable eyeshadow products - by respondents

During the research into the sustainability claims of the different brands it was observed that all brand FAQs cover cruelty free properties, vegan friendliness, and gluten-free properties, but rarely sustainability properties. This means that these brands believe that the key attributes of interest to their consumers do not include sustainability yet. On the other hand, brands like MAC and The Body Shop differentiate themselves strategically by emphasising sustainability attributes of their products as well as communicating sustainability as their key brand value.

Discussion

Participants indicated that sustainable product packaging was as important to them as price, relative to all makeup product attributes. This is a high level of utility so that women do give a lot of importance to the sustainability of the materials used in makeup products.

The environmental sustainability consciousness of women is also high. This means that women are generally knowledgeable and have the right attitude and behaviour with respect to environmental concerns. This also means that women are entering the purchase activity in full consciousness of environmental concerns. Causality, that the environmental consciousness precedes the purchase event, is assumed since environmental sustainability consciousness, being the product of personal actions, experiences, and knowledge, precedes the importance given to sustainability attributes of cosmetic packaging in a buying event.

The findings reported also show a positive relationship between the environmental sustainability consciousness of females and their product choice, giving more importance to the sustainable packaging attribute of the product. This means that environmental consciousness is influencing the purchase decision in favour of sustainable packaging materials.

However, the environmental sustainability consciousness factor only explains 7.2% of the relative importance given to sustainable packaging. This means that 92.8% of variance in the sample was not explained. In other words, it is likely that we have missed important variables that predict the importance given to cardboard sustainable packaging in eyeshadow makeup products. Clearly there are other factors at play. Multiple areas of the literature and other findings in this thesis support this low predictor.

Corrigan and Attalla (2001) state that consumers may be more motivated by other attributes not covered in this analysis, such as for paraben free, cruelty free and the absence

of other toxins, when buying eyeshadow. This is borne out by the results of the post-survey interviews. It may be observed that in a makeup shop such as Douglas, or ICI Paris XL, one is more likely to see makeup brands with cruelty free written on the products than any mention of sustainability, as borne out by the market analysis.

The post-survey interviews also indicate that the reasons for this apathy could be due to several factors such as, relatively low frequency of makeup purchases, unavailability of sustainable makeup products, lack of awareness of sustainable product alternatives, or even simply because consumers do not care enough. The possibilities for apathy are endless and may also be personal and affected by price, or even just buying makeup on impulse.

This needs to be considered in line with another comment most interviewees made such that, as consumers, they felt helpless in bringing about sustainable change to cosmetic product packaging. Participants clearly identified this as a producer issue and a producer responsibility to make sustainably packaged makeup alternatives available to consumers. This may be critical to understanding the overall research result and the opportunity, or obligation, of the cosmetic brand producers.

Moisander (2007) explains that it is a heavy responsibility for any single individual to engage in green consumerism as part of one's private lifestyle. The inference here is that consumers would look towards an authority to resolve environmental issues, limiting their own sustainability-based actions. This is highlighted in the results of the ESCQ where participants placed a heavy emphasis of the need for authorities to act, such as '*I think that we need stricter laws and regulations to protect the environment*'. Also, the lowest score by the participants was to themselves showing a limitation to their lifestyle change to support better sustainable development.

Coupled to this are the three factors that influence sustainable consumer choices set out by Eberhard and Naderer (2017). The authors highlight the consumer need to be able to identify alternative products, that is sustainable products, to choose from. This has two implications. The consumers need to want to seek more sustainable products, and such products must be available.

This lack of alternate sustainable product availability issue is confirmed through both the post-survey interviews as well as the makeup brand sustainability survey where fully 88% of the participant's favourite makeup brands do not offer a sustainable version, and nor do they advertise sustainability of their products. The result is that 69% of respondents named a favourite makeup brand with no sustainable alternative.

This means that most consumers would not be able to purchase sustainable makeup alternatives even if they wanted to. It also indicates that cosmetic producers still do not feel the necessity, or motivation, to supply sustainable alternatives, nor is sustainability part of the marketing narrative of the 88% of the favourite makeup brands.

This raises an important question for which further research may be required. If female consumers are so environmentally conscious, why do they stick to the same favourite brand even if this does not offer sustainable alternatives?

At least two areas of research may be derived from this question. The first is a need to understand a fuller set of makeup product attributes that drive the purchase choice women make. Fully 92.8% of what drives the purchasing decision is not captured in this research. The second is to understand the elasticity of the favourite brand. It may be possible to treat the brand as a product attribute and measure its value relative to all other product attributes.

Research question 4, which has been purposely kept to the end of this discussion, shows that as makeup is applied more frequently, the utility derived from sustainable

packaging reduces in favour of accessories and number of pans, with lower price utility remaining unchanged. This means that consumers using makeup most frequently gain more utility from the functional aspects of the makeup product. This is an unexpected result that sounds counter-intuitive and that deserves further research.

Perhaps the other way of looking at this result is, the more frequently makeup is used the more frequently it is purchased too. Gigerenzer and Brighton (2009) explain that the more frequently a product is purchased, the stronger is the heuristic process seeking a good-enough solution. However, even though eyeshadow makeup is not frequently purchased, it is used often enough to potentially motivate the female buyer into giving subconscious importance to the cosmetic attributes over product sustainability. In fact, as one interviewee declared that seeking sustainably packaged cosmetics '*never crossed my mind*'.

Limitations

There are several limitations to this research that deserve attention.

The timing of this study was the peak of the COVID-19 pandemic so that it was not legal or possible to have face-to-face sessions with participants, such as in a makeup shop. This caused the use of online Conjoint Analysis which reduced the buying experience, and the in-store environment that is one of the motivators in buying behaviour (Fam et. al., 2011). In a manual Conjoint Analysis, it would have been possible to demo prototype eyeshadow products in a real store environment, with the different attributes to better stimulate the participants.

Participants may also not have been in the right frame of mind to take part in such research during this pandemic period. This may have affected their choices or concentration.

The responses to one question that was negatively worded in the Environmental Sustainability Consciousness Questionnaire had to be discarded as a considerable number of respondents did not read the question properly.

The Conjoint Analysis purchase simulation may not have had enough attributes and attribute levels to represent more realistic product choices and decisions. For example, attributes such as for cruelty-free testing, paraben free and toxic chemical free attributes were not included. Obviously, the more attributes in the Conjoint Analysis design, the more time the survey would have required of the participants. This therefore required a balance as a longer survey instrument would have created different research limitations. Nevertheless, introducing these attributes may have improved the predictive value of sustainability consciousness as the meaning of such consciousness is widened. Furthermore, inclusion in future research may identify the key factors in play within female consumer buying heuristics.

The Conjoint Analysis could have been designed in the form of a brand analysis to measure the relative importance of the brand as a key product attribute. Ideally, the conjoint analysis would have referred to the participant's own favourite brand instead of a made-up brand. This may answer why participants purchase their favourite makeup brands even when these do not offer sustainable alternatives. The difficulty here would have been the sheer number of brands on the market which would require a specific research instrument design.

Convenience sampling was used to identify the first round of respondents and then these participants were asked to forward the survey instrument to family and friends, thus using snowball sampling. This resulted in the sample being heavily Malta dominated and therefore this may not be fully representative of the wider market.

Ideally, in future research, the sampling frame will be composed of early adopters from which a random sample can be collated. This is to enable Toly to detect early trends to support R&D on time to support corporate customer demand. Moreover, this research method may need to be transformed into a longitudinal study, requiring periodic repeats of this survey process to evaluate engagement and preference for sustainable packaging attributes over time.

Conclusion and Practical Implications

This study confirms that even when environmental sustainability consciousness is high, it influences, or motivates, the choice of sustainably packaged makeup products to a limited extent. This is surprising considering the contribution makeup products make to domestic packaging waste, and therefore, the resulting damage to the environment. Whilst the contribution to total packaging waste may not be as high as other product categories like food, the materials and toxins leached into the environment may still be relatively high and damaging.

This state of play may partially be a case of the consumer being willing to make the effort to purchase more environmentally friendly products, but not being able to due to a lack of sustainable makeup product availability. Alternatively, it is a case of the consumer wishing to purchase sustainable alternatives, but not willing to switch makeup brands. Single use plastic and other non-recyclable packaging remain in high use within the industry.

Female consumers have brought into play the roles and responsibilities of the producer, and authorities, in making the changes required towards greater sustainability. This is interesting and may suggest that considering the role of the consumer in isolation may not lead to the consumers' own desired environmental protection outcome.

The female consumers participating in this research have made a call to action. They are looking to the role of government authorities in improving environment protection legislation and enforcement. This may be in multiple forms such as an environment tax on non-sustainable packaging, or direct legislation such as an EU wide directive, and could instigate production of more sustainable makeup products, creating the choices necessary for a wider adoption of such alternatives. This seems to have the support of female consumers and could be an industry game-changer.

There is another critical part to this call to action. These same consumers also expect a producer led change in providing sustainable makeup product alternatives. If a makeup product goes beyond its utilitarian value, then the emotional or consciousness factor is not being met by most existing brands, creating both an opportunity and a threat in the industry.

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Appendix 1 – Supporting organisation profiles

Toly Group.

Toly Group is the World's leading makeup packaging company with clients including Chanel, Givenchy, Estee Lauder, NYX, Fenty Beauty, Shiseido, MAC and many others. This global organisation designs, develops, and produces a diverse range of cosmetic packaging and applicators ranging from established producers of branded products, to relative start-ups in the global cosmetic world. It needs to remain in the forefront, detecting, analysing, and developing for upcoming market trends to have viable packaging products to share with its customers (toly.com).

Toly Group has a global reach in the European, Asian, and North American continents. The corporate head office is in Malta, together with two major plants, and the design and engineering capability. Malta is where Toly's founder, Dr. Zoli Gatesy founded Toly Products in 1971. Since then his son Andy Gatesy has become chairman and CEO of the group which he has grown largely organically to an annual turnover of over eur100m (toly.com).

The organisation manages three websites. Toly.com is the corporate website. Tolydeluxe.com is a marketing site promoting sustainable cardboard packaging as a premium alternative to its current cosmetics packaging product range. It is interesting that Toly chose to focus this new product range through a dedicated site. The third site is beautysource.info, a site dedicated to communicating with consumers and to carry out consumer research. Toly does this because of its need to know, even though the group does not sell consumer products per se. Toly' product, the cosmetic pack and applicator, forms part of an overall product sold by Toly's brand customers, such as for an eyeshadow palette by MAC. Current research from this site shows that consumers declare openly that they are pro-sustainable packaging – but then may not select such products when placed on the market.

Heri Cosmetics

The Heri Cosmetics brand belongs to Henry Galea who has supported this thesis with brand description advice and his experience on the market.

After being inspired by Jeffree Star, Henry decided he wanted to be his own boss and work hard to make his dream of being Malta's first cosmetic producer into a reality. He started off by creating lipsticks and has since released lip glosses, highlighters, and eyeshadows, making his total range to-date 27 items. His products are packaged by Toly Group. Heri Cosmetics is vegan friendly and cruelty free, with the addition of his eyeshadow palettes being made from recycled cardboard and recyclable lipstick containers making this brand eco-friendlier than most. His mind and passion are what make his products unique. Heri Cosmetics may be new, but it is growing faster than ever.

Henry has big plans for his brand which includes long term goals such as cash giveaways to give back to society as to shake the rich into being more generous. Henry is an entrepreneur who puts people as his first goal.

Appendix 2 - Literature Study Log

Apart from database and book searches, I also used the literature reviews and literature lists

in the initial relevant articles to source more relevant literature directly.

Constructs	Related terms	Broader terms	Narrower terms
X=Environmental Sustainability Consciousness	Sustainable development	Sustainability, Sustainability awareness, environmental sustainability	Sustainability knowingness, sustainability attitudes, sustainability behaviour Green consumerism
Y=Consumer utility attributed to sustainably packaged makeup products	Consumer behaviour, decision heuristics	Purchase behaviour, purchase motivation	Sustainable product purchasing, cosmetic purchasing behaviour

Table 14: Constructs and search terms

Date	Source	Search terms and strategies	Number of hits	Related terms/ Authors	Notes
26/02/2020	Google.com	Price perception in consumer behaviour	23,200,000 hits.		First five most relevant. Results were sufficient
26/02/2020	Google.com	Types of sustainable cosmetic packaging	33,500,000	Ethical cosmetic packaging, Eco-friendly cosmetic packaging	Lots of noise, third link most to the point.
26/02/2020	Scopus.com	Sustainability AND "price perception"	7		First result most relevant, rest is noise
26/02/2020	Statista.com	Cosmetic package sustainability	78		Good indication of buying behaviour
5/4/2020	Google Scholar	"packaging design" AND "psychology"	7,120		Fourth article useful
5/4/2020	Scopus.com	"green consumerism" AND "sustainable development" AND motivation	3		First document useful.

Date	Source	Search terms and strategies	Number of hits	Related terms/ Authors	Notes
5/4/2020	Scopus.com	"ethical consumer" AND "purchase behaviour"	7		All noise except for last article.
7/4/2020	Google Scholar	Consumers sustainable purchasing behaviour	188,000	Purchase behaviour	First few articles interesting
9/4/2020	Google Scholar	"sustainability consciousness questionnaire"	38		First four articles useful
10/4/2020	Google Scholar	"sustainability information" AND "decision making"	6,790		First article useful.

Appendix 3 - Survey instrument design

The entire scale was designed as a single flow on-line research instrument using the

Conjoint.ly service.

The research instrument itself is a combined online questionnaire and Conjoint

Analysis exercise through Conjoint.ly. This is a 20-screen page instrument, one web page per

question, as follows:

Q1 – INTRO text and motivation to undertake exercise

Q2 – Consent form

Q3 – Multiple choice – state gender

Q4 – Multiple Choice – state age group

Q5 – Multiple choice – state makeup use frequency

Q6 – Multiple choice – state if professional makeup artist

Q7 – Short answer – state favourite eyeshadow makeup brand

Q8 – INTRO to conjoint analysis exercise establishing a shop environment

Q9 – Conjoint analysis designed around seven choice tasks of three products each

Q10 – INTO text and motivation to complete Environment Sustainability Consciousness
Questionnaire

Q11 – Likert scale – Environmental Sustainability Knowingness question one

Q12 – Likert scale – Environmental Sustainability Knowingness question two

Q13 – Likert scale – Environmental Sustainability Knowingness question three

Q14 – Likert scale – Environmental Sustainability Attitude question one

Q15 – Likert scale – Environmental Sustainability Attitude question two

Q16 – Likert scale – Environmental Sustainability Attitude question three

Q17 – Likert scale – Environmental Sustainability Behaviour question one

Q18 – Likert scale – Environmental Sustainability Behaviour question two

Q19 – Likert scale – Environmental Sustainability Behaviour question three

Q20 - Conclusion, thank you, invitation to comment

The full layout is set out below. This also contains the consent form, respondent motivation screens and quotes to encourage an in-store experience and to complete the survey.
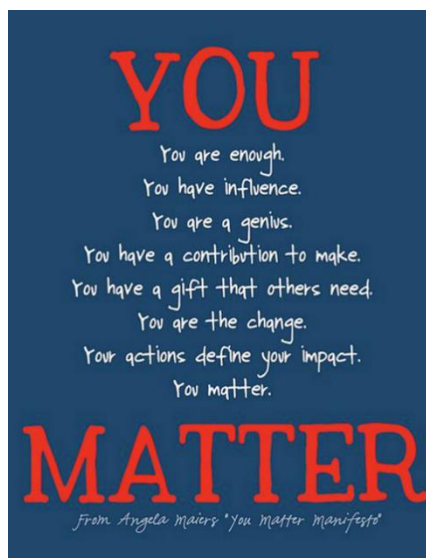
1. **Q1 Intro text: No respondent input**

   (Required)

   Thank you for participating in this survey measuring your preferences when purchasing an eyeshadow palette. I am using a made-up brand, ***Aurora Gold,*** to give this research an element of realism. Aurora Gold Eyeshadows are highly pigmented, multipurpose, and blend effortlessly.

   Your thoughts and opinions mean a lot and will form an important part of my thesis.

   The research should take 7 minutes to complete. Be assured that all answers you provide will be anonymised and kept in the strictest confidentiality.

   Once again, thank you for your support.

2. **Q2 Intro text: No respondent input**

   (Required)

   CONSENT FORM

   I confirm that I volunteer to participate in a research project conducted by Petra Caruana from University of Twente. I will be one of the people participating in this research.

   - My participation in this project is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time without penalty.
   - If I feel uncomfortable in any way during my participation in this study, I have the right to decline to answer any question or to end my participation.
   - Participation in the research exercise involves completing a questionnaire that includes a Conjoint Analysis sorting exercise online.

- o I understand that the researcher will not identify me by name in any reports using information obtained from these interviews, therefore confirming anonymity.
- o I have read and understood the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study.
- o I am able to print and / or copy this consent form.

By proceeding to the survey I am giving my consent.

3. **Q3 Multiple choice**

(Required; Place options in 3 columns)

Please state your gender

- o Female
- o Male
- o Other

4. **Q4 Multiple choice**

(Required; Place options in 3 columns)

Please state your age group

- o 18-25
- o 26-35
- o 36-50
- o 50+

5. **Q5 Multiple choice**

(Required; Place options in 3 columns)

Do you use makeup:

- o Daily
- o Frequently
- o Special occasions only
- o Not at all

6. **Q6 Multiple choice**

(Required; Place options in 3 columns)

Are you a professional makeup artist?

- o Yes
- o No

7. **Q7 Short answer**

(Required)

What is your favourite eyeshadow makeup brand?

8. **Q8 Intro text: No respondent input**

(Required)

Welcome to my makeup shop. You have asked for a high-quality Aurora Gold eyeshadow palette. Aurora Gold eyeshadows are highly pigmented, multipurpose, and easy to blend. In the next 7 rounds I will offer you three eyeshadow palettes to choose your preferred one in each.

Each round is independent (pretend you've walked into my shop again) and I will offer you three new palettes in each successive round. Please choose your preferred one in each round

.

9. **Q9 Block of conjoint questions**

The conjoint analysis exercise was designed to include seven choice tasks of three products each, designed around four attributes with two levels each, as follows:

   o **CHOICE TASK 1**

o **CHOICE TASK 2**

Aurora Gold Eyeshadow Palette

Welcome to my shop. Here are three Aurora Gold eyeshadow palettes. Please choose one.

A	B	C
12 pans	12 pans	8 pans
Colours of your choice	Colours of your choice	Colours of your choice
Cardboard packaging- single use, recyclable	Cardboard packaging- single use, recyclable	Plastic packaging- single use product
No mirror included	Includes mirror	No mirror included
Eur 20	Eur 30	Eur 20

o **CHOICE TASK 3**

Aurora Gold Eyeshadow Palette

Welcome to my shop. Here are three Aurora Gold eyeshadow palettes. Please choose one.

A	B	C
12 pans	8 pans	12 pans
Colours of your choice	Colours of your choice	Colours of your choice
Cardboard packaging- single use, recyclable	Cardboard packaging- single use, recyclable	Plastic packaging- single use product
Includes mirror	Includes mirror	No mirror included
Eur 20	Eur 20	Eur 30

o **CHOICE TASK 4**

Aurora Gold Eyeshadow Palette

Welcome to my shop. Here are three Aurora Gold eyeshadow palettes. Please choose one.

A	B	C
8 pans	8 pans	12 pans
Colours of your choice	Colours of your choice	Colours of your choice
Plastic packaging- single use product	Cardboard packaging- single use, recyclable	Plastic packaging- single use product
Includes mirror	No mirror included	Includes mirror
Eur 30	Eur 30	Eur 20

o **CHOICE TASK 5**

Aurora Gold Eyeshadow Palette

Welcome to my shop. Here are three Aurora Gold eyeshadow palettes. Please choose one.

A	B	C
8 pans	8 pans	12 pans
Colours of your choice	Colours of your choice	Colours of your choice
Plastic packaging- single use product	Cardboard packaging- single use, recyclable	Plastic packaging- single use product
Includes mirror	No mirror included	No mirror included
Eur 30	Eur 20	Eur 30

o **CHOICE TASK 6**

Aurora Gold Eyeshadow Palette

Welcome to my shop. Here are three Aurora Gold eyeshadow palettes. Please choose one.

A	B	C
8 pans	12 pans	12 pans
Colours of your choice	Colours of your choice	Colours of your choice
Cardboard packaging- single use, recyclable	Plastic packaging- single use product	Plastic packaging- single use product
Includes mirror	No mirror included	Includes mirror
Eur 30	Eur 20	Eur 20

o **CHOICE TASK 7**

Aurora Gold Eyeshadow Palette

Welcome to my shop. Here are three Aurora Gold eyeshadow palettes. Please choose one.

A	B	C
12 pans	12 pans	8 pans
Colours of your choice	Colours of your choice	Colours of your choice
Cardboard packaging- single use, recyclable	Plastic packaging- single use product	Plastic packaging- single use product
No mirror included	Includes mirror	No mirror included
Eur 30	Eur 30	Eur 20

10. **Q10 Intro text: No respondent input**

(Required)

Thank you for completing your purchase preferences.

You are almost done; I just have a few more important questions I would like you to answer honestly please.

11. **Q11 Likert scale**

(Required)

Reducing water consumption is necessary for sustainable development

Labelled from Strongly disagree (1) *to* Strongly agree (5)

12. **Q12 Likert scale**

(Required)

Preserving the variety of living creatures is necessary for sustainable development

Labelled from Strongly disagree (1) *to* Strongly agree (5)

13. **Q13 Likert scale**

(Required)

For sustainable development, people need to be educated in how to protect themselves against natural disasters

Labelled from Strongly disagree (1) *to* Strongly agree (5)

14. **Q14 Likert scale**

(Required)

I think that using more natural resources than we need does not threaten the health and well-being of people in the future

Labelled from Strongly disagree (1) *to* Strongly agree (5)

15. **Q15 Likert scale**

(Required)

I think that we need stricter laws and regulations to protect the environment

Labelled from Strongly disagree (1) *to* Strongly agree (5)

16. **Q16 Likert scale**

(Required)

I think that it is important to take measures against problems which have to do with climate change

Labelled from Strongly disagree (1) *to* Strongly agree (5)

17. **Q17 Likert scale**

(Required)

I recycle as much as I can

Labelled from Strongly disagree (1) *to* Strongly agree (5)

18. **Q18 Likert scale**

(Required)

I always separate food waste before putting out the rubbish when I have the chance

Labelled from Strongly disagree (1) *to* Strongly agree (5)

19. **Q19 Likert scale**

(Required)

I have changed my personal lifestyle in order to reduce waste (erg: throwing away less food or not wasting materials)

Labelled from Strongly disagree (1) *to* Strongly agree (5)

20. Concluding screen

Aurora Gold Eyeshadow Palette

Thank you for participating!
Should you have any questions, please email me on p.caruana@student.utwente.nl and quote:
SZDOJIQSSIBGSZMFVWTF

Kind regards,
Petra :)

Appendix 4 – Conjoint Analysis

During a purchasing event the consumer assimilates the information across the considered product alternatives and forms perceptions about the choice set. These perceptions become the basis for preferences toward the alternatives, where both perceptions and preferences are idiosyncratic to the individual. This means that this product selection paradigm incorporates individual heterogeneity in the way information on alternatives is assimilated by the individuals. After, the consumer translates preferences into choices, such that the individual's preferences form the basis for choices in the marketplace. An individual's preferences will be modified by characteristics of the choice situation, for example, choices made for one's own consumption, or for a gift, changes in one's income, etc. Conjoint analysis is a decomposition method that estimates the structure of a consumer's choices in terms of the levels of attributes of the alternatives (Gustafsson, 2007).

Conjoint analysis is one of the most effective models in extracting consumer preferences during the purchasing process, turning the data into a quantitative measurement using statistical analysis. Traditional rating surveys cannot place a value (or utility measurement) on the product's different attributes. Instead, conjoint analysis sifts through respondents' choices to determine the reasoning for those choices, determining what they value most in goods or services (QuestionPro, 2020).

Anderson et. al. (1993) compare customer needs research methods in wide use and finds that the results obtained with conjoint method are more detailed, reliable, and easier to understand. Moreover, based on the analysis of more than 300 applications in the literature which aimed to learn customers' needs, they conclude that conjoint analysis was the most successful in comparison to other methods as set out in the table below (Anderson et. al, 1993).

Method	% of successful applications
The estimates of company's employees	55%
Open-ended questions in the questionnaire	66%
Benchmark (learning from competitors)	67%
Focus group estimates	70%
Observing the customer when using product	72%
Using rating scale or constant sum direct evaluations	75%
Conjoint analysis	85%

Source: Anderson *et al.*, 1993.

Table 15: Customers' needs evaluation methods compared for accuracy

Sándor & Franses (2009) state that choice experiments provide a useful framework to collect data, like to estimate hypotheses about the distribution of consumer preferences for a given product, when real-life data is not available or is more costly. They tackle the issue of experiment design, specifically the complexity of choice sets, knowing that the number of trade-offs in a choice set (also the specific choice complexity) is expected to negatively affect the consistency of choice. In this case the recommendation is to design for simpler choice sets with lower trade-offs, without losing the information content of the experiment. (Sándor & Franses, 2009)

The Conjoint Analysis method selected is the choice based conjoint design (CBC), the most common type of discrete choice experiments. This is typically used for feature selection for new products, and testing branding, packaging, and advertising claims. The method uncovers consumers' preferences and is used across different industries for all types of products, such as consumer goods, life insurance plans, retirement housing, and air travel. It is applicable when discovering the type of product consumers are likely to buy, and what consumers value the most (and least) about a product. It is commonplace in market research because CBC interviews closely mimic the purchase process for products in competitive contexts. Instead of rating or ranking product concepts, respondents are shown a set of

products in full profile and asked to indicate which they would purchase. (Conjoint.ly, 2020) (Orme, 2014).

Discrete choice experiments are an examination of datasets that contain choices made by people from among several alternatives. In this case we want to understand which attributes, and attribute levels, motivated consumers to make these choices. Conjoint analysis is a survey-based technique that presents participants with several options (each described in terms of feature and price levels) and measuring their response to these options. The measured response is their choice between these options. Partworth utilities (preference scores) describe consumer, or cluster, average product feature preferences. These are the key output of the Conjoint Analysis and can explain selection trade-offs between product features. (Conjoint.ly, 2020).

Conjoint analysis provides greater realism, with attributes based on concrete realistic descriptions, so that it results in better discrimination among attribute importance, thus creating a more appropriate context for research. Consumers can make finer distinctions when they directly compare objects, and, to this end, choice-based conjoint offers even greater realism and extends the idea of side-by-side comparisons, mimicking what buyers do in reality. Choosing among available offerings creates data that reflects choices, not just preferences (Orme, 2014).

The attributes selected for this experiment describe the Aurora Gold eyeshadow makeup product and include:

    a. the size of the palette attribute, that is, the number of pigment pans in the product, with two attribute levels of 8 or 12 pans,

b. the packaging material attribute. This is a one-time use package (as opposed to a re-fillable package) with two attribute levels, being either made of plastic or recyclable cardboard.

c. An accessory attribute with two attribute levels, having a mirror or not,

d. A price attribute, in this case two attribute levels of eur20 or eur30.

The inclusion of a price attribute is important to the CBC experiment, as price has two distinct functions. Consumers use price as a signal of product quality (informational role) and as a financial constraint in choosing it (allocative role) (Gustafsson, 2007). In this exercise, only the net effect of the two roles of price is estimated.

The table below includes a summary of the Conjoint Analysis attributes and levels. The figure below is of the Conjoint.ly system showing how these attributes and levels are set up.

AURORA GOLD MAKEUP PRODUCT DESIGN

ATTRIBUTE	Attribute levels
PALETTE SIZE	3. 8 pans (colours of your choice) 4. 12 pans (colours of your choice)
PACKAGE DESIGN	3. Plastic packaging – single use product 4. Cardboard packaging – single use, recyclable
ACCESSORIES	3. Includes mirror 4. No mirror included
PRICE	3. Eur20 4. Eur30

Table 16: Conjoint Analysis design - attributes and levels

Figure 10: Conjoint Analysis design settings in Conjoint.ly

The intention is to analyse the importance respondents give to the packaging attribute and specifically to the recyclable cardboard level, compared to the other attributes.

When the attributes and levels are set up, the choice-based conjoint (CBC) system will measure the utility of each attribute level by counting the number of times an attribute level was chosen relative to the number of times it was available for choice. This requires a CBC design to acquire the correct product attribute level combinations (see table below) to test the various levels equally. These are then displayed in three product concepts per choice task.

Palette size	Package design	Accessories	Price
12 pans (your choice of colours)	Cardboard packaging- single use, recyclable	Includes mirror	Eur 20
12 pans (your choice of colours)	Cardboard packaging- single use, recyclable	No mirror included	Eur 20
8 pans (your choice of colours)	Cardboard packaging- single use, recyclable	Includes mirror	Eur 20
12 pans (your choice of colours)	Plastic packaging- single use product	Includes mirror	Eur 20
12 pans (your choice of colours)	Cardboard packaging- single use, recyclable	Includes mirror	Eur 30
8 pans (your choice of colours)	Cardboard packaging- single use, recyclable	No mirror included	Eur 20
12 pans (your choice of colours)	Plastic packaging- single use product	No mirror included	Eur 20
12 pans (your choice of colours)	Cardboard packaging- single use, recyclable	No mirror included	Eur 30
8 pans (your choice of colours)	Plastic packaging- single use product	Includes mirror	Eur 20
8 pans (your choice of colours)	Cardboard packaging- single use, recyclable	Includes mirror	Eur 30
12 pans (your choice of colours)	Plastic packaging- single use product	Includes mirror	Eur 30
8 pans (your choice of colours)	Plastic packaging- single use product	No mirror included	Eur 20
8 pans (your choice of colours)	Cardboard packaging- single use, recyclable	No mirror included	Eur 30
12 pans (your choice of colours)	Plastic packaging- single use product	No mirror included	Eur 30
8 pans (your choice of colours)	Plastic packaging- single use product	Includes mirror	Eur 30
8 pans (your choice of colours)	Plastic packaging- single use product	No mirror included	Eur 30

Table 17: Conjoint.ly created CBC design of attribute level combinations

Whilst the researcher sets up the attributes and levels to be tested, Conjoint.ly will automate the creation of the product concepts and the choice tasks to be able to test all attribute levels equally. If this same exercise were carried out through SPSS, an orthogonal design would be computed to establish the product concept combinations.

Appendix 5 – Further analysis of participant data and hypothesised relationship

Conjoint analysis

The survey results are filtered to include female participant results only. The makeup product attribute importance for the female participant is set out in the figure below.
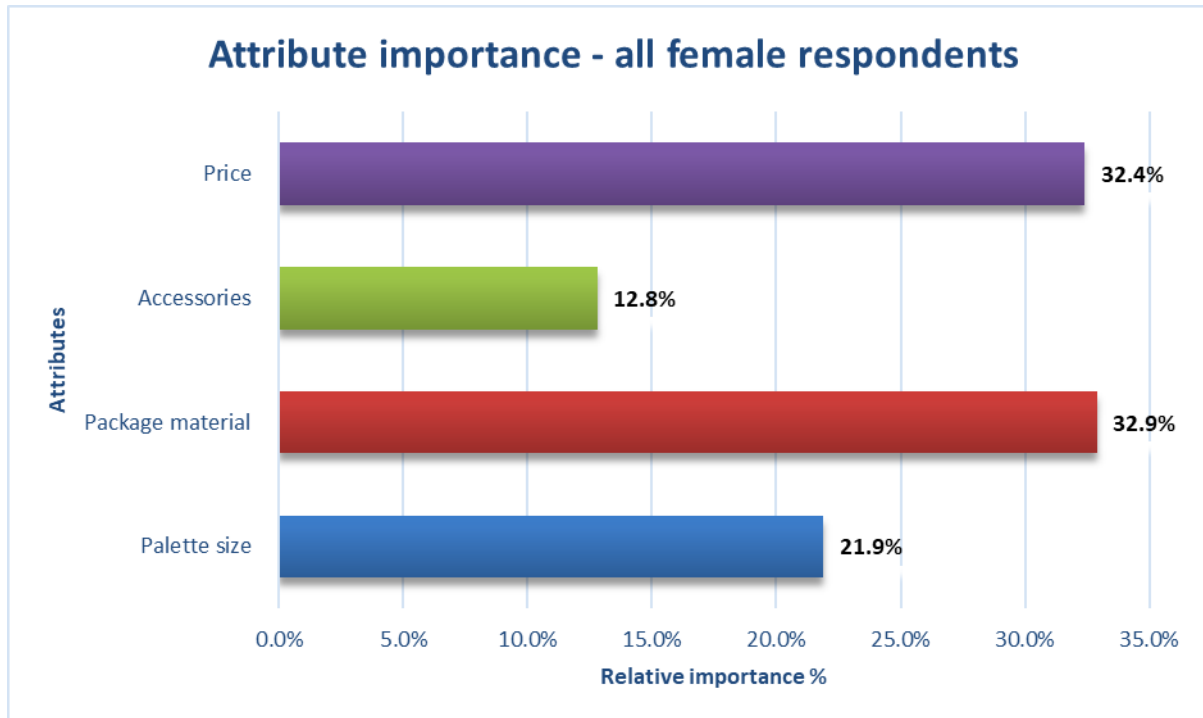

Figure 11: Attribute importance - all female respondents

This shows that package design (cardboard or plastic) and price (eur20 or eur30) have practically equal importance to the group at 32.9% and 32.4% respectively. This information can be explained in terms of the attribute level utility for the group as set out in the table and figure below.

Female respondents

Attribute level part-worths

Attribute	Level	Relative utility
Palette size	12 pans	1.56
Palette size	8 pans	-
Package design	Cardboard	2.34
Package design	Plastic	-
Accessories	Mirror	0.91
Accessories	No mirror	-
Price	eur20	2.31
Price	eur30	-

Table 18: Attribute level utility - all female respondent group
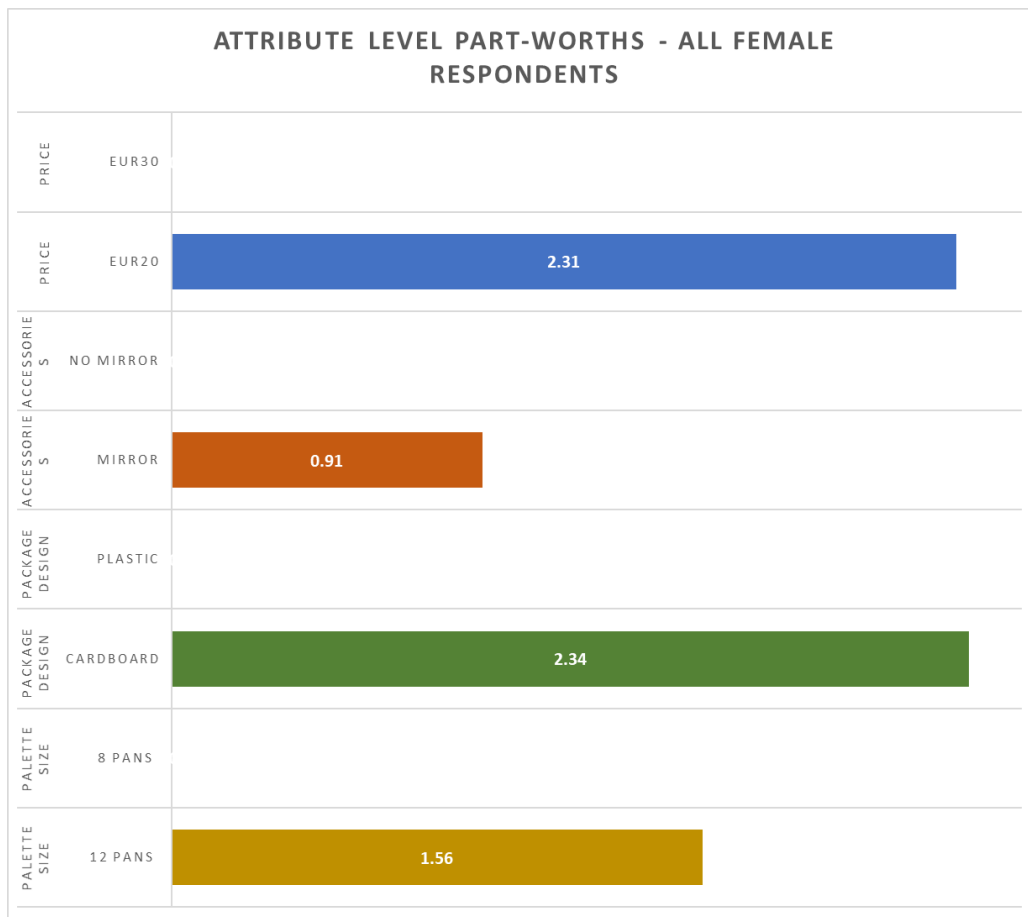
Figure 12: Attribute level utility for all female respondent group

This shows that the highest utility is achieved with cardboard packaging (2.34 utils), Eur20 price (2.31 utils), a 12-pan palette (1.56 utils) and a mirror accessory (.91 utils). The utils are calculated as the preference for one attribute level versus the other levels of the same attribute. So, for example, female respondents, on average, preferred cardboard packaging over plastic packaging by 2.34 utils. This is additive and therefore, for presentation purposes,

the plastic packaging level can be set to a zero baseline with the difference shown as utils for cardboard packaging. This does not mean that respondents do not like or demand plastic packaging. They will still buy plastic makeup packs but will prefer cardboard packaging by 2.34 utils (Orme, B., 2010, 2019).

Since there are only two levels per attribute in this conjoint design, the attribute importance is also equal to the preferred level importance as set out in the figure below.
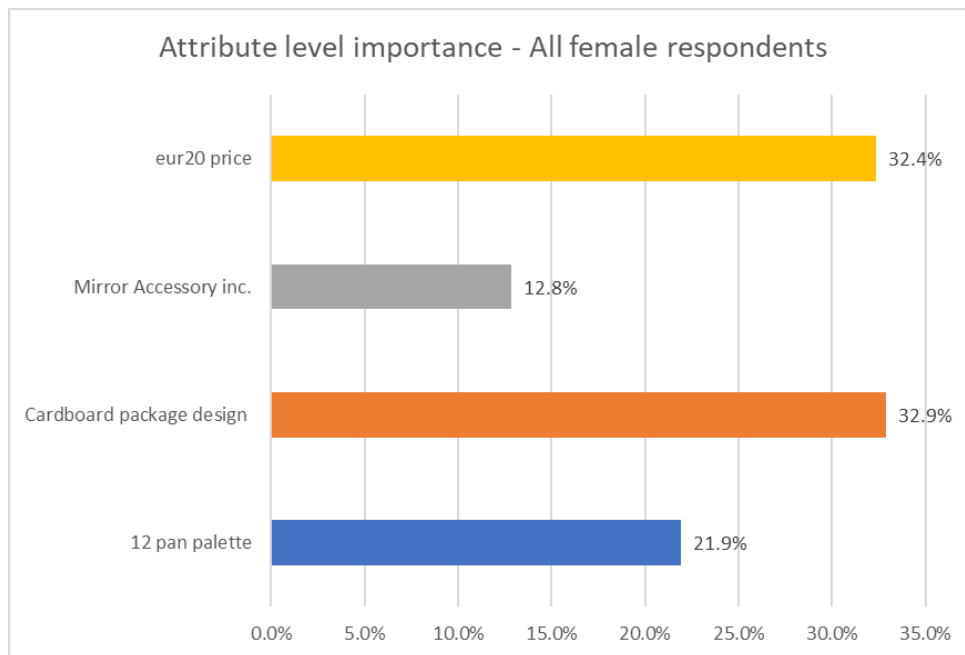

Figure 13: Attribute level importance - all female respondent group

Category analysis – All female age groups.

We can now delve deeper into the overall CBC results, starting with the part-worths (utils) attributed to the different levels by the different age groups of the study.

By age group

Attribute level part-worths and relative importance

Age group	Palette size: 12 pans	Package design: Cardboard packaging	Accessories: Includes mirror	Lower price
18 to 25	1.67	2.40	1.04	2.35
26 to 35	1.50	2.85	0.83	2.26
36 to 50	1.68	1.92	0.86	2.87
50+	1.15	2.11	0.57	1.85
18 to 25	22%	32%	14%	31%
26 to 35	20%	38%	11%	30%
36 to 50	23%	26%	12%	39%
50+	20%	37%	10%	33%

Table 19: Attribute level utilities and relative importance by female age groups

The table above and the graph below are related. The 35 to 50-year-old group are more price sensitive (2.87 utils, 39% importance) than sensitive to sustainable packaging material (1.92 utils, 26% importance). The 50+ and 26 to 35-year-old age groups seem to be synchronised having approximately the same relative importance levels. One could say there is very little to distinguish between age group preference differences to the current CBC design.
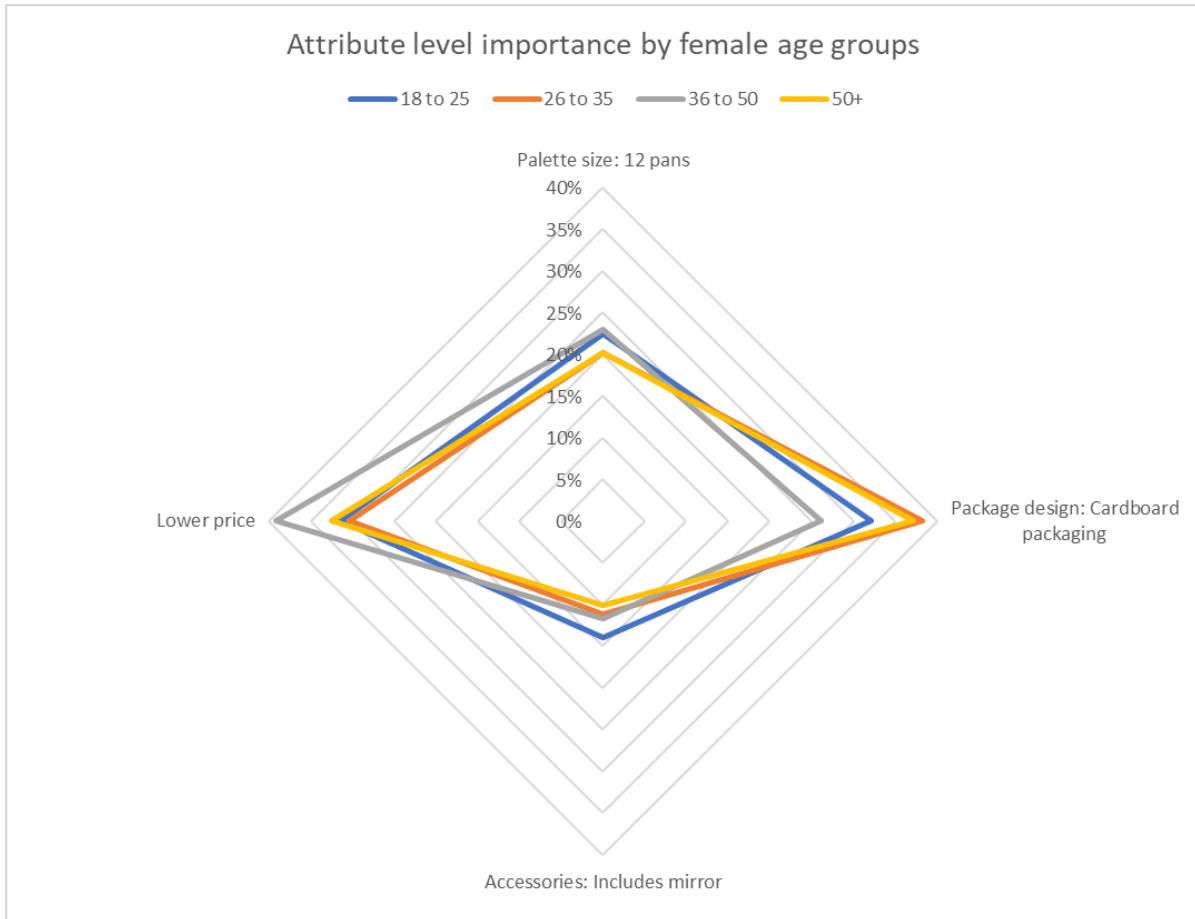
Figure 14: Attribute level relative importance by female age groups - graphed

Category analysis – All female frequency of makeup-use groups.

Table 20 and Figure 15 below show that respondents who do not use makeup attribute more importance to recyclable packaging than normal users (52% vs 27% to 35%), possibly since they have less interest in the product attributes once they do not use these. The Daily Use group are marginally less sensitive to packaging type at 27%, trading this for accessories and palette size (17% and 24% respectively). Once again price sensitivity is approximately equal across all groups (32% to 34%).

By frequency of makeup use

Attribute level part-worths and relative importance

Frequency	Palette size: 12 pans	Package design: Cardboard packaging	Accessories: Includes mirror	Lower price
Daily	1.54	1.76	1.09	2.09
Frequently	1.62	2.51	0.82	2.29
Occasionally	1.62	2.52	0.92	2.58
Never	0.59	4.06	0.66	2.54
Daily	24%	27%	17%	32%
Frequently	22%	35%	11%	32%
Occasionally	21%	33%	12%	34%
Never	7%	52%	8%	32%

Table 20: Attribute level part-worths and relative importance by female frequency of use categories
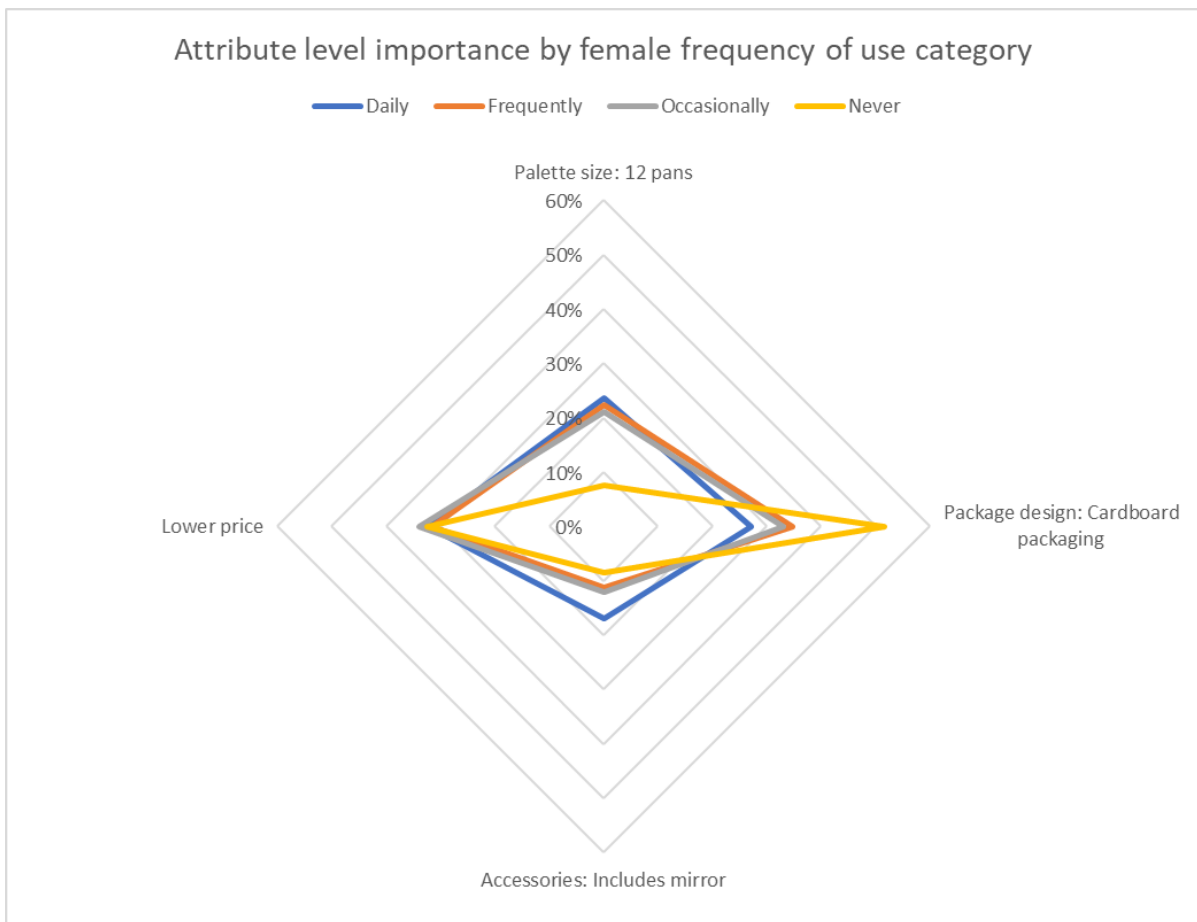

Figure 15: Level importance by female frequency of use groups

Category analysis – All female professional makeup artist / normal groups.

Table 21 and Figure 16 contrast the product level importance given by the professional makeup artist group and the normal user group, both of which are all female groups. In this case, professional users are less sensitive to price and recyclable packaging making a trade-off for more palette pans and accessories.

By professional use

Attribute importance

Professional makeup artist	Palette size	Package design	Accessories	Price
Normal user	21.8%	33.0%	12.6%	32.7%
Professional makeup art	25.8%	31.0%	19.3%	23.9%

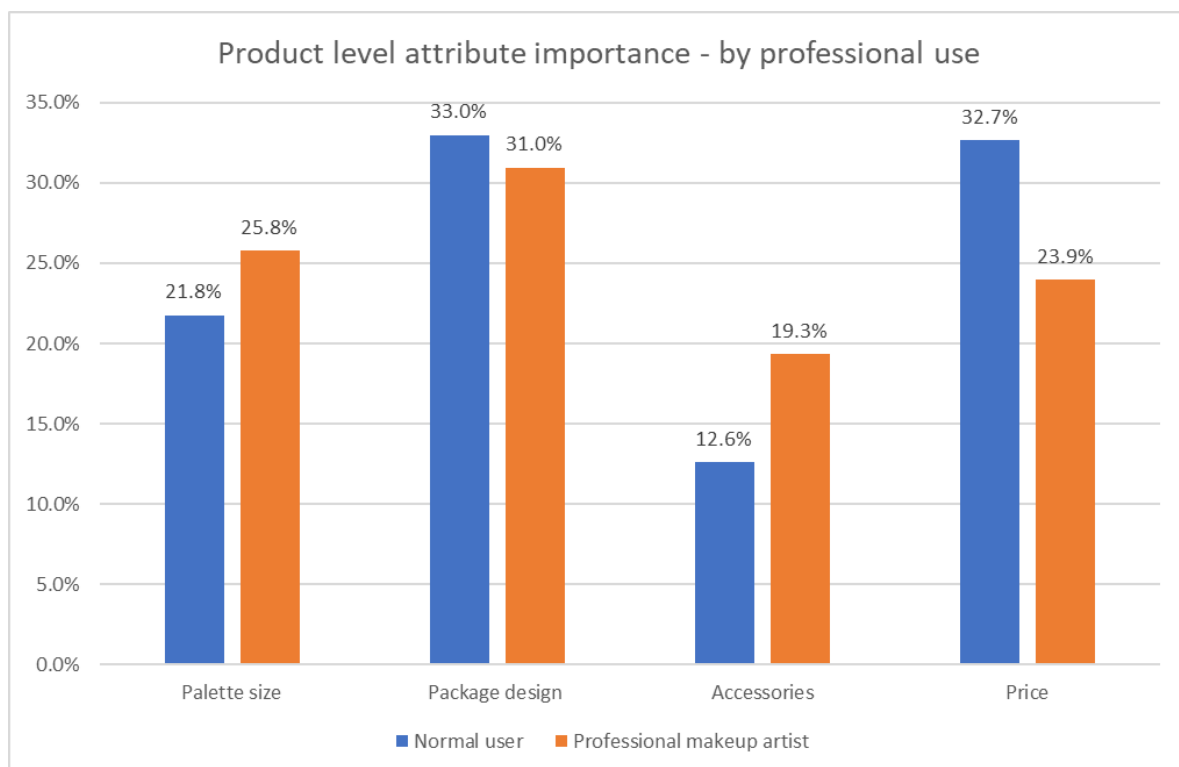*Table 21: Attribute level importance by Professional User groups*

Figure 16: Product level importance by professional and normal user groups

Category analysis – All female age groups by frequency of makeup use.

The analysis set out in Figure 17 shows a trend for most age groups such that, as makeup use increases, the relative importance given to sustainable packaging reduces. The

exception is the 26 to 35 age group who reverse the trend to become increasingly sustainable packaging conscious as makeup use frequency increases. Non-users have been purposely excluded from this analysis.
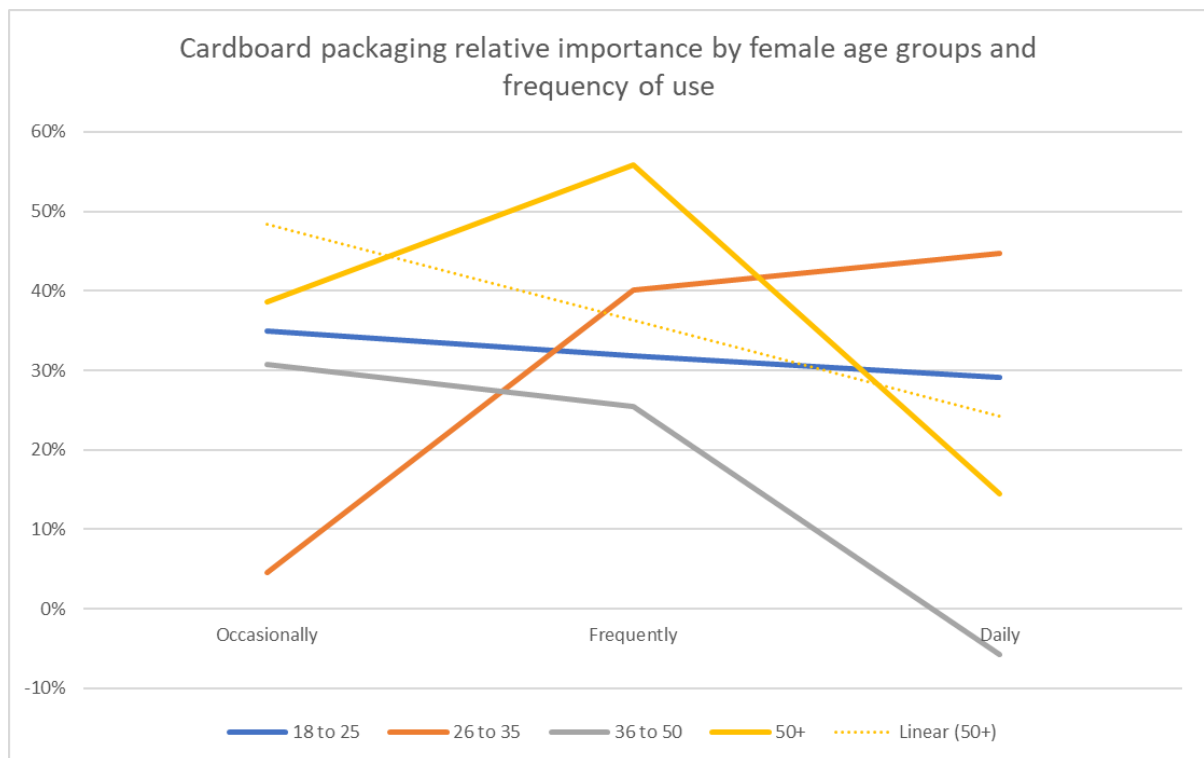
Figure 17: Cardboard packaging relative importance by female age groups and frequency of makeup use

Environmental sustainability consciousness

No significant differences in population group means for the different category variables below were detected using analysis of variance, as follows

- Age groups: $F(3, 236)=3.559$, MSE=0.248, p=0.015 **

- Frequency of makeup use groups: $F(3, 236)=0.446$, MSE=0.258, p=0.721

- Professional / normal user groups: $F(1, 238)=1.941$, MSE=0.255, p=0.165

**The Age Group category showed slight differences in means, specifically for the 50+ group (category 4) with F > 3.05 (van den Berg, 2018). However, this is minimal as can be seen in the boxplot below.
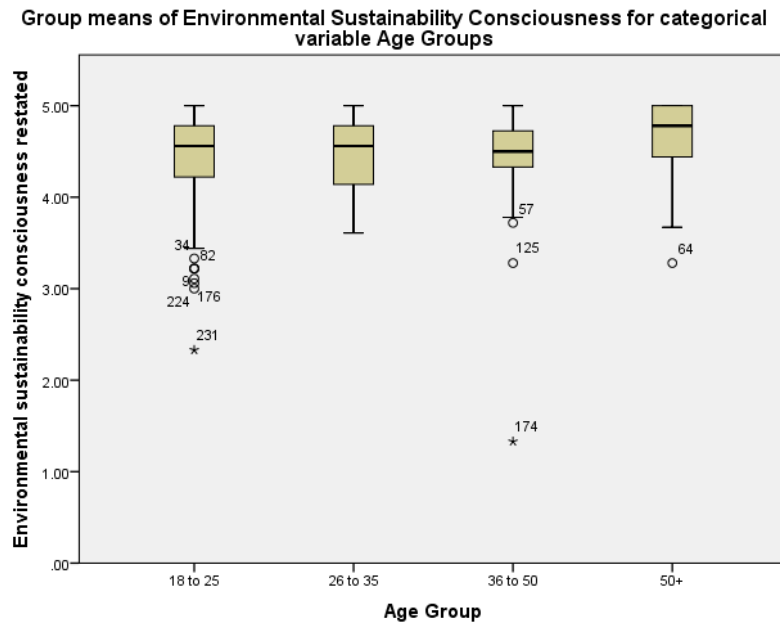
Figure 18: Environmental sustainability consciousness group means for Age Group category

Environmental sustainability consciousness as predictor to sustainable packaging attribute importance – all female respondents

The hypothesis Females with a higher Environmental Sustainability Consciousness will place a relatively higher utility value on Cardboard Recyclable Packaging Material with respect to Plastic Disposable Packaging when buying eyeshadow makeup is tested through regression analysis. In this case the predictor variable is Environmental Sustainability Consciousness and the dependent variable is Relative Importance of Cardboard Recyclable Packaging. This is set out in Table 22 and the line of best fit is illustrated in Figure 19.

Tests of Between-Subjects Effects

Dependent Variable: Relative importance recyclable pack

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.469[a]	1	1.469	18.509	.000
Intercept	.531	1	.531	6.687	.010
ES_Consc_Restated	1.469	1	1.469	18.509	.000
Error	18.889	238	.079		
Total	38.165	240			
Corrected Total	20.358	239			

a. R Squared = .072 (Adjusted R Squared = .068)

Parameter Estimates

Dependent Variable: Relative importance recyclable pack

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Intercept	-.417	.161	-2.586	.010	-.735	-.099
ES_Consc_Restated	.155	.036	4.302	.000	.084	.226

Table 22: Regression analysis for Environmental Sustainability Consciousness and Importance of Cardboard Recyclable Packaging
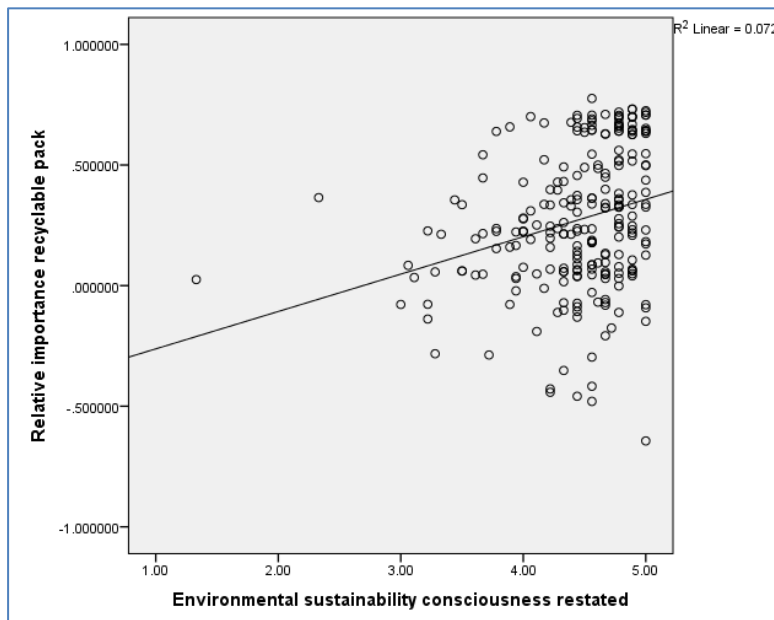
Figure 19: Relationship between Environmental Sustainability Consciousness and Relative Importance of Cardboard Recyclable Packaging

In the category analysis that follows, the line of best fit is calculated to establish the R^2 statistic to explain the variance of Environmental Sustainability Consciousness for each category (Age groups, frequency of use groups, professional use / normal use groups) on Importance of Cardboard Recyclable Packaging on Importance of Cardboard Recyclable Packaging in this sample.

Figure 20: Line of best fit for all female age groups

Figure 21: Line of best fit for all female respondents and frequency of makeup use

Figure 22: Line of best fit for all female professional /normal use

In all cases R^2 remains low except for the age group 25 to 35 when the model explains 24.2% of the variance, and for frequency of use is never when the model explains 20.8% of the variance.
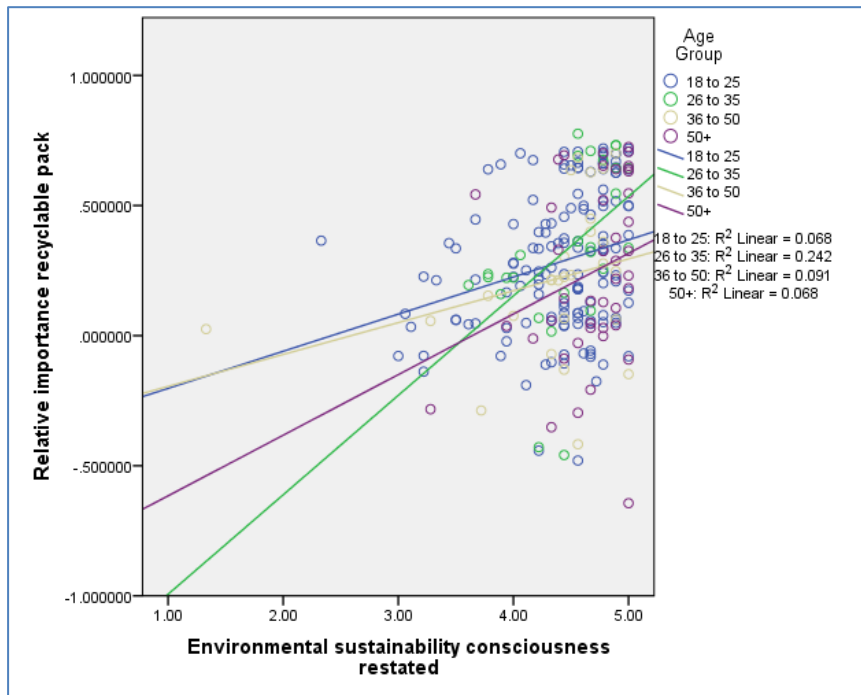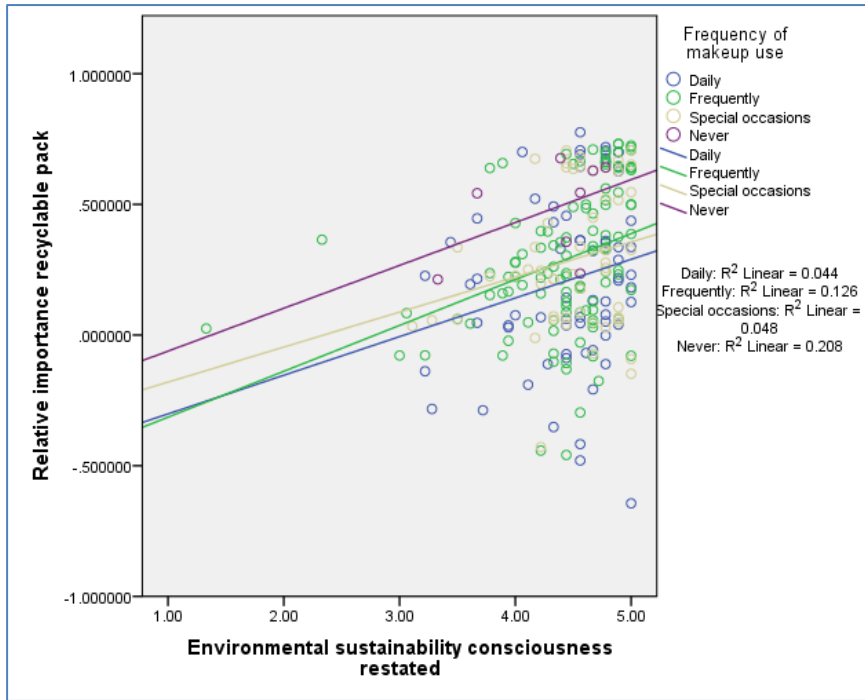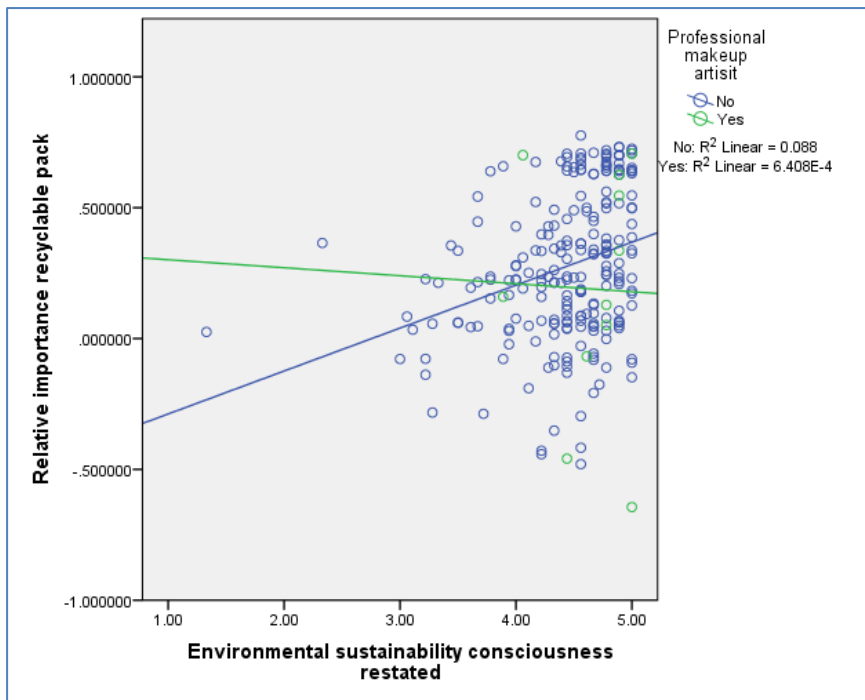
Appendix 6 - Makeup brand sustainable product availability analysis

Brand	Participants	Sustainable eyeshadow product
Alverde	1	No
Anastasia Beverly Hills	6	No
bh cosmetics	2	No
Bobbie Brown	1	No
Body Shop	5	Yes
Catrice	3	No
Chanel	5	No
Charlotte Tilbury	2	No
Colourpop	1	No
Crayon case	1	No
Deborah	1	No
Dior	8	No
Essence	10	No
Estée Lauder	2	No
Etude house	1	No
Eva Garden	1	No
Guerlain	3	No
Heri Cosmetics	5	Yes
Huda beauty	9	No
Inglot	6	No
Isadora	1	No
Jeffree Star Cosmetics	9	No
Juvia's place	3	No
Kat von d	1	Yes
Kiko	10	Yes
L'Oréal	3	No
Lancôme	1	No
Laura Mercier	1	No
Lime Crime	1	No
MAC	11	Yes
Make Up Factory	2	No
Manhattan	2	No
Marks and spencer	1	No
Max Factor	5	No
Maybelline	4	No
Mina	1	No
Morphe x Jacyln Hill	9	No
NA	41	NA
Naked	5	No
Nars	1	No

Brand	Participants	Sustainable eyeshadow product
Natasha Denona	1	No
NYX	14	No
Path McGrath	1	No
Pixi	1	No
Pupa	3	No
Revlon	5	No
Revolution Makeup	6	No
Rimmel	2	No
Rival de Loup	1	No
Royal Enhance	1	No
Sephora	2	No
Shiseido	1	No
Sleek	2	No
Tarte	1	No
Too faced	2	No
Urban Decay	10	No
Wycon	1	Yes
Zoeva	1	No
Total	240	

Table 23: Makeup brands mentioned by participants offering sustainable eyeshadow makeup products

Appendix 7 – Post-Survey Interviews

Post-survey interviews script

Me: Hi thank you so much for taking time out of you day to participate in this interview.

Before we start do you have any questions? (If not: Let's just jump straight to it)

Participant: answers

Me: So, what attributes do you look for when shopping for makeup?

Participant: Answers

Me: Do you look for sustainable packaging when shopping for other goods like food?

Participant: Answers

Me: Why do you think this differs from when people buy cosmetics?

Participant: Answers

Me: Do you think a change must come from the public or the brands themselves?

Participant: Answers

Me: thank you this concludes our interview.

Post survey interview codebook

Codes and Sub-codes	Definition	Example
1.0 Desired Attributes	What features the participants desire in their makeup and makeup packaging	
1.1 Cruelty Free	The makeup formula is not tested on animals or use animal products or biproducts. No animals are harmed or used in the making of makeup.	"I definitely don't buy anything that is animal tested." Participant 2
1.2 Sustainable packaging	Packaging is made in a (mostly) circular economic way	
1.3 Sustainable Ingredients	Ingredients are grown and used in a (mostly) circular economic way	"So like that it lasts long, also that it's mostly consisting of natural ingredients, and also that

Codes and Sub-codes	Definition	Example
		it's sustainable." Participant 5
1.4 Price	Price is not too high	"The first thing I look for is the Price" Participant 1
1.5 Brand	The brand is well-known and trusted	"I get something that's from a reputable brand" Participant 4
1.6 Quality	Product itself does not irritate skin, is well pigmented, and long lasting	"I look for quality because I am very sensitive so I need to be very careful with what I use" Participant 2 "if you're gonna buy eyeshadow you know you want to see that it's pigmented not like you're applying it on your hand and there's no colour" Participant 3
2.0 Sustainable packaging in other goods	What type of sustainable packaging people look for in other goods	
2.1 Paper	Alternative to unsustainable materials	"I would always prefer to take for example paper packaging over plastic, and also recycled paper." Participant 5
2.2 Plastic	Certain plastics that are more sustainable than plastics which are not	
2.3 Fabric material	Alternative to unsustainable materials	
2.4 Sustainable packaging is looked for in other products	Sustainable packaging is actively looked for in goods that are not cosmetic related	"I think with food I look out a lot more than I do with makeup and the main reason for that is I think it's way easier to find sustainably packaged food rather than sustainably packaged makeup." Participant 1

Codes and Sub-codes	Definition	Example
2.5 Sustainable packaging is not looked for in other products	Sustainable packaging is not looked for in products that are not cosmetic related	
3.0 Reason for not looking for sustainable packaging	Reasons why people do not seek to buy makeup with sustainable packaging	
3.1 unavailability	Sustainably packaged cosmetics are not available for purchase.	"if I go into a makeup store, I'm hardly going to find, like I'm just going to find everything packaged in plastic." Participant 1 "So when it comes to food, if I go into any store, I can pick what I think is more environmentally friendly, whereas with makeup I don't normally have a choice." Participant 1
3.2 Impulse purchase	Makeup is bought out of an instantaneous whim and therefore sustainability was not taking into consideration when purchasing.	"it could be more of an impulse purchase kind of thing like they choose a product without paying attention to certain things" Participant 3
3.3 Apathy	People are passive towards sustainable packaging when shopping for cosmetics.	"I very rarely buy and make use of makeup I don't bother because it's like uwijja (so what) it's one it's like something I buy once every three years." Participant 2
3.4 Price	It costs too much to purchase makeup with sustainable packaging.	"So they just go into the drugstore and get a cheaper version." Participant 5
3.5 Frequency of purchase	Since makeup is not purchased as often as other goods (example, food), sustainable packaging is not kept in mind or thought of as a valid attribute	"if you're buying cosmetics and it's a rare occasion you may not take it into consideration." Participant 3

Codes and Sub-codes	Definition	Example
3.6 Lack of sustainable packaging awareness	Less aware of sustainable packaging for makeup	"It never crossed my mind to be honest." Participant 2
4.0 Who needs to initiate change	In order for there to be a change in awareness and purchasing behaviour brands and/or the public need to take the first step	
4.1 Brands	The ones who manufacture makeup and their influencers need to take the first step in bringing about change	"The brands. Definitely. Because I think if the brands just change it, then the people will have to get with it you know?" Participant 5
4.2 Public	The people who buy makeup need to take the first step in bringing about change through demand	
4.3 Both	Both the public and the brands need to take the first step together to bring about change	"I think the change needs to come from both really." Participant 1

Table 24: Post survey interview codebook

Transcripts and consent forms

All transcripts and consent forms are deposited with the University of Twente.