ERASMUS UNIVERISTY ROTTERDAM
ERASMUS SCHOOL OF ECONOMICS

Bachelor Thesis Marketing

The Price of Sustainability: Discovering University Students' Willingness to Pay for Recycled Products

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Abstract

The following thesis explores university students' willingness to pay for new versus recycled products and what the factors influencing these preferences and decisions are. This was done through a survey that was mainly distributed to students around the Erasmus University Rotterdam. After the data was collected, a choice-based conjoint analysis was conducted through JMP with a sample size of 174. Through this, the price sensitivity, perceived quality, environmental concern and influence from surroundings is tested and the way that they affect purchasing decisions. Through conducting this analysis, it is revealed that the price and the quality are the factors that most significantly impact the university students' willingness to pay. Furthermore, the environmental concern does also have an influential role in the decision-making process of the students. However, it can be seen from the results that the influence form the surroundings has less of an impact compared to all the other attributes. As a result of the findings, it can be considered that targeted marketing strategies can enhance and improve the image of sustainable products among university students. Overall, this research is a step towards a deeper understanding of the sustainable consumption amongst the younger generation's consumptions. This provides insights for business that aim to begin selling or producing recycled and eco-friendly products into the market.

Keywords: willingness to pay, purchasing decisions, university students, sustainable products

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1. Introduction:

In a world increasingly mindful of sustainability, understanding consumer preferences and behaviors towards certain types of products is vital. By examining the attitudes and behaviors of university students, who represent a significant consumer demographic with potential long-term impact, we aim to highlight an under-discussed area of debate. The central focus of my thesis will revolve around understanding students' preferences and their willingness to pay for new versus recycled products. Recycled products are defined as products remanufactured in the ultimate form, and it conserves the raw material content but also could have added value during the process (Gaudette, 2003) or simply reused goods. This consists of diving into the complicated relationship between consumer behavior and sustainability consciousness among the university student demographic. The most important component of this study is in identifying the factors that influence university students' choices between new and recycled products. When looking into this, different components will be taken into consideration such as the correlation between various factors such as environmental awareness, perceived quality, cost considerations, and social norms. This will not only contribute to academic discourse but also offer insights that can inform real-world strategies for businesses and policymakers, additionally looking into the implications of these preferences on sustainable consumption patterns.

Mobley et al., (1995) also delves deep into the different willingness to pay, however the aim of this paper will be to do this in more niche circles in order to be able to identify different preferences of different age groups and demographics of different products that are offered in the market. The aim will be to look into different products with different characteristics thus striving to also pinpoint the different factors that affect the university students' willingness to pay for the two different types of goods.

1.2 Research Problem & Motivation

Previous experiments, such as those conducted by Mobley et al. (1995), have shown that consumers generally view products favorably when made with recycled materials, regardless of the specific type of product. This aligns directly with the central focus of this study, which aims to explore students' preferences and their willingness to pay for new versus recycled products. By investigating the key factors influencing students' decisions between new and recycled items, this research sheds light on the dynamics of consumer behavior and sustainability consciousness within this demographic.

Drawing upon existing research, including studies by Essoussi and Linton (2010), the aim is to look into students' attitudes towards both new and recycled products, as well as their perceptions of social responsibility and environmental impact. In addition to the insights from research conducted by Parguel et al. (2017), which emphasizes the significance of environmental concerns in shaping consumer preferences, this study seeks to uncover how students' beliefs and attitudes influence their willingness to pay for different products, whether recycled or new.

Furthermore, research by Hidalgo-Baz et al. (2017) suggests that consumers who feel empowered to make a difference in environmental issues are more inclined to engage in sustainable consumption practices. Thus, this study not only highlights the varying perceptions and attitudes towards new and recycled products but also explores how different consumer beliefs influence their willingness to pay for these products.

1.3 Research Objectives

This paper aims to look into the willingness to pay of university students for new versus recycled goods and the different factors that influence these decisions. This study explores the relative importance of different factors and their influence of university students' behavior and willingness to pay. Sending out a survey will allow the collection of quantitative data and a conjoint analysis; this will aid in finding the most influential factors for students when considering what goods to purchase. This information gathered together will lead to the formation of the following research question:

To what extent do university students prefer and demonstrate a willingness to pay for new versus recycled products, and what factors influence their preferences and willingness to pay?

This topic holds academic significance as it adds to the existing research on factors that influence university students' preferences regarding new and recycled goods. It addresses a gap in the literature, particularly relevant to the expanding industry of recycled goods and this specific demographic in discussion. From a social standpoint, understanding which products resonate more with students is crucial for companies aiming to market effectively through platforms like social media and university channels. Recognizing the relevance and potential variations in demographic characteristics among students allows businesses to tailor their marketing strategies accordingly, for continued relevance and engagement. Moreover, from an economic perspective, assessing the changing needs and preferences of university students, especially concerning sustainability, is

essential. The insights gained from this study enable businesses to make informed decisions, potentially increasing their market share and revenue.

1.4 Research Methodology & Thesis Outline

The first part of this thesis research will involve an in-depth analysis of previously mentioned academic papers as well as go more into depth on prior research about willingness to pay for new versus recycled products and the motives that influence these decisions. In addition, this will pinpoint the potential influences on willingness to pay that need to be emphasized in this study and highlight the difference in preferences within the target demographic, therefore putting together potential hypotheses that could be drawn from the research. Moreover, this will be followed by a structured online survey and a conjoint analysis will be carried out establishing specific demographic features to match the sample for the study. As a result of this, we will be able to answer the hypotheses, this will be calculated through descriptive statistics and marginal effects. Using these, it will allow us to discover the potential similarities and differences from the results and therefore lead to the points of discussion. Furthermore, the survey and conjoint analysis will be conducted, this will then be followed by the data analysis, results, and findings. Lastly, this paper will end with the discussion and conclusion, and highlighting potential limitations and recommendations for future research.

2 Literature Review

RQ: *To what extent do university students prefer and demonstrate a willingness to pay for new versus recycled products, and what factors influence their preferences and willingness to pay?*

Looking into how university students express their preferences between new and recycled products provides an insight into the different behaviors exhibited. Starting with a glimpse at how sustainability matters are shaping the choices of the younger consumers, this paper looks into already existing literature. Our main goal is to understand what influences university students when they make the decision between buying something new or choosing a recycled good.

The paper will explore factors like how much they care about the environment, their perceptions of product quality, how prices play into their decisions, and even the influence of people around them. By looking into these studies, we aim to get a clearer picture of what makes the university students' choices. We'll also look at similar research done around the topic to see if there are any broader trends to consider. Additionally, it is important to find the gap that currently exists in the previous research in similar fields. The information is being gathered from reliable sources, mostly found through platforms like Google Scholar, to make sure it is solid ground to build on.

In our day and time, the concept of sustainability has gained significant attention amongst consumers in recent years. As these environmental concerns increase, consumer choices play an important role in shaping the future of which products companies decide to sell. Considering the increasing demand for these practices, businesses are increasingly choosing sustainable strategies to meet the consumer expectations (Day et al., 2014).

2.1 Choice-based conjoint analysis

An increase in demand for sustainable products has led to businesses being forced to adopt eco-friendly strategies, meaning that they must learn to also navigate through consumer-product interactions. When analyzing different consumer's sustainable consumption behavior, it is very important to consider which factors are the reason behind these behavioral patterns (Singh et al., 2019; White et al., 2019). In order to correctly examine the different behaviors, it is important to consider various consumption needs (Blok et al., 2015) in relation to the interaction between the new product that the company has put out in response to the demand and the consumer's choices (Young et al., 2010).

Conjoint analysis shows how consumers weigh the importance of different factors when deciding on purchasing a certain product. It considers how the value of a product changes depending on the combination of features it offers, and which one the different consumers consider to be more important than the other. Given the analysis chosen to be conducted, it would involve a multiple regression including dummy variables in order to be able to look into the changes in the value created of the product by the change in the attributes (Green, Krieger & Wind, 2004). Each of the attribute levels has a certain utility value that will overall impact the utility as a whole of the product for the consumers (Sorenson & Bogue, 2006).

2.2 Factor affecting on willingness to pay discussed in previous studies

Michaud and Llerena (2010) explain the need for consistent and transparent communication regarding the environmental benefits of remanufactured and recycled goods. Although consumers may not initially be willing to pay higher prices for them, their choices might be affected by environmental consciousness and therefore making the remanufactured products more comparable.

Moreover, the study by Gomes et al. (2023) discusses that the environmental drivers are essential for marketing eco-friendly to the generation that is now in their university education. Brands should voice their ability to improve the environment through their production methods and their future sustainability aspects if they intend to shape the generation's consumption behaviors towards more recycled products regardless of the possibly higher prices.

To marketers advertising eco-friendly products, it's important to know how this generation decides to purchase something. This study by Heo & Muralidharan (2019) points out the important part that concern for the environment has in leading to environmentally responsible behavior. Thus, marketing activities should concentrate on approaches which not only stress the eco-friendliness of their goods but also inform them on how their choices affect the environment as a whole.

2.3 Formulation of hypotheses

Considering previous research on this topic and different analyses that have been done. As mentioned above there are various factors that affect the willingness to pay and choice of consumption of goods. As can be seen in the study performed by Mabkhot (2024), different variables are taken in order to be tested therefore each of these variables are turned into its own hypothesis to be tested.

The first variable to be discussed is "price sensitivity", this is one of the factors that can be considered to affect one's willingness to pay. According to Gleim et al., 2013, research in the past has found that higher prices for various sustainable products compared to the new products, are the main issue and barrier for these products. Therefore, one of the main variables that should be considered for university students should be their price sensitivity. It is very commonly seen that recycled materials usually cost more than the new products of similar productivity and characteristics (Vandermerwe & Oliff, 1990). In fact, the majority of respondents in previous surveys claimed they would be willing to pay a price up to 5% higher for green products. It may be that the respondents are not being honest or that the price difference between the two types of products is not significant enough (Naresh, 1986).

H1: Price sensitivity has a negative effect on university students' willingness to pay for recycled products.

O'Rourke & Ringer (2016) did research to examine the impact on consumer behavior toward sustainable consumption if the information related to the environmental wellbeing is being shared. The survey was conducted in different stores both online and in person. In this survey, with information provided on the products, the consumers were asked to rate over 200,000 items. As a result, it was proven that consumers are positively influenced by a guide and additional information, however of course for some it did not have an effect and for others it had a negative effect. However, overall, the most common outcome was the positive one, and that more information related to sustainability had a positive effect. It is important to test whether this is applicable for the particular demographic of university students, therefore bringing forward the second hypothesis. Both a positive attitude towards the environment and a perception of high quality in recycled products lead to a greater intention to buy them (Sun et al., 2018). Previous studies have shown that in several cases, people who are aware of the environmental issues are much more likely to be willing to pay extra for recycled products. Therefore, suggesting that a more extensive availability of information can be effective in changing people's decisions when choosing between the products (Mamun et al., 2018).

H2: Environmental concern positively influences university students' willingness to pay for recycled products.

One of the most important factors when purchasing anything is the quality of the product that is being offered. Highlighting how brand quality is always a determinant of consumption for various different products (Pyun et al., 2011). As can be seen in previous research and papers on the topic, it is important to note that perceived product quality should be considered. One of the many factors that should be considered when deciding on consumer willingness to pay should be the quality of the product offered (Schaefer, A., & Crane, A, 2005). It

has at times been considered in several cases that recycled products may be seen to be of a lower quality than products made of raw materials (Reid, 1990). Moreover, in a study conducted by Bigliardi et al. (2020), the various factors that influence the buying of recycled products were tested, most importantly the ones that focused on consumer opinions. It highlights that consumers often consider recycled products as lower quality compared to those made from new materials, which can reduce their preference and willingness to pay towards the recycled products. Therefore, bringing forwards the following hypothesis to be tested.

H3: Perceived quality has a positive effect on university students' willingness to pay for recycled products.

After research relating to the different effects socially and the different factors that lead to different consumption behaviors, it was made clear that one of the factors that matters is social influence and surroundings. It is considered that people who advocate for buying green and recycled products are seen as more favorable in today's society (Berger, 2019). In addition, nowadays, social media plays a big role in influencing different purchasing habits especially relating to eco-friendly and recycled goods (Delcea et al., 2019; Strähle & Gräff, 2016). As can be seen conducted by Saeed et al. (2019), it was brought to light that the connection between social media and eco-friendly products, it is common that individuals who are exposed to either positive or negative information about sustainable and recycled products usually gravitate towards the green consumer goods. It was noted by the experiment that for the people who usually look for this content on social media, the availability of it led to an effect on their purchasing choices. Moreover, when considering the effects of a social media campaign for eco-friendly products, it can be seen that 49% of the followers were able to learn more about living more sustainably. In addition, due to the different campaigns it led to 25% of the followers developing at least one sustainable habit in two months. Thus, the study shows that through social media and further education about sustainability it is possible to change the way in which people decide to behave and the actions they take towards their choice in consumption (Al-Mulla et al., 2022).

H4: Social influence positively impacts university students' willingness to pay for recycled products.

2.4 Conceptual Model

Attributes (Independent Variables)
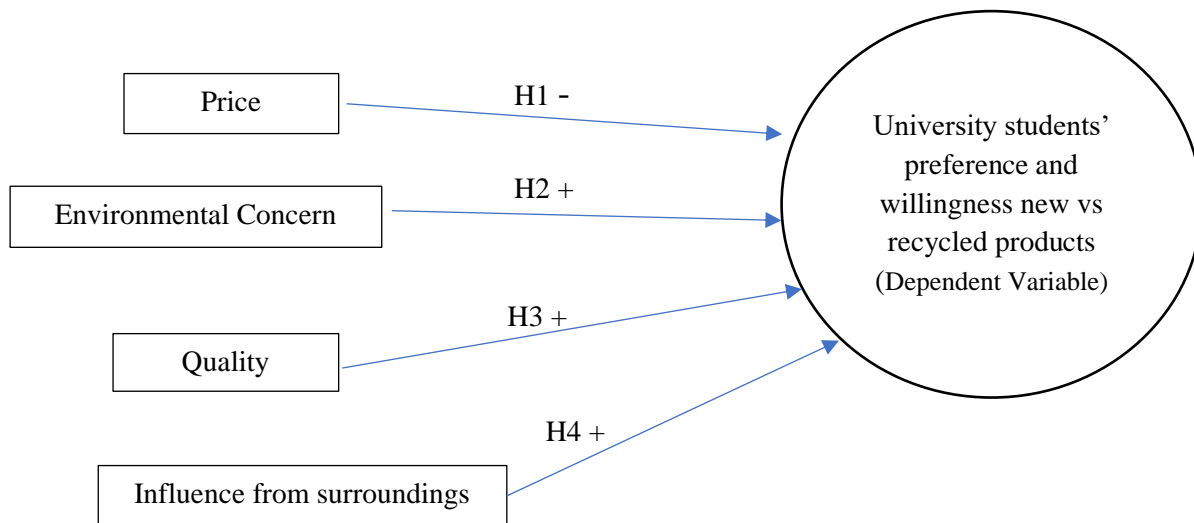
3 Methodology

3.1 Research Methodology

This research explores the preferences and purchasing behavior of university students when it comes to new versus recycled products. It aims to understand the importance of the different product attributes in influencing the choices they make and how much they are willing to pay. Considering the nature of this research, a quantitative approach was chosen to be the most appropriate. A conjoint analysis was conducted to assess the varying levels of importance for different product attributes. This approach involves presenting respondents with different options that have varying attributes. By doing so, we can analyze how each attribute influences the choices made by respondents.

It is possible to acquire information about a product's quality and its impact on choice without expressly asking about them. Consumers must assess product qualities as a whole. Therefore, this is more realistic than evaluating only one attribute level separately. In this study, choice-based conjoint analysis was used instead of metric conjoint analysis because it more properly replicates real-world decision-making processes in which people pick between objects with different attribute combinations. Choice-based conjoint analysis is favored because it closely resembles actual market circumstances, allowing us to better understand customers' trade-offs and preferences when choosing between profiles. This approach gives useful information about customer behavior and may be used to mimic market shares for various product configurations.

This study uses a survey to investigate customers' willingness to pay for new vs recycled items and the different factors affecting this. In an online survey, participants are met with several attribute combinations, which they can then choose between. As a result, an experimental design is unneeded since a survey design may efficiently collect useful findings. Furthermore, employing a survey design is useful since it saves time and allows for the collecting of responses from a broader pool of participants online.

3.2 Sampling and Data Collection Methods

Firstly, the survey begins by asking questions relating to the demographic of respondents. Following this, some questions relating to their environmental behavior are asked, these will relate to recycling habits and their

awareness of the current environmental issues. These questions helped us to understand the respondents' backgrounds and their possible impact on the study's findings.

When looking at the type of analysis, a conjoint analysis will be used through the statistical software JMP. In order for this to be done, 10 profiles are created following different principles such as level balance and minimal overlap (Lazari & Anderson, 1994). As mentioned by De Meulenaer (2015), the design made sure that each of the attribute levels we present for the same amount in order to make sure providing a reliable dataset for analysis. To acquire credible findings in conjoint analysis, an average sample size of 100-200 respondents is recommended (Quester & Smart, 1998). A minimum of 100 respondents were required to ensure the validity of the findings.

As for the target population of the research, university students living in the Netherlands were chosen. This group was selected due to their financial independence, decision-making capacity, and the large amount of information they are exposed to regarding the purchases being made. The sample included diversity in demographics such as gender, origin, and income. The data was collected online through a Qualtrics survey, which was distributed on social media and university channels to ensure a wider and more diverse reach.

3.3 Procedures

A Qualtrics survey was created with the following two main sections: demographic questions and the profiles used for the conjoint analysis. This survey can be found in Appendix A. The survey began with an introduction explaining the study's purpose and obtaining consent for the respondents' answers to be used for the study. The conjoint analysis section included an introduction to the choice-based conjoint analysis, describing the four aforementioned attributes and their levels.

Through randomization 10 profiles were created and converted into tables. These were added to the survey, presenting the respondents with two of the profiles at a time and asking them to choose their preferred profile. By doing this, the aim was to understand consumers' preferences clearly and identify how different attributes affect their decisions.

After collecting a sufficient number of responses, the data was exported from Qualtrics into Microsoft Excel in order for it to be rearranged, after which it was imported into JMP for the analysis. After this data is imported, JMP is able to compute the analysis metrics such as likelihood ratios and effects marginal tests. These amongst others were used in order to conduct this study.

3.4 Data Analysis & Bias

The research began by providing demographic data to confirm that the sample was representative of the target population. The results and the data from the conjoint analysis was then analyzed. In order to determine the most applicable factors impacting university students' willingness to pay for new versus recycled items, the effect marginal calculations were used. These findings can be seen in tables in order for them to be easily visualized.

In order to reduce researcher bias, both internal and external validity were set up. Firstly, internal validity was possible due to the random distribution of the survey and the randomization of the profiles when they appear. Moreover, the external validity was addressed by employing realistic product qualities and profiles that are representative of current market situations. The poll specifically targeted frequent buyers of new and recycled items, as evident by the demographic questions.

4 Results

After the distribution of the survey, a sample of 213 was collected as a total number of responses. However, due to the fact that not all of them fell within the necessary sample size, it the final sample size used is 174 university students. This survey was distributed to university students through different means of communication such as WhatsApp, Instagram, and Canvas therefore aiming to avoid distribution bias overall. As previously mentioned, the survey included consent regulations relating to the use of the respondents' answers, an introduction about the topic, demographic questions and the choice sets.

4.1 Sample Characteristics

Table 1: *Sociodemographic of the survey sample, including gender, age, and average income (n=174)*

Category	Count	Sample %
Gender		
Male	95	55%
Female	75	45%
Other	2	1%
Age		
17	1%	1
18	1%	2
19	7%	12
20	23%	40
21	19%	33
22	33%	56
23	13%	22
24	2%	4
25	1%	2

In the table above, it is not necessary to include "Occupation" due to the fact that everyone who is not a student has been removed from the final number of respondents. Therefore, the two variables that are being looked at are Gender and Age. According to table 1, there is a larger number of males than females. Moreover, all of the respondents are students, therefore most of them, as can be seen above, are 22 years old. However, the age

range extends from 17 being the minimum to 25 maximum ages of participants. As previously mentioned, these are all meant to be students therefore they fall into the suitable age group. As can be seen above, as a result of the different means of distribution of the survey, there had been several responses from people who were not students, therefore having to exclude them. Overall, the sample matches the desired sample for the study, focusing on university students.

Table 2: Minimum, mean, and maximum of the monthly budget/income of the survey sample. (n=174)

	Monthly budget/ Income excluding rent (euros)
Minimum	0
Mean	488.87
Maximum	1500

Considering table 2, the range of the monthly budget of the survey sample is large, from 0 to 1500 euros to spend per month excluding the rent. However, the mean accurately represents most of the average budgets, which somewhat corresponds with most student lending amounts found in the Netherlands, as all of the respondents of the survey are university students. This value is a good measure for the following purchasing behavior related questions, as it helps show us the spending potential for goods for university students. The provided mean is calculated using the midpoints of the ranges, and using the mean code provided JMP after analyzing the responses when asked about monthly income. The final actual mean is the sum of the mean value given by JMP and all the midpoints of the ranges provided in the choices. This calculation assumes that the representative midpoint values accurately reflect the distribution of responses within each range of the survey question.

4.2 Green behavior Sample Results
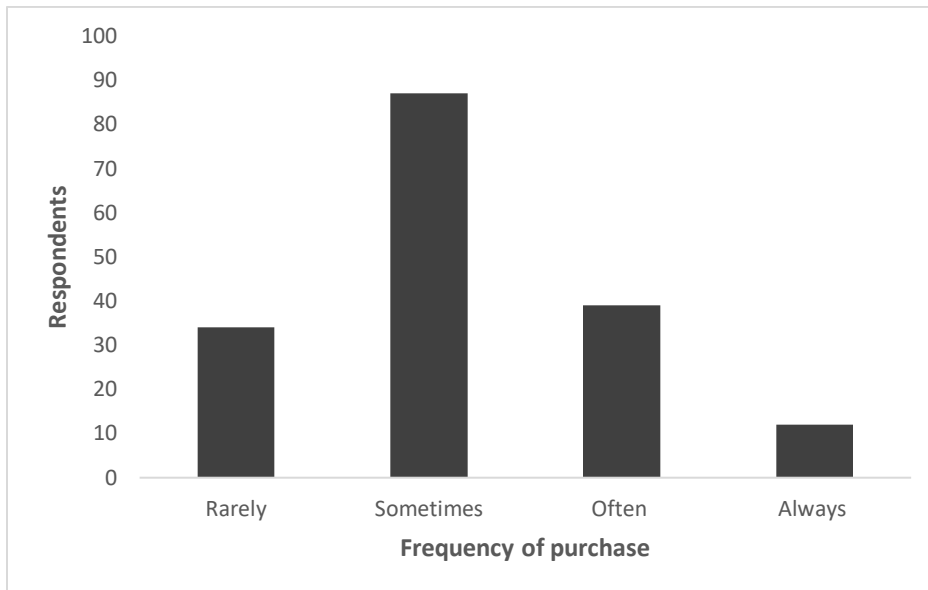
Figure 1: Frequency of purchasing products with minimal or eco-friendly packaging (n=172)

When considering the results of Figure 1, it is evident that most of the respondents decide on purchasing eco-friendly packaging from time to time rather than as a regular practice. This suggests that even if there is an awareness of the importance of sustainable packaging, it has not yet translated into a regular purchasing habit for a majority of the consumers. Thus, various efforts to educate and motivate more regular eco-friendly purchasing could have a significant impact on the different purchasing habits.
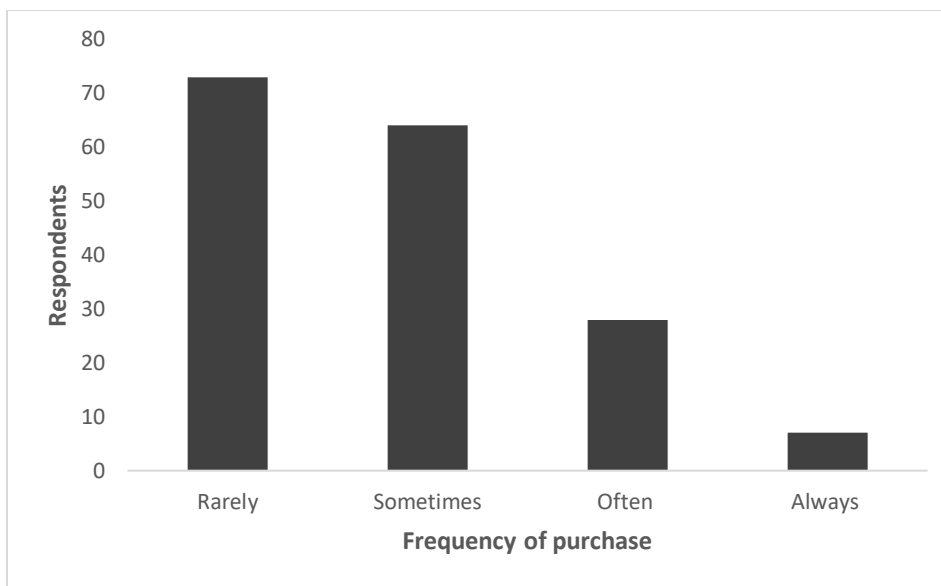
Figure 2: Frequency of purchasing vintage or second-hand products instead of new ones (n=172)

Figure 2 looks at the preferences and the frequency or purchasing pre-owned products such as vintage or second hand instead of new ones. It can be seen here that most of the respondents are less willing to pay for pre-owned items and that is rare that they decide to purchase them. This indicates a preference among university students for not buying products that have been owned before and rather new ones.
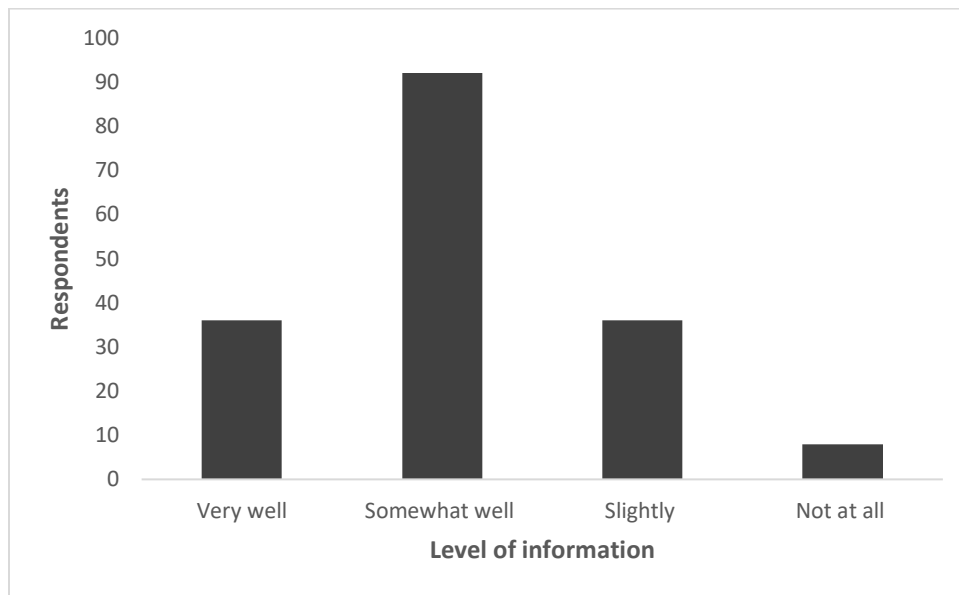
Figure 3: Level of information about the environmental impact of daily habits (n=172)

When looking at Figure 3, it can be seen that most university students consider that they are "somewhat well" informed about the environmental impact of daily habits. As can be seen this is the second-best level of information, therefore university students feel like they have a level of information that is more than sufficient.
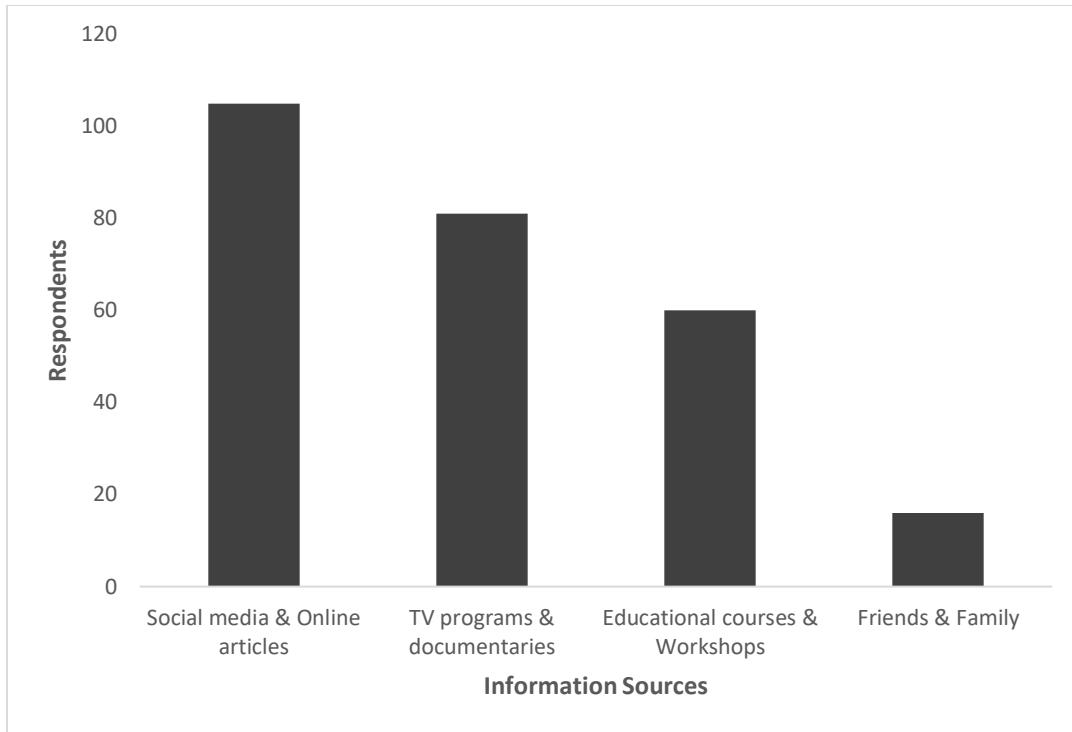
Figure 4: Source of information about eco-friendly practices (n=172)

In Figure 4, the most common source of information is social media and online articles, showing that most university students in the modern day get their information from their time spent on social media.
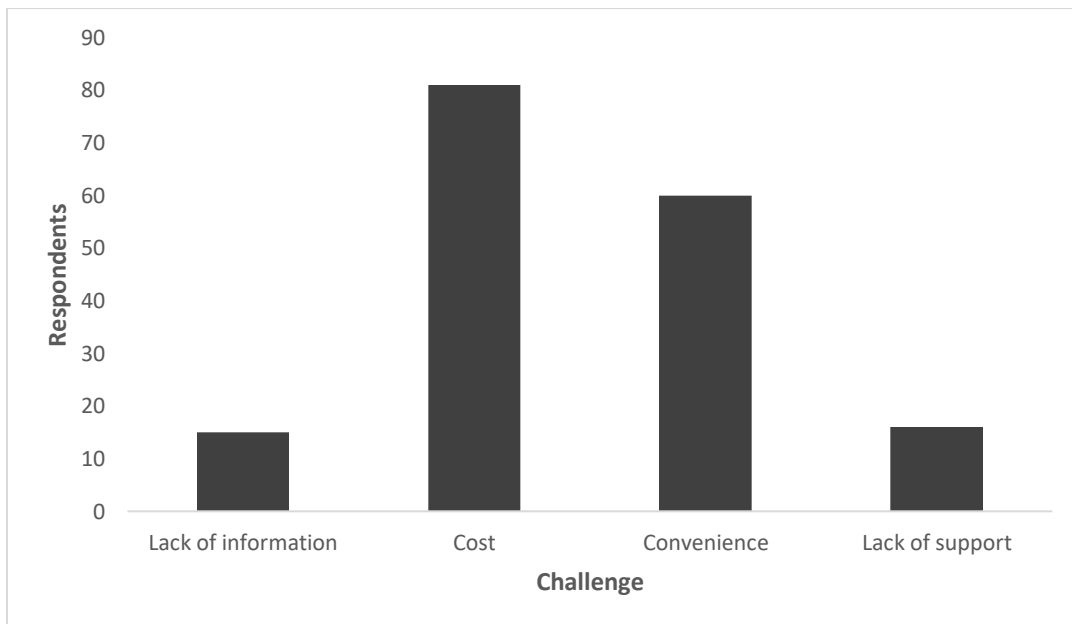
Figure 5: Most challenging factors relating to adopting eco-friendly practices (n=172)

Considering Figure 5, it can be seen that the reason for which university students choose to not adopt eco-friendly practices is the cost. This is in line with the above-mentioned monthly budget being lower for students therefore them not having the means to spend more on eco-friendly products. The second highest challenge is convenience which could mean that it is difficult to reach or find.

4.3 Choice-based Conjoint Analysis Results

Following the choice-based conjoint analysis using the survey respondents, the numbers were computed by JMP. In the following table, Table 3, the added value of utility, also called the marginal utility, can be found. Considering the values below, most of them except on are positive; therefore, this represents a positive relation between the attributes at different levels. There is only one negative value that can be seen here, which presents the opposite effect. It can be seen that medium quality has the highest value while the influence of surroundings not being present is the lowest. There reason and effect of these values will be further discussed in the effect marginals test that is presented later on.

Table 3: Parameter estimates of conjoint analysis computed via JMP based on survey responses (n=172)

Attribute	Estimate	Standard Error
Item Type (New)	0.241	0.036
Price (Low)	0.028	0.047
Price (Medium)	0.177	0.045
Quality (Low)	-0.318	0.045
Quality (Medium)	0.471	0.046
Influence from surroundings (Not present)	0.040	0.035
Environmental Concern (Low)	0.090	0.048
Environmental Concern (Medium)	0.131	0.042

The likelihood ratio test assesses the statistical significance of each feature and its interaction with possible control factors. If the p-value for each characteristic is below the 5% significance level, then the impact on the utility of the responder is considered statistically significant. If the variables have a substantial influence, this study shows that the qualities also have a significant effect on the purchasing decision choices of the respondent. Table 4 displays the findings of the likelihood ratio test, which does not include any control

variables. The table presents the characteristics, chi-square values, degrees of freedom (DF), and the significant probability of the survey data.

When considering the significance level in the fourth column of Table 4, it can be seen that the attributes used to describe the products are mostly significant at 1% except the attribute of influence from surroundings. When looking at it from the bigger picture, this means that the consumer's purchasing decision and willingness to pay is affected by a difference in the four attributes. Therefore, it can be deduced from the results presented in the table that the Item Type, Price, Quality, and Environmental Concern all can be considered to have a significant impact on the consumers choice to purchase and willingness to pay for a certain product on the market.

Table 4: Likelihood Ratio Test of the Effect of the Attributes on the purchasing decisions of the survey respondents (n=172)

Attribute	L-R Chi-Square	DF	Prob>ChiSQ
Item Type	46,585	1	<0.0001*
Price	18,111	2	0.0001*
Quality	139,984	2	<0.0001*
Influence from surroundings	1,250	1	0.2636
Environmental Concern	14,461	2	0.0007*

*Note: The sign * corresponds to all value that are less than the p-value of 0.05 which represents the significance. Degree of freedom is represented in the table as DF.*

After conducting the initial individual regression above, it is not important to look more into depth, in the following Likelihood Test of Interaction the control variables gender and age were added. This was done with only two control variables in order to limit the large amount of interaction effects calculation, due to the fact that this may lead to an increase in inaccuracy if the interaction effect for more control variables was tested. For all the interaction effects between the control variables and the attributes except one the value is insignificant. This means that the p-value calculated is greater than 0.05, there making it insignificant. Therefore, the conclusion that can be drawn from this is that there will be no significant change when taking the control variable into consideration. As mentioned before, only one of the attribute and control variable combination which is between gender and item type is considered significant at a 5% significance level.

Therefore, this may mean that the whether someone is a female or male is likely to have an effect on the whether they choose a new or recycled product. For the most part, it can be concluded form the results that there is not a significant difference in the choices that are made by consumers when purchasing products when adding gender and age, the only place where it is significant is with the gender of the respondent and the item type that they choose. Another factor that is important to consider, is that the AIC and the BIC, these are values that show how fit the model is, can be seen to be lower when the controls are added and taken into consideration. Therefore, this results in an accurate representation of the results.

Table 5: Likelihood Ratio Test of Interaction Effects of Attributes on the purchasing decision of the survey respondents with the control variables Gender and Age (n=172)

Attribute	L-R Chi-Square	DF	Prob>ChiSQ
Gender*Item Type	4.963	1	0.026*
Gender*Price	1.589	2	0.452
Gender*Quality	4.285	2	0.117
Gender*Influence from surroundings	0.023	1	0.879
Gender*Environmental Concern	1.145	2	0.564
Age*Item Type	0.357	1	0.550
Age*Price	0.423	2	0.810
Age*Quality	3.851	2	0.146
Age* Influence from surroundings	0.466	1	0.495
Age*Environmental Concern	2.890	2	0.236

*Note: The sign * corresponds to all value that are less than the p-value of 0.05 which represents the significance. Degree of freedom is represented in the table as DF.*

In order to be able to correctly estimate the importance that each of the attribute's weights on the purchasing decision of the respondents, it is important that the effect marginals test be looked at as can be seen in Table 6. Upon the computation of these values, the part-worth utility range is also provided for each of the attributes. This will show the probability that a respondent will decide to go with a certain attribute level. The importance depicted in Table 6, is calculated as each of the individual ranges divided by the sum of ranges of the attributes.

When looking at the JMP results presented in Table 6, it can be considered that the most important attribute as considered by the respondents is Quality, with a value of 0.404. Meaning that, when choosing between the different options in the choice sets, the first thing that they would consider is the level of quality of the product.

This would be considered the main factor when making the purchasing choice. The least important attribute as seen by the survey responses and analyses by JMP is the Influence of the surroundings. Therefore, when looking at all the attributes that affect the choices the Influence of the surroundings is seen to be the least influential and important.

Table 6: Effect Marginal Test Range and Computed Importance of Each Attribute of the survey responses (n=172)

Attribute	Range	Importance
Item Type	0.490	0.249
Price	0.385	0.196
Quality	0.795	0.404
Influence from surroundings	0.081	0.041
Environmental Concern	0.218	0.111

Note.: The range is calculated as the maximum - the minimum part-worth utility for each attribute. The importance is calculated as the individual range divided by the sum of ranges of the attributes.

Table 7: Table of Pearson Correlation Coefficients Among Key Attributes (n=172)

Attribute	Price	Item Type	Influence from Surroundings	Quality	Env Concern
Price	1	0.309**	0.112**	0.052**	0.320**
Item Type	0.309**	1	0.042*	0.028	-0.146**
Influence from Surroundings	0.112**	0.042*	1	0.253**	-0.146**
Quality	0.052**	0.028	0.253**	1	-0.074**
Env Concern	0.320**	-0.146**	-0.146**	-0.074**	1
Significance (2-tailed)	<0.001	<0.001	<0.001	0.002	<0.001

Note: The Correlation is significant at the 0.01 level (2-tailed). Correlation is significant at the 0.05 level (2-tailed).

In the table above, the Pearson Correlation Coefficient can be seen that tests the multicollinearity of the attributes. Through this, there are different correlations that can be seen now between the aforementioned attributes. There are three different significant correlations that can be seen in Table 7, the first one being Price and Item Type at 0.309. Secondly, it is Price and Environmental Concern with a correlation of 0.320, and lastly the correlation between Influence of Surroundings and Quality at 0.253. Due to the significant values that were found it can be considered that there are some multicollinearity issues. The most important ones are the two

correlations with the attribute Price. This is due to the fact that they are the attributes that have correlation value higher than 0.300. The issue of multicollinearity may limit the reliability of the estimation of the regression model since it may be that a higher correlation for the predictors might make it hard to separate the individual effect of the attribute on the dependent variables. It is important to address multicollinearity in order to ensure that the regression model and the findings of the study are reliable.

When considering the research question upon which all of this data collected and the results of the hypothesis, it is important to address the key findings. Firstly, students will show a lower willingness to pay for the recycled products as a result of the increase in price sensitivity. Moreover, university students with a higher environmental concern implies that they will have a higher willingness to pay for recycled products. Moreover, it can be seen that a higher perceived quality will lead to an increase in the overall willingness to pay for recycled goods. Lastly, it is considered the influences from surroundings has a relatively smaller impact on the willingness to pay of university students. These results put the significant factors that affect the university students' purchasing decision in the spotlight, as well as provide as response to the aforementioned research question.

5 Conclusion & Discussion

5.1 Conclusion

The aim of this study was to look into and try to find an answer to the question:

To what extent do university students prefer and demonstrate a willingness to pay for new versus recycled products, and what factors influence their preferences and willingness to pay?

When looking at the data provided about, there are certain conclusions that can be drawn about the validity of the previously formed hypothesis.

H1: Price sensitivity has a negative effect on university students' willingness to pay for recycled products.

The results from Table 3 in Section 4.2 depict that Price have a significant effect on purchasing decision of the respondents. The estimate for low price (0.028) is positive but still considered to be relatively low, whereas medium price (0.177) shows a higher positive estimate. This implies that the price sensitivity of the products at hand, can be considered to be a significant factor. Price sensitivity influences their choices, as can be seen by the likelihood ratio test in Table 4, which indicates that strong impact of price on purchase decisions (L-R Chi-Square: 18111, Prob>ChiSQ: 0.0001*). In particular, the items with prices medium are more useful than he items with the low prices, suggesting that even if the high prices are likely to discourage students from buying them, they are willing to spend a bit more for higher overall quality of the product. Therefore, as a result of this the willingness to pay for recycled products decreases as prices get higher.

H2: Environmental concern positively influences university students' willingness to pay for recycled products.

As mentioned above, the Table 3 shows that both low (0.090) and medium (0.131) levels of environmental concern have positive estimates. This shows that higher environmental concern is higher it shows that there will be an overall higher willingness to pay for the recycled products for consumers when making a choice. Therefore, the hypothesis mentioned above would be considered valid since it is proven to be correct.

H3: Perceived quality has a positive effect on university students' willingness to pay for recycled products.

The estimates for quality in Table 3 indicate that lower quality has a negative estimate of -0.318, while medium quality has a positive estimate of 0.471. The positive correlation with better quality and negative correlation with lower quality shows the hypothesis that a decrease in perceived quality leads to a decrease in the willingness to pay for recycled items. Thus, validating the hypothesis that had previously been formed.

H4: Social influence positively impacts university students' willingness to pay for recycled products.

When looking at Table 3, it can be seen overall that the surroundings influence has a positive estimate. Therefore, showing us how it is more likely for university students to have a higher willingness to pay for recycled products when experiencing approval from their peers or being influenced. Yet, when looking at the other attributes that are tested, it is important to consider that influence from surroundings has a relatively less significant effect. It is still a positive effect; however, it has a weaker correlation. Overall, hypothesis 4 is supported by results, while considering that they are less influential in comparison to other attributes.

Therefore, when considering all the data interpretation mentioned above as well as the proof for the hypothesis. It can be considered that a clear answer has been provided for the main initial research question. When considering these attributes in relation to the Item type it can be seen as mentioned in the results. Thus overall, the above-mentioned findings all provide an answer to the main research question.

5.2 Implications

5.2.1 Research Implications

This study contributes to the already existing research on consumer preferences and behaviors regarding sustainable products, specifically examining the willingness of university students to pay for newly produced items compared to those made from recycled materials. The primary objective was to reduce the gap in understanding the unique preferences of this particular group.

As a result of this research, it can be seen that the results align with the results found and provided by different papers and research previously done. However, the extra step that was taken with this research was to see the different attributes and how it affects the consumer choices of university students in particular. It is important to highlight that out of all the aforementioned attributes, it is common that university students do not consider that social influence has a significant role in the purchasing choices made by the university students. It is

important to consider the fact that, cautious interpretation needs to be considered until further research is conducted to further validate these findings.

5.2.2 Practical Implications

This research enables insights into the purchasing and consumer behavior of university students. The findings of this research can be useful for business that aim to begin selling recycled goods as opposed to new goods. The main target audience of this study is businesses, as well as policy makers. For business it is important to know what to look for, especially for those who aim to target university students in particular since they are the demographic on which this research is concentrated. In this way, using the different attributes, companies will be able to decide on what characteristics they concentrate when they look to choose the products they want to see. This would be useful both for the marketing of these products as well as the choice of what products are to be sold in the store. By being able to highlight the attribute that stand out to the university students, it is more likely that they will be more willing to pay higher prices for it. It is important for them to highlight low prices or discount and offers for the recycled products. This is one of the main factors that students find difficult with purchasing this type of product as well as make sure that the high quality of the product is brought into the light. This is important for university students when making the choice. Moreover, it is important to enhance marketing campaigns by focusing on the environmental friendliness of the product. For example, using social media platforms to spread awareness about how the product is made and the sustainability. For policymakers, it is important to consider the opinions of the younger generation when making laws to therefore make it easier to follow and adapt.

University students represent a high amount of the consumer demographic with long-term impact, thus the businesses that are able to successfully fulfill the preferences can lead to potential growth. By promoting the higher quality, low priced, and environmentally friendly products, the companies can meet the demand but also contribute to a large extent o the a more sustainable economy on the long term.

5.3 Limitations

Firstly, the choice to use a choice-based conjoint analysis through JMP for the analysis could be seen as a limitation. All of the conclusions that were drawn, were a result of the respondents being presented with a mere 10 profiles. When considering the bigger picture, this an insufficient number of profiles in order to clearly see and understands someone's preferences, reasoning, and biases. This may lead in minor gaps in the collected and analysed data. Yet, it would not have been possible to present more profiles due to the fact that it would

have caused the respondents to not give the same amount of attention to the end and would have risked in an inaccurate outcome of the results when the data is analysed.

Moreover, in the results section of the paper, the level of importance of the attributes was calculated with the use of the effect marginal test. This calculates the marginal utility (part-worth utility), of the respondents all based on the choices made with the different profiles provided. When conducting the choice-based conjoint analysis, the limitation may be that the marginal utility that is found is more or less an abstract measure. Therefore, it could be that the day-to-day choices that these respondents would make would not align with the value provided by this analysis. Therefore, this would mean that the real-life choices and opinions would not directly align with the estimates given by the marginal utility calculation.

In addition, one of the main limitations of this survey was the lack of diversity in the respondent pool. This is due to the fact that most of the respondents in the sample of 172 people who answered, were in majority from the same university. This is due to the fact that it was distributed mostly around the Erasmus University Rotterdam. Therefore, this can be considered to be a sample size that is not representative of the population due to everyone living in the same city as well as being exposed to more or less readily available products. Since most of the people are living in Rotterdam, their choice may be biased towards the characteristics of the city and what it has to offer. Overall, this demographic and as well as geographic limitation may have caused biases as well as may have caused a limitation in the extent to which the results can be generalized.

Moreover, in hypothesis testing it is important to take into account the Type I and Type II errors. These errors can impact the overall interpretation of the hypothesis and the results. One of the possible sources of a Type I error (false positive) in this study is the 5% siginficance level, due to this there is an increased risk in the possibility that some of the results that are considered to be significant are false and could be due to only chance.

Furthermore, a Type II error (false negative), as mentioned above, could be due to the relatively small sample size and the relatively large amount of interaction terms. An example of this may be that only if the interaction between gender and item type was considered to be significant however it could have been that other interaction effects could also be significant. However, these may not have been detected when running the analysis due to the fact that the sample size is relatively small therefore leading to a significantly lower statistical power that is insufficient. In order to limit the possibility of these errors occurring, as mentioned above it is important that the sample size be significantly larger.

After the completion of the study, in order to test the interaction effect, a post-hoc power analysis was conducted. This indicated an 11% power; this is a significantly low value compared to the usual accepted value for a study in order to be able to detect a true effect. As a result, this may mean that there is an increased risk of a Type II error. As previously mentioned, in order to improve the power of the study it is important to increase the sample size. By changing this, we are able to make sure that the study is more likely to detect a true effect and reduce the likeliness of a Type II error.

5.4 Further Research

One of the main points of possible further research that can be done, could be to conduct more experimental studies where the respondents are placed in a focus group. In this situation, they would be placed in a situation where they would have to make a decision in given scenarios. In this way, we are able look deeply into the preferences and behaviors. This will limit the snowball effect that was faced with the survey that was done now. If the focus group is done, this will be able to better isolate the effects of outside factors of the decision making of the respondent.

In order to further mitigate the limitations regarding the collection of data, this would mean that the further studies should be done through a mix of both qualitative and quantitative research.

Furthermore, the addition of extra variables could be explored. These variables could be the ones that influence consumer purchasing choices. For example, these could be factors such as economic conditions or cultural influences. If these are added, it could provide a comprehensive view of what the more detailed determinants of purchasing decisions and choices are. As well as broader demographic as well as more research in different geographical locations can be considered in order to not limit the overall results and decision making based only on one group of respondents.

Moreover, further research can be done on factors such as cultural influences on making such decisions. It is important how different norms and cultural habits affect these decisions. In addition, to the economic conditions of the respondents. This will affect the choices they make and the reasons for these choices.

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7 Appendix

7.1 Appendix A: Survey Questions

Thank you for participating in my survey!

Thank you for your valuable contribution to this research conducted for my Bachelor Thesis at Erasmus University Rotterdam. I have created this survey to assess your interest in purchasing new products compared to recycled ones. Profiles with various product attributes will be presented to you, and you will have the opportunity to choose your preferred profile through a choice-based conjoint analysis. This survey includes some demographic, sustainable habits, and product preference questions, as well as 10 choice profiles for you to consider. It should only take around 5 minutes to finish. I am specifically targeting university students residing in the Netherlands with this survey. All the answers will remain confidential and anonymous.

Please answer as honestly as possible. Rest assured, the data will only be utilised for academic research and will not be shared with any external entities. If you have any questions or concerns regarding the survey, please don't hesitate to reach out to Kira Maalouf at 561912km@eur.nl.

End of Block: Block 3

Start of Block: Default Question Block

Q1 What is your gender?

○ Female (1)

○ Male (2)

○ Prefer not to say (3)

Q3 What is your age?

_____

Q2 What is your current occupation?

○ Student (1)

○ Part-time employed (2)

○ Full-time employed (3)

○ Unemployed (4)

Q4 What is your average monthly income (excluding rent)?

○ 0- 500 euros (1)

○ 500-1000 euros (2)

○ 1000-1500 euros (3)

○ more than 1500 euros (4)

End of Block: Default Question Block

Start of Block: Block 1

Q12 How often do you purchase products with minimal or eco-friendly packaging?

○ Rarely (1)

○ Sometimes (2)

○ Often (3)

○ Always (4)

Q14 How often do you buy second-hand or vintage items instead of new ones?

○ Rarely (1)

○ Sometimes (2)

○ Often (3)

○ Always (4)

Q13 How well-informed do you feel about the environmental impact of your daily habits?

○ Very well-informed (1)

○ Somewhat informed (2)

○ Slightly informed (3)

○ Not informed at all (4)

Q15 Where do you get most of your information about eco-friendly practices?

○ Social media and online articles (1)

○ TV programs and documentaries (2)

○ Educational courses and workshops (3)

○ Friends and family (4)

Q16 What do you find most challenging about adopting eco-friendly practices?

○ Lack of information (1)

○ Cost (2)

○ Convenience (3)

○ Lack of support from others (4)

End of Block: Block 1

Start of Block: Block 2

Q29 For the following section, you will be presented with 10 profiles of shirts, each including 5 product attributes. Each profile will state whether the attribute rating or whether it is present or not. You will then pick which profile you would prefer. The profile selection you will pick should be based on which attributes, or attribute combination, you find most important when making your purchasing decisions.

Please take your time reviewing each profile before choosing. The following attributes are explained below:

1) Item Type: Indicates whether the shirt is new or recycled, informing consumers about the product's lifecycle. A recycled shirt is made from reused materials, contributing to sustainability, while a new shirt is made from entirely new materials.

2) Price: The cost of the shirt, categorised into Low ($10), Medium ($30), or High ($50), informing consumers about the shirt's affordability.

3) Quality: The quality of the shirt, rated on a Likert scale from 1 to 5:
- 1 (Poor): For example, a shirt that feels rough, fades quickly, and loses shape after a few washes.
- 5 (Excellent): For example, a shirt that feels very soft, maintains color, and keeps its shape even after many washes.

4) Influence of Surroundings: Indicates whether the buying decision is influenced by surroundings, such as recommendations by friends, family, or online communities. "Present" means there is an influence, while "Not present" means there is no influence.

5) Environmental Concerns: The level of environmental concern associated with the shirt, rated on a Likert scale from 1 to 5:
- 1 (Not concerned at all): For example, a shirt produced with minimal regard for environmental impact, using non-recycled materials and processes that contribute to pollution.
- 5 (Extremely concerned):For example, a shirt made from 100% recycled materials, produced with environmentally friendly processes, and supporting sustainability initiatives.

Imagine walking into your favorite clothing store, ready to buy a new shirt. As you browse, you compare options based on their type, price, quality, environmental impact, and recommendations from friends and online reviews.

Now, review the following profiles carefully and choose the shirt that best matches your preferences and values.

	Item 1	**Item 2**
Item Type	New	Recycled
Price	€10	€30
Quality	1	4
Influence of surroundings	Not present	Present
Environmental Concerns	4	2

Choice 1

	Item 1	**Item 2**
Item Type	Recycled	New
Price	€ 10	€50
Quality	3	1
Influence of surroundings	Not present	Present
Environmental Concerns	3	4

Choice 2

	Item 1	Item 2
	Item 1	**Item 2**
Item Type	New	Recycled
Price	€10	€30
Quality	5	3
Influence of surroundings	Not present	Present
Environmental Concerns	2	5

Choice 3

	Item 1	Item 2
	Item 1	**Item 2**
Item Type	Recycled	New
Price	€10	€50
Quality	4	3
Influence of surroundings	Not present	Present
Environmental Concerns	4	2

Choice 4

	Item 1	**Item 2**
Item Type	New	Recycled
Price	€50	€10
Quality	3	5
Influence of surroundings	Not present	Present
Environmental Concerns	4	3

Choice 5

Choice 6

	Item 1	**Item 2**
Item Type	New	Recycled
Price	€10	€30
Quality	4	1
Influence of surroundings	Not present	Present
Environmental Concerns	5	2

	Item 1	Item 2
Item Type	Recycled	New
Price	€10	€30
Quality	1	2
Influence of surroundings	Not present	Present
Environmental Concerns	2	1

Choice 7

	Item 1	Item 2
Item Type	New	Recycled
Price	€10	€30
Quality	4	5
Influence of surroundings	Present	Not present
Environmental Concerns	2	1

Choice 8

	Item 1	Item 2
Item Type	New	Recycled
Price	€ 10	€30
Quality	2	4
Influence of surroundings	Present	Not present
Environmental Concerns	3	1

Choice 9

	Item 1	Item 2
Item Type	New	Recycled
Price	€30	€10
Quality	1	2
Influence of surroundings	Present	Not present
Environmental Concerns	3	2

Choice 10

7.2 Appendix B: JMP Choice-Based Conjoint Analysis

Choice Model: Response Indicator

Effect Summary

Source	Logworth		PValue
Quality	30,397		0,00000
Item Type	11,057		0,00000
Price	3,933		0,00012
Environmental Concern	3,140		0,00072
Influence from surroundings	0,579		0,26361

Remove Add Profile Effect Add Subject Effect ☐ FDR

Parameter Estimates

Term	Estimate	Std Error	Lower 95%	Upper 95%
Item Type[New]	-0,241351467	0,0363995121	-0,313219	-0,170756
Price[Low]	-0,027695748	0,0470498966	-0,119826	0,0643047
Price[Medium]	-0,176813627	0,0448072392	-0,264551	-0,089224
Quality[Low]	0,318202749	0,0449634861	0,230555	0,4065293
Quality[Medium]	-0,470943992	0,0455368836	-0,5607	-0,382498
Influence from surroundings[Not present]	-0,039678864	0,0354835510	-0,109142	0,0297524
Environmental Concern[Low]	-0,090442063	0,0479870520	-0,184482	0,003293
Environmental Concern[Medium]	0,130855253	0,0416006616	0,0497411	0,2125196

AICc	2177,2438
BIC	2220,7603
-2*LogLikelihood	2161,1597
-2*Firth LogLikelihood	2110,1576

Converged in Gradient
Firth Bias-Adjusted Estimates

Likelihood Ratio Tests

Source	L-R ChiSquare	DF	Prob>ChiSq	
Item Type	46,585	1	<,0001*	
Price	18,111	2	0,0001*	
Quality	139,984	2	<,0001*	
Influence from surroundings	1,250	1	0,2636	
Environmental Concern	14,461	2	0,0007*	

Effect Marginals

Marginal Probability	Marginal Utility		Item Type
0,3816	-0,24135		New
0,6184	0,24135		Recycled

Marginal Probability	Marginal Utility		Price
0,3202	-0,02770		Low
0,2759	-0,17681		Medium
0,4039	0,20451		High

Marginal Probability	Marginal Utility		Quality
0,4345	0,31820		Low
0,1973	-0,47094		Medium
0,3682	0,15274		High

Marginal Probability	Marginal Utility		Influence from surroundings
0,4802	-0,03968		Not present
0,5198	0,03968		Present

Marginal Probability	Marginal Utility		Environmental Concern
0,3031	-0,09044		Low
0,3782	0,13086		Medium
0,3187	-0,04041		High

Utility Profiler

Utility: -0,08097 [-0,24919, 0,087263]

Choice Model: Response Indicator

Effect Summary

Source	Logworth		PValue
Quality	1,759		0,01741
Gender*Item Type	1,587		0,02590
Gender*Quality	0,930		0,11738
Age*Quality	0,836		0,14582
Item Type	0,774		0,16825
Environmental Concern	0,692		0,20313
Age*Environmental Concern	0,627		0,23579
Gender*Price	0,345		0,45178
Influence from surroundings	0,317		0,48168
Age*Influence from surroundings	0,305		0,49504
Age*Item Type	0,259		0,55030
Gender*Environmental Concern	0,249		0,56419
Price	0,183		0,65579
Age*Price	0,092		0,80952
Gender*Influence from surroundings	0,056		0,87895

Remove   Add Profile Effect   Add Subject Effect   ☐ FDR

Parameter Estimates

Term	Estimate	Std Error
Item Type[New]	-0,81165591	0,6003249370
Price[Low]	-0,05769003	0,7688860226
Price[Medium]	-0,62147019	0,7254555989
Quality[Low]	1,67920345	0,7341160299
Quality[Medium]	-1,60223773	0,7432940558
Influence from surroundings[Not present]	-0,39967829	0,5776731591
Environmental Concern[Low]	-1,09135672	0,7873955103
Environmental Concern[Medium]	-0,76425556	0,6694274704
Gender*Item Type[New]	0,15315282	0,0699055685
Gender*Price[Low]	0,11008978	0,0901772567
Gender*Price[Medium]	-0,00626369	0,0859599938
Gender*Quality[Low]	-0,06634986	0,0861963763
Gender*Quality[Medium]	0,17775482	0,0873599293
Gender*Influence from surroundings[Not present]	-0,01133501	0,0682228475
Gender*Environmental Concern[Low]	0,04398083	0,0922603749
Gender*Environmental Concern[Medium]	0,07773617	0,0801813882
Age*Item Type[New]	0,01614712	0,0273420540
Age*Price[Low]	-0,00630360	0,0350875450
Age*Price[Medium]	0,02133341	0,0331598597
Age*Quality[Low]	-0,05932552	0,0335042148
Age*Quality[Medium]	0,04084869	0,0338854776
Age*Influence from surroundings[Not present]	0,01765552	0,0263562520
Age*Environmental Concern[Low]	0,04405438	0,0358753525
Age*Environmental Concern[Medium]	0,03661045	0,0306632707

AICc	2190,1873
BIC	2320,2812
-2*LogLikelihood	2141,4793
-2*Firth LogLikelihood	1994,2299

Converged in Gradient

Firth Bias-Adjusted Estimates

Likelihood Ratio Tests

Source	L-R ChiSquare	DF	Prob>ChiSq	
Item Type	1,898	1	0,1683	
Price	0,844	2	0,6558	
Quality	8,102	2	0,0174*	
Influence from surroundings	0,495	1	0,4817	
Environmental Concern	3,188	2	0,2031	
Gender*Item Type	4,963	1	0,0259*	
Gender*Price	1,589	2	0,4518	
Gender*Quality	4,285	2	0,1174	
Gender*Influence from surroundings	0,023	1	0,8790	
Gender*Environmental Concern	1,145	2	0,5642	
Age*Item Type	0,357	1	0,5503	
Age*Price	0,423	2	0,8095	
Age*Quality	3,851	2	0,1458	
Age*Influence from surroundings	0,466	1	0,4950	
Age*Environmental Concern	2,890	2	0,2358	

Correlations

		PriceRecode	ItemRecode	InfluenceRecode	QualityRecode	EnvRecode
PriceRecode	Pearson Correlation	1	.309**	.112**	.052**	.320**
	Sig. (2-tailed)		<.001	<.001	.002	<.001
	N	3440	3440	3440	3440	3440
ItemRecode	Pearson Correlation	.309**	1	.042*	.028	-.146**
	Sig. (2-tailed)	<.001		.015	.099	<.001
	N	3440	3440	3440	3440	3440
InfluenceRecode	Pearson Correlation	.112**	.042*	1	.253**	-.146**
	Sig. (2-tailed)	<.001	.015		<.001	<.001
	N	3440	3440	3440	3440	3440
QualityRecode	Pearson Correlation	.052**	.028	.253**	1	-.074**
	Sig. (2-tailed)	.002	.099	<.001		<.001
	N	3440	3440	3440	3440	3440
EnvRecode	Pearson Correlation	.320**	-.146**	-.146**	-.074**	1
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	
	N	3440	3440	3440	3440	3440

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Multicollinearity test through Pearson Correlation Coefficient