

# What is the willingness-to-pay for sustainable product attributes?

A ratings-based conjoint analysis in the FMCG market

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Following recent evolutions in sustainability, this master's thesis examines what consumers are willing to pay for fast-moving consumer goods with certain eco-friendly attributes. The methodology used is ratings-based conjoint analysis, applied to data obtained via a web-based survey. Each respondent was asked to rate ten profiles of a body wash product with varying prices, ingredients, packaging and branding attribute levels. This rating data was later analysed using R. Based on the coefficients of a linear regression analysis, the willingness-to-pay and importance measures of each product attribute (level) were derived. The regression is then repeated for several subsamples constructed on sociodemographic characteristics, i.e., age, gender, income level and highest obtained degree. In this way, results can be compared across different types of consumers. The findings of this study are that the willingness-to-pay is highest for products that contain biological ingredients and that are sold in reusable packaging. In line with this trend, the product content is the most important attribute to consumers, followed by the product packaging. Furthermore, the price only comes in third place and branding has the lowest importance measure. The analysis of the demographic subgroups shows that the most sustainable shopper is female, older than 45 years old, highly educated and has a high-income level.

### Keywords

ratings-based conjoint analysis, sustainability, fast-moving consumer goods, willingness-to-pay, ecolabels, recycling, packaging, eco-branding, nudging, greenwashing, greenhushing, Gen Z, Millennials

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<sup>1</sup> This document might contain (parts of) texts from earlier submitted documents within the same educational programme, related to the Master's Thesis process of the same author as the author of this work.

## General introduction

As seen during the European climate strikes of 2019, the cry for environmental governance is getting louder. Citizens urge their governments to react to climate change as the number of floods, heatwaves, wildfires and other climate related disasters increases (EEA, s.d.). In the meantime, people also demand an answer from businesses (Gatzer & Roos, 2021). The first party held accountable, the European government, reacted in December 2019 with the European Green Deal (EGD), an ambitious legislative initiative that aims to transform the European Union's approach to sustainability (European Commission, s.d.a; Fetting, 2020). The second party, the businesses, are bound to follow the rules set in line with the EGD, but they possibly also implement sustainable market practices from a moral point of view or to appeal to more eco-conscious consumers (Gatzer & Roos, 2021; Mattsson, 2016). Although individuals often feel that their efforts are not enough to save the climate, as consumers, they have a large impact on the market (Gunderson, 2022). Hence, the actions by lawmakers and companies are ultimately directed towards individual consumers.

The implementation of sustainable market practices by enterprises is constantly evolving. The large body of recent examples is an illustration of this evolution. Current scientific literature often describes the positive attitude consumers have towards environmentally friendly actions. However, insights on what trending practice is valued most by consumers in terms of their willingness-to-pay for it, is so far overlooked. This quantification is especially crucial in the fast-moving consumer goods (FMCG) sector that, according to Stewart and Niero (2018), has "a large potential in applying circular economy principles". Moreover, the focus on FMCG is justified by the fact that these products are habitually purchased in substantial volumes at relatively low prices, and thus influence consumers' interest in sustainable alternatives most (Cromwell et al., 2023; Stewart & Niero, 2018). This combination of sustainability principles and FMCG is captured in the central research question for this thesis:

"What is the willingness-to-pay of consumers for sustainable attributes in fast-moving consumer goods?"

Firstly, the relevant body of literature is summarised, structured around the two largest groups of stakeholders of sustainability practices in the FMCG market: producers and consumers. In the first section, the motives for producers to adapt their products are discussed. Then, an overview of possible eco-friendly product adaptations is provided, divided into three groups: adaptations related to product content, to packaging and different branding strategies for sustainable products. In the second section, consumers' general view on previously discussed pro-environmental market practices is discussed. An important phenomenon perceived in the discussion of this consumers' perspective is the difference between their opinion on sustainability and their actions, i.e., the attitude-behaviour gap.

Secondly, the methodology of the ratings-based conjoint analysis used in the study is sketched in section 2. In the first part of this chapter, several hypotheses on the outcome of the survey are developed based on the conceptual framework. Later in the methodology section, the selection of product attributes is presented and the survey design in Qualtrics is explained. The results of this survey are analysed using R. First, some descriptive statistics are calculated for the product rating data and the respondents' demographic information. Next, a linear regression analysis is performed. Some preliminary conclusions can be drawn from the coefficients, but more importantly, these coefficients serve to compute the willingness-to-pay and importance measures in a second part of the result analysis. These calculated numbers are used to test the different hypotheses. In the final part of this thesis, a conclusion is drawn from the result analysis. Additionally, the limitations of this study and possibilities for further research are discussed.

The overall conclusion of this thesis is that consumers value sustainable attributes related to the product content most. The willingness-to-pay is namely highest for products with biological ingredients. Contrary to the findings of existing literature, the importance measures reveal that eco-branding does not have a large influence on respondents, which is also reflected in their willingness-to-pay for products with sustainable branding characteristics. Although the price is only the third most important attribute, the demographic data reveals some dissimilarities in the preferences of certain subgroups of consumers. For example, Gen Z consumers watch the price more closely than their older peers. Overall, this twofold conclusion can be used by managers of FMCG brands to determine what attributes of their product they should adapt, while keeping their target group in mind.

Hence, this study contributes to current scientific literature by adding insights into trending sustainable product adaptations to the overview of the large body of existing knowledge in the literature review. Then, conjoint analysis is used to quantify the value of several eco-friendly product attributes by calculating an importance measure and the willingness-to-pay, something that is absent in many research papers on sustainability. Moreover, by collecting a substantial amount of demographic information, the results can be compared among subgroups of the population.

# 1 Literature review

The structure of the literature review is based on the two most important groups that are relevant for the research question: producers and consumers<sup>2</sup>. The first group discussed, producers, have the power to change the products offered on the market (Cromwell et al., 2023). Their perspective is discussed first. Subsequently, the consumers' perspective is important since their spending accounts for a large part of emissions.

## 1.1 Producer Perspective

In this section, the incentives for sustainable action and several recent market practices by manufacturers are explained and illustrated with recent examples.

### 1.1.1 Incentives for Sustainable Action

Sustainable product adaptations by businesses are instigated by different motivations. One source is governmental initiatives, such as the European Green Deal (EGD) presented by the European Commission in 2019 (European Commission, s.d.a). The EGD is not a law on itself, but it is a general policy strategy that is implemented by new laws and action plans (Fetting, 2020). The overall targets of the EGD are carbon neutrality, and more sustainable economic growth and resource use. It also aims to put the wellbeing of EU citizens at the centre of economic policy. This combination of objectives shows similarities with another governmental initiative, namely the Sustainable Development Goals (SDG) of the United Nations (UN) (Stanchev, 2023).

In total, the EGD consists of 47 policy actions that can be divided into five categories: economic (e.g., environmental taxes), regulatory (e.g., norms and standards), cooperation (e.g., technology transfer), education and research (e.g., training), and information (e.g., sustainability reporting) (Mattsson, 2016; Pellerin-Carlin & Sweatman, 2020). One example of how the EGD is implemented in practice is the Circular Economy Action Plan from the European Commission (Amanatidis & Lipcaneanu, 2023). The main goal of the Circular Economy Action Plan is to make all packaging in the EU reusable or recyclable by 2030 (European Commission, 2020).

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<sup>2</sup> Policymakers are also a relevant stakeholder group but are not the main focus of this thesis since this would make the scope of the study too broad.

The new legislative reality of the EGD is challenging for business leaders (Pellerin-Carlin & Sweatman, 2020). However, sustainable policy initiatives are not always enforced by (European) governments, but NGOs, citizen groups, professional organisations or other stakeholders are often also active in promoting sustainable practices from the bottom up (Mattsson, 2016). For example, 96 companies in Belgium are members of the Belgian Alliance for Climate Action, which is an initiative taken by sustainability network The Shift and the Belgian branch of the WWF (Willocx, 2023). Although organisations like the Belgian Alliance for Climate Action do not have the authority to introduce mandatory laws, they do make use of recommendations and voluntary compliance (Mattsson, 2016).

Lastly, research showed that companies often independently take the initiative to become more sustainable (Gatzer & Roos, 2021). This can happen out of a genuine concern with the environment, but complying to sustainability standards has also proven to pay off. As confirmed by researchers at McKinsey, eco-conscious actions and financial performance have a strong positive relation. Moreover, sustainability is often perceived as a powerful marketing tool and a driver of trust in the brand (Jung & Kim, 2023; Reichheld et al., 2023). Overall, no matter the source of the initiative, its implementation by producers is vital to create a sustainable market and to thus influence consumers (Kennedy et al., 2016).

### **1.1.2 Sustainable Market Practices**

The discussion of sustainable market practices is structured around three dimensions of a product: its content, packaging and branding. These three groups comprise some of the most important attributes of FMCG products derived from scientific literature around sustainability.

#### *1.1.2.1 Product Content*

A highly important adaptation that can be done to a product is changing its content to be more environmentally friendly. FMCGs like cosmetics or personal care products such as shampoo, toothpaste, sunscreen or laundry detergent are often associated with microplastics (de Boer, 2023; Nawalage & Bellanthudawa, 2022). The term 'microplastics' can be defined as "small pieces of plastics, usually smaller than 5 mm" (European Commission, s.d.b). They do not only have a negative impact on the environment but can also cause health problems (Nawalage & Bellanthudawa, 2022). Two well-known categories of microplastics are glitters and microbeads, small plastic grains that are used to scrub off dead skin cells (Vanhelden, 2023). A ban on microplastics has been installed as part of the EGD in 2020, but this does not mean that glitters or microbeads will disappear completely (European Commission, 2020; Vanhelden, 2023). There are alternatives made from natural minerals or plant-based cellulose that are biodegradable (Vanhelden, 2023). For instance, Dutch cosmetics brand Rituals offers microplastic-free skincare like a face scrub that uses small bamboo particles to clean the skin (Rituals, s.d.).



Using ecological alternatives is also a common practice for food FMCG products. Possible measures to make food consumption more environmentally friendly are producing sustainable meat substitutes (such as plant-based alternatives, lab-grown meat or insects), a decrease in water and energy-usage in the production process, and organic farming (Delap & Fasman, 2021; Verain et al., 2012; Winter & Davis, 2006). The latter means that farmers do not use synthetic pesticides, genetic modification or chemical fertilisers to grow foods (Winter & Davis, 2006). Although these practices are mostly applied to food, they are also relevant for the ingredients of other types of FMCG like soap or toothpaste (Isojärvi & Aspara, 2023). Because of the focus on nature in production processes, organic products are often associated with health (Verain et al., 2012).

#### 1.1.2.2 *Packaging*

Companies can invest in sustainable packaging in many ways. A first dimension is the selection of materials used to package products. Danone, for example, focuses on simplifying the materials used in their packaging. The French multinational will remove the plastic label of products like their Actimel yoghurt drinks to make the bottles completely recyclable (Willcox, 2023). According to the company, this change results in a reduction in plastic used of 22 tonne per year for the Belgian market alone.

However, it is equally important to prevent plastic from ending up as (marine) waste (Kozik, 2020). Following this logic, Coca-Cola has modified its plastic bottles to have attached caps that previously often ended up polluting nature (Wiener-Bronner, 2022). Although the company is taking this initiative, environmental action groups argue that the multinational is not doing enough. They hold Coca-Cola accountable for still producing billions of throwaway plastics every year and advocate to switch to reusable packaging. Therefore, multinationals are collaborating with organisations that develop plastic recovery technologies (Kozik, 2020). Danone's water brand Evian, for instance, will launch high-quality plastic PET bottles 100% made from post-consumer recycled plastics.

Another example of how packaging can be made easier to recycle is Pringles potato chips. Its mother company Kellogg's has invested 100 million euros in the European production site to facilitate the removal of the metal component of its tubes, which will now only consist of paper (Verstichel, 2023). For consumers, there will be no significant change since the look will stay 90% the same and the paper tubes will not affect the expiration date of the product. Another producer that will make the switch to paper is Confiserie Napoleon (Willems & Schoofs, 2023). The producer of sweets will replace the individual plastic wrappers by a more durable waxed paper version. As per Confiserie Napoleon itself, removing the individual packaging altogether was not an option because the sweets would stick together and market research showed that people like to take several pieces with them instead of the entire bag at once. Although these are positive evolutions to prevent plastic from ending up in nature, focusing on paper is not an ideal solution either (Kozik, 2020). While paper is biodegradable, this natural process of decomposition also generates greenhouse gasses. Recycling the paper as much as possible reduces the environmental impact but is not always accomplishable. Recycled paper is namely of lesser quality and is therefore not often reused within, for example, the food industry. However, companies like Starbucks are taking initiative to increase the percentage of recycled material used in their paper coffee cups.

Aside from plastic or paper, glass is a frequently used raw material for product packaging, especially for liquids (Kozik, 2020). Although it is often perceived to be sustainable, glass production requires a considerable amount of energy and this material is not biodegradable (Boz et al., 2020; Kozik, 2020). Here again, the focus should lie on recycling or reusing glass bottles or jars (Boz et al., 2020). For instance, the Swedish brand Absolut Vodka produces 1 million glass bottles per year and by using 40% recycled materials, they can reduce their energy consumption by 10% while also lowering their greenhouse gas emissions.

A different dimension of product packaging that can be adapted is size. An optimal packaging size can reduce material usage and thus have a considerable impact on the environment (Saveth, 2023). Danone, for example, has launched bigger bottles of its drinking yoghurt that use less plastic than the same amount of yoghurt divided over small bottles (Willocx, 2023). Additionally, the size of packaging could be adjusted to minimise the space needed during transportation and hence reduce the number of shipments needed, thereby decreasing CO<sub>2</sub> emissions (Saveth, 2023). This sustainable practice was applied by Dutch e-commerce company Bol.com (Spinner, 2021). They invested in a multi-packaging machine that scans ordered products and cuts out the perfectly sized cardboard box for shipment.

### 1.1.2.3 *Branding*

In scientific literature, the branding strategy of ecological products is often referred to as 'eco-branding' (Kan et al., 2017). The goal of eco-branding is emphasising the environmentally friendly attributes of the goods, differentiating them from non-green products. Thus, eco-branding or green marketing is a way of yielding the company's sustainability investments and changing consumers' purchase behaviour at once (Kennedy et al., 2016; Olsen et al., 2014). A popular tactic in promoting green products is using the prefix 'eco' (Dias, 2011). However, a problem that companies often face in green marketing is the confusion around frequently used terms such as 'ecological', 'biodegradable' or 'environmentally friendly' (Solaiman et al., 2015). Buyers do not always understand the meaning of these words and producers have a hard time proving their legitimate use. A solution that worked for UK retailer The Body Shop in the past is 'environmental targeting'. This means that the company deliberately selects advertising methods that reach many eco-conscious consumers. Through the use of signs and leaflets in the stores, the already environmentally educated consumer group is informed about the products.

A more budget-friendly alternative to educational initiatives is the use of nudging (Vandenbroele et al., 2020). The aim of nudging is "to change people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives" (Vandenbroele et al., 2020). People should thus be free to avoid the nudge easily, without obligations (Dassis, 2016). Nudges that influence ecological purchase behaviour are called 'green nudges' and are highly important since they help to correct market failures such as climate change (Schubert, 2017).

In research, green nudges are divided into three categories (Schubert, 2017). A first category are nudges based on people's desire to maintain their self-image through pro-environmental behaviour. Ecolabels for example, draw attention to the environmentally friendly aspect of the product and, hence, give this attribute a disproportional weight in the decision process (Dias, 2011; Schubert, 2017). Sustainable characteristics that can be communicated through labels are: the use of organic materials, carbon footprint, the origin of production, animal welfare, pesticide usage, water and energy use, clean transportation, etc. (Yokessa & Murette, 2019). Some labels, like the European Ecolabel, are regulated by governmental bodies and products should therefore meet certain requirements in order to obtain it (Amanatidis & Lipcaneanu, 2023; European Commission, 2020). Nevertheless, other organisations or brands themselves can create labels, but those labels' credibility is often doubted (Cromwell et al., 2023; Solaiman et al., 2015). However, buying a product with any sustainability label has proven to cause a satisfying feeling for consumers and thus contribute to their self-image (Vandenbroele et al., 2020).

A second category of green nudges can exploit individuals' need of belongingness to a group (Schubert, 2017). For instance, by interacting with an influencer or their followers who promote ecological products, a consumer might change their perception of said products (Jalali & Khalid, 2021). A third category are green nudges that use the power of defaults (Schubert, 2017). If, for example, the price of a product includes a contribution to a charity and people should explicitly indicate if they do not want to donate, the default option is to contribute and people get an opt-out option. However, an important note is that although green nudges are generally seen as measures that serve the greater good, there is some controversy concerning their ethicality (Schmidt, 2019; Schubert, 2017). Nudges can namely be perceived as manipulative and not sufficiently justified.

Another important part of branding sustainable products is the visual aspect since it draws attention to the product at the point of sale and directly influences consumers' sustainability perceptions (Boz et al., 2020; Kauppinnen-Räisänen, 2014). In view of this, 90% of consumers base their buying decision on the visual scanning of the product (Kauppinnen-Räisänen, 2014). Colour would be the most powerful aspect in influencing the purchase decision. This visual attribute has several functions: capturing attention, being a source of attractiveness and transferring messages. In relation to sustainability, green is the colour that communicates the ecological and healthy attributes of a product. However, it is advised to be accompanied by other sustainability information to prevent consumers from thinking the producer is making false claims (Boz et al., 2020). For example, the vegan product line of Ben & Jerry's ice cream is easily recognisable by its green lids with 'vegan' written on them (Ben & Jerry's, s.d.). In addition, its cardboard look gives the ice cream the appearance of being a more environmentally friendly product as consumers perceive this material to be sustainable (Ben & Jerry's, s.d.; Boz et al., 2020; Gjerde, 2022).

Graphics or images are other key visual aspects of packaging (Kauppinnen-Räisänen, 2014). A package design containing depictions of, e.g., blue skies, mountains or grass give a product a natural perception (Chrysochou & Festila, 2019; Gjerde, 2022). Another regularly used graphic design that signals eco-friendliness is a green leaf. An example is the Dutch chocolate milk brand Cécémel (Cécémel, s.d.). Their plant-based alternative is packed in the same yellow carton as the normal version, but with the addition of a green 'plant-based' logo surrounded by leaves.

## 1.2 Consumer Perspective

Since legislation and its implementation by manufacturers are all aimed at eventually influencing consumers and their buying behaviour, this section of the literature is dedicated to the consumers' view on sustainable market practices and the green attitude-behaviour gap.

### 1.2.1 View on Sustainable Market Practices

“According to the Eurobarometer public-opinion survey, most European consumers want a stronger focus on sustainability and the environment – and they want industry stakeholders to act accordingly” (Gatzer & Roos, 2021). On the one hand, this quote implies that consumers' concern with the environment is rising, which results in people themselves adopting a more eco-conscious lifestyle to some extent (Cromwell et al., 2023). On the other hand, consumers state that they need brands to help them change their carbon footprint (Townsend, 2018). The actions that people indicate to appreciate most are sustainable packaging and products, and reducing wastage (Cromwell et al., 2023). Especially adaptations to frequently bought items and necessities, for example groceries, influence purchasers' interest in sustainable practices most. As discussed in the previous section of the literature review, however, there are many possible packaging adaptations or wastage policies a manufacturer can undertake, with varying costs and impact on the production process. The study by Cromwell et al. (2023) does not distinguish between these, thus leaving manufacturers wondering whether all practices are perceived in the same way by consumers.

The price of eco-friendly products is typically higher than that of standard products since it reflects the additional expenses for adapting the product or production process (Solaiman et al., 2015). Therefore, the price tag is considered the biggest obstacle for people to change their purchase behaviour towards more sustainable product choices, especially in times of rising inflation (Cromwell et al., 2023). However, other studies do not share this conclusion: they suggest that approximately 50% of consumers would have no problem paying a premium of 5% or more for FMCGs such as organic or locally produced foods (Deloitte, s.d.). The reasoning behind this increased willingness-to-pay for sustainable products is attributed to the COVID-19 pandemic, which played a moderating role in consumers' behavioural change (Gatzer & Roos, 2021). Firstly, the health crisis made people more aware of the fate of the planet. Secondly, the inflation that resulted from the pandemic made consumers take more eco-conscious decisions that are also cost-saving, for instance buying more second-hand products, repairing items and choosing different transportation methods (Cromwell et al., 2023). To conclude, the contradiction in existing research results in a lack of information on the willingness-to-pay for sustainable product attributes.

Sustainable market practices by businesses have proven to build trust between them and their customers (Cromwell et al., 2023; Jung & Kim, 2023; Reichheld et al., 2023). A potential point of scepticism, however, is greenwashing (Olsen et al., 2014). This is the communication of environmental claims without any real efforts following them (Yokessa & Murette, 2019). Companies can deceive consumers in different ways that scientific research defines as 'sins' (de Freitas Netto et al., 2020). The first one on the product-level is called "the sin of the hidden trade-off" (de Freitas Netto et al., 2020) which implies that producers base the eco-friendliness of their product on a small number of green attributes, while ignoring other environmental problems. The use of paper is a clear example. This material can be sourced from sustainably managed forests, but its production process might still be polluting or the chemicals used for bleaching it are often harmful. Another greenwashing action is "the sin of no proof" (de Freitas Netto et al., 2020). This is the claiming of a sustainable characteristic without presenting evidence for it, or using a claim that is too vague or too broad. Producers should, e.g., be able to prove the use of a certain percentage of recycled materials by presenting a valid third-party certification. However, the trustworthiness of such certifications or labels is often doubted. Therefore, companies should use government-regulated labels to signal trustworthiness and consequently influence consumers' purchase decisions (Amanatidis & Lipcaneanu, 2023). Finally, some environmental claims might be truthful, but irrelevant (de Freitas Netto et al., 2020). For example, brands can easily state that their sprays do not contain CFCs that harm the Ozon layer, while these gasses are forbidden by law in any case.

Although greenwashing has a considerable impact on consumers' perspective, it also causes an opposite reaction by companies called 'greenhushing' (Joselow, 2023). In this case, businesses hide their green ambitions from, on the one hand, consumers who are against sustainability policies to avoid backlash, and, on the other hand, from climate activists who might hold the companies accountable for not living up to their pledges. Public opinion conflicts have driven, for instance, brewery AB Inbev to quietly stop running advertisements for their 2040 zero emissions goal on Facebook. Apart from consumers' judgement, EU governmental actions that are meant to prevent greenwashing can drive companies to greenhushing as well (Amanatidis & Lipcaneanu, 2023; Joselow, 2023). The fear of lawsuits could namely scare companies operating in Europe to not openly take environmental initiatives anymore (Joselow, 2023).

### **1.2.2 Green Attitude-Behaviour Gap**

To conclude, research indeed shows that a majority of citizens support pro-environmental legislative interventions like installing higher taxes on unecological packaging or nonlocally sourced foods, and thus their implementation by companies (Deloitte, s.d.; Shubert, 2017). Nevertheless, a declared preference is not always translated into concrete actions (Gatzer & Roos, 2021; Schubert, 2017). In scientific literature, this is called the (green) attitude-behaviour gap, value-action gap or green purchasing inconsistency (Boz et al., 2020; Sharma et al., 2023). This difference between, for example, indicated choices in a survey and perceived actions can be explained by economic, socioeconomic and demographic trade-offs that arise (Boz et al., 2020). For instance, in the soft drink product category, different aspects like taste, health, habits, convenience, etc. are considered. Price is also a crucial factor (Cromwell et al., 2023). Another cause of the gap can be the emotion of helplessness people experience when it comes to climate change (Gunderson, 2022).

## 2 Methodology

In this section, the conceptual framework is presented. Subsequently, the hypotheses are further developed. Afterwards, the research method and the survey design are explained.

### 2.1 Conceptual Framework

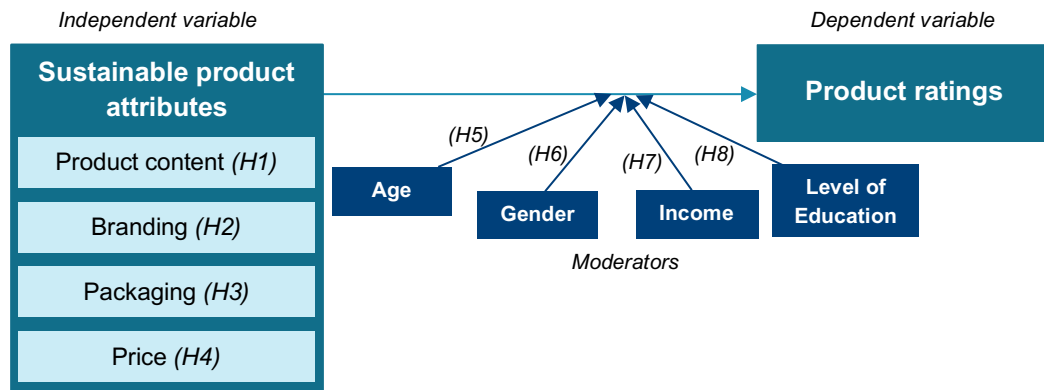


Figure 1 – Conceptual Framework

#### 2.1.1 Independent variable: Sustainable Product Attributes

The first three product attributes in Figure 1 correspond to the subtitles under part 1.1.2 of the literature review and are derived from the various business cases discussed there. For each product attribute, different adaptations are possible to make the product more eco-friendly. In the survey, there are three levels of sustainable adaptations per attribute. They are likewise inspired by the recent examples covered in the literature review to enhance the realism and relevance of this study. Other attributes (e.g., product size) or levels (e.g., the use of images in branding) are also possible, but this increases the required sample size to do the analysis which is not possible within the scope of a master's thesis. Table 1 provides an overview of the levels used. Important to note is that Level 1 is always a control level where there is no eco-friendly adaptation to the product attribute. The fourth attribute, price, is included to be able to calculate the willingness-to-pay later. In the rest of the current section, a hypothesis for each attribute is formulated and briefly explained.

**Table 1 – Levels of Adaptations to the Product Attributes**

Attribute	Level 1	Level 2	Level 3
PRODUCT CONTENT	Containing synthetic ingredients	No microplastics	Biological ingredients
BRANDING	No eco-friendly branding	Colour green	Ecolabel
PACKAGING	Single-use, non-recyclable bottle	Recyclable	Reusable
PRICE <sup>3</sup>	€1,50	€3,50	€6,00

#### 2.1.1.1 Product content

**H1:** Product content without microplastics (Level 2) and biological ingredients adaptations to the product content (Level 3) have a significantly larger positive influence on the willingness-to-pay than the same levels of adaptations to the branding or packaging.

This hypothesis is funded by the fact that the product content, e.g., the presence of microplastics, is strongly associated with health concerns (Nawalage & Bellanthudawa, 2022). The absence of microplastics or the presence of biological ingredients is therefore expected to have a greater influence on the willingness-to-pay than adaptations to the packaging or branding.

#### 2.1.1.2 Branding

**H2:** Ecolabels (Level 3) have the largest positive influence on the willingness-to-pay compared to the use of the colour green (Level 2) or the absence of eco-friendly branding techniques (Level 1).

As seen in section 1.1.2.3 of the literature review, an ecolabel is a type of nudge that causes the consumer to feel satisfied (Dias, 2011; Schubert, 2017; Vandebroele et al., 2020). The colour green likewise communicates ecological attributes of the product, but is expected to be less influential since it is best combined with other information on sustainability (Boz et al., 2020).

#### 2.1.1.3 Packaging

**H3:** Reusable packaging (Level 3) has the largest positive influence on the willingness-to-pay compared to recyclable packaging (Level 2) or single-use, non-recyclable bottles (Level 1).

As described by Boz et al. (2020), reusable packaging is perceived as most sustainable by consumers. However, the researchers do not test this preference in terms of willingness-to-pay. The concluding prediction is therefore that the soap in reusable bottles receives a higher willingness-to-pay than other types of packaging.

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<sup>3</sup> To establish realistic prices in the survey, the numbers are based on real-life examples at different points-of-sale. An overview of these reference prices can be found in Appendix A.

#### 2.1.1.4 Price

**H4:** *The lower the price, the higher the rating of the product.*

A basic principle in economy, namely the law of demand, states that consumers' demand is higher when the price is lower. The expectation for the product rating is that it will follow a similar pattern.

### 2.1.2 Moderators: Consumer Characteristics

In existing research concerning sustainability, several demographics are repeatedly used to define different consumer groups. These characteristics are age, gender, income and level of education (Gatzer & Roos, 2021; Verain et al., 2012). This set of attributes will provide possible moderators for the influence of eco-friendly product characteristics on the product ratings and ultimately on the willingness-to-pay.

#### 2.1.2.1 Age

**H5:** *The willingness-to-pay for sustainable product attributes is higher for Gen Z consumers, compared to other generations of consumers.*

Age is a frequently observed variable in research about sustainability (Deloitte, s.d.; Figueroa-García et al., 2018; Gatzer & Roos, 2021; Gomes et al., 2023; Verain et al., 2012). A synonym also often used is generation (Gatzer & Roos, 2021; Gomes et al., 2023). In this case, Gen Z, or people born after approximately 1997, is perceived as the 'sustainability generation' (Petro, 2021). Their green purchasing behaviour is usually compared to millennials, those born between circa 1981 and 1996, and other age groups (Gatzer & Roos, 2021; Petro, 2021). Previous research has revealed that the majority of the Gen Z generation prefers sustainable brands, are most willing to spend 10% more on sustainable products and, together with millennials, are most likely to base their purchase decisions on values and principles.

While age is often differentiated in sustainability research, distinctions in participants' age are underrepresented in studies on the influence of product attributes, e.g., graphic design, eco-branding or colour meanings (Gjerde, 2022; Kan et al., 2017; Kauppinen-Räsänen, 2014). Thus, age is considered a differentiating factor, but there is still room for research into the impact of this demographic on the perception of market practices and sustainable purchase behaviour.



#### 2.1.2.2 Gender

**H6:** *The willingness-to-pay for sustainable product attributes is higher for female consumers, compared to male consumers.*

In terms of gender, female consumers value sustainability more than male consumers (Dias, 2011; Gatzert & Roos, 2021; Verain et al., 2012). Moreover, similar to age, product attributes such as packaging colours have a different impact on men and women, but there are few studies examining this variation in detail (Kauppinen-Räsänen, 2014). An important sidenote, however, is that most research articles all use the two-dimensional system male versus female and thus do not consider other gender identities, e.g., transgender or non-binary individuals (Slade et al., 2021). For this research paper, the male-female distinction will also be used since it allows for comparison with previous studies. Nevertheless, this demographic question is reformulated to include a choice option 'other' to comply with gender inclusivity norms.

#### 2.1.2.3 Income

**H7:** *The willingness-to-pay for sustainable product attributes is higher for high-income consumers, compared to low-income consumers.*

There is a positive relation between the income level and the willingness to buy ecological goods (Dias, 2011; Gatzert & Roos, 2021). Hence, people with an above average income are more likely to be green consumers (Dias, 2011). This logic matches with the observation that eco-friendly products are typically priced at a higher price point (Solaiman et al., 2015) However, other researchers argue that "higher income households are less likely to act 'green'" (Verain et al., 2012). This could be explained by the fact that these families have the means to consume more and can rebuy instead of reuse or repair. This thesis therefore adds to current knowledge by testing this hypothesis again and clarifying the existing contradiction.

#### 2.1.2.4 Level of Education

**H8:** *The willingness-to-pay for sustainable product attributes is higher for higher educated consumers, compared to lower educated consumers.*

The level of education is a demographical value regularly linked to differences in sustainable consumption behaviour (Dias, 2011; Figueroa-García et al., 2018; Verain et al., 2012). A possible measurement of education level is highest obtained degree with categories such as high school degree, bachelor's degree (professional or academic), master's degree and PhD (Figueroa-García et al., 2018). Connected to sustainability, a higher level of education has a positive effect on environmental behaviour (Verain et al., 2012). However, the reason for this correlation is not largely substantiated by scientific literature.

### 2.1.3 Dependent variable: Product Rating

The dependent variable in the framework is the product rating. It is obtained by asking respondents how likely they are to buy the product presented to them. This variable serves as a basis to derive the willingness-to-pay and the importance weight in the result analysis (see 3.2).

## 2.2 Research Method

### 2.2.1 Ratings-Based Conjoint Analysis

The research method that is used for this study is conjoint analysis. The specific variant used in this thesis is a ratings-based conjoint. In this type of study, respondents of a survey are presented with products with various combinations of attributes and are hereafter asked to rate their preference for them on a scale from 0 (“no preference”) to 100 (“high preference”) (Eggers et al., 2022). According to Eggers et al. (2022), the rating represents the product’s utility as perceived by consumers. By applying a regression model with the rating as the dependent variable and the attribute levels as independent variables (e.g., as dummy variables), the so-called partworth utility for the attribute levels can be derived.

Considering that the focus of this research is the FMCG market, a product that fits this classification must be used in the survey. Moreover, it should be possible to test different attributes described in the literature review. Liquid body soap is a product that meets both requirements (Rao, 2014). For the survey, all described products will have a fixed size and no scent specified to avoid that these characteristics have an influence on consumers’ preferences.

The conceptual framework (Figure 1) specifies four different attributes, derived from the literature review: product content, branding, packaging and price. All attributes are divided into three levels (Table 1) and can therefore be recombined into 81 ( $3^4$ ) different product profiles<sup>4</sup>. Level 1 is the reference level in which the product has a non-eco-friendly attribute. This level serves as a point of comparison in the analysis of the results of the survey. In conjoint analysis studies, the product attributes should meet several requirements to protect the validity of the study (Eggers et al., 2022). Firstly, the attributes should be relevant. For the selected set of attributes, this requirement is fulfilled since they have been the subject of previous studies, as visible in the literature review. Secondly, the attributes should create sufficient differentiation between product profiles. This is true for this study, which can be illustrated by the fact that product profiles can even be differentiated by look, e.g., green labels versus blue labels. Third, Eggers et al. (2022) argue that the number of attributes should be manageable, best using less than seven. This is the case in this study since there are only four. Lastly, the attributes should be independent. In practice, this means that each product profile with different attributes remains realistic.

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<sup>4</sup> A list of all 81 product profiles is included in Appendix B.

To determine the product attribute levels, several requirements are met as well (Eggers et al., 2022). Firstly, the levels should cover a wide range. This is fulfilled for this study since the levels start from no eco-friendly characteristics at all and end with highly realistic sustainable options. Secondly, the levels cannot have an ambiguous meaning. This requirement is met by explaining different levels to the respondent before starting the survey. Moreover, the price is quantified using specific values to avoid free interpretation of terms such as 'high price' or 'low price'. Next, the number of levels should be kept low, preferably at an average of three to four levels per attribute, to keep away from an overcomplex study design. In this study, there are three levels, thus this is in line with the recommended number. Finally, every attribute has the same number of levels. In this way, "the number of levels effect, which leads to an artificially higher relevance of attributes that have more levels" (Eggers et al., 2022) is avoided.

### **2.2.2 Survey Design**

The survey is designed using Qualtrics and spread via the researcher's social media channels and personal network using the snowball method in which each respondent is asked to further distribute the questionnaire. Since the survey is primarily spread in Flanders, a Dutch translation is available in addition to the original English version. As questioning 81 different product profiles would require too many respondents (and subsequently too much time) to be statistically relevant, fractional factorial design is used to narrow the number of profiles down. This method entails that a fraction of all product profiles is selected to be questioned in the survey (Rao, 2014). In this study, 20 product profiles are used to evaluate the different attributes. Out of this sub-selection, each respondent will have to rate 10 products that are randomly assigned to them. The product profiles are presented using a picture to make it more realistic for respondents. Moreover, the default rating score is set to 50 to avoid bias. Respondents also cannot go back to previous questions to change their score and cannot continue to the next question without answering. After rating five products, the respondent gets a simple question in which they are told what answer they should indicate. This question serves as an attention check that increases the validity of the responses.

At the end of the online survey, people get four demographic questions related to the four moderating consumer characteristics (age, gender, income level and level of education). The choice options for the demographic questions are formulated in the least invasive way possible. For example, the question on the income level is multiple-choice with three options, "low income, "medium income" and "high income", in order to avoid respondents from leaving the survey if they do not want to disclose a concrete number.<sup>5</sup>

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<sup>5</sup> The full survey can be found in Appendix C.

### 3 Results

The data set exported from Qualtrics consists of 176 respondents who filled out the full survey and responded correctly to the attention check question. This results in 1760 product ratings with each product profile rated between 90 and 103 times, as visible in Table 2. All data is analysed using R Studio and the results are discussed in this section.

#### 3.1 Descriptive Statistics

Using the demographic data, the set of 176 respondents can be described as follows.

**Table 2 – Descriptive Statistics on Demographic Data**

<b>Gender</b>			
<b>Female</b>	<b>Male</b>	<b>Prefer not to tell</b>	
97	78	1	
55,11%	44,32%	0,57%	
<b>Age</b>			
<b>&lt; 30 years old</b>	<b>30-45 years old (bounds included)</b>	<b>&gt; 45 years old</b>	
46	47	83	
26,14%	26,70%	47,16%	
<b>Level of Education</b>			
<b>Lower Secondary School</b>	<b>Higher Secondary School</b>	<b>Bachelor's Degree (professional/academic)</b>	<b>Master's Degree</b>
5	60	72	39
2,84%	34,09%	40,91%	22,16%
<b>Income</b>			
<b>Low income</b>	<b>Medium income</b>	<b>High income</b>	
19	132	25	
10,80%	75,00%	14,20%	

As visible in Table 2, there is a slightly higher percentage of women in the respondent group. The category “Other” was also included in the questionnaire but was not indicated by any respondent and thus not included in the dataset. In terms of age, the groups ‘younger than 30’ and ‘from 30 to 45’ are represented almost equally. These categories correspond to the previously discussed generations ‘Gen Z’ and ‘Millennials’, respectively (see 2.1.2.1). The level of education that occurred most frequently is a bachelor’s degree. PhD was another option but was not indicated and thus not included. For the income level, the majority of respondents stated to have a medium income.

To evaluate the representability of the sample, the demographic data in Table 2 can be compared to the population of Belgium, the primary distribution region of the web-based survey. For gender, the total percentage of women in the 2021 census was 50,67% (versus 49,33% men) (Eurostat, 2023). The sample thus follows the same trend with a larger proportion of women than men, but the difference is larger than in the entire Belgian population. In terms of age, Eurostat (2023) defines the age groups differently, but comparison is still possible. According to the latest numbers, 17,75% of the population falls within the age group from 15 to 29 years old. This percentage is somewhat larger in the sample with 26,14% of the respondents aged younger than 30. Furthermore, 26,70% of the respondents are 30 to 45 years old which is in line with 26,08% of the Belgian population aged 30 to 49 years old. While the rest of the age groups account for 47,16% of the sample, they represent 39,42% of the population. Next, the proportion of respondents that holds a bachelor's or master's degree as highest obtained degree, 63,07% in total, is visibly larger than in the population where only 31,81% has completed higher education (Statbel, 2024). The last demographic variable, the income level, is harder to compare since there were no monetary boundaries defined in the survey. Based on input from Statbel (2023), the average employee in Belgium earned 3 866 euros gross per month in 2021. 10% of employees earns less than 2 303 euros gross per month, a percentage that is comparable to the 'low income' category in the survey. Another 10% of the working population earns 5 992 euros gross per month and this way qualifies as high income. The remaining 80% then has an income level between those two and can thus be described as having a medium income. In conclusion, the demographic statistics of the sample are representative of the Belgian population as a whole, except for the education level.

Descriptive statistics are also obtained for the rating data. In Table 3 below, the mean rating is given per product profile with number 10 being the most popular product. This product profile has the lowest price, does not contain microplastics, uses the colour green in the branding and has recyclable packaging. Because of the combination of many positive elements, the high rating is not surprising. Similarly, the second highest rated product profile, number 18, is a combination of multiple high-level sustainable attributes at the medium price level and its high score is therefore not unexpected as well. However, the mean rating of a product profile does not provide any information on the rating for isolated attribute levels.

**Table 3 – Overview Product Profiles with Mean Rating (Qualtrics)**

Product Profile	Product content	Branding	Packaging	Price	Times rated	Mean rating
1	Synthetic ingredients	No eco-friendly branding	Single-use, non-recyclable	€ 1,50	90	28,04
2	Synthetic ingredients	No eco-friendly branding	Recyclable	€ 1,50	100	39,93
3	Synthetic ingredients	No eco-friendly branding	Recyclable	€ 3,50	97	35,66
4	No microplastics	No eco-friendly branding	Reusable	€ 3,50	95	57,26
5	No microplastics	No eco-friendly branding	Recyclable	€ 6,00	92	46,51
6	Biological ingredients	No eco-friendly branding	Single-use, non-recyclable	€ 6,00	95	34,02
7	Biological ingredients	No eco-friendly branding	Recyclable	€ 6,00	91	47,78
8	Synthetic ingredients	Colour green	Single-use, non-recyclable	€ 3,50	100	25,02
9	Synthetic ingredients	Colour green	Recyclable	€ 6,00	100	28,91
10	No microplastics	Colour green	Recyclable	€ 1,50	103	<b>60,99</b>
11	No microplastics	Colour green	Single-use, non-recyclable	€ 6,00	95	34,36
12	Biological ingredients	Colour green	Reusable	€ 6,00	100	52,88
13	Synthetic ingredients	Ecolabel	Single-use, non-recyclable	€ 1,50	100	29,97
14	Synthetic ingredients	Ecolabel	Recyclable	€ 3,50	98	35,18
15	No microplastics	Ecolabel	Single-use, non-recyclable	€ 1,50	93	44,11
16	No microplastics	Ecolabel	Recyclable	€ 3,50	100	56,30
17	No microplastics	Ecolabel	Single-use, non-recyclable	€ 6,00	91	34,11
18	Biological ingredients	Ecolabel	Reusable	€ 3,50	95	59,66
19	Biological ingredients	Ecolabel	Single-use, non-recyclable	€ 6,00	97	36,58
20	Biological ingredients	Ecolabel	Recyclable	€ 6,00	96	49,05

In Table 4, the mean rating is calculated per attribute level, based on the rating for a product that contains this specific attribute level. The highest average rating per product attribute category is underlined in the table.

**Table 4 – Descriptive Statistics on Ratings Data**

<b>Price</b>		
<b>€1,50</b>	<b>€3,50</b>	<b>€6,00</b>
41,91	<u>44,54</u>	40,81
<b>Product Content</b>		
<b>Synthetic ingredients</b>	<b>No microplastics</b>	<b>Biological ingredients</b>
32,21	<u>48,65</u>	46,67
<b>Branding</b>		
<b>No eco-friendly branding</b>	<b>Colour green</b>	<b>Ecolabel</b>
41,54	41,44	<u>43,28</u>
<b>Packaging</b>		
<b>Single-use, non-recyclable bottle</b>	<b>Recyclable</b>	<b>Reusable</b>
33,76	44,90	<u>56,83</u>

In Table 4, it is visible that the mean ratings do not differ strongly for two of the four product attribute categories, namely 'Price' and 'Branding'. There is, however, a clear difference between the rating for products containing synthetic ingredients and body wash without microplastics or with all biological ingredients. The distinction is even stronger for 'Packaging', where there seems to be a clear order of preferences with reusable bottles being most and single-use, non-recyclable bottles least favoured. The distance between the mean ratings of the three packaging attribute levels is around 11. However, this is only descriptive information, and a regression is required to analyse any relationship between the product ratings and attribute levels.

### **3.2 Regression**

A regression was performed on the dataset using R Studio. The dependent variable in this model is the rating of the product profiles. For the independent variables, i.e., the product attribute levels, dummies are created since they are all categorical. In the regression model, one dummy of each category is left out to avoid the dummy variable trap. The attribute level excluded is the one with the lowest expected utility for the consumer per attribute, i.e., the highest price level and the non-sustainable levels (Level 1) for the other product attributes. Table 5 presents an overview of the outcome of this linear regression analysis. All coefficients in the table are positive thus ecological product attributes are, on average, valued. Although this can already be concluded, the main purpose of this statistical technique is to determine the willingness-to-pay for and the importance of the different product attributes based on the coefficients in a later stage.

**Table 5 – Regression Output**

Residuals				
Min	1Q	Median	3Q	Max
-62,651	-22,235	0,479	19,831	71,999
Coefficients				
Variable	Estimate	Standard Error	Significance*	
(Intercept)	14,2816	2,2547	***	
Price_1.5	13,7191	2,0232	***	
Price_3.5	7,9414	2,1399	***	
ProductContent_NoMicroplastics	18,7633	1,7046	***	
ProductContent_BiologicalIngredients	20,6533	2,4652	***	
Branding_ColourGreen	2,7054	1,7272		
Branding_Ecolabel	0,9863	1,5655		
Packaging_Recyclable	13,1818	1,4421	***	
Packaging_Reusable	16,0501	2,5463	***	
General				
Multiple R-squared			0,1517	
Adjusted R-squared			0,1478	

\* Significance codes: 0 '\*\*\*' 0.001 '\*\*' 0,01 '\*' 0,05 '.' 0,1 ' ' 1

### 3.2.1 Importance Measure

Partworth utilities, i.e., the utility of a single attribute level, can be derived from the linear regression (Eggers et al., 2022). To be able to do this, the attribute levels are transformed into dummy variables. For every attribute, one dummy is left out since the presence of this level can be derived from the absence of the other levels within the attribute, this way thus avoiding the dummy variable trap. The partworth utility of the level that is left out is set to 0. The calculated partworth utilities are necessary to establish the Importance Measure (IM) using the formula below:

$$IM_n = \frac{\max(U_n) - \min(U_n)}{\sum_{i=1}^n (\max(U_i) - \min(U_i))}$$

In the equation, the numerator represents the difference between the maximum utility level of a given product attribute n and the minimum utility level for n. The denominator is the sum of all utility ranges across all attribute levels. It is important to note that IMs for a group of respondents always add up to 1, which is a check for the correctness of the calculations.



### 3.2.2 Willingness-to-pay

Furthermore, the partworth utilities can be used to calculate the willingness-to-pay (WTP) for each product attribute level via the following formula (Eggers et al., 2022):

$$WTP = \frac{U_{nm}}{Price\ index}$$

$$\text{with } Price\ index = \frac{U_{1,5\ euro}}{Max(price) - Min(price)}$$

The numerator of the WTP-formula consists of the partworth utility for level m of attribute n. The price index in the denominator is calculated by dividing the utility for the lowest price level by the price range, i.e., the maximum price minus the minimum price. The WTP is expressed in euros.

### 3.2.3 Discussion of General Hypotheses

Table 6 shows the WTP and IM of each product attribute (level) for the entire group of respondents. This table can be used to discuss the general hypotheses.

**Table 6 – Willingness-to-pay & Importance Weight for all respondents**

	All respondents
WTP No Microplastics (€)	6,15456510
WTP Biological Ingredients (€)	6,77451989
WTP Colour Green (€)	0,88738880
WTP Ecolabel (€)	0,32352946
WTP Recyclable Bottle (€)	4,32377570
WTP Reusable Bottle (€)	5,26462033
Importance Product Content	0,38874772
Importance Branding	0,05091573
Importance Packaging	0,30210627
Importance Price	0,25823028
IMPORTANCE CHECK	1

#### 3.2.3.1 Hypothesis 1 – Product Content

**H1:** *Product content without microplastics (Level 2) and biological ingredients adaptations to the product content (Level 3) have a significantly larger positive influence on the willingness-to-pay than the same levels of adaptations to the branding or packaging.*

For this hypothesis, the level 2 and 3 adaptations to the product content are ‘No Microplastics’ and ‘Biological Ingredients’. With €6,15 and €6,77, respectively, the WTP for these attributes is larger than that for ecolabels, the presence of the colour green and a recyclable or reusable bottle. This is also reflected in the importance of product content in Table 6. This number is larger than the IMs of the other product attribute categories. The conclusion is therefore that the hypothesis cannot be rejected: the product content is expected to be relatively more important to the general consumer than the branding, packaging or price.

### 3.2.3.2 Hypothesis 2 – Branding

**H2:** *Ecolabels (Level 3) have the largest positive influence on the willingness-to-pay compared to the use of the colour green (Level 2) or the absence of eco-friendly branding techniques (Level 1).*

This hypothesis is rejected since Table 6 shows that the WTP for products featuring the colour green in its branding is larger than that for products with ecolabels on them. Overall, it should be noted that the WTP for the branding product attribute levels is remarkably low compared to other product attributes. This is also confirmed by the vastly low IM for branding.

### 3.2.3.3 Hypothesis 3 – Packaging

**H3:** *Reusable packaging (Level 3) has the largest positive influence on the willingness-to-pay compared to recyclable packaging (Level 2) or single-use, non-recyclable bottles (Level 1).*

In Table 6, it is clear that the WTP for a reusable bottle is higher than the WTP for a recyclable bottle. With €5,26 versus €4,32, the difference is almost €1. The hypothesis is therefore not rejected. The IMs further show that packaging is the second most important product attribute.

### 3.2.3.4 Hypothesis 4 – Price

**H4:** *The lower the price, the higher the rating of the product.*

To test this hypothesis, the coefficients of Table 5 are required. These show that the rating for a product with a lower price is higher. Thus, the hypothesis cannot be rejected. Another important note on the price level is that it is not the most important attribute to consumers based on the IM.

## 3.2.4 Discussion of Demographic Hypotheses

For the demographic hypotheses, separate regressions were run on subgroups of respondents. Subsequently, the WTP and IMs were calculated again based on the coefficients of these new regressions.

### 3.2.4.1 Hypothesis 5 - Age

**Table 7 – Willingness-to-pay & Importance Weight for subgroups based on Age**

	Gen Z	Millennials	Other generations
WTP No Microplastics (€)	2,84751546	4,05770621	11,72857807
WTP Biological Ingredients (€)	3,07533780	5,84376974	11,79521938
WTP Colour Green (€)	1,21271140	0,68532102	0,82417202
WTP Ecolabel (€)	0,26124975	1,11229359	-0,74006377
WTP Recyclable Bottle (€)	2,03233537	2,19796672	8,59197721
WTP Reusable Bottle (€)	3,55091947	2,40810962	9,51687482
Importance Product Content	0,24923902	0,42150260	0,43085441
Importance Branding	0,09828659	0,08023148	0,05714685
Importance Packaging	0,28777640	0,17369037	0,34763169
Importance Price	0,36469800	0,32457555	0,16436705
IMPORTANCE CHECK	1	1	1

**H5:** *The willingness-to-pay for sustainable product attributes is higher for Gen Z consumers, compared to other generations of consumers.*

As visible in Table 7, the WTP for the sustainable product attributes is in most cases lower for the youngest respondent group (under 30 years old) compared to the millennial group or older generations. Gen Z is only willing to pay more than millennials for a reusable bottle, more than other generations for products featuring an ecolabel and more than all generations for products with branding that uses the colour green. A possible explanation for this phenomenon might be the fact that people under 30 have a smaller income compared to other generations. This is also confirmed by the data when relating the age to the income level in R. The numbers in Table 8 show that a third of Gen Z consumers is part of the low-income group, which is in strong contrast with other age segments. A reusable bottle fits in with this income group since it might be a more economical option in the future. Overall, Hypothesis 5 is rejected, although Gen Z is perceived as the eco-conscious generation based on previous studies (see 2.1.2.1).

**Table 8 – Relationship between Age & Income Level**

	Low income	Medium income	High income
< 30 years old	15 32,61%	31 67,39%	0 0%
30-45 years old	0 0%	41 87,23%	6 12,77%
> 45 years old	4 4,82%	60 72,29%	19 22,89%

### 3.2.4.2 Hypothesis 6 - Gender

**Table 9 – Willingness-to-pay & Importance Weight for subgroups based on Gender**

	Male	Female
WTP No Microplastics (€)	4,79790546	7,59317156
WTP Biological Ingredients (€)	5,08226545	8,75334127
WTP Colour Green (€)	1,22819818	0,31230200
WTP Ecolabel (€)	0,25988759	0,03738886
WTP Recyclable Bottle (€)	4,81841649	3,50342312
WTP Reusable Bottle (€)	4,96194119	5,30587256
Importance Product Content	0,32223040	0,46382708
Importance Branding	0,07786771	0,01655012
Importance Packaging	0,31459406	0,28116126
Importance Price	0,28530782	0,23846154
IMPORTANCE CHECK	1	1

**H6:** *The willingness-to-pay for sustainable product attributes is higher for female consumers, compared to male consumers.*

As visible in Table 9, the WTP is higher for women in case of the absence of microplastics, the presence of biological ingredients or the packaging of the product in a reusable bottle. However, men are willing to pay more than women for products with green branding elements, an ecolabel and recyclable bottles. Each gender thus has a higher WTP for half of the product attributes. However, since women have a higher WTP on the attributes that matter most to them, i.e., product content attributes, Hypothesis 6 is not rejected.

### 3.2.4.3 Hypothesis 7 – Income Level

**Table 10 – Willingness-to-pay & Importance Weight for subgroups based on Income Level**

	Low income	Medium income	High income
WTP No Microplastics (€)	4,3394428	5,85280067	9,13231652
WTP Biological Ingredients (€)	3,1818197	6,94740175	8,71293911
WTP Colour Green (€)	2,2663713	1,03124582	-0,79647128
WTP Ecolabel (€)	0,3282185	0,48132234	-0,94122583
WTP Recyclable Bottle (€)	3,2090066	3,71736663	8,37356021
WTP Reusable Bottle (€)	6,4086602	4,37299924	8,49710678
Importance Product Content	0,2477664	0,41226319	0,39584290
Importance Branding	0,1294026	0,06120297	0,04079533
Importance Packaging	0,3659086	0,25950058	0,36831357
Importance Price	0,2569224	0,26703326	0,19504820
IMPORTANCE CHECK	1	1	1

**H7:** The willingness-to-pay for sustainable product attributes is higher for high-income consumers, compared to low-income consumers.

Hypothesis 7 is correct for all product attributes related to the product content and the packaging. Only for the branding characteristics, the WTP in Table 10 is even negative. This means that high-income consumers prefer products that are not branded as eco-friendly. However, as the hypothesis is correct for the majority of sustainable attribute levels, it cannot be rejected.

#### 3.2.4.4 Hypothesis 8 – Level of Education

**Table 11 – Willingness-to-pay & Importance Weight for subgroups based on Level of Education**

	Lower Secondary School	Higher Secondary School	Bachelor's Degree	Master's Degree
WTP No Microplastics (€)	7,5132473	5,03363637	5,52069475	9,76768405
WTP Biological Ingredients (€)	14,0172450	6,43797794	5,70903879	9,08242390
WTP Colour Green (€)	4,9557976	0,95509695	0,27709830	1,46071877
WTP Ecolabel (€)	1,5255243	-0,04898199	0,27940051	0,98791687
WTP Recyclable Bottle (€)	6,1193077	4,49739521	4,29395678	4,44339995
WTP Reusable Bottle (€)	3,9354731	5,53714554	5,28411383	5,85150621
Importance Product Content	0,4424702	0,36831846	0,36195643	0,45263195
Importance Branding	0,1564337	0,05745358	0,01770751	0,06769138
Importance Packaging	0,1931642	0,31678123	0,33503131	0,27115466
Importance Price	0,2079319	0,25744674	0,28530475	0,20852200
IMPORTANCE CHECK	1	1	1	1

**H8:** The willingness-to-pay for sustainable product attributes is higher for higher educated consumers, compared to lower educated consumers.

The statement is correct for some attributes, but certainly not for all. Respondents with a master's degree have the highest WTP for products without microplastics and for body wash that comes in a reusable bottle (see Table 11). On the contrary, respondents with the lowest level of education have the overall highest WTP for soap with biological ingredients and recyclable bottles. However, this group is poorly represented in the sample, thus the results might not be reliable. Not taking this lower-educated group into consideration, the WTPs are mostly highest for people with a master's degree. Therefore we can conclude that the hypothesis cannot be rejected.

## General conclusion

The central research question of this thesis is to find out what consumers' WTP for sustainable product attributes in FMCG is. By analysing existing literature, a list of these product attributes was established. They were tested in a ratings-based conjoint analysis study in which respondents were presented with a body wash product, a type of FMCG, that contained combinations of different levels within the product attribute categories. From the coefficients of a linear regression analysis performed on these ratings, the WTP and IM were derived.

This thesis contributes to the existing body of literature by quantifying consumers' WTP and allowing for comparison of the WTP across different product attribute levels, including non-eco-friendly variants (Gomes et al., 2023). Moreover, this study considers different demographic characteristics, i.e., age, gender, income and education, which can affect green purchasing behaviour. Lastly, this thesis uses conjoint analysis, which is an advantage since it resembles a real choice situation with trade-offs between attributes more than a traditional survey that questions consumers' WTP for green products directly (Rao, 2014).

From the conjoint analysis study, it can be concluded that in terms of product content, the WTP is highest for products with biological ingredients. Moreover, the product content has the highest importance to consumers. This is in line with the literature that describes the link people make between eco-friendly product content adaptations and healthiness (Verain et al., 2012). For the branding of sustainable products, respondents prefer the use of the colour green over the presence of ecolabels in terms of willingness-to-pay. This is rather unexpected since ecolabels are perceived as a powerful nudge, although they are sometimes also associated with greenwashing (de Freitas Netto et al., 2020; Solaiman et al., 2015). Overall however, branding only has a small IM and thus does not matter much to consumers. When it comes to packaging, reusable bottles have the highest WTP, which confirms scientific sources that found that consumers view reusable packaging as both sustainable and economical (Boz et al., 2020; Verain et al., 2012). For the last product attribute, the price, the general assumption that a lower price is better in the eyes of the consumer stands, but it is in fact only the third most important attribute to the consumer. In conclusion, the ideal sustainable FMCG product has biological ingredients, is branded using the colour green, comes in reusable packaging and has the lowest price possible.

By requesting demographic information in the survey, the representativeness of the sample compared to the population was checked and now, an ideal sustainable consumer profile can be established. Some hypotheses on this topic based on existing scientific literature were rejected, some not. To conclude, the customer of an eco-friendly product is preferably a highly educated woman over 45 years old with a high income.

The two main takeaways of the study, namely the most valued sustainable product attributes and the ideal green consumer profile, can provide insights for managers of FMCG companies. First, while price is an important aspect of a product in times of inflation, the conjoint analysis study showed that a sustainable product's price tag does not matter as much to the consumer as its product content or packaging. Nevertheless, managers should keep the target group of their product in mind. Although Gen Z is believed to be the most eco-conscious generation, the majority of them have low incomes and thus consider price most. Likewise, for Millennials, price matters more than packaging, but can still not win from product content. Because of the price sensitivity of younger consumers, managers could choose to provide them with personalised discounts. However, for FMCG goods that are not sold via direct channels, producing companies possibly need help from retailers to reach the right customer group.

The second managerial implication focuses on the most valued aspect to consumers, the product content. This aspect is especially important to women. In terms of WTP, FMCG products with biological ingredients are highest valued. For a brand in the female personal care segment, for example, it might thus be interesting to use biological components if they want to make their product more sustainable. Moreover, highlighting the health aspects of biological or microplastic-free products can help to convince consumers to pay a higher price.

Third, packaging scores relatively high on importance. Mainly consumers over 45 years old have a high WTP for recyclable or reusable bottles. This phenomenon can be explained by the fact that the majority of them has a medium to high income. However, respondents that categorised themselves in the low-income group also present with a high WTP for reusable bottles. This is most likely because this packaging can later be refilled at a lower price. For liquid FMCG products, e.g., soap or olive oil, it is a common practice to take a bottle to the store and refill it there or to buy a cheaper, larger quantity and refill the reusable, more convenient bottle at home.

The last attribute examined in this thesis was how sustainable products are branded. As opposed to existing literature, the conjoint analysis study revealed that eco-branding only has little importance to consumers. This was rather unexpected since ecolabels are known to be nudges that strongly influence people's behaviour. Nevertheless, this type of branding might also be related to greenwashing or brands making other false claims. The use of the colour green in branding generated a slightly higher WTP, especially for men, low-income consumers and lower-educated respondents. The reason for this is the association of green with nature and health. For managers, this implies that they should concentrate on adapting the product or the packaging instead of spending their resources on heavily branding their products as sustainable.

As seen in the paragraph on the green attitude-behaviour gap in the literature review (see 1.2.2), people do not always act according to their stated preference (Gatzer & Roos, 2021; Schubert, 2017). Although a ratings-based conjoint analysis study is a generally accepted method in marketing research, it is not an ideal representation of reality (Boz et al., 2020; Eggers et al., 2022). Another problem with the survey design could have been the information at the beginning of the questionnaire (see Appendix C) which might have influenced respondents' perception. For, e.g., ecolabels, this could be the cause of why this attribute has generated a low WTP. Moreover, even though the sample of respondents was a good representation of the Belgian population based on the available statistics, some choice options in the demographic part of the survey were not or barely indicated. However, the census data at hand does not include information on, for example, gender identities outside of the binary system. Therefore, it is unclear how this influences the representativeness of the sample. Lastly, the limited timeframe in which a master's thesis should be completed forms a restriction on the scope of this study. This had an influence on, amongst other aspects, the number of product attributes included in the study and the number of profiles eventually questioned in the survey.

In future research with more resources, the number of product attributes or the attribute levels included could be increased. Examples of attribute levels that were incorporated in the literature review and that have been left out of the survey in this thesis are product size, brand contributions to charities with an ecological cause, natural images on packaging, etc. Moreover, the list of eco-friendly product attributes included in the literature review is constantly evolving and thus non-exhaustive. The attributes were now also applied to a product in the personal care department, nevertheless, future studies could repeat this for other types of FMCG like food or beverages. Likewise, similar research could be conducted for other product categories such as electronics or clothing. Furthermore, keeping the green attitude-behaviour gap in mind, future studies could use a different methodology like choice-based conjoint analysis, an experiment or the use of shopper data, three methods that approach real choices more than ratings-based conjoint analysis. Moreover, this study could go deeper into the financial part of the producer side and compare the WTP of consumers with the costs of adapting a product. Another incentive for future research could be to take into account the characteristics of the point-of-sale, i.e., supermarkets or other types of retailers. In addition, other types of consumers, i.e., public buyers, could be an interesting starting point of a future study in the area of sustainable consumption.



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## Appendix A: Reference prices for liquid body soap

To establish a realistic reference price, the following websites of different points of sale were used. All products listed below are examples of liquid body soaps.

Point of sale	Product description	Price
Delhaize (supermarket) ( <a href="http://www.delhaize.be">www.delhaize.be</a> )	Delhaize (private label) – Almond 500 ml	€1,95
	Sunlight – Aloe Vera 450 ml	€4,55
	Palmolive – Almond 250 ml	€2,79
	Le Petit Marseillais – Orange blossom (bio) 250 ml	€3,85
Carrefour (supermarket) ( <a href="http://www.drive.carrefour.be">www.drive.carrefour.be</a> )	Carrefour (private label) – Orchid 250 ml	€1,15
	Tahiti – Vanilla (bio) 300 ml	€3,09
	Nivea – Waterlily & Oil 250 ml	€3,19
Aldi (supermarket) ( <a href="http://www.aldi.be">www.aldi.be</a> )	Lacura – Milk & Honey 750 ml	€1,79
	Sanex – All Skin Types (Hydrating) with ecolabels (natural origin & recyclable bottle) 400 ml	€4,99
Aēsop (skincare brand) ( <a href="http://www.aesop.com">www.aesop.com</a> )	Aesop – Geranium Leaf (vegan) 100 ml	€17,00
	Aesop – Geranium Leaf (vegan) 500 ml (min. 97% recycled materials)	€45,00
Rituals (skincare brand) ( <a href="http://www.rituals.com">www.rituals.com</a> )	Rituals – Rice milk & Sherry blossom (shower oil) 200 ml	€9,90
	Rituals – Rice milk & Sherry blossom (foaming) 200 ml	€9,90
Hema (drugstore) ( <a href="http://www.hema.com">www.hema.com</a> )	Hema – Peach 500 ml	€4,00
	Hema – Cucumber with ecolabel (90% natural origin) 50 ml	€1,75
Medi-market (pharmacy) ( <a href="http://www.medi-market.be">www.medi-market.be</a> )	Marque Verte Dermasens – Flowers with ecolabel (98% natural origin) 1000 ml	€8,63
	Weleda – Lavender + Bergamot + Vetiver with ecolabel (natural origin & bio) 200 ml	€5,49
	Le Comptoir du Bain – Rosemary & Tea Tree Oils with ecolabel (99% natural origin & bio) 500 ml	€9,47



## Appendix C: Full Qualtrics Survey

### Introduction:

**KU LEUVEN**

English ▼

(Indien u de enquête liever in het Nederlands invult, kan u hierboven de taal aanpassen.)

Dear respondent,

My name is Margot Himschoot and I am a student enrolled in the Master of Business Administration at KU Leuven. In light of my master's thesis, I am conducting a study on sustainable product attributes. Filling in this survey will only take around 5 minutes. Your answers to this questionnaire are anonymous and will only be used for the purpose of this master's thesis. For further information on privacy, you can consult [www.kuleuven.be/privacy/en/](http://www.kuleuven.be/privacy/en/).

Your help is greatly appreciated!

By clicking 'I understand' below, you will start the questionnaire.

I understand

### Setting:

In the following part of the questionnaire, you will get several pictures of fictional body wash products. After seeing each image, you will be asked to rate your likeliness to buy the product. Before starting the survey, please read through the definitions of some key concepts below.

#### **Packaging:**

- *Throw this bottle away after usage* = the bottle cannot be recycled or reused
- *Recyclable* = the packaging materials are 100% recovered
- *Reusable* = the bottle can be opened and refilled



**Product content:**

- *Contains synthetic ingredients* = some or all ingredients are artificially made
- *No microplastics* = the product does not contain small plastic grains (that e.g. cleans the skin)
- *Biological ingredients* = all ingredients have a plant-based origin and are sourced e.g. without pesticides

**Branding:**

- *Ecolabel* = there is a label on the bottle that communicates an eco-friendly aspect of the product (not necessarily backed up by evidence)

By clicking 'I am ready' below, you can start rating the products.

I am ready

**Rating product profiles:**

(Each respondent randomly sees 10 of them, presented one by one.)

Product Profile 1

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



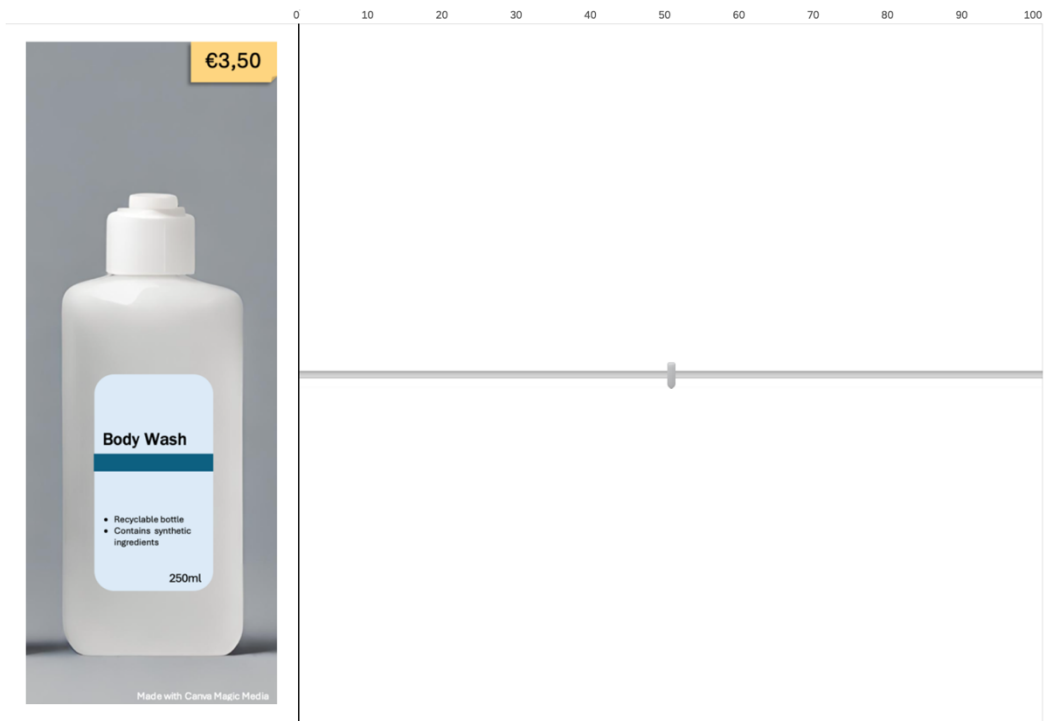
Product Profile 2

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 3

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 4

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 5

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 6

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



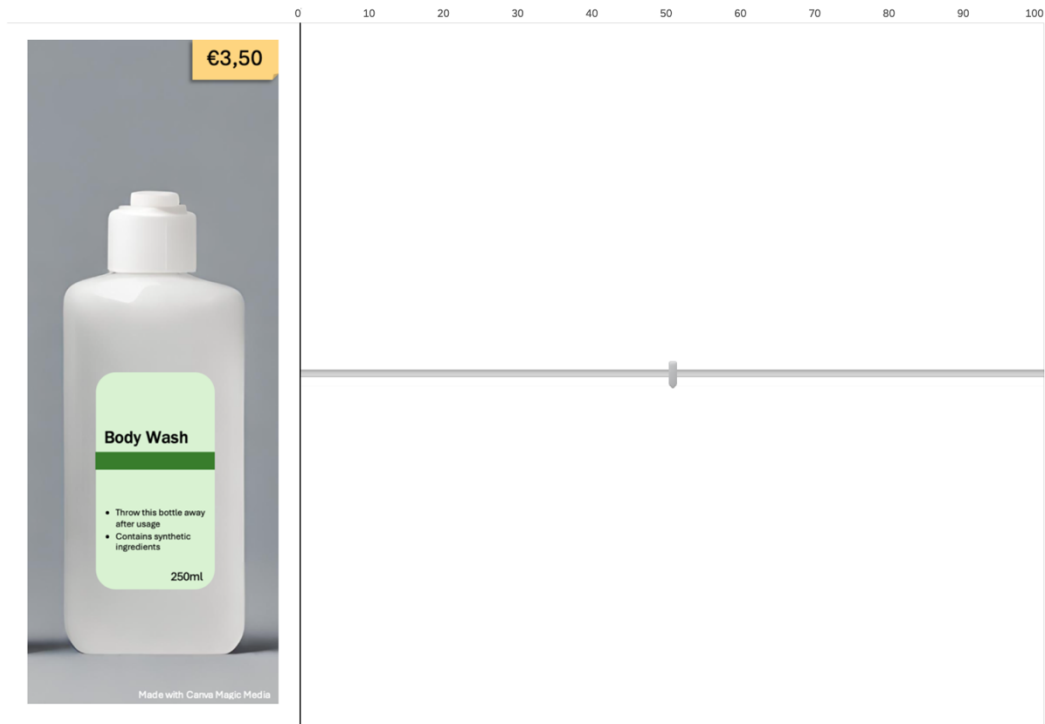
Product Profile 7

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



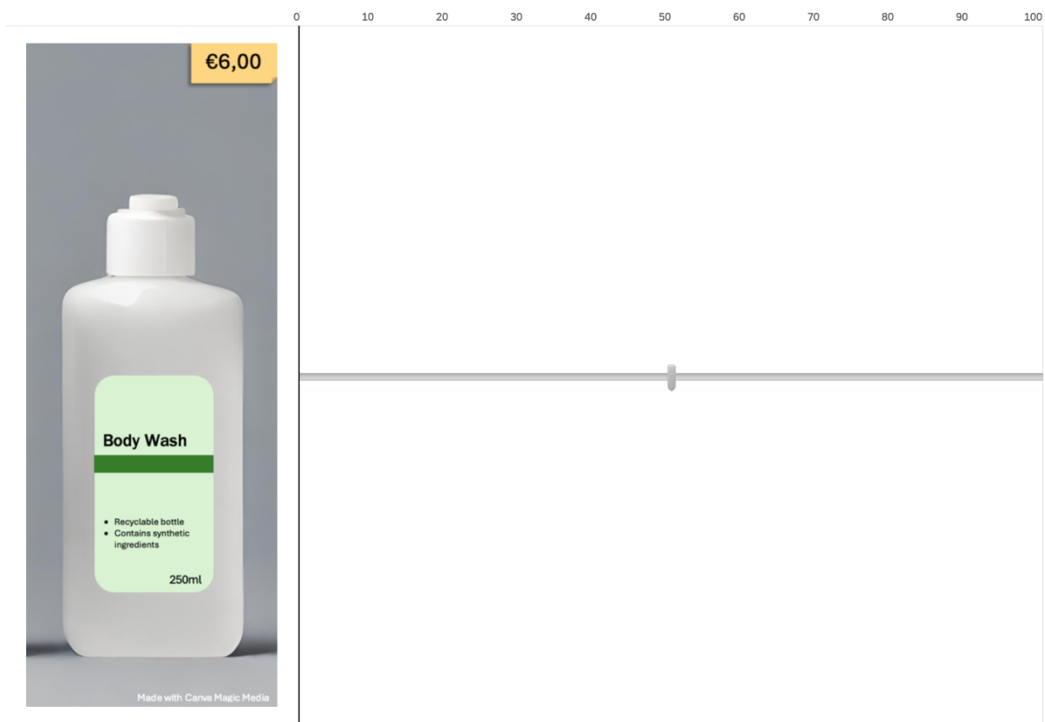
Product Profile 8

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



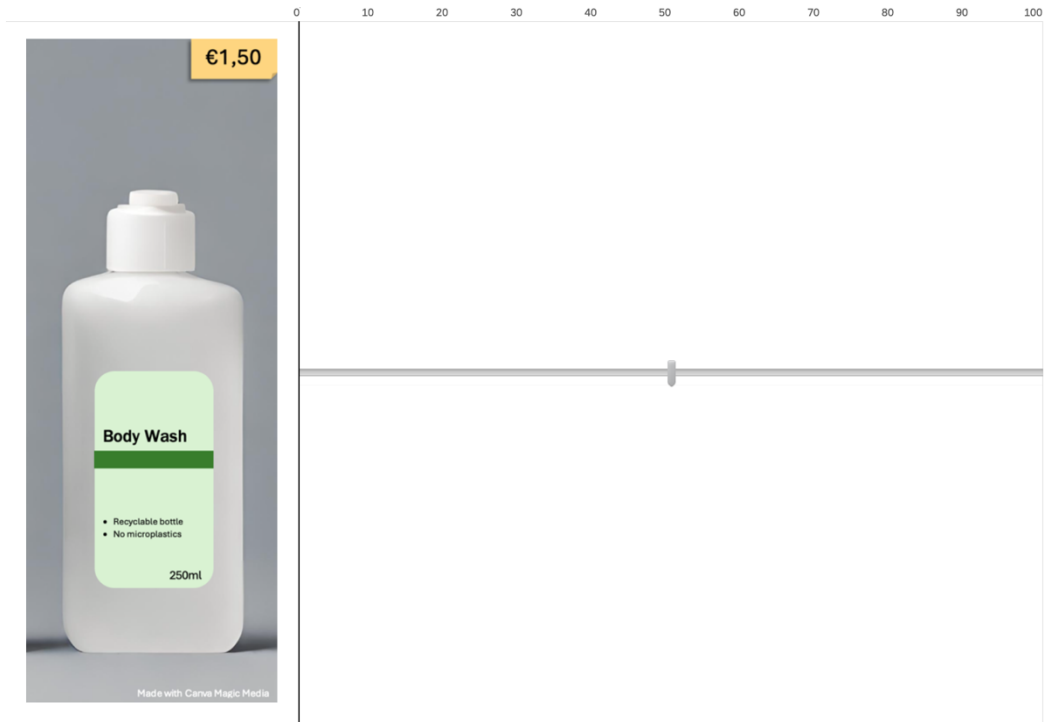
Product Profile 9

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



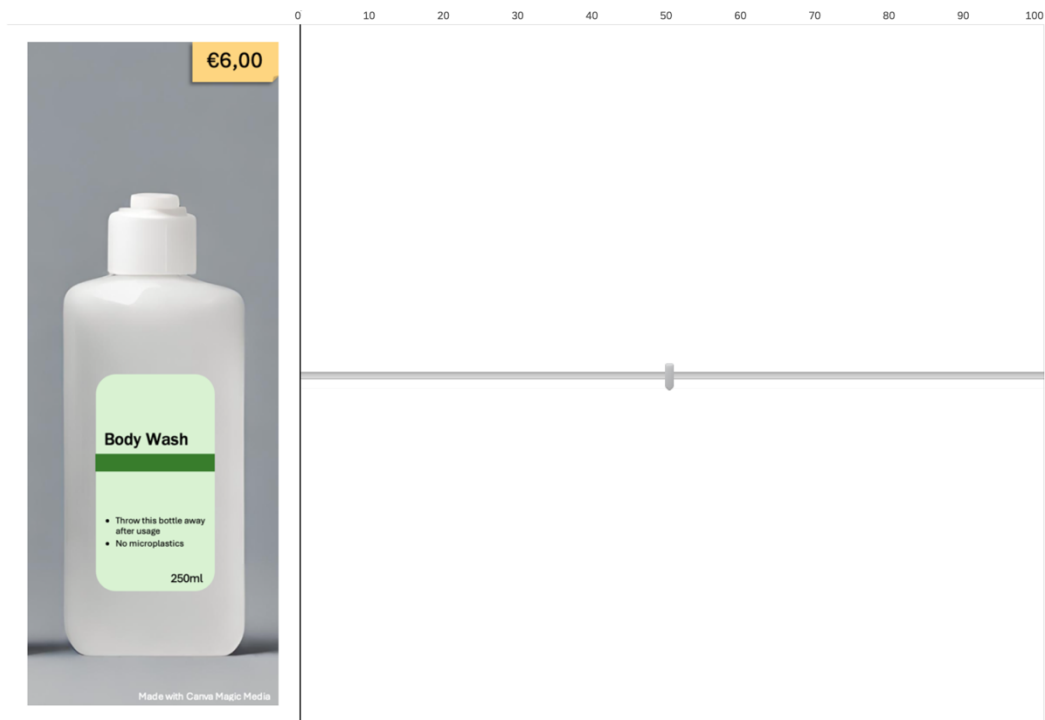
Product Profile 10

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 11

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 12

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 13

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 14

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 15

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?





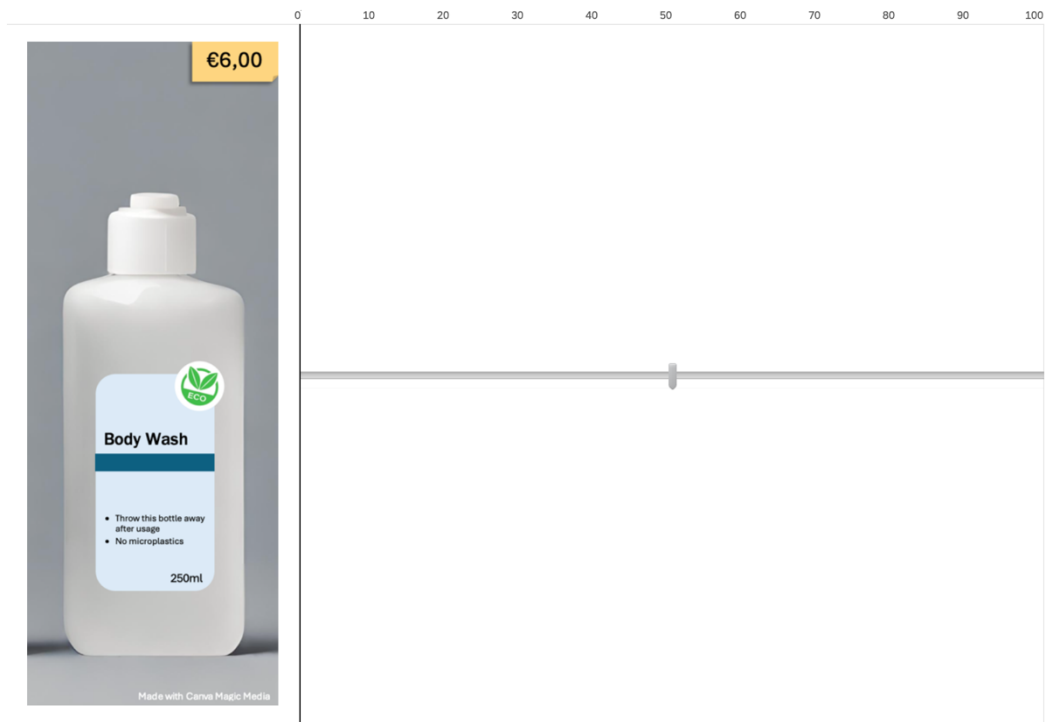
Product Profile 16

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 17

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 18

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



Product Profile 19

On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



On a scale from 0 (not likely) to 100 (very likely), how likely would you buy this bottle of body wash (250 ml)?



**Attention check:**

(This is presented after the respondent has rated five questions.)

English ▾

Choose 'Soap' from the options below.

Shampoo

Water

Soap



**Demographic questions:**

To end, I will ask you some questions on personal characteristics. Your responses are still completely anonymous and are handled with great care.

What is your gender?

- Male
- Female
- Other
- Prefer not to tell

What is your age?

- younger than 30 years old
- between 30 and 45 years old (bounds included)
- older than 45 years old

What is your highest obtained degree?

- Lower secondary school
- Higher secondary school
- Bachelor's degree (professional/academic)
- Master's degree
- PhD

How would you describe your income level?

- Low income
- Medium income
- High income

**Ending:**

**Thank you for taking the time to fill in this survey!**

**Your answer has been recorded.**

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LID VAN **ASSOCIATIE  
KU LEUVEN**