

Harmonising self-interest and collective benefit: an approach to use an XR driven filter system to mitigate price sensitivity for green products in the supermarket



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Abstract

An important barrier that is currently preventing consumers from buying sustainable products in the supermarket is that they experience a dilemma between the ego and collective in which the ego often wins. Even though scholars have established this problem, a good solution to tackle the price sensitivity for sustainable products has not yet been found. This study explores whether consumers' price sensitivity can be reduced by utilising a data-driven filter system that harmonises egoistic and collective benefits in one product. To test this a within-subjects experiment is conducted in a Virtual Reality (VR) supermarket, where users were asked to choose an ecolabel which they found important. Subsequently, during the shopping trip only the recommended option fitting their indicated preference was shown, blurring out other products and prices in that product category. The research did not show that the sustainable products in the filter condition appealed more to the self-interest, which in turn led to a lower price sensitivity. Additionally, a moderation of involvement and trust was not found. The findings indicate the complexity of harmonising egoistic and collective features in one product. The findings did suggest that price sensitivity and level of self-appeal were affected, however not through the mediation of diminishing the level of conflict experienced during the purchase decision. Possibly due to the restriction of choice freedom. The research provides consumer shopping insights and shows that more research is needed to decrease the existing green purchasing gap.

Keywords: Virtual Reality, price sensitivity, sustainability, consumers, supermarket, data-driven filter system

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List of abbreviations

AR	Augmented Reality
VR	Virtual Reality
XR	Extended Reality
MOA	Motivation Opportunity Ability
TAM	Technology Acceptance Model
PEU	Perceived Ease of Use
PU	Perceived Usefulness

1. Introduction

Within a supermarket environment, consumers frequently express that they want to make sustainable choices. Yet, in reality consumers often opt for low-cost products instead of sustainable products (Seubelt et al., 2022), even when consumers are environmentally concerned. Numerous studies have delved into the root cause of this phenomenon and have identified pricing as one of the detrimental factors that cause consumers to not buy sustainable products (e.g. Eberhart & Naderer, 2017; Nicolae & Roşca, 2023; Seubelt et al., 2022; Van Giesen & Leenheer, 2019). Particularly, within the 18-24 age group price was a crucial factor in making purchase decisions (Siuda, 2022), and also Gen Y consumers showed great sensitivity towards relatively high prices of sustainable products, explaining that they were unwilling to pay extra for sustainable products, even when they were environmentally concerned (Ran & Zhang, 2022). This is because consumers tend to prioritise egoistic product attributes over sustainability, collective considerations, which are good for the collective (Nicolae & Roşca, 2023; Schuitema & Groot, 2015). Self-interest and self-indulgence, thus lead consumers to favour health and affordability over sustainability benefits (Eberhart & Naderer, 2017). This shows that there currently is a clash between the ego (cheap products) and collective (sustainability), in which the self is favoured. Grunert et al. (2023) even found that the price sensitivity of 32 percent of the surveyed consumers in Europe went up due to Covid-19, rising prices, and the war in Ukraine. This resulted in consumers paying more attention to prices in the supermarket and opting for lower-cost products. Therefore, to increase sustainable purchase decisions, it is crucial to bring price sensitivity to a halt (Ingenbleek & Krampe, 2022).

A grocery store has an overwhelming number of products that consumers can buy. These choices are often considered relatively unimportant by consumers since they do not involve large risks and have been made numerous times in the past (Hoyer, 1984). Additionally, since consumers typically have to make many decisions within one shopping trip, they desire to minimise time and cognitive effort used to make decisions. Thereby, consumers often use intuition or easy-to-access cues to make decisions (Krampe et al. 2018). They can utilise, for instance, price, specific claims, symbols or imagery to simplify their choices (Hoek et al., 2013). In the realm of quick decision-making, consumers often choose price as an indicator for their purchase decision. Next to that, other factors that influence price sensitivity are for example brand loyalty, product involvement (Zaichkowsky, 1988), and uncertainty (Wu et al., 2017). However, these articles often stop after concluding that there is an unequal power dynamic in which one has to choose the self over sustainability (White et al., 2019). Some suggestions were made, however not studied. For example, Grunert et al. (2023) suggested

that there is a need for innovative solutions that merge health and sustainability while maintaining the value-for-money aspect of food products. Additionally, Ingebleek and Krampe (2022) also stressed that price sensitivity should be brought to a halt and suggested using technology that shows consumers only a restricted number of products, based on their preferences. Hence, there is a need to generate knowledge on how to tackle the pricing dilemma in the realm of sustainability development.

This paper's proposed approach is to mitigate price sensitivity by recommending products to an individual consumer that focus on the egoistic features and collective benefits (sustainability), whilst leaving out the price of unsustainable products. This can be achieved by offering consumers a digital filter system in a supermarket setting, allowing them to select the product attributes that they place importance on, for example: carbon footprint, and Fairtrade. The consumer could then indicate what type of products they want to purchase, subsequently the program would show the best product based on the indicated preferences whilst leaving out the products and price in that same category. This approach is designed to foster personal desires, as consumers actively choose the attributes that align with their values, whilst at the same time recommending sustainable products. Leaving out the price of unsustainable products also reduces decision-making effort for the consumer and decrease reliance on cues, such as price. This gives consumers the ability to behave sustainably without extra cognitive effort. Thus, it shows the optimal choice harmonising individual needs and sustainability considerations.

One way to do this is by using Extended Reality (XR). XR can be used as a tool that allows users to immerse themselves in a virtual world and interact with virtual objects (Bhavadarini et al., 2023). Additionally, features can be added, such as blurring out products that are not relevant for the shopper or adding additional information to products (Rejeb et al., 2021). Considering the advantages of XR, this study proposed to use it as a means to show shoppers the best product that incorporates their indicated affordability and sustainability benefits. The primary objective of this study is to investigate whether consumers would make more sustainable purchase decisions when offered a filtering system in the supermarket, and whether this system would make them less price-sensitive. Additionally, the different factors that cause price sensitivity will also be tested to see which ones become obsolete due to the XR driven filter system. This leads to the question:

“What impact does offering an XR driven filter system for sustainability benefits for products have on the price sensitivity of consumers for sustainable products in the supermarket?”

2. Theoretical background

This chapter will first delve into Extended Reality. Following this, it employs the SHIFT and the Motivation Opportunity Ability (MOA) model to elucidate what consumers require to engage in green behaviour, how to modify behaviour to be more environmentally friendly, and how XR can facilitate these changes. After that, the important barrier to green consumption, price sensitivity, will be discussed. The chapter then examines how XR can be utilised to mitigate the dilemma between the individual's interests and the collective benefit, which is hypothesised to reduce price sensitivity, and boost sustainable purchasing behaviour.

2.1 Extended reality

Over the last decades, immersive digital technologies have evolved, creating new ways of enhancing consumer experiences (Flavián et al., 2019). Extended Reality (XR) is an umbrella term that describes Augmented Reality (AR), Virtual Reality (VR), and Mixed Realities (MR) (Chuah, 2018). AR is used to extend the real world by integrating virtual, as well as, real objects in the same space in a real-time display (Van Krevelen & Poelman, 2010). Whereas, VR immerses a person in a three-dimensional virtual environment in which they can interact from a first-person viewpoint (Flavián et al., 2019; Rokhsaritalemi et al., 2020). MR also combines real-world objects with virtual objects in real-time, however, the interaction between the real-world objects and virtual objects is higher as well as the level of user emergence during the scenarios in comparison to AR (Rokhsaritalemi et al., 2020).

As XR is able to change how people interact with the world it can have a huge impact on consumer experience (Hoyer et al., 2020). Previous research concluded that immersive technologies pose benefits in many different contexts, for example, tourism (Orús et al., 2021), arts (Belk et al., 2022), education (Sahin & Yilmaz, 2020), and healthcare (Patrício et al., 2020). XR has numerous advantages, several of which are highlighted here. Firstly, XR can increase consumer satisfaction by augmenting experiences and providing additional value (Flavián et al., 2021). Moreover, it allows consumers to play a dynamic and autonomous role within an experience (Rafaeli et al., 2017), while also offering opportunities to enrich multisensory engagement (Flavián et al., 2021). Secondly, XR can create a safe environment for consumers, for example, VR can help elderly consumers who might not feel safe going to a supermarket to shop due to large crowds (Yung et al., 2022). Thirdly, XR can be utilised to create a virtual space in which scientific experiments can be conducted that would not be possible in the real world (Pettersson et al., 2013). Lastly, literature has shown that XR can aid consumers in making more environmentally friendly decisions. By using XR

technology users can access information and receive immediate feedback. It can be used to show users things that otherwise would be invisible, such as their carbon footprint, and allows them to interact with sustainability issues in specific and engaging ways (Ahn et al., 2016; Fauville et al., 2016). Seeing that XR provides the opportunity to alter the current way consumers make decisions in the supermarket, it presents great opportunities to tackle price sensitivity.

2.2 Sustainable behaviour change

The SHIFT model addresses why consumers express favourable attitudes towards sustainability but fail to display sustainable behaviours (White et al., 2019). An extensive literature review captured the most recurring concepts to identify sustainable consumer behaviour change. This resulted in a model that encompasses five different routes that can be utilised to encourage sustainable behaviours: Social Influence, Habits, Individual Self, Feelings and Cognition, and Tangibility. The model explains how these five psychological factors can shift consumers towards pro-environmental behaviour. Notably, there is not one optimum route, since various barriers often hinder the transition to more sustainable behaviour. It differs per situation and combining different routes might be more impactful (Osterhus, 1997; Stern, 2011). The primary objective of the current study is to test whether a data-driven filter technology can help reduce price sensitivity. XR can be utilised to encourage sustainable behaviours and reduce price sensitivity through the routes of Habits, Individual Self, and Feelings and Cognition.

First, the Individual Self-route states that individuals are motivated to maintain a positive self-view (Dunning, 2007; White et al., 2019). Consuming climate-friendly products enhances this feeling (Paharia, 2019). Furthermore, consumers dislike learning that their behaviours harm the environment, since they desire to view themselves positively (De Wit & Dickinson, 2009). Once commitment is made, individuals want to act accordingly. Individuals desire to act self-consistent and view themselves positively (White et al., 2019). As personal commitment increases the likelihood of subsequent sustainable behaviour (Bodur et al., 2014; Katzev & Johnson, 1984), requesting consumers to commit to a sustainability aspect in the data-driven filter system, could enhance the intrinsic desirability to purchase sustainably.

The SHIFT model also acknowledges that self-interest is highly important for consumers (Griskevicius et al., 2012; White et al., 2019). One recommended way to tackle this is by highlighting the self-benefits that a product, service, or behaviour brings the consumer (Green & Peloza, 2014). The problem that consumers often choose price over sustainability

(Eberhart & Naderer, 2017) aligns with taking the self-interest route since most consumers experience sustainable behaviours as having costs to the self, such as requiring more effort and expenses and resulting in inferior quality and aesthetics (Luchs & Kumar, 2017), in which they end up favouring the product that benefits themselves the most. This extra effort can also be linked to the dual process theory, which explains that there are two systems through which consumers think, make decisions, and process information. System 1, processes information intuitively, quickly and automatically, while System 2 is logical and cognitive (Kahneman, 2011). Making sustainable decisions often requires System 2 thinking, as it usually involves considering long-term consequences and processing. Due to a consumer's bounded knowledge, available time, and/or computational capacities (Gigerenzer & Goldstein, 1996; Kahneman, 2003), consumers often rely on System 1 to make decisions, this automatic thinking frequently uses heuristics and biases. This will lead them to make decisions based on for instance the brand or price (System 1) instead of the technical characteristics (System 2), since this requires more cognitive processing and time (Samson & Voyer, 2012). By allowing consumers to indicate the product attributes they deem important, tailor-made product advice can be given. This recommended product optimises both self-interest and sustainability factors (e.g., carbon footprint). Thereby, highlighting the benefits to the self and fulfilling self-relevant motives, rather than solely emphasising costs to the self, such as affordability (Chang, 2011), possibly decreasing price sensitivity. Additionally, allowing consumers to indicate their own preferences could give them the feeling of agency over the outcome (White et al., 2019). This can offer the individual the feeling of empowerment, in comparison to showing them the most sustainable option without their input, and provide them with the feeling that they can make a change. The feeling of agency also increases sustainable behaviour for the individual self (White et al., 2019).

Next to that, changing habits can lead to more sustainable behaviour. Juhl et al. (2017) showed that once purchasing habits in the supermarket are changed, the sustainable product share of the consumer's basket grew. Habits are automatic behaviours, relatively uncontrolled and easy to perform (Honkanen et al., 2005). Changing these behaviours to form new habits requires repeated actions. The SHIFT model states that there are multiple ways to break old habits to form new sustainable ones: making sustainable actions easy, using prompts, setting implementation intentions, penalties, offering incentives, and providing feedback (White et al., 2019). Leveraging data-driven technology to present consumers with their optimal product, whilst blurring out other (unsustainable) products, can be utilised to break routine behaviours (habits) to stimulate consumers to make new decisions easily. Since many people experience sustainable actions as requiring much time

and effort (McKenzie-Mohr, 2000), offering them one recommended product makes it easier to engage in sustainable behaviour. Research has shown that consumers often stick with the default option as it makes sustainable actions easier (Frederiks et al., 2015; Pichert & Katsikopoulos, 2008; Theotokis & Manganari, 2015). Showing one product can help consumers break with current habits, and simplifying the decision-making process can help consumers to automatically form new sustainable habits (Steg & Vlek, 2009). This, combined with showing products that fulfil self-interested needs, could lead to consumers decreasing the emphasis on price and the use of System 2 thinking.

Lastly, the feelings and cognition route explains that consumers generally take one of two different routes when making a decision: driven by affect or driven by cognition (Shiv & Fedorikhin, 1999). Promoting eco-friendly behaviour among consumers through cognitive routes involves informing them about the outcomes of (un)desired behaviours (McKenzie-Mohr, 2000). Additionally, eco-labelling and framing can make consumers make more environmentally friendly decisions (White et al., 2019). Lastly, the information could be utilised to SHIFT consumers' behaviour towards more sustainable choices. Showing the best possible product choice conveys information that shows desired and undesired behaviour, encouraging consumers to adopt pro-environmental habits (McKenzie-Mohr, 2000). However, White et al. (2019) already emphasise within their framework that consumers need to understand the information and that it should also be related to self-benefits, self-values etc. Therefore, combining the self-interested attributes in the filter system could increase sustainable behaviour.

The Motivation Opportunity Ability (MOA) framework is widely adopted within earlier literature to understand sustainable purchase decisions. Within the framework, three determinants are conceptualised that should be present for sustainable behaviour to happen; ability, opportunity, and motivation. This framework was constructed by MacInnis et al. (1991) in the field of consumer marketing, and later adopted in more cases, including sustainable consumer behaviour (e.g. Baumhof et al., 2018; De Koning et al., 2015; Van Trijp, 2014; Thøgersen, 2009). Within the framework, ability refers to the skills and competencies of the consumer to perform the behaviour, for example, relevant knowledge about sustainable products (Van Trijp, 2014; Van Geffen et al., 2020). Opportunity encompasses the available and accessible behavioural options to make a sustainable decision, such as infrastructure and offer of a supermarket, or lifestyle. This also relates to the convenience of place and the utility of time (Thøgersen, 2005). Motivation includes attitudes, subjective norms, values, and drivers of intention-setting. It is thus concerned with the consumers' desire to engage in a specific action (Davis et al., 1992). It involves

balancing the personal perceived costs against the benefits of conducting desired behaviour (Van Trijp, 2014). Van Trijp (2014) suggest that since consumer behaviour is mainly driven by self-interest (Holmes et al., 2002; Rothschild, 1999), sustainable products should have concrete consumer benefits when compared to unsustainable alternatives.

Data-driven filter technology can be leveraged to boost the consumers' motivation, opportunity, and ability to make sustainable decisions thereby (possibly) decreasing price sensitivity. First of all, emphasising personal benefits can enhance the motivation of consumers to buy sustainable products (Van Trijp, 2014). Additionally, recommending a single product to the consumer limits the need for cognitive processing (System 2) that is required to make the decision. It provides a quick and intuitive way to make decisions, thus enhancing the opportunity for consumers to choose sustainable options as it saves time (Thøgersen, 2005). Moreover, this approach can improve consumers' ability to make sustainable choices by equipping them with the knowledge and skills necessary for informed decision-making.

However, an important factor that needs to be discussed is price as it is an important factor influencing consumer purchasing behaviour (Huo et al., 2021). Price sensitivity is a subject widely known and researched by, for instance, scholars, marketers, and businesses. It pertains to individual reactions to price (Goldsmith & Newell, 1997). Consumers who are highly sensitive to price react heavily to price changes and place more emphasis on cost than quality and value (Fu, 2023). Much research has found that a high level of price sensitivity lowers sustainable purchase decisions in green consumption since sustainable options are seen as more expensive (Erdil, 2018). In contrast, low price-sensitive consumers are willing to pay higher prices and have a weak tendency to seek out promotions (Foxall & James 2007; Shimp et al. 2003). Previous research has found many different aspects that determine how price-sensitive a consumer is. It is for instance influenced by how involved consumers are in a buying process (Ramirez & Goldsmith, 2009), how similar products are within a product category, how loyal consumers are to a brand, and how many known substitutes there are (Hoffman & Turley, 2014). Product involvement with regards to price sensitivity often relates to the consumer's perceptions of importance based on their desires, values, and interests (Rahman, 2017).

2.3 Data-driven filter system

The XR filter technology lowers the need for involvement during the decision process, as it eliminates (unsustainable) alternatives, however, involvement is needed whilst consumers fill

in the filter system. Given that involvement is an important determinant for price sensitivity, this study will examine whether involvement in the filter system also influences price sensitivity.

Previous research into price sensitivity has found that involvement is negatively related to price sensitivity, meaning that when consumers are highly involved, they place less emphasis on price cues than people with low involvement (Datta, 2003; Dominique-Ferreira et al., 2016; Zaichkowsky, 1988). Involvement can be present in different aspects, for example advertisements (Krugman, 1977), products (Hupfer & Gardner, 1971), and purchase decisions (Clarke & Belk, 1978).

For the current study, the focus will be on involvement in the data-driven filter system. Hartwick and Barki (1989, p. 53) described user involvement as: “a subjective psychological state reflecting the importance and personal relevance of a system to the user”. High involvement in the data-filter system implies that the consumer invests effort into carefully selecting filter criteria and understanding the filter system, rather than casually entering options without much thought. It is hypothesised that consumers who are highly involved in the filtering system are less price sensitive compared to those who are not involved in the system and will use price cues more often. This is since highly involved consumers are more likely to believe the recommendation and choose products based on other factors than price.

Building on the principles outlined in the SHIFT model, consumers have a strong desire to behave self-consistent. It is hypothesised that when consumers invest much effort and thought configuring the filter according to their preferences, their involvement increases. Consequently, this heightened involvement is expected to motivate them to follow through with behaviour and feel pleased with the sustainable choice. This leads to the following hypothesis:

H1: The strength of the relationship between appeal to self-interest and price sensitivity is stronger when involvement in the data-driven filter system is higher.

An individual has a dual role as on one hand an economic actor who purchases products and on the other hand, as a citizen who functions within a society (Tienhaara et al., 2015). This may result in a conflict of values between the personal (i.e., pursuing low price and high quality) and collective (i.e., pursuing the common good and equity). Contrary to conventional consumer decision-making, which primarily aims at maximising short-term gains for oneself, sustainable choices involve long-term benefits for both others and the environment (White et al., 2019). These sustainability choices are often collective and long-term as the consumer

does not directly feel the benefits of the product, but it does bring advantages in the long run when many consumers make these choices. For example, taking collective action to decrease meat consumption, might increase animal welfare.

Within the supermarket for example a vegan hamburger could involve long-term benefits as it does not emit as much CO2 emissions as a regular hamburger. Still, a regular hamburger is cheaper (gains for the self). In practice, the dilemma is clearly visible. Many consumers indicate that they want to buy green, but end up buying cheap products (ElHaffar et al., 2020). Previous research has found that highlighting self-benefits related to green products and services encourages individuals to behave more eco-friendly (Nolan et al., 2008; Green & Peloza, 2014; Gleim et al., 2013). The XR technology is expected to incorporate both collective and self-interested benefits, which will prevent the consumer from experiencing a dilemma between the self and the collective. Following the SHIFT model, as explained earlier, it is hypothesised that requesting consumers to choose a sustainability aspect (self-consistency) and highlighting the self-interest benefits (self-concept, and a self-chosen important sustainability attribute) can convince consumers to buy greener (White et al., 2019). Additionally, by providing the consumers with a recommendation that fits their chosen sustainability aspect, whilst removing the prices of other products, it is expected that consumers will rely less on price cues for their decisions. These price cues are currently often utilised by consumers when making quick decisions. By removing them is expected to increase the attention on other attributes and making consumers less price sensitive. Additionally, by removing the other prices, the emphasis on the costs to the self (additional price) is expected to decrease.

H2: The VR filter system increases how much sustainable products appeal to self-interest compared to without the system

H3: When the appeal to self-interest is high (compared to low), it is expected that consumers experience a low level of conflict between the self and the collective whilst making a purchase decision, which decreases the price sensitivity

H4: The VR filter system decreases the price sensitivity of consumers compared to without the system.

Utilising VR can increase the available information and make this information more accessible to the consumer. The current research aims to provide consumers with a personalised recommendation of a product based on their preferences. Previous research has examined recommender systems, personalised agents that provide consumers with recommendations based on the individual's needs (Komiak & Benbasat, 2006). They help

consumers navigate through information, Rad et al. (2023) even said that they are becoming a necessary tool user tool online since the amount of information is rapidly increasing. An important factor that often emerges for accepting a recommender system is trust, which Ghanem et al. (2022) found was crucial for consumers to adopt the recommendation. Various articles delved into the different components of trust that influence how consumers use recommender systems. For example, consumers trusted a recommendation more when the system was transparent about how it arrived at the recommendation (O'Donovan & Smyth, 2005). Lerch et al. (1997) found that the level of trust depends on the traits and behaviours of the information source and the user. Mayer et al. (1995) and McKnight & Chervany (2001) identified three aspects of trusting beliefs: competence, benevolence, and integrity. Competence, in this case, refers to the capacity of the recommender system to fulfil the needs of the user, benevolence characterises the recommender system's concern for the well-being and interests of the user (Xiao & Benbasat, 2007), and integrity encompasses the system's adherence to a set of principles, such as transparency and honesty, that are deemed acceptable by the user. The factor of trust is not yet studied in the context of providing one recommendation within a supermarket setting.

An absence of trust can leave users with a feeling of loss of autonomy and dissatisfaction (Yang & Lee, 2018). This can make them unwilling to use a service (Chang et al., 2016). Trust minimises the need for users to verify the safety of a service, making transactions easier and more convenient (Chiu et al., 2010). Additionally, trust can decrease uncertainty (Wu et al., 2017).

Trust is also an important component of green consumption. Previous research has shown that consumers are much less likely to purchase a product or adopt a favourable attitude toward it when they do not trust the content of marketing claims or suspect an advertising message of green-washing (Atkinson & Rosenthal, 2014; Kangun et al., 1991). Also, Bray et al. (2010) and D'Souza et al. (2006) found that many consumers express concern about the possibility for deception of products that are marketed as environmentally friendly, especially when they come with a higher price tag (Thøgersen, 2011). Since green characteristics are often not easily verifiable by the consumer, consumers must have trust in the products and these green claims (Janßen & Hamm, 2012; Noblet & Teisl, 2015; Vermeir & Verbeke, 2006). Next to that, shop owners can also choose to suggest items that obtain a high-profit margin instead of recommending the best product for the consumer (Ghanem et al., 2022). When consumers repeatedly notice that the recommendations are not a good fit, they can lose trust in the recommendations or the provider. Therefore, consumers should trust the recommender system.

This shows that different components of trust are important for consumers to believe in the recommendation that is provided. They can distrust how well the technology can provide a recommendation that fulfils the needs of the user (competence), they can distrust that the company gives them a recommendation based on their interests instead of aiming for their own profit (benevolence), or distrust that the company is honest about the green claims (integrity). It is hypothesised that these factors will moderate the relationship between the VR technology and appeal to self-interest since the consumer is sceptical about the recommendation.

H5: When the consumers' level of trust (competence, benevolence, and/or integrity) in the data-driven filter system is low, the strength in the relationship between the VR condition and appeal to self-interest is weaker.

Notable is that the current study focuses on the level of trust that the consumers have in the technology and will not delve deeply into trust in the claims. Since consumers can choose the claims they want to add to the filter system, this is not as relevant and might be interesting for later research.

2.4 Conceptual model

The aforementioned hypotheses and relationships are conceptualised in Figure 1.

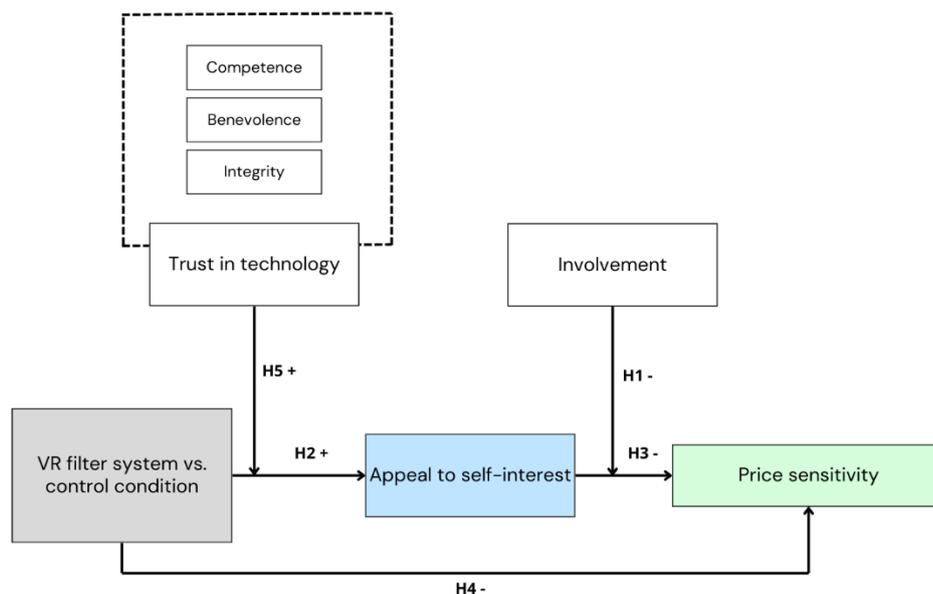


Figure 1. Conceptual model showing the hypothesised relationship between the VR filter system and price sensitivity

3. Method

Building upon the hypotheses and theoretical framework outlined in the previous chapter, this section delves into the experimental design used in this study. It provides information on which stimuli were used and prepared for the experiment. This is followed by the procedure and the items used to measure the variables.

3.1 (VR) study design

To test the hypotheses, an experiment including two questionnaires was conducted. The experiment employed a within-subjects design, consisting of two conditions all participants experienced: an experimental and a control condition. The order in which participants encountered these conditions was randomised to control for order effects (Schuman & Presser, 1981). The participants were asked to purchase the same products in the VR supermarket in both conditions. In the experimental condition, only one recommended product was visible, whilst the other products in that category, including their price, were blurred out. In contrast, the control condition displayed all products clearly. The decision to utilise a within-subject design was made since it allowed a direct comparison between the purchase decisions and satisfaction of the participants with and without the filter system.

The decision to use VR as the Extended Reality research tool was based on its ability to recreate a supermarket shopping experience realistically. The immersive characteristics of VR can make users feel like they are present in the supermarket and view it as a plausible space (Parong et al., 2020), especially if auditory cues are present and they can interact with the space (Wirth et al., 2007). Makransky et al. (2017) and Moreno & Mayer (2004) found that this user presence is higher for high-immersion, compared to low-immersion and non-immersive VR. Therefore, the decision-making process is more natural compared to conventional ways, for example, self-report questions and scenarios (Mol, 2019).

Additionally, VR offers an affordable and flexible method to research shopping behaviour in which external variables can be controlled, thereby enhancing the study's external validity (Ploydanai et al., 2017). In comparison to for example AR for which real-life shelves or a real-life supermarket is needed. VR's capabilities make it an ideal choice for this study, ensuring a realistic yet controlled environment that closely mimics actual shopping experiences.

The participants viewed the virtual environment through a Head-Mounted Display (Varjo XR-3) and could interact through hand-held motion Valve Index controllers (Figure 2). To

increase immersion in the virtual environment spatialized sound was played through earplugs. These sounds included beeps from cash register, product placement into the shopping basket, and other noises present in a supermarket.



Figure 2. *Participant during the virtual reality experiment*

3.2 Participants

A total of 29 participants (male = 10, female = 19) were recruited through convenience sampling. The participants were Dutch-speaking students and staff from Wageningen University. Their ages ranged from 18-39 ($M = 23.14$, $SD = 3.79$). All the participants were Dutch-speaking as the meaning of the Dutch ecolabels, such as Beter Leven, is likely more familiar to Dutch consumers. Even though this sample size is relatively small, the aim for the number of participants was 30 participants as this is sufficient for experimental research (Cohen et al., 2007; Daniel, 2012; Gall et al., 1996).

3.3 Stimuli generation

The virtual environment was created by using Unity 2022.3.34f with support scripts in Visual Studio 2019. The virtual supermarket included five identical aisles, each with three shelves, one fridge and a cash register. Every aisle represented one of the conditions: no filter, Beter Leven, organic, sustainable packaging, and locally produced.

The decision for those conditions was based on the outcome of seven exploratory interviews (Appendix A & B). These interviews were aimed at identifying the most utilised ecolabels whilst consumers conduct sustainable shopping in a supermarket, since no earlier research was done for the specific product categories of the study. The four most frequently mentioned attributes were: local, organic, Beter Leven, and sustainable packaging. Notably, sustainable packaging is defined as using minimal packaging materials that are recyclable.

Blender 4.1 was used to create the 3D models of the products that the participants were required to purchase: minced meat, diced tomatoes, spaghetti, cheese, and onion (Appendix C). These chosen products were based on several considerations. First of all, the experiment was focused on a relatively small amount of product categories. Given that the participant had to complete the shopping trip twice (once for the control and once for the experimental condition), the decision was made to focus on a relatively small number of product categories to stay within the time constraints and prevent the experiment from taking too long. This approach decreases the risk of participant fatigue and dropout. Additionally, the decision was made to choose products from different categories, to test whether participants reacted differently. Furthermore, categories were chosen that consumers often buy in real life (pasta, meat, cheese, vegetables) to ensure that they were already familiar with the product category.

For canned tomatoes, onions, and pasta the Beter Leven label was not applicable. Additionally, the sustainable packaging label did not apply to the onion, since the onions did not have packaging to begin with. Therefore, these products were not be present in these conditions.

Each product was selected to stand out in a specific preference attribute or in price. The prices and packages were modelled after existing products of the Dutch supermarket Albert Heijn (*Albert Heijn: Boodschappen Doen Bij De Grootste Supermarkt*, n.d.). Leveraging Albert Heijn's product range added realism to the study, as this supermarket holds the largest market share in the Netherlands (Nieuwe Oogst, <https://www.nieuweoogst.nl>, 2023). This approach ensured that product selections and prices were representative of what most consumers typically encounter when grocery shopping. The packaging was designed to look similar to existing products, but not identical to decrease the effect of brand loyalty. Appendix D provides an overview of the existing products used as templates for the VR products.

Within the experiment, an icon on the product packaging signified the ecolabel. Additionally, the shape of the packaging was changed for the sustainable packaging condition, for the other conditions additional text was added, such as "organic tomatoes". Table 1 provides an overview of the icons on the packaging with example products.

Ecolabel	Icon	Example product
Beter Leven		
Organic		
Sustainable packaging		
Locally produced		

Table 1. Filter conditions with label used in the experiment

3.4 Procedure

The experiments were conducted in the Consumer Research Room of the Leeuwenborch building at the university. The experiment ran from September 23rd until October 14th, with each session lasting approximately 30 minutes per participant.

Before starting the experiment, written informed consent was requested from the participants (Appendix E). Thereafter, the participant was asked to imagine that they were going to cook pasta Bolognese for 3-4 people and needed to purchase the ingredients. They were instructed to shop as they normally would for a regular dinner, using the same budget they would normally allocate to cooking for four people.

Figure 3 displays the steps taken in the virtual supermarket. The experiment started with a VR familiarisation task. Thereafter, the right shopping aisle was activated by the participant pressing the button for one of the filter conditions or the control condition. To assist in navigation, blue planes indicated areas where participants could teleport to. After deciding on a product, the participant deposited that product into a shopping basket. A bell sound indicated that it was successfully placed in the basket. Once the participant had chosen a

product from every category, the participant proceeded to the cash register, where they were shown their receipt including prices per product and the total price. After the participant selected “betaal” they could remove the VR headset and start the questionnaire. Thereafter, they were asked to go through the task again but then in the opposite condition, followed by another questionnaire.

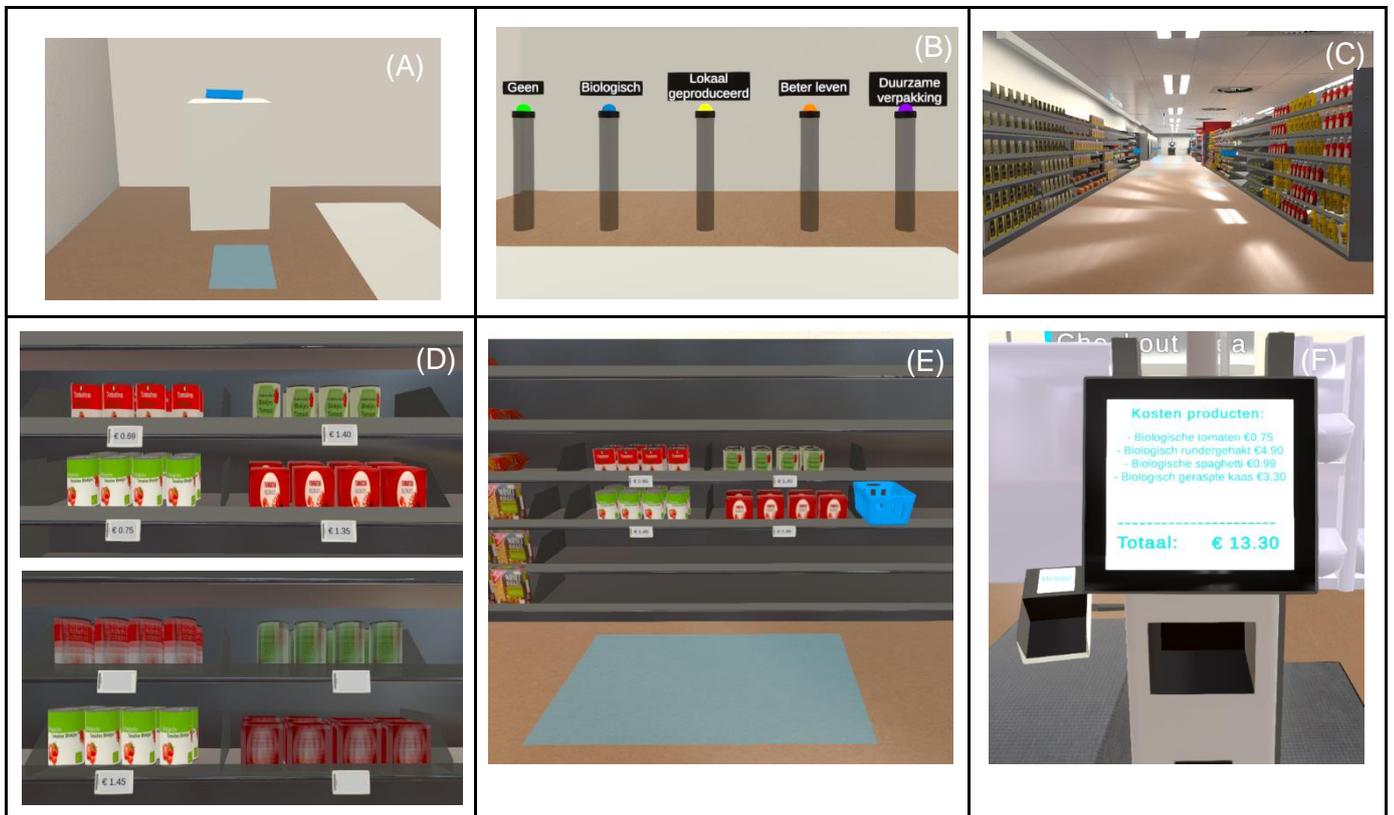


Figure 3. (A) familiarisation task in which participants were asked to pick up the blue product and move it around. (B) Sorting task for choosing condition. (C) begin position aisle. (D) Diced tomato shelf in the control condition vs. organic filter condition. (E) chosen product was placed in the basket. (F) cash register in organic filter condition.

3.5 Measures

After both conditions, participants had to answer a questionnaire (Appendix F). Table 2 provides an overview of the items that were used to measure the variables. All the items, except the demographic questions, were measured on a 7-point Likert scale, ranging from (1) strongly disagree to (7) strongly agree. Notable is that for price sensitivity no applicable existing scale was found in previous research. Most price sensitivity scales ask for the price that the consumer is willing to pay for the product, e.g. Van Westendorp's Price Sensitivity Meter (Van Westendorp, 1976). However, since the price was already given during the task,

this was not feasible. Instead, the reaction to that price was asked, as Goldsmith and Newell (1997) defined price sensitivity as the individual's reaction to price.

Variables	Items	Adapted from
Involvement *	The filter system: <ul style="list-style-type: none"> - Is relevant to me - Is of concern to me - Is needed - Important 	(Barki & Hartwick, 1994)
Appeal to self and others	<ul style="list-style-type: none"> - This product is associated with looking out for the interest of others - This product is associated with looking out for my own interests 	(Yang et al., 2015) who adapted it from a scale by (White & Pelozo, 2009).
Price sensitivity	<ul style="list-style-type: none"> - I am satisfied with this price - I would buy this product 	
Trust in technology *	<p>I believe that the system that gives me recommendations is:</p> <p><i>Competence</i></p> <ul style="list-style-type: none"> - Competent and effective in providing me with recommendations - Very knowledgeable about the sustainability aspects of products <p><i>Integrity</i></p> <ul style="list-style-type: none"> - Honest <p><i>Benevolence</i></p> <ul style="list-style-type: none"> - Acts in my best interest - Interested in my well-being, not just its own 	(Lankton and McKnight, 2011)
TAM	<p><i>PU</i> *</p> <ul style="list-style-type: none"> - The filter system helps me choose my foods more quickly - In general, I find the filter system useful to choose food products - I find the filter system useful to make sustainable choices <p><i>PEU of filter system</i> *</p> <ul style="list-style-type: none"> - I find the filter system easy to use - Learning to use the filter system is easy for me - My interaction with the filter system is clear - I felt comfortable using the filter system <p><i>PEU of VR devices</i></p> <ul style="list-style-type: none"> - The devices (VR glasses) have not interfered with the actions I wanted to perform - I felt comfortable using the virtual reality devices 	<p>(Calderon-Monge et al., 2024)</p> <p>(Ghani et al., 2019) (Calderon-Monge et al., 2024)</p>
Demographics	<ul style="list-style-type: none"> - Age (open question) 	

- Gender (Multiple choice question with options: men, woman, other, rather not say)

* *Items not asked in the questionnaire of the control condition*

Table 2. *Items used for measuring the research variables in the questionnaires*

4. Results

This chapter reveals the results of the statistical analyses used for hypothesis testing. IBM SPSS Statistics 28 was used to perform the statistical analyses.

4.1 Descriptives

Prior to conducting the analyses, the variables were tested for normality, the presence of outliers, and internal consistency using Cronbach's alpha to ensure the data's suitability for hypothesis testing (Appendix G). For the Shapiro-Wilk and Kolmogorov-Smirnov test a p-value of < 0.05 indicated that the sample was significantly different from a normal distribution (Field, 2018). The results indicated that the assumption of normality was violated.

Consequently, nonparametric methods were employed, as these tests do not rely on assumptions about the population. This makes nonparametric tests more powerful when the data is obtained from a non-normal distribution (Pappas & DePuy, 2004; Siegel, 1957). The specific type of nonparametric tests used for this study is outlined later in this chapter.

The internal consistency of the questionnaire items was assessed to determine whether they could be combined to form a single variable for further analysis. A Cronbach's alpha value of $\alpha > 0.7$ was deemed acceptable (Nunnally, 1978). The competence component of trust did not meet this criterium ($\alpha = 0.49$). However, when the three components of trust - benevolence, competence, and integrity - were combined, the internal consistency improved ($\alpha = 0.75$). Therefore, a composite variable labelled "trust" was used in further analyses.

The variables price sensitivity, self-appeal, and level of conflict were averaged, to form a single variable per condition that composites of the ratings given in all the product categories. All variables were measured on a 7-point Likert scale, where 7 represented a high level and 1 a low level.

At the start of the experiment the participant selected their preferred filter criteria. The most frequently chosen criterion was "Local" (N = 10), followed by "Organic" (N = 7). The criteria "Beter Leven" and "Sustainable packaging" were both chosen 6 times.

The participants generally reported feeling comfortable using the VR technology (filter: $M = 5.52$, $SD = 1.35$), (control: $M = 6.17$, $SD = 1$) and felt like the VR technology did not intervene with the actions they wanted to take (filter: $M = 5.45$, $SD = 1.8$), (control: $M = 5.72$, $SD = 1.71$). Next to that, the mean rating of perceived usefulness of the filter system was 5.78 ($SD = 0.96$). In the filter and control condition 3 participants disagreed or somewhat disagreed that the technology intervened with their wanted actions. Furthermore, in the filter condition one participant somewhat disagreed that they felt comfortable with the VR technology, for the control condition this was one participant who strongly disagreed. 8 out of 23 participants indicated that their answers regarding the meat were influenced by eating little to no meat, 5 said it influenced them a bit, and 10 said it had no influence.

4.2 Self-appeal on Conflict and Price Sensitivity

To assess whether consumers who rated a product as appealing to the self, experienced a low level of conflict between the self and the collective, which in turn decreased price sensitivity (H3), a mediation analysis was done. The variables in this analysis included the independent variable (level of self-appeal), a mediator (level of conflict), and a dependent variable (price sensitivity). The level of conflict was measured by subtracting appeal to the collective from appeal to self. This was transformed into an absolute variable, which means that a high number means a high discrepancy between the appeal to the self and the collective. The level of experienced dilemma was low in both conditions, control ($M = 2.1$, $SD = 0.84$), filter ($M = 1.24$, $SD = 0.71$). A mediation analysis using PROCESS ran for both conditions. The assumption of normality was not met, therefore bootstrapping was utilised using 5000 bootstrap resamples. Bootstrapping offers a solution for nonnormality and power problems as it makes no assumptions about the shape of the sampling distribution or variables (Efron & Tibshirani, 1993; Mooney & Duval, 1993). Additionally, it increases the confidence with how it is applied to small samples as it produces a test that is not applied based on a large-sample theory (Preacher & Hayes, 2004).

The analysis revealed that there was no total effect of self-interest on price sensitivity for the filter condition, $b = -0.32$, 95% CI [-0.74, 0.11], $t = -1.54$, $p = .13$. Additionally, no significant indirect effect of self-interest on price sensitivity through level of conflict was found ($b = 0.03$, 95% BCa CI [-0.18, 0.22]). The analysis did show a significant A-path, revealing a negative significant relationship between self-interest and level of conflict, $b = -0.39$, $p = .04$. As the A-path showed to be significant, the bootstrapping method was used to test the bias-corrected CI ($b = -0.39$, 95% BCa CI [-0.71, -0.3]). Since CI does not cross zero, the results verified that there was a significant negative effect of self-appeal on dilemma.

The control condition also revealed no total effect of self-interest on price sensitivity ($b = -0.16$, 95% CI [-0.41, 0.09], $t = -1.32$, $p = .20$). Additionally, no significant mediation of the level of conflict was found ($b = -0.05$, 95% BCa CI [-0.28, 0.09]). The analysis did show a significant A-path, indicating that there is a positive significant positive relationship between self-interest and level of conflict, $b = 0.58$, $p = .002$. This was confirmed by the bootstrapped 95% CI [0.13, 0.90], $b = 0.58$.

Meaning that when level of self-appeal increases, the level of dilemma increases in the control condition and vice versa for the filter condition. The hypothesis (H3) that the level of self-appeal decreases the level of conflict which decreases price sensitivity is not accepted.

4.3 Moderation Involvement

The PROCESS analysis examined whether the relationship between appeal to self-interest and price sensitivity was moderated by involvement (H1). Bootstrapping, with 5000 resamples, was used as normality was not reached. Table 3 reveals that involvement does not significantly moderate the relationship between self-interest and price sensitivity ($b = -0.06$, $p = .79$). The bootstrapped results confirm this ($b = -0.06$, 95% BCa CI [-0.43, 0.3]).

	b	SE B	t	p
Constant	4.41	5.41	0.81	.42
Appeal to self interest	-0.04	0.99	-0.04	.97
Involvement	0.07	1.18	0.07	.95
Appeal to self x involvement	-0.06	0.22	-0.27	.79

$N=29$

Table 3. Results of moderation analysis for the moderation of involvement on for the independent variable appeal to self and the dependent variable price sensitivity

4.4 Appeal to self-interest

The Wilcoxon related-samples signed ranks test was employed to measure the difference in appeal to the self for sustainable products between both conditions (H2). Due to violation of normality, and the presence of outliers, this robust nonparametric test was chosen. The Wilcoxon signed ranks test ranks the differences between scores of the two dependent

conditions, in this case self-appeal (Field, 2018). Thereafter ranks are assigned to the differences, making it more robust to non-normally distributed data.

Participants who bought the cheapest product in the control condition were excluded from the analysis, to measure whether the participants associated the sustainable products more with their self-interest compared between the conditions, this led to $N=26$.

The Wilcoxon Signed Rank indicated that level of how much a sustainable product appealed to the self was higher in the control condition ($M = 5.9$, $SD = 0.72$) than in the filter condition ($M = 5.5$, $SD = 0.71$), $z = -1.9$, $p = .063$. It does not meet the significance threshold of 0.05, however, the results showed a tendency towards statistical significance ($p = .06$). The findings of the test do not support H2.

4.5 Trust

Next, the effect of trust on the relationship between the data-driven filter system and level of self-appeal was tested (H5). Since trust was only measured in the filter condition, it was not possible to test for moderation as there was no independent variable. Therefore, a correlation test was conducted. Since the assumptions were not met, the nonparametric Kendall's tau test was conducted (Field, 2018). Kendall's tau was preferred over Spearman's rank coefficient, since the sample size was small, and it is more robust and insensitive to error. Kendall's tau was used to measure the strength and direction of the relationship between the variables (Bolboaca & Jantschi, 2006).

The analysis showed that there was a tendency towards significance for a weak (Dancey & Reidy, 2007) negative relationship between trust and level of self-appeal ($\tau_b = -0.23$, $p = .09$). This indicates that an increase in trust decreases how much the product appeals to the self. This rejects the hypothesis, as it was expected that an increase in trust led to an increase in appeal to the self.

4.6 Price Sensitivity

To measure whether the level price sensitivity for sustainable products was different in the two conditions, a Wilcoxon related-samples signed ranks test was employed (H4). Since it compares the price sensitivity for sustainable purchases, answers given for the cheapest option in the control condition where excluded from the analysis, this resulted in $N = 26$.

The test indicated that the price sensitivity for sustainable product in the control condition ($M = 2.62$, $SD = 0.86$) was statistically lower than in the filter condition ($M = 3.17$, $SD = 0.79$), $z = -2.65$, $p = .008$. This finding contradicts the expectation of H4.

5. Discussion

This study aimed to assess the impact of offering a driven data filter system in a virtual reality supermarket on price sensitivity of consumers for sustainable products. The following chapter will discuss the results and the practical and theoretical implications. After that the limitations and suggestions for future research will be discussed.

5.1 General discussion

First of all, the research found that there was a tendency toward significance for participants to rate the sustainable products in the supermarket without a data-driven filter system as more appealing to the self-interest than in the supermarket with a filter system. The decision to consider trends toward significance was made due to the explorative nature of the research and the small sample size. The current research aims to gain insights and identify patterns in consumer behaviour towards a new technique, tendencies towards significance can highlight trends worthy of further investigation. Moreover, small sample sizes can reduce statistical power, increasing the likelihood of meaningful effects to go undetected (Maxwell, 2004). These are reasons to look at tendency towards significance, however, further research is needed to validate these findings with larger samples.

The finding contradicted the expectation that allowing participants to select the sustainability aspect themselves would result in their need to behave in a self-consistent manner (White et al., 2019). Additionally, it was expected that the rating of the product would be higher as it reflected the interest of the participant. One possible explanation lies in the nature of the SHIFT model, which serves as a conceptual framework rather than a step-by-step guide. As such, the model may allow for varied outcomes depending on situational factors or combinations of routes (Osterhus, 1997; Stern, 2011). Additionally, the self-interest scores given to the products by the participants were averaged to form a single self-appeal variable. In the condition without a filter, the participants could freely choose the product that appealed most to them within each product category. A possible explanation could be that a deviating rating given to a product influenced the average score. Moreover, 13 out of 23 participants reported that their answers were influenced (a bit) by the fact that they ate little to no meat, the “Beter Leven” condition was excluded from this statistic as it contained vegetarian meat. During the experiment, some participants verbally indicated that they were vegetarians and reacted negatively towards the fact that they could not choose a meat substitution in some of the filter conditions. This may have contributed to a lower average self-appeal score in the filter condition. To mitigate such effects, products were chosen from

different product categories. However, in future research it would be beneficial to test these differences.

The study results did not show that involvement in the VR filter system moderated the relationship between self-interest and price sensitivity. This result contrasts with prior findings from Datta (2003), Dominique-Ferreira et al. (2016), and Zaichkowsky (1988) who demonstrated that involvement was negatively related to price sensitivity, caused by the decreased reliance on price cues during high-involvement purchase decisions. A possible explanation for this discrepancy could be that the experiment did not foster participant involvement enough. At the beginning of the experiment, the participants were asked to choose the filter that was most important to them. This decision-making process may have been too quick, diminishing the amount of thought participants put into choosing the filter. Causing that they might have not thought about how important and personally relevant the system is prior to choosing, as Barki & Hartwick (1994) describe user involvement.

Contrary to the expectations, the results showed that there was a tendency for the level of self-appeal to decrease, when trust increased. As Ghanem et al. (2022) found, trust was crucial for consumers to adopt a recommendation from a recommender system. Similarly, Atkinson & Rosenthal (2014) found that consumers are more likely to purchase a product when they trust the content of the marketing claims. A possible explanation could be that Ghanem et al. (2022) tested a different kind of recommender system, one based on prior purchases. In the current study, however, the participants rely on the recommender system to provide options for green products instead of recommending products that fit their self-interest thereby possibly causing an increase in trust in the recommender system to decrease the level that the product appeals to the self.

The research revealed that self-interest levels did not influence the price sensitivity in either condition. Additionally, no mediation effect of experienced conflict between the self and collective was observed. This outcome contradicts the hypothesis that price sensitivity would decrease when the self-interest and collective were harmonised in one option. Notably, the filter condition did show that an increased level of self-appeal led to a lower level of experienced conflict, whereas in the control condition, it led to a decreased level of conflict. However, it did not support that this subsequently led to a lower price sensitivity. Additionally, the research revealed that the price sensitivity for sustainable products was statistically higher in the filter condition. This finding contradicted the expectation that price sensitivity would be lower in the filter condition. Previous research stated that a reason for buying unsustainably was that consumers would rather buy something that met their self-

interest goals than the collective (Eberhart & Naderer, 2017; Nicolae & Roşca, 2023; Schuitema & Groot, 2015). This exploratory research expected that the filter system would harmonise these two.

The fact that the existence of the filter system significantly changed the price sensitivity substantiates that there is a direct effect. However, the hypothesised mediation of self-interest is not present. A possibility is that the filter system did not foster self-interest. Conversely, as the system takes away the freedom of choice, it could stir up resistance and a feeling of loss of autonomy. This was also noticeable in the experiment, as many participants verbally indicated that they disliked not being able to choose personally a product. A number of participants also added it in the comments of the questionnaire, saying for instance: *"I would have liked to have had some more choice (some products that met the filter) in each of the product categories"* and *"I would have preferred a system where you could deviate from the "best" choice"*. This negative effect of not showing the other products and their prices on price sensitivity and self-interest could be explained with earlier consumer research on choice freedom. Previous research found that individuals actively seek to preserve and reinforce autonomy and personal control, which highlights the importance of choice freedom (Bear & Knobe, 2016; Landau et al., 2015). Additionally, consumers prefer personally choosing an option over being assigned that option by external forces or predetermined (Beattie et al., 1994; Botti & Iyengar, 2006; Broniarczyk & Griffin, 2014; Chernev et al., 2015). This was confirmed by Botti & McGill (2011) who found that consumers were more satisfied with that option if they chose it themselves compared to when they were externally imposed with that option. A threat to the freedom can lead to psychological reactance, causing contrary attitudes and behaviours regarding the source of the threat, and an increasing interest in the object of restriction (Brehm, 1966). This psychological reactance could explain why the price sensitivity of the sustainable products increased in the filter condition.

The restriction of choice did not activate the hypothesised thought process, causing self-interest and collective benefit to be harmonised. It actually does not require a cognitive thought process, as there is no freedom of choice. This diminishes the need for cognitive effort and causes consumers to buy sustainably, whilst negatively impacting the opinion (price and self-interest) of the participants in this study on those recommendations.

5.2 Implications

This research provides knowledge on consumer behaviour when faced with a filter system that restricts access to certain products in the supermarket. And to the extensive collection of literature studying green consumer behaviour. The findings reveal that this system does not increase the level of self-interest associated with sustainable products, thereby showing the complexity of harmonising the self-interest with collective goals. One explanation for this could be the restriction of choice. Rather than causing consumers to view the recommended product as appealing to the self, the restriction required participants to not think about their choice. This contributes to existing literature on recommender systems and cognitive processes during sustainable purchasing behaviour. Additionally, this insight is important for future research as it shows the need carefully considering the psychological trade-offs when designing and studying systems that encourage green behaviour.

The current study is a contribution to the need for knowledge on consumer behaviour for new ways to tackle price sensitivity and increasing sustainable consumption. The findings can be interesting within the broader context of understanding how cognitive processes shape sustainable purchasing decisions.

Next to that, practical insight can also be gained from this research. During the experiment, many participants verbally expressed that they enjoyed the idea of a filter system for sustainable ecolabels, as it simplified their decision making in a supermarket containing many products. However, participants also voiced a dislike for the choice restriction. The willingness to participate in and interest in a filter system for ecolabels highlights the potential for retailers and/or policymakers to create a system that shows a recommendation, without restriction, to guide consumers to make more sustainable decisions.

The findings suggest that the filter system does not lead to a harmonisation of the ego and the collective, instead, the restriction does not allow for a thought process whilst purchasing. This begs the question: is freedom of choice always necessary for everyone? There might be some consumers that do not actively want to make purchasing decisions. The system offers an approach through which consumers can make sustainable purchases whilst removing the need for a thought process. Notably, the sample consisted mainly of students from Wageningen University, an institution in which consumers are encouraged to actively think about sustainability. Retailers and policymakers could benefit from performing segmentation analyses to identify consumers who do not wish to think about their

purchases. For this group, the filter system presents a promising tool to increase sustainable purchasing behaviour without requiring cognitive effort.

5.3 Limitations and Future research

This research has limitations that may affect the results of the study. First and foremost, the sample size. Due to the confined time and budget the number of participants (N=29) was limited. To make more general conclusions, it is important that in future research larger sample sizes are used. Additionally, the participants were primary university students, reducing the representativeness of the sample for broader consumer populations.

Second, the VR environment provided a great opportunity to mimic a supermarket in which it was possible to create a filter system that made certain products and prices to become blurry. Thereby, previous research showed that it can realistically recreate a plausible space (Parong et al., 2020; Wirth et al., 2007), especially compared to for example scenarios or questionnaires (Mol, 2019). However, notable is that the VR did hinder some actions. This was indicated in the comment section of the questionnaire with statements, such as *“Sometimes the supermarket was a bit laggy/unsharp”* and *“the teleportation did not work that well every time”*. This could have disrupted the participant’s feeling of immersion, potentially influencing the decision-making process.

Third, price sensitivity is a very complex concept which is studied by many scholars (e.g. Eberhart & Naderer, 2017; Nicolae & Roşca, 2023; Seubelt et al., 2022; Van Giesen & Leenheer, 2019). The level of price sensitivity can be influenced by many determinants (Hoffman & Turley, 2014). Due to the limited time, it was impossible to take in all possible influential factors of price sensitivity in the current study. The deliberate decision was made to focus on experiencing a dilemma between the ego and collective, as much research indicated that this was a huge barrier in preventing sustainable purchasing behaviour (Nicolae & Roşca, 2023; Schuitema & Groot, 2015; Eberhart & Naderer, 2017) and had a research gap. With the moderator’s trust and involvement as these are important determinants of price sensitivity. However, other determinants might also have an influence on how consumers experience the data-driven filter system, the level of conflict, and their price sensitivity. For example, income or environmental consciousness.

Fourth, in the experiment the participants were asked to imagine that they paid for the groceries with their own money, keeping the budget that they usually allocate to groceries in

mind. However, no actual payment was required. This might have influenced their perceptions on the prices.

Further research can be done to investigate this topic further and to work towards decreasing price sensitivity in favour of green consumption. First of all, a more comprehensive data-driven filter system could be tested. Incorporating various criteria, and providing consumers with the option of choosing a filter option for only certain products, to see if this increases their self-appeal and subsequently price sensitivity. Additionally, a larger sample size could be utilised to test the filter systems and increase the power of the tests. Lastly, as participants indicated that they struggled with the fact that they were not able to see the price, it could be interesting to see how consumers would react if they initially could not see the price of unsustainable alternatives, but if they stand still for longer, the information of the other products become available, thereby giving them freedom of choice.

6. Conclusion

This study tested an approach to lower price sensitivity, a factor that is a detrimental in causing unsustainable purchasing behaviour (e.g. Eberhart & Naderer, 2017; Nicolae & Roşca, 2023; Seubelt et al., 2022; Van Giesen & Leenheer, 2019). Previous research has shown that individuals prioritise the egoistic attributes over the collective. However, the articles often stop after concluding that there is an unequal power dynamic (White et al., 2019). Given the importance of price sensitivity in shaping sustainable consumption, this study tried to tackle the problem by gaining knowledge on the consumer's reaction to a data-driven filter system that tries to harmonise the self-interest and the collective benefit. The data-driven filter system was created and tested in a VR supermarket. To this date there is no research proposing and testing a data-driven filter system in an VR environment to tackle price sensitivity.

To conclude, the research showed that the filter system significantly decreased the self-appeal of sustainable products, whilst increasing the price sensitivity. This was in contradiction to what was expected. Additionally, it did not find support for the fact that level of experienced conflict mediated the relationship between self-appeal and price sensitivity in either condition. Also, no support for the moderation of involvement in filling in the filter system was found between self-appeal and price sensitivity. Lastly, it was found that trust in the filter system was negatively related to level of self-appeal. The hypothesised harmonisation of self-interest and collective benefit did not happen, whilst an effect of the system on price sensitivity and self-interest did happen. Possibly due to the restriction of choice, which did not allow for cognitive effort whilst making the purchase decision. Future research can delve into identifying possible consumer segments for which this choice restriction is desirable or studying consumer behaviour when presented with a filter system that does allow for deviation of the recommendation.

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Appendix

Appendix A Interview guide pre-test

Bedankt dat je mee wil werken aan mijn korte interview, deze zal waarschijnlijk rond de 5 minuten duren. Het interview gaat over waar mensen op letten bij het doen van aankopen in de supermarkt. Hiervoor wil ik je vragen om je in te beelden dat je in je reguliere supermarkt boodschappen doet.

- Stel dat je parmezaanse kaas koopt, waar let je op?
 - Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?
 - Zijn er nog andere keurmerken waar je op let?
- Stel dat je tomaten uit blik koopt, waar let je op?
 - Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?
 - Zijn er nog andere keurmerken waar je op let?
- Stel dat je uien koopt, waar let je op?
 - Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?
 - Zijn er nog andere keurmerken waar je op let?
- Stel dat je (vegetarisch) vlees koopt, waar let je op?
 - Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?
 - Zijn er nog andere keurmerken waar je op let?
- Stel dat je pasta koopt, waar let je op?
 - Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?
 - Zijn er nog andere keurmerken waar je op let?

Appendix B Interview transcripts pre-test

Interview 1

Male, 23 years old

- Stel dat je Parmezaanse kaas koopt, waar let je op?
 - Prijs, want parmezaanse kaas is duur. Kwaliteit, als ik een blok koop wil ik wel echte, dus niet echt dat het erop lijkt zeg maar. Daarnaast zou ik misschien letten op de voedingswaarden, maar dat is meer nieuwsgierigheid. Daar laat ik niet mijn keuze van af hangen.
 - Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?
 - Ik weet niet echt waar ik op zou moeten letten. Misschien kijken uit welk land het komt
 - Zijn er nog andere keurmerken waar je op let?
 - Ik let nooit op keurmerken, bij sommige producten. Bij parmazaanse kaas let ik alleen op dat het wel echt parmazaanse kaas is
- Stel dat je tomaten uit blik koopt, waar let je op?
 - Ik let op dat ik hele tomaten koop, want die kwaliteit is beter. En ik let erg op prijs, want ik heb het idee dat tomaten uit blik hetzelfde zijn.
 - Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?
 - Weer letten op waar het vandaan komt.
 - Zijn er nog andere keurmerken waar je op let?
 - Ik denk niet echt dat er duurzame keuzes zijn. Ik heb zelf nog nooit biologische tomaten ofzo gekocht
- Stel dat je uien koopt, waar let je op?
 - Hoe groot ze zijn, prijs.
 - Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?
 - Land van herkomst
 - Zijn er nog andere keurmerken waar je op let?
 - Zou ik niet op letten.
- Stel dat je vlees koopt, waar let je op?
 - Voedingswaarden, ingredienten.
 - Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?
 - Ik zou het niet echt weten
 - Zijn er nog andere keurmerken waar je op let?
 - Biologisch
- Stel dat je vegetarisch vlees koopt, waar let je op?
 - Ik koop eigenlijk nooit vegetarisch vlees. Ik zou letten op de voedingswaarden, maar verder niet echt keurmerken of iets dergelijks
- Stel dat je pasta koopt waar let je dan op?
 - Als ik een duurzame keuze zou maken dan zou ik vooral letten op of het biologisch is.

Interview 2

Female, 59 years old

- *Stel dat je kaas koopt, waar let je op?*
 - Ik eet zelf geen kaas, dus ik vind het moeilijk om hier een antwoord op te geven.
- *Stel dat je tomaten uit blik koopt, en je wil een duurzame keuze maken, waar zou je dan op letten?*

- Ik zou naar het etiket kijken om te kijken wat er in zit. Ook zou ik kijken naar hoe het verpakt is. Nu zijn er een aantal van die merken die de stukjes in karton verpakt hebben. Dit voelt wel duurzamer, dus die koop ik nu ook. Ook zou ik kijken waar het vandaan komt. Het liefst koop ik iets van dichtbij, als er een keurmerk op zou staan waarop staat waar het vandaan komt dan zou ik die wel gebruiken.
- Zijn er nog andere keurmerken waar je op let?
 - Nee
- Stel dat je uien koopt, waar let je op?
 - Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?
 - Het liefst koop ik losse uien, dus zonder zo een netje. Verder heb ik laatst van die lelijke asperges gekocht, ik heb het idee dat dat wel echt beter voor het milieu is. Ik weet niet of ze dat ook voor uien hebben, maar anders zou ik dat kopen. Verder zou ik kijken naar waar het vandaan komt en naar de rest van het etiket kijken om te zien of ik daar iets uit kan afleiden.
- Stel dat je vlees koopt, waar let je op?
 - Wat voor vlees het is, maar dat is meer persoonlijk. Ik vind veel vlees niet echt lekker of er zit te veel vet in. Verder kijk ik ook naar prijs. Ik kijk wel vaak naar of het beter leven of biologisch is, maar als ik het biologische vlees veel duurder vind, koop ik het toch weer niet. Maar als het in de aanbieding is of er zit een euro tussen dan doe ik dat.
 - Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?
 - Prijs, keurmerk, beter leven, maar ik heb nu ook wel weer gehoord dat dat niet helemaal betrouwbaar is. Ook kijk ik of het recyclebaar is, op sommige verpakkingen heb je nu een driehoekje zitten die dat aanduidt. Die gebruik ik wel en verder kijk ik ook wel naar de herkomst, maar ik moet zeggen dat ik dit niet allemaal doe als ik echt in de supermarkt sta.
- Stel dat je vegetarisch vlees koopt, waar let je dan op?
 - Ik kan niet echt keurmerken verzinnen die op vegetarisch vlees staan. Ik zou letten op waar het van gemaakt is en of het vegan is.
- Stel dat je pasta koopt, waar let je dan op?:
 - Ik zou kijken of ik het in een kartonnen verpakking kan kopen in plaats van een plastic verpakking. Verder zou ik kijken waar het vandaan komt en wat er op staat.
 - *En waar zou je dan op letten als je ziet waar het vandaan komt?*
 - Dichterbij is beter, want dan hoeft het minder te reizen denk ik. Verder zou ik ook op letten dat ik geen kleine verpakkingen koop, maar liever een grotere zak.

Interview 3

Male, 24

- *Stel dat je kaas koopt, waar let je op?*
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Bio keurmerk, heeft kaas beter leven stickers? Ik weet het even niet. Verpakkingen met meer groen, want als ik dat zie heb ik het gevoel dat het duurzamer is. Verder de grootte van de verpakking, als er veel plastic in zit koop ik hem minder snel.
 - *Zijn er nog andere keurmerken waar je op let?*
 - Het is moeilijk om eraan terug te denken. Vaak herken je wel dingen, als je ze dan ziet dan denk je oh ja, maar er komt nu even weinig in me op. Ja trouwens, hebt volgensmij ook zoiets van vriendelijk voor de koe ofzo.

- *Stel dat je tomaten uit blik koopt, waar let je op?*
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Bio keurmerk ook, misschien als erbij zou staan van land waar het vandaan komt. En het is een goed land, bijvoorbeeld Nederlandse tomaten. Want het is lokaler, alleen het staat er vaak niet op. Voor de rest meer groen in het label denk ik dat het biologischer is of duurzamer.
- *Stel dat je uien koopt, waar let je op?*
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Ik weet niet of ik er bij uien op zou letten. Misschien bio, het voelt alsof er minder snel een duurzame keuze voor is. Je kan wel een beetje klooiën met duurzaamheid. Met tomaten heb je veel meer opties om het duurzaam te maken. Uien zijn een simpel gewas, misschien waar het vandaan komt.
- *Stel dat je vegetarisch vlees koopt, waar let je op?*
 - Ik vermijd sowieso rood vlees, en ik wil niet te grote porties. Verder let ik op de kleur van het vlees, de prijs en de hoeveelheid plastic van de verpakking.
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Dan kijk ik naar bio en beter leven. En of er iets vermeld staat over hoe het dier geleefd heeft. Bijvoorbeeld dat ze gras gehad hebben ipv dat er niets staat.
 - *Zijn er nog andere keurmerken waar je op let?*
 - De nutri score, Verder bedenk ik me ook dat ik op fairtrade probeer te kopen, maar dat is meer bij tropische producten.
- *En dezelfde vraag voor vegetarisch vlees?*
 - Ik denk dat ik veel op prijs let. En dingen waarvan ik weet dat ze lekker zijn, want ik weet dat daar veel verschil tussen zit bij vegetarisch vlees. En dat het niet probeert er teveel uit te zien als vlees. Ik vind vaak dingen die dat proberen na te bootsen vies. Liever iets losstaands
 - *Zijn er nog andere keurmerken waar je op let?*
 - Op dit moment niet, maar als ik meer geld heb fair trade, biologisch en de nutri score.
- *Stel dat je pasta koopt, waar let je op?*
 - Merk, want ik vind sommige merken wel echt lekkerder dan andere. Prijs, land van herkomst. Als het uit Italië komt is het wel echt van betere kwaliteit.
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Biologisch, dan misschien kijken naar lokaler, groene verpakking geeft me sneller het idee dat iets duurzaam is.
 - *Zijn er nog andere keurmerken waar je op let?*
 - Mogelijk de nutriscore.

Interview 4

Male, 21

- *Stel dat je kaas koopt, waar let je op?*
 - Wat voor soort kaas ik nodig heb. Mijn preferentie in jong, oud of belegen. Vooral prijs, aanbieding of goedkoopste.
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Biologisch of beter leven keurmerk.
 - *Zijn er nog andere keurmerken waar je op let?*
 - Nee
- *Stel dat je tomaten uit blik koopt, waar let je op?*
 - De prijs en of er geen basilicum is toegevoegd ofzo.
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Biologisch
 - *Zijn er nog andere keurmerken waar je op let?*

- Nee
- *Stel dat je uien koopt, waar let je op?*
 - Hoeveel ik er nodig heb, meestal koop ik ze in bulk. dan is het uiteindelijk goedkoper
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Of ze biologisch zijn, en misschien of ze in plastic verpakt zijn. Ik denk dat het beter voor de wereld om ze te kopen als ze niet in een netje zitten. Als ik zou kunnen kiezen tussen in een netje of niet in een netje, zou ik voor zonder gaan..
 - *Zijn er nog andere keurmerken waar je op let?*
 - Nee
- *Stel dat je vlees koopt, waar let je op?*
 - Ik vind het slecht van mezelf maar prijs, ik zou meer op biologisch of beter leven willen letten. Momenteel heb ik weinig geld, maar als ik het zou hebben zou ik daar op letten.
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Met vis heb je nog een verschil tussen gekweekt en gevangen. Volgensmij is gekweekt beter. Verder niet.
- *En voor vegetarisch vlees?*
 - Wat er goed in mn gerecht past, prijs en of het er een beetje lekker uit ziet. Als de duurdere versie er beter uit ziet dan zou ik voor die gaan
 - *Zijn er nog andere keurmerken waar je op let?*
 - Misschien de nutri score. Of er b12 in zit en de mineralen.
- *Stel dat je pasta koopt, waar let je op?*
 - Prijs.
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Biologisch.
 - *Zijn er nog andere keurmerken waar je op let?*
 - Nee

Interview 5

Woman, 20

- *Stel dat je kaas koopt, waar let je op?*
 - Prijs, ook gewoon wat voor soort kaas het is, jong, oud of belegen. De vorm van kaas: geraspt of een plak.
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Ik denk vooral het eerste opvallende iets aan de verpakking, bijvoorbeeld duurzaam. Dan zou ik het snel doen. Dan zou ik ook wel bereid zijn om iets meer te betalen.
 - *Zijn er nog andere keurmerken waar je op let?*
 - Ik heb nog nooit een keurmerk op kaas gezien. Volgensmij staat er geen beter leven keurmerk op kaas
 - *Stel dat het erop zou staan, zou je er dan naar kijken?*
 - Ja, ik zou er bij vlees op letten, dus waarom bij kaas niet.
- *Stel dat je tomaten uit blik koopt, waar let je op?*
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Eigenlijk alleen biologisch of niet.
- *Stel dat je uien koopt, waar let je op?*
 - Of ze er vers uit zien. Met hoeveel ze verpakt zijn. Het liefst koop ik een grote zak. Ze verkopen ze ook wel per 3, maar ik heb het idee dat dit altijd veel duurder is dan een grote zak.
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Of er bestrijdingsmiddelen zijn gebruikt, of in Nederland zijn geproduceert of geëxporteerd. Vooral dat

- *Zijn er nog andere keurmerken waar je op let?*
 - Nee niets
- *Stel dat je vlees koopt, waar let je op?*
 - Beter leven keurmerk, of het biologisch is geproduceert. Maar de eens in de zoveel keer dat ik vlees koop, dat ik het niet zo erg vindt om biologisch te kopen omdat het duur is.
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Prijs per kilo.
 - *Zijn er nog andere keurmerken waar je op let?*
 - Bij vlees beter leven, bij melk kijk ik ook naar CO2 neutraal, ik weet dat Albert Heijn dat nu daar op de verpakking zet. Als dat ook bij vlees zou zijn zou ik daar zeker naar kijken. Ik weet alleen niet in hoeverre CO2 neutraal klopt.
- *Vegetarisch vlees:*
 - Ik let vooral op de verpakking als het aanspreekt dan wil ik het wel proberen. Meestal hebben ze bij vlees vervangers een plastic verpakking. Als het er droog uit ziet dan zou ik het al niet kopen. Ik kijk bij vleesvervangers vaak niet naar de prijs. Verder heeft het volgens mij niet echt keurmerken om te laten zien dat het duurzaam is of niet.
- *Stel dat je pasta koopt, waar let je op?*
 - Of het volkoren of normaal is. Meestal kijk ik ook naar de prijs. Je hebt meestal biologisch, a-merk, en huiskerk, dan kies ik meestal de goedkoopste want ik heb het idee dat qua prijs het niet echt verschilt.
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Ik weet dat je biologische pasta's hebt, maar ik heb geen idee wat het biologisch maakt. Ja, ik denk dat het dan ligt aan de eieren, dat die biologisch zijn. Dan zou ik misschien ook wel een beter leven keurmerk verwachten voor die eieren, maar dat heb ik eigenlijk nog nooit gezien.
 - *Zijn er nog andere keurmerken waar je op let?*
 - Sticker die aanduidt wat de goedkoopste pasta is.
- *Nog iets anders dat je wil toevoegen?*
 - Bijvoorbeeld producten als vlees, daar staat al veel meer op dat de dieren goed behandeld zijn, maar bij andere producten is er niet echt duidelijk wat een duurzamere keuze is.

Interview 6

Woman, 24

- *Stel dat je kaas koopt, waar let je op?*
 - Vooral wat voor soort kaas ik zoek. Jong, of oud, zoiets.
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Ik let dan denk ik op keurmerken, bijvoorbeeld biologisch, de kleur van de verpakking, dus de groene logo's en je hebt zo'n keurmerk 'better for the planet' ofzo, zoiets
 - *Zijn er nog andere keurmerken waar je op let?*
 - Nee eigenlijk niet
- *Stel dat je tomaten uit blik koopt, waar let je op?*
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*
 - Ik denk eigenlijk vooral biologisch
 - *Zijn er nog andere keurmerken waar je op let?*
 - Nee niet echt.
- *Stel dat je uien koopt, waar let je op?*
 - Of ze biologisch zijn of niet
 - *Stel je voor dat je een duurzame keuze wil maken, waar zou je dan op letten?*

- Ja dat [biologisch] en ook waar ze vandaan komen. Ik denk dat dichterbij beter is, maar ik weet niet echt of ze dat er nu bij zetten in de supermarkt.
- *Stel dat je vlees koopt, waar let je op?*
 - Ik eet eigenlijk nooit vlees, maar waar ik dan op zou letten is allereerst welk vlees. Dus ik zou eerder kip eten dan rundvlees, omdat dat slechter is voor het milieu. Verder zou ik letten op of het biologisch is en of het een beter leven keurmerk heeft.
- *Stel dat je vegetarisch vlees koopt waar let je dan op?*
 - Ik let hier niet echt heel erg op, je kiest sws wel duurzamer omdat je geen vlees eet
- *Stel dat je pasta koopt, waar let je op?*
 - moeilijk, ik zou snel niet echt duurzaam zoeken voor pasta, maar ik zou denken vers vs niet vers, en dan niet vers lijkt me duurzamer.

Interview 7

Woman, 23

- *Stel dat je kaas koopt, en een duurzame keuze wil maken, waar let je op?*
 - Als ik duurzame kaas koop let ik erop dat ik zo min mogelijk kaas koop omdat kaas een hoge CO2 voetafdruk heeft. Als ik dan toch kaas koop dat zou ik er vooral op letten dat het een zachte kaas is en dat het geitenkaas is
- *Stel dat je uien koopt, en een duurzame keuze wil maken, waar let je op?*
 - Als ik duurzame uien zou willen kopen zou ik dit bij een boer halen of van het bio merk.
- *Stel dat je tomaten uit blik koopt, en een duurzame keuze wil maken, waar let je op?*
 - Bij tomaten uit blik zou ik letten op het bio keurmerk
- *Stel dat je vlees koopt, en een duurzame keuze wil maken, waar let je op?*
 - Als ik vlees koop let ik er vooral op dat het kip is aangezien rund en varkens een hogere uitstoot hebben. daarnaast zou ik letten op het beter leven keurmerk
- *Stel dat je vegetarisch vlees koopt, en een duurzame keuze wil maken, waar let je op?*
 - Als ik vega vlees koop ga ik er al vanuit dat ik een duurzamere keus maak, hier let ik niet op.
- *Stel dat je pasta koopt, en een duurzame keuze wil maken, waar let je op?*
 - Bij pasta let ik ook niet op duurzamere keuzes

Appendix C 3D models of experimental VR products

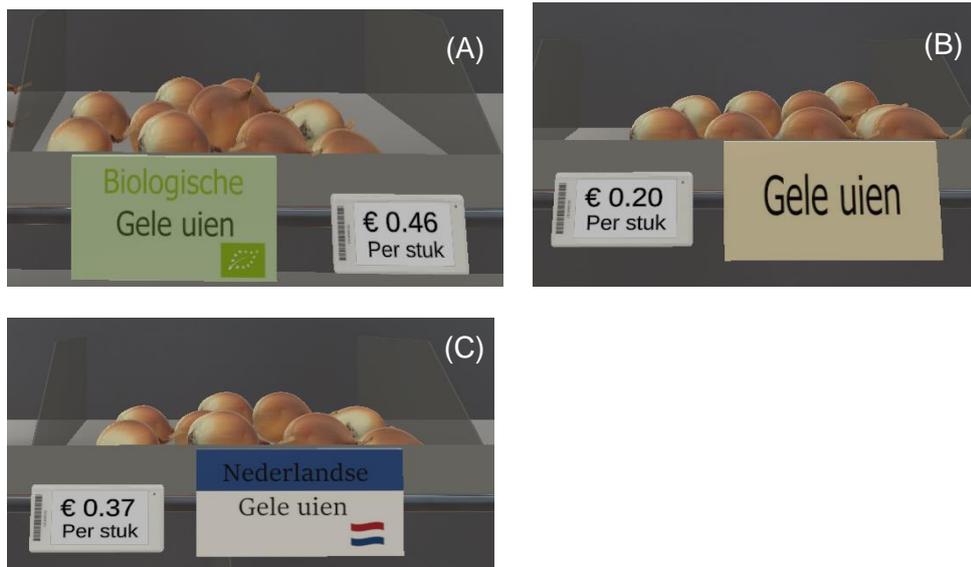


Figure C1. 3D models of the VR onions used in the experiment. (A) organic, (B) control, (C) local



Figure C2. 3D models of the VR diced tomatoes used in the experiment. (A) organic, (B) sustainable packaging, (C) local, (D) control



Figure C3. 3D models of the VR minced meat used in the experiment. (A) biological, (B) *Beter Leven*, (C) local, (D) control, (E) sustainable packaging



Figure C4. 3D models of the VR spaghetti used in the experiment. (A) local, (B) *Beter Leven*, (C) organic, (D) sustainable packaging, (E) control



Figure C5. 3D models of the VR grated cheese used in the experiment. (A) control, (B) *Beter Leven*, (C) organic, (D) local, (E) sustainable packaging

Appendix D Templates for VR product stimuli

This table shows the products and their accompanying prices from Albert Heijn. Suggested pictures for the packaging of the products are added in the tables, also from Albert Heijn (ah.nl).

	Control	Organic	Local	Beter leven	Sustainable packaging
Grated cheese (300 g)	€3.33 	€3.28 	€4.87 	€4.87 "beter voor koe" 	*
Spaghetti (500 g)	€0.95 	€0.99 	* 	*	€1.60 
Diced tomatoes (400 g)	€0.69 	€0.75 	*	*	€1.35 
Onion (3 onions)	€0.60 	€1.4 	€0.72 	*	€0.90
Minced meat (400 g)	€4.00 	€5.99 	*	€2.65 	*

*Not currently existent in Albert Heijn

Table D1. List of products from the Dutch supermarket Albert Heijn used as template for price and look of the Virtual Reality products

Appendix E Ethical briefing

Beste deelnemer,

Hartelijk dank voor uw deelname aan dit onderzoek naar koopgedrag met behulp van een filtersysteem in een virtuele supermarkt. De verzamelde gegevens worden uitsluitend gebruikt voor mijn masterthesis aan de Wageningen Universiteit. Uw gegevens worden anoniem verwerkt onder een willekeurig toegewezen nummer om uw privacy te waarborgen.

Het onderzoek duurt ongeveer 30 minuten en is volledig vrijwillig. Dit betekent dat u op elk moment kunt stoppen met uw deelname. Tijdens het onderzoek zult u twee keer gevraagd worden om producten te kopen in een Virtual Reality (VR) supermarkt. Na beide rondes wordt u gevraagd een vragenlijst in te vullen. Als u vragen heeft, kunt u ze altijd tijdens of na het onderzoek stellen.

Zet uw handtekening en naam hieronder als u akkoord gaat met deelname nadat u de tekst heeft gelezen en uw toestemming geeft.

Alvast hartelijk dank voor uw medewerking,

Sanne

Naam:

Handtekening:

Appendix F Questionnaire

Below are the links that direct to the questionnaire on Qualtrics.

Link for the questionnaire conducted after the filter condition of the experiment:

https://wur.az1.qualtrics.com/jfe/form/SV_2bDvoYvgPid2aVM

Link for the questionnaire conducted after the control condition of the experiment:

https://wur.az1.qualtrics.com/jfe/form/SV_3VnFlkyYBAykOma

Appendix G Assumption testing

Variables		Cronbach's alpha	Normality	
			Shapiro Wilk test	Kolmogorov-Smirnov
Involvement		.80	0.95**	0.11**
Appeal to self	Filter		0.83**	0.27**
	Control		0.80**	0.27**
Appeal to collective			Filter: 0.90**	0.23**
			Control: 0.93**	0.15**
Price sensitivity	Filter	.81	0.93**	0.17**
	Onion	.8	0.17	0.93
	Tomato	.91	0.21*	0.9*
	Meat	.58	0.16*	0.94
	Pasta	.85	0.18*	0.92*
	Cheese	.82	0.14	0.95
	Control	.89	0.88**	0.25**
	Onion		0.30**	0.8**
	Tomato		0.2*	0.89*
	Meat		0.24**	0.86**
	Pasta		0.19*	0.89*

	Cheese		0.28**	0.85**
Trust in technology	Together	.75	0.96**	0.13**
	Competence	.49		
	Integrity			
	Benevolence	.73		
TAM		PU = .83 PEU = .48		
		Together: .61		

** significant at $p < 0.001$, * significant at $p < 0.05$

Table G1. List of variables tested for internal consistency and normality