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Should the milkman return? The effect of a reusable packaging on product perceptions and behavioural intentions

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ABSTRACT

This research investigates how consumers evaluate returnable packaging for fast-moving consumer goods. Through three online studies, we analysed how returnable packaging influences consumer behavioural intentions (*intention to recommend* and *repurchase intention*), overall attitudes and product perceptions (*attitude towards the product*, *perceived product quality*, *packaging convenience* and *perceived contamination*), and the perceived *environment-friendliness* of the packaging. The results demonstrate that consumers, overall, rate returnable packaging more positively than single-use packaging, regardless of the type of single-use packaging (conventional or recycled plastic), the appearance of the returnable packaging (identical or different to the single-use packaging), and whether the type of product inside is non-sensitive or sensitive (a bottle of all-purpose cleaner vs. a pot of Greek-style yoghurt). Finally, the relevance and limitations of these results are discussed and their practical implications for managers, packaging designers and retailers are highlighted.

1. Introduction

1.1. Reusable packaging: A potential solution to the negative consequences of single-use packaging

Packaging for fast-moving consumer goods (FMCG) is important as it allows for the safe distribution of products and information provision to consumers (Marsh & Bugusu, 2007). However, it also comes with severe environmental impacts. In Europe, each citizen discards an average of 174 kg of packaging per year (Eurostat, 2018). Packaging waste usually consists almost entirely of single-use packaging, which has an exceptionally short service life (it is estimated that around 95 % of packaging is lost to the economy after a very short life cycle; Kleine Jäger & Piscicelli, 2021). It is also worth noting that a significant proportion of some raw materials are used in the production of packaging. In Europe, for example, 40 % of all plastics and 50 % of all paper are used for this purpose (Confederation of European Paper Industries, 2018; Geyer et al., 2017). Solutions for the recycling of these materials are imperfect. Recycling rates for glass (76 %) and metal (83 %) are high in Europe (Eurostat, 2021), but the process requires a lot of energy and therefore contributes to greenhouse gas emissions. When it comes to the recycling of plastics, 60 % of all plastic packaging in Europe is either incinerated or landfilled (Eurostat, 2021). Next to that, many items of packaging leak into the environment, which is a major issue with plastics as they break down into microplastics that pollute the air and marine life. Consequently, it is not surprising that packaging waste is currently considered to be a major concern worldwide (Babader et al., 2016; Steenis et al., 2017).

Of all the approaches and strategies that have emerged to improve the environmental sustainability of packaging and reduce waste, the Zero Waste philosophy and, more recently, the circular economy have attracted considerable interest (Ghisellini et al., 2016; Pietzsch et al., 2017; Trevisan et al., 2022; Zaman, 2015). In contrast to the current linear economy, which focuses primarily on the production of short-lived products and waste management, the circular economy advocates a holistic approach that slows, closes and narrows material and energy loops through practices such as durable design, maintenance, repair, reuse, remanufacturing, refurbishment and recycling (Geissdoerfer et al., 2017). This approach promotes keeping all extracted and produced resources in circulation for as long as possible, and understanding waste as a value rather than a problem (Barrett & Scott, 2012; Pietzsch et al., 2017).

Compared to other circular alternatives such as recycling, the potential of reuse in the packaging sector has been largely overlooked.

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However, reuse may be a more effective strategy than recycling in reducing waste, conserving resources and maintaining quality of life (Coelho et al., 2020; Ertz et al., 2017). Reuse makes it possible to keep using packaging and materials that are already in circulation without the need to reprocess or manufacture them, thereby generating less waste than recycling (Babader et al., 2016; Jarupan et al., 2004). Therefore, it has been ranked as the second best option in the European Waste Hierarchy among the five strategies considered to promote waste reduction (ahead of recycling and only behind waste prevention; Directive 2008/98/EC, 2008). Similarly, the Butterfly Diagram developed by the Ellen MacArthur Foundation ranks it as the best of all possible options after lifetime extension, which actually also concerns reusable packaging (Ellen MacArthur Foundation, 2015). Thus, the European Parliament has proposed increasing the reuse rate of packaging to 10 % by 2030 (Coelho et al., 2020; Greenwood et al., 2021), and some countries have even set their own targets (e.g., France aims to reach 5 % of reused packaging in2023 and 10 % by 2027; Loi no 2020-105, 2020). Furthermore, the Ellen MacArthur Foundation states that reuse could be an economical alternative for at least 20 % of plastic packaging, with an estimated value of $9 billion globally (Ellen MacArthur Foundation, 2017), making it an attractive solution for businesses.

Reusable packaging can be divided into two categories (Greenwood et al., 2021; Muranko et al., 2021): refillable packaging systems, where the consumer is responsible for cleaning and refilling the packaging, and returnable packaging systems, where companies in the supply chain repeatedly clean and refill the packaging with products (Miao et al., 2023). It is worth highlighting that reusable packaging systems are not new. Although reusable packaging systems are now mainly used in business-to-business (B2B) markets, they were once common in some sectors of the business-to-consumer (B2C) market (Coelho et al., 2020). For example, in the US soft drinks sector, 100 % of containers were reusable in 1947, but by 2000 this had fallen to 1 % due to the increased use of metal cans and PET plastic bottles (Babader et al., 2016). There are many reasons for this decline, including factors such as the greater convenience of single-use packaging systems and the reduced complexity of the supply chain. Moreover, factors such as the need to redesign the existing systems or the lack of incentives from institutions have hindered the widespread adoption of reusable packaging systems (Coelho et al., 2020; Gardas et al., 2019). The literature on reusable packaging also notes that to support enduring usage, reusable packaging needs to be robust, which usually requires more energy and raw material compared to single-use packaging (Greenwood et al., 2021). As a result, for a reusable packaging to be more sustainable than its single-use counterpart, it is crucial that it is used beyond its break-even point (i.e., the minimum number of uses necessary for a reusable packaging to be preferable than a single-use packaging; Cottafava et al., 2021).

Although aforementioned issues highlight the challenge of a fast development of reusable packaging systems for FMCG, the great potential of reusable packaging in terms of waste reduction has attracted scientific interest in recent years. The approaches taken so far have been diverse, with studies analysing aspects related to sustainability, supply chain, or logistics (Böröcz, 2022; Ellsworth-Krebs et al., 2022; Koskela et al., 2014; Mahmoudi & Parviziomran, 2020; Pålsson & Olsson, 2023). However, while consumer acceptance of reusable packaging is crucial for its success, consumer research on reusable packaging has been rather scarce (Miao et al., 2023).

1.2. Consumer acceptance of reusable packaging systems

Recent surveys have shown that consumers would be keen to adopt reusable packaging systems for FMCG under certain conditions. A 2022 report analysing consumer behaviour in 23 countries found that an average of 45 % said they often tend to avoid excessive packaging, while an average of 47 % said they try to avoid single-use plastics most or all of the time (GlobeScan, 2022). Another survey of over 2000 UK consumers conducted between August and October 2021 found that 81 % would be open to trying a reusable packaging system for FMCG products (Institute of Grocery Distribution, 2021).

Existing studies highlight several factors for consumer acceptance and adoption of reusable packaging systems (Bocken et al., 2022; Ertz et al., 2017; Greenwood et al., 2021; Kunamaneni et al., 2019; Lofthouse et al., 2009; Long et al., 2022). These factors are very diverse and can be related to the characteristics of the consumer, the packaging itself, the specific reuse system and the socio-political context in which the action takes place. Kunamaneni et al., 2019 have highlighted the challenge of overcoming consumer habits and their resistance to adopting innovations. Ertz et al. (2017) emphasised the importance of creating an environment that facilitates the use of reusable packaging and discourages access to single-use packaging. Miao et al. (2023) further explained that reusable packaging systems should be widely available in supermarkets for consumers to use, offering a variety of products and ensuring compatibility between different systems. Importantly, cost has been reported as one of the main barriers to the adoption of reusable packaging systems (Bocken et al., 2022), and consumers seem to be generally unwilling to pay a price premium for products sold in reusable packaging (Miao et al., 2023).

While issues related to accessibility, availability and costs are crucial for consumer adoption, they are very much related to the scaling of reusable packaging systems initiatives. To ensure their success, it is also important to understand how consumers consider products sold in reusable packaging compared to more conventional single-use packaging. Therefore, this research focuses on studying how returnable packaging affects behavioural intentions (intention to recommend, repurchase intention), overall attitudes and product perceptions (attitude towards the product, packaging convenience, perceived contamination and perceived product quality), and the perceived environment-friendliness of the packaging.

1.2.1. Influence of reusable packaging on behavioural intentions and importance of environmental consciousness

Research investigating the key drivers of sustainable consumer behaviour change is often based on attitude-behavioural intention patterns (Liu et al., 2017) such as described in the Theory of Planned Behaviour (TPB; Ajzen, 1991). Behavioural intention can be defined as the willingness to make an effort to perform a certain behaviour (Klöckner, 2013). Although there are other approaches aiming to explain the factors that determine the adoption of behaviours (Long et al., 2022; White et al., 2019; Yan et al., 2022), the TPB has generally proved successful in studies analysing sustainable consumer behaviour (Ceglia et al., 2015) as behavioural intention is often considered an antecedent of actual behaviour. In our context, *intention to (re)purchase* can be considered a behavioural intention variable of interest as it is related to the adoption of reusable packaging systems. In addition, it has been suggested that *intention to recommend* may serve as an indicator of the potential success of the adoption of a new product or service (Harrison-Walker, 2001; Mazzarol, 2011). This can be explained by the fact that the opinion of other consumers tends to be considered more objective than other types of sources (Moise et al., 2019). Thus, a greater intention from consumers to recommend a product sold in reusable packaging (compared to a product sold in single-use packaging) can be seen as a factor favouring its subsequent adoption by a wider audience.

Furthermore, the literature shows that the role of individual characteristics must be considered when it comes to the adoption of more sustainable packaging innovations (Cruz & Manata, 2020; Magnier & Schoormans, 2015). It is reasonable to assume that environmental consciousness may play a role in consumer acceptance of reusable packaging with more environmentally conscious consumers more likely to have positive responses towards reusable packaging alternatives.

1.2.2. Effects of reusable packaging on overall attitude and product perceptions

Approaches based on the framework of the TPB propose that the attitude of an individual towards a certain object / behaviour is an important antecedent of behavioural intention (Ajzen, 1991). Attitudes represent how favourably an individual views a behavioural alternative (Klöckner, 2013). We can expect that the attitudes of individuals towards a product sold in a reusable packaging will be related to their perceived convenience, how hygienic they consider them to be in comparison to single-use packaging or their perceived environment-friendliness.

Perceived convenience represents an important factor for the success of reusable packaging systems (Babader et al., 2016; Bocken et al., 2022; Lofthouse et al., 2009; Madria & Tangsoc, 2019; Ratnichkina et al., 2021). Past research has shown that the convenience of reusable packaging systems could be perceived both positively and negatively, depending on the specific characteristics of the service. On the one hand, consumers may perceive a service that offers home delivery and collection of packaging as very convenient, and the ease of not having to sort and recycle the different parts of the packaging at the time of disposal may reinforce this perception (Lofthouse et al., 2009; Vaughan et al., 2007). On the other hand, consumers may perceive reusable packaging as inconvenient, depending on the ease of use and maintenance of the containers (e.g., in the case of refilling), the return options available (e.g., in-store, pick-up) or the space taken up by the packaging at home once it has been emptied (Coelho et al., 2020).

Perceived hygiene appears to be another important driver of acceptance. Specifically, existing studies suggest that *perceived contamination* may negatively affect consumer adoption of reusable packaging, as it may trigger feelings of disgust and mistrust towards the product (Baxter et al., 2017; Rozin et al., 2015). Consumers may have concerns about product contamination due to the way the packaging is filled, cleaned or handled, but also simply because the packaging has previously been touched or used by others (Miao et al., 2023; White et al., 2016). These effects, which can be expected to be particularly noticeable for sensitive products at risk of spoilage or contamination (e.g., dairy products; Coelho et al., 2020), could negatively affect consumer attitudes and responses to reusable packaging.

Furthermore, previous research has shown that consumers use packaging to infer on the intrinsic qualities of the product (Magnier et al., 2016; Piqueras-Fiszman & Spence, 2015). Specifically, analysing the possible impact of reusable packaging on *perceived product quality* is relevant as consumers attach importance to the ability of reusable packaging to maintain the quality of the packaged products (Lofthouse et al., 2009; Miao et al., 2023). Interestingly, previous studies have shown that consumers tend to perceive products contained in sustainable packaging as being of higher quality than those marketed in less sustainable packaging (Magnier et al., 2016; Rebollar et al., 2017). In this regard, reusable packaging can be expected to have a positive effect perceived quality thereby also improving behavioural intentions.

1.2.3. Influence of reusable packaging on environment-friendliness

Perceived environment-friendliness has been highlighted as an important driver of reusable packaging adoption (Bocken et al., 2022; Miao et al., 2023). In general, past research has noted that consumer knowledge about the environmental impact of packaging tends to be low (Otto et al., 2021; Steenis et al., 2017). While some consumers seem to be concerned by the additional environmental impacts associated with the logistics of reusable packaging such as cleaning and transporting the packaging (Bocken et al., 2022), there is initial (qualitative) support to suggest that in general, consumers consider reusable packaging environment-friendlier than their single-use counterparts (Miao, et al. 2023), which in turn may have a positive effect on their attitude towards these packages.

1.3. Literature gaps and overview of the studies

The analysis of the literature demonstrates several gaps in current knowledge of consumer responses to reusable packaging. Existing research has mostly focused on on-the-go retail (Coelho et al., 2020) and reusable packaging for FMCG has so far been less studied. Of the studies that have focused on FMCG, a significant proportion have examined refillable packaging (Lofthouse et al., 2017; Lofthouse et al., 2009; Miao et al., 2023) and the specific case of returnable packaging has been relatively overlooked (Bocken et al., 2022). Furthermore, the effect of reusable packaging on perceptions of product quality remains unexplored. Finally, to date, no study has explicitly analysed how consumers evaluate reusable packaging compared to single-use packaging in experimental settings (Ertz et al., 2017; Greenwood et al., 2021).

This article aims to contribute to the literature on circular consumption and consumer behaviour with regard to reusable packaging in different ways. First, we focus on the case of a returnable packaging system (RPS) for FMCG. In this system, consumers receive their product in a pre-filled packaging, which they return to the system provider when empty. The system provider then cleans and refills the returnable packaging before reselling it to another consumer (Greenwood et al., 2021; Muranko et al., 2021). This system corresponds to various initiatives that have recently been introduced to the market (e.g., Loop; Coelho et al., 2020). We also aim to contribute by experimentally testing how consumers perceive the concept of reusable packaging in comparison to conventional single-use packaging, how reusable packaging influences their perception of the product it contains, and their behavioural intentions towards the packaged product. To this end, we conducted three studies to empirically assess how consumers evaluate reusable packaging compared to single-use packaging for different types of products. In Study 1, we compared consumer evaluations of both types of packaging for a non-sensitive, non-perishable product (i.e., an all-purpose cleaner). In Study 2, we replicated Study 1 but with a sensitive, perishable product (i.e., Greek-style yoghurt), and investigated the possible effect of each participant's environmental consciousness (EC). Finally, in Study 3, we compared the evaluations given to reusable packaging to those given to more sustainable single-use packaging made from recycled plastic.

In each of these studies, the participants were recruited via the Prolific platform (https://www.prolific.co/) and received a small amount of monetary compensation for their participation (between 1 and 1.10 GBP). Responses were collected on the Qualtrics platform. Research shows that online questionnaires allow for diverse samples in terms of gender distribution, age, or demographic composition (Casler et al., 2013), and that Prolific produces higher quality data compared to other platforms (Peer et al., 2017). The purchase situations described in this paper are based on a use scenario in which the participant's usual online grocery retailer offered the option of reusable packaging, thus representing an e-commerce environment. By doing so, we aimed to place participants in a situation where they could evaluate reusable packaging as a comparable alternative to more traditional single-use packaging. Additionally, we expected that this use scenario would reduce the convenience risk described in prior literature (Lofthouse et al., 2009), thereby representing recently introduced user-centred innovative solutions for reusable packaging. Participants were pre-screened on the basis of having shopped online at least once a month, to ensure that they were familiar with the online grocery shopping context of this study.

2. Study 1

This study aimed to assess consumers' evaluations of reusable packaging for a conventional product (i.e., a bottle of all-purpose cleaner) compared to conventional single-use packaging.

2.1. Method

2.1.1. Stimuli

In this experiment, we chose an all-purpose cleaner spray bottle as the target product because it is non-perishable and therefore less susceptible to potential contamination issues. Three visual stimuli were created by a professional designer to accompany the scenarios that participants were invited to read (Fig. 1). The single-use bottle was made of hard, opaque white plastic, whereas the reusable spray bottles were made of either the same material as that of the single-use bottle or a more durable material (i.e., metal). Two different types of reusable packaging were tested to account for the fact that reusable packaging is available in different materials, some of which are similar to traditional single-use plastic packaging, while others are made from more robust materials that are less susceptible to damage and wear (such as glass or metal). In addition, the inclusion of these two materials allowed us to assess whether the response to reusable packaging was driven not only by the change in appearance of the packaging, but also by its reusability. Furthermore, all packages were opaque to avoid confounding effects related to the effect of transparency on product perceptions (Simmonds et al., 2018; Simmonds & Spence, 2019). Similarly, the shape of the packages and the label displayed on the bottles were identical across conditions. The brand depicted on the packages was fictional to avoid any bias related to prior knowledge of the brand (Orth et al., 2010).

2.1.2. Participants and procedure

The final sample consisted of 90 individuals (62 females, 26 males, 2 other), with a mean age of 28.2 years ($SD = 7.75$). This sample size was based on a power analysis with large effect size. The experiment followed a between-subjects design, in which they were assigned to one of the three experimental conditions (packaging type: single-use plastic vs. reusable plastic vs. reusable metal).

The experiment consisted of four parts: a consent form, a scenario, a questionnaire and a manipulation check. After completing the consent form, participants were assigned to one of the three scenarios and instructed to imagine that they had recently done their grocery shopping in their usual online store. They were then told that they had chosen a spray bottle of all-purpose cleaner, and depending on the condition, this spray bottle was either single-use or reusable. In the single-use condition, no further information about the packaging was mentioned to simulate a conventional purchase in an online grocery store. In the reusable conditions, the scenario indicated that the retailer had introduced a reusable packaging option for some products and that they had chosen it for the spray of all-purpose cleaner. In addition, a brief explanation of how the packaging system worked was added to the scenario (the exact wording of the scenario is presented in the Supplementary Materials, Part 1). To increase the chance that participants would read and evaluate the scenario and image carefully, they were not allowed to continue with the questionnaire until 40 s had elapsed.

2.1.3. Measures

In the questionnaire, the participants had to rate the bottle of all-purpose cleaner on several 7-point scales, in which the Cronbach's α was used to estimate the reliability of scales consisting of more than two items and the Spearman-Brown split half coefficient (ρ) was used to estimate the reliability of scales consisting of two items (Eisinga et al., 2013).

First, we asked participants to rate their behavioural intentions towards the product using two scales: an *intention to recommend* scale ($\alpha = 0.94$; adapted from Cheema & Kaikati, 2010) and a *repurchase intention* scale ($\alpha = 0.98$; adapted from Chiu et al., 2009). Next, participants were asked to rate their overall attitudes and their perceptions of the packaged product. Specifically, they had to rate their *attitude towards the spray bottle of all-purpose cleaner* (using five semantic differential scales from White et al., 2016; $\alpha = 0.93$), *product quality* (using three semantic differential scales from White et al., 2016; $\alpha = 0.91$), *convenience* (using five Likert scales adapted from Keh & Pang, 2010; $\alpha = 0.93$), and *contamination* (using four semantic differential scales from White et al., 2016; $\alpha = 0.72$). Finally, they had to rate the *Perceived environment-friendliness* of the package (using two Likert scales from Magnier et al., 2016; $\rho = 0.97$). In addition, to control for the potential effect of individual *environmental consciousness* (EC) in our results, we measured it using six Likert scales from Thøgersen et al. (2010; $\alpha = 0.89$). The scales used in this study are presented in the Supplementary Materials, Part 2.

Finally, we checked whether participants had read the scenario correctly by asking them whether the package of all-purpose cleaner they had received was single-use or reusable in a two-option multiple-choice question.

Fig. 1. Visual stimuli of study 1 –single-use plastic (left); reusable plastic (centre); reusable metal (right).

2.2. Results

2.2.1. Manipulation checks

All participants in the reusable conditions ($N_{reusable\_plastic} = 30$ and $N_{reusable\text{-}metal} = 30$) indicated that the packaging they had received was reusable. Of the participants who were assigned to the single-use condition (N = 30), ten reported that the packaging was reusable. This may be due to the fact that many consumers reuse single-use packaging after they have finished using the product it contains (Magnier & Crié, 2015) and our participants may have been triggered by the fact that the disposable packaging was designed so that its shape would not differ from the shape of the reusable packaging, thereby making it adapted to be reused for another purpose. We ran all analyses both with and without these individuals and did not find any difference in the results. Consequently, we decided to keep them in the sample.

2.2.2. Effects of packaging type on behavioural intentions

First, we performed two analyses of covariance (ANCOVAs) with *intention to recommend* and *repurchase intention* as the dependent variables, the packaging type as the independent variable and EC as the covariate. When the covariate was not significant, we removed it from the analysis and reported one-way analyses of variance. After controlling for EC, there was a significant effect of the type of package on the intention to recommend ($F(2,86) = 12.58$, $p < .001$, $\eta^2 = 0.23$). Multiple comparisons with the Bonferroni correction demonstrated that participants were less likely to recommend the single-use packaging ($M_{single\text{-}use} = 3.37$) compared to both types of reusable packages ($M_{reusable\_plastic} = 4.92$, $p < .001$; $M_{reusable\_metal} = 5.17$, $p < .001$; Fig. 2). There was no significant difference between the two types of reusable packaging ($p < .999$).

After controlling for EC, there were also significant differences in terms of repurchase intention ($F(2,86) = 7.23$, $p = .001$, $\eta^2 = 0.14$). Specifically, there were significant differences in the extent to which participants intended to repurchase the products, with participants less likely to repurchase the product when it was packaged in a single-use packaging ($M_{single\text{-}use} = 3.71$) compared to both types of reusable packaging ($M_{reusable\_plastic} = 4.76$, $p = .03$; $M_{reusable\_metal} = 5.31$, $p = .001$; Fig. 3). Again, the results demonstrated no significant differences between both types of reusable packaging (p = .87).

2.2.3. Effects of packaging type on overall attitude and product perceptions

Next, we performed four ANCOVAS with *attitude towards the product*, *perceived product quality*, *perceived convenience* and *perceived contamination* as the dependent variables, the type of packaging as the independent variable and EC as the covariate. Results indicated a significant effect of the type of package on *attitude towards the product*, after controlling for EC ($F(2, 86) = 10.429$, $p < .001$, $\eta^2 = 0.20$). Specifically, results showed that attitude was significantly more positive for the two reusable packages ($M_{reusable\_plastic} = 5.38$, $p = .001$; $M_{reusable\_metal} = 5.51$, $p < .001$), than for the single-use packaging ($M_{single\text{-}use} = 4.40$). Again, no significant difference was found between the two types of reusable packaging ($p = 1.00 < 0.999$).

Results indicated a significant effect of the type of package on *perceived product quality*, when controlling for EC ($F(2, 86) = 11.36$, $p < .001$, $\eta^2 = 0.21$). The multiple comparisons with the Bonferroni correction showed that there were significant differences between the single-use packaging ($M_{single\text{-}use} = 4.06$) and both reusable packages ($M_{reusable\_plastic} = 4.99$, $p = .004$; $M_{reusable\_metal} = 5.43$, $p < .001$), with no significant difference between the two types of reusable packaging (p = .64).

There were no significant differences in terms of *perceived convenience* between the three types of packaging when controlling for EC ($F(2,86) = 0.75$, $p = .47$), suggesting that participants did not perceive the convenience of reusable packaging to be inferior to that of single-use packaging in the settings of the study.

Remarkably, there was also no significant difference in terms of *perceived contamination* between the three types of packaging when controlling for EC ($F(2,86) = 1.99$, $p = .14$), demonstrating that participants did not perceive the reusable all-purpose cleaner packaging to be more contaminated than the single-use one.

2.2.4. Effects of packaging type on perceived environment-friendliness

Finally, we performed a one-way ANOVA with *perceived environment-friendliness* as the dependent variable and the type of package as the independent variable. Results demonstrated a significant effect of the type of package on perceived environment-friendliness ($F(2, 87) = 40.26$, $p < .001$, $\eta^2 = 0.48$). Specifically, there were significant differences between the single-use packaging ($M_{single\text{-}use} = 2.30$) and the two reusable packages ($M_{reusable\_plastic} = 5.47$, $p < .001$; $M_{reusable\_metal} = 5.33$, $p < .001$), but no significant difference between the two types of reusable packaging (p > .99).

2.3. Discussion

Overall, the results of this first study show that consumers perceive a non-sensitive product sold in reusable packaging more positively than

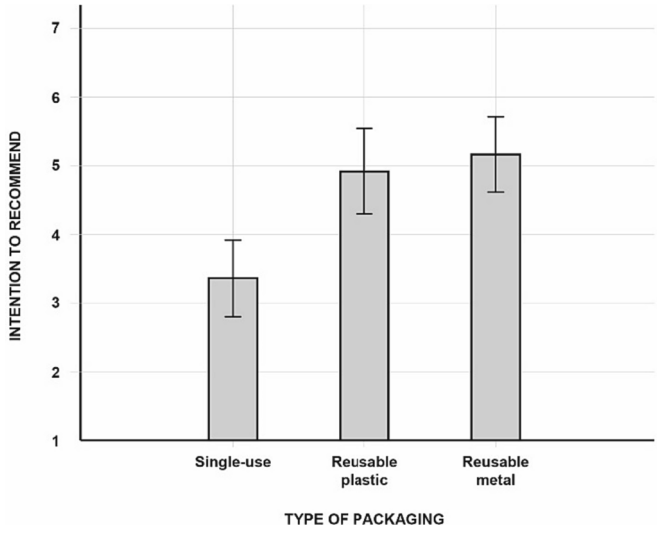

Fig. 2. Differences in intention to recommend between types of packaging (Study 1). The error bars indicate 95% confidence intervals.

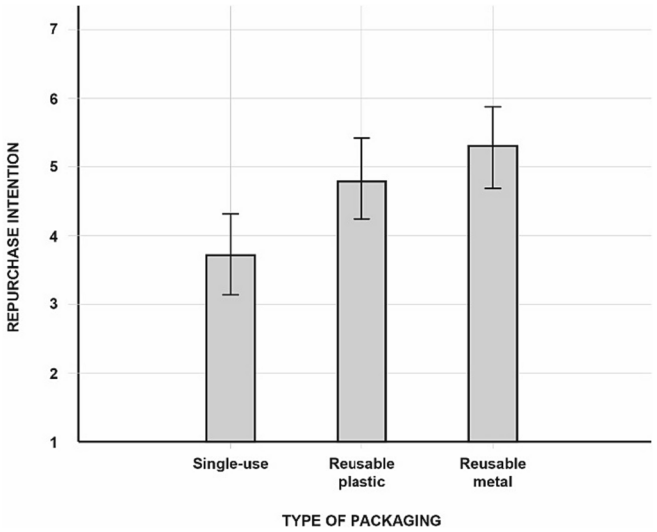

Fig. 3. Differences in repurchase intentions between types of packaging (Study 1). The error bars indicate 95% confidence intervals.

the same product sold in single-use packaging, regardless of their level of environmental consciousness. Moreover, the results show that this effect is independent of whether the reusable packaging had the same appearance as the single-use packaging or a different appearance. Additionally, reusable packaging was perceived as more environment-friendly than single-use packaging, confirming prior research (Barr et al., 2001; Magnier & Crié, 2015). Compared to single-use packaging, reusable packaging also leads to a better attitude towards the product and an increase in perceptions of product quality.

Interestingly, perceived convenience was not significantly inferior for the reusable spray bottle, which was in line with our expectations because of the proposed service but does not confirm existing studies on refillable packaging (Lofthouse et al., 2009). Furthermore, by showing that attitudes towards convenient reusable packaging are relatively high, our results contribute to recent literature indicating that consumers are willing to pay more for reusable packaging alternatives that are easily returnable (Schuermann & Woo, 2022).

While our results are generally positive, it should be noted that this study used only one product category, consequently generalisation to other product categories may require further research. Furthermore, all-purpose cleaner is a non-sensitive product, for which reusable packaging might not be considered an issue. This latter point could explain why results show no difference in perceived contamination between the single-use and reusable packages. Previous research has questioned whether consumers would consider reusable packaging to be safe for more sensitive products (Coelho et al., 2020). As a result, it is unclear whether similar results would be obtained if this study were repeated with a sensitive product (such as a dairy product). Consequently, in the following study, we compare responses to single-use and reusable packaging for a sensitive product.

3. Study 2

This study aimed to evaluate consumers' responses to reusable packaging compared to conventional single-use packaging when it comes to protecting a sensitive product (i.e., a dairy product). We further test whether these responses vary according to individual environmental consciousness.

3.1. Method

3.1.1. Stimuli

Greek-style yoghurt, a dairy product, was selected as a sensitive product at risk of spoilage (Coelho et al., 2020). A professional designer created two visual stimuli, identical in all their characteristics except for the appearance of their material, to accompany each of the scenarios in this experiment. The single-use package consisted of a plastic-looking pot, and the reusable package consisted of the same pot with a metallic appearance (Fig. 4). Based on the results of Study 1, which did not highlight significant differences between the two types of reusable packaging, and prior research showing the risk of deformation caused by the cleaning of reusable plastic packaging for food products (Nahar et al., 2022), we decided not to include the reusable plastic condition in this experiment.

Fig. 4. Single-use (left) and reusable (right) packages shown in Study 2.

3.1.2. Participants and procedure

Ninety-one individuals (54 females) were recruited on the Prolific platform to participate in this experiment. Their mean age was 44.2 years ($SD = 12.61$). This sample size corresponds to the results yielded with a power analysis with large effect size. This study consisted of an experiment following a between-subjects design with two experimental conditions (packaging type: single-use vs reusable).

As in the previous case, the experiment was divided into four parts: a consent form, a scenario, a questionnaire and a manipulation check. All participants read a scenario similar to the one presented to participants in Study 1, in which they had ordered a pot of Greek-style yoghurt online (the scenarios for this study are presented in the Supplementary Materials, Part 1). Depending on the condition, the yoghurt was sold in either a single-use or a reusable pot, and participants were presented with a photorealistic rendering of the product. Similar to Study 1, participants had to remain on the page with the scenario and the picture of the product for at least 40 s to ensure that they had time to examine it well.

3.1.3. Measures

Participants were asked to rate the pot of yoghurt on several measurement scales, based on the scenario they had read. In the questionnaire, they were first asked to rate their behavioural intentions towards the product (*intention to repurchase* ($\alpha = 0.99$) and *intention to recommend* ($\alpha = 0.91$)). They were then asked to rate various measures of overall attitude and product perception, such as their *attitude towards the product* ($\alpha = 0.92$), *perceived quality* ($\alpha = 0.92$), *perceived contamination of the packaging* ($\alpha = 0.74$), and the *environment-friendliness* of the packaging ($\rho = 0.93$). The scales were identical to those used in Study 1. Considering that in this experiment we did not have a reusable bottle with the same appearance as the single-use one, we also measured the *aesthetic appearance of the packaging* using a single 7-point Likert scale. Similar to Study 1, we measured EC ($\alpha = 0.92$) to control for the potential effect of individual consciousness on the results. Finally, the same manipulation check was applied as in Study 1.

The manipulation check consisted of a two-option multiple-choice question asking participants to indicate whether the packaging of the yoghurt they had purchased in the scenario was Single-use (aimed to be disposed of after use) or Reusable (aimed to be reused after use).

3.2. Results

3.2.1. Manipulation and confounding checks

As in Study 1, we checked whether participants had read the scenario correctly. All participants in the reusable condition ($N = 45$) indicated that the packaging they had received was reusable. Of the participants who were assigned to the single-use condition ($N = 46$), 11 participants indicated that the package was reusable. Again, we ran all analyses both with and without these individuals, found no difference in the results, and therefore kept them in the sample.

We also tested for differences in terms of perceived aesthetic appearance by conducting a *t*-test with the type of packaging as the independent variable and aesthetic appearance as the dependent variable, and found no significant difference between the stimuli ($p = .18$).

3.2.2. Effects of packaging type on behavioural intentions

Similar to Study 1, we first conducted ANCOVAs with packaging type as the independent variable, *intention to recommend* and *repurchase intention* as the dependent variables, and EC as the covariate. Given that the covariate was non-significant in all the analyses, we report the results of the independent t-tests.

The results indicated that there was a significant effect of the type of package on the intention to recommend ($t(89) = -3.24$, $p < .01$, *Cohen's*

d = 0.68). Participants were more likely to recommend products in reusable packaging ($M_{reusable}$ = 5.06) than products in single-use packaging ($M_{single\text{-}use}$ = 4.10). Results with the variable repurchase intention were however not significant ($M_{reusable}$ = 4.89; $M_{single\text{-}use}$ = 4.43; t(89) = -1.23, p >.22), indicating that overall, participants were not more likely to repurchase the reusable pot of yoghurt than the single-use one.

3.2.3. Effects of packaging type on overall attitude and product perceptions

We then performed ANCOVAs with *attitude towards the product*, *perceived product quality* and *perceived contamination* as the dependent variables, packaging type as the independent variable and EC as the covariate. Again, EC was not significant in any case, so the results of the independent t-tests are shown below.

First, the results demonstrated a significant effect of the packaging type on the attitude towards the product (t(89) = -2.80, p <.01, *Cohen's d* = 0.59). Participants' attitudes were more positive towards the reusable packaging ($M_{reusable}$ = 5.56) than towards the single-use one ($M_{single\text{-}use}$ = 4.82). Similarly, participants perceived the quality of the product in the reusable packaging to be significantly higher than that of the product in the single-use packaging ($M_{reusable}$ = 5.13; $M_{single\text{-}use}$ = 4.45; t(77.54) = -2.94, p <.01, *Cohen's d* = 0.62). Interestingly, in this scenario, there was a significant effect of the packaging type on perceived contamination (t(78.46) = -2.36, p <.05, *Cohen's d* = 0.50), with participants assessing the reusable packaging ($M_{reusable}$ = 2.76) as more contaminated than the single-use one ($M_{single\text{-}use}$ = 2.23). However, it should be noted that the contamination scores were relatively low.

3.2.4. Effects of packaging type on environment-friendliness

Given that EC as a covariate was also not significant in an ANCOVA with *environment-friendliness* as the dependent variable and packaging type as the independent variable, we performed an independent *t*-test with *environment-friendliness* as the dependent variable and packaging type as the independent variable. The results demonstrated a significant effect of packaging type on packaging environment-friendliness (t(78.85) = -7.84, p <.001, *Cohen's d* = 1.64), indicating that the reusable packaging ($M_{reusable}$ = 6.08) was perceived as more environmentally friendly than the single-use one ($M_{single\text{-}use}$ = 3.76).

3.2.5. Moderating effect of environmental consciousness on repurchase intention

Given that we did not find any difference in terms of repurchase intention between the two conditions, but prior literature suggests that behavioural intentions may differ based on individual characteristics, we decided to check whether we would find differences in repurchase intention based on the environmental consciousness of our participants.

We conducted a moderation analysis using model 1 of the PROCESS macro (version 3.5) for SPSS (Hayes, 2018) with the packaging type as the independent variable, repurchase intention as the dependent variable, environmental consciousness (EC) as the moderator, a 95 % confidence interval and 5000 bootstrap samples. Our results demonstrated a significant interaction effect (0.83; p <.003) with a confidence interval between 0.29 and 1.36, excluding 0. Floodlight analyses further demonstrated that participants with a high level of EC were more likely to repurchase the reusable packaging than the single-use one (Johnson-Neyman point at M > 5.62; 45 % of the sample). In contrast, those with a low level of EC (Johnson-Neyman point at M < 3.05; 5 % of the participants) were significantly less likely to repurchase the reusable packaging.

3.3. Discussion

The results of this study show that the evaluation of products packaged in reusable packaging remains positive even for a sensitive product. Yet, in this case, the intention to repurchase products in reusable packaging was higher only among consumers with a high level of environmental consciousness. This aligns with previous research suggesting that the perceived contamination of reusable packaging used to market sensitive products could negatively affect consumer acceptance (Coelho et al., 2020), but suggests that such an effect only occurs for consumers with low environmental consciousness. This finding also adds to the existing literature showing that individuals with high EC are more likely to adopt environmentally friendly packaging (Magnier & Schoormans, 2015). Despite this finding, the results of this study suggest that overall perceptions about reusable packaging outweigh perceptions of single-use packaging. However, neither Study 1 nor Study 2 provided specific details about the single-use packaging involved, despite the fact that an increasing number of single-use packaging display cues of environmental friendliness (Magnier & Crié, 2015). Thus, it is questionable whether the differences found in Study 1 and Study 2 between reusable packaging and single-use packaging will hold for single-use packaging designed and marketed as more sustainable. Previous research has specifically shown that single-use food packaging made from recycled materials is perceived as more sustainable than packaging made from virgin materials (Polyportis et al., 2022). As a result, it is interesting to test whether consumer evaluations of reusable packaging will be superior to those of single-use food packaging made from recycled materials.

4. Study 3

The objective of this study was to compare consumer evaluations between a reusable packaging and a single-use packaging made from recycled materials. As in the previous study, a sensitive product was chosen (Greek-style yoghurt).

4.1. Method

4.1.1. Stimuli

The product category used in this study was again Greek-style yoghurt (i.e., a sensitive product). The same visual stimuli were used as in Study 2, except that the single-use yoghurt pot had a clearly visible logo indicating that the packaging was made of recycled plastic. The reusable pot of yoghurt was made of a durable metallic material, and all other characteristics remained identical (Fig. 5). Recycled plastic was selected as a sustainable packaging option because prior research has shown that it is generally perceived as such by individuals (Polyportis et al., 2022).

4.1.2. Participants and procedure

Eighty individuals (53 females) with a mean age of 27.04 years (*SD* = 7.33) recruited from the Prolific platform participated in this study. This sample size was defined based on a power analysis with large effect size. The experiment followed a between-subjects design with two conditions (packaging type: packaging made of recycled plastic vs. reusable packaging).

Fig. 5. Single-use made of recycled plastic (left) and reusable (right) packages shown in Study 3.

The same four-part structure used in the previous studies (i.e., a consent form, a scenario, a questionnaire and a manipulation check) was used again in this experiment. As in the previous studies, participants read a scenario describing that they had recently done their grocery shopping in their usual online supermarket and purchased a pot of Greek-style yoghurt (cf. Supplementary Materials, Part 1). Both scenarios were similar to those in Study 2, except that in the recycled plastic condition, the scenario indicated that the participant had selected a pot of yoghurt with a packaging made of recycled plastic. Each scenario was also accompanied by the photorealistic rendering of the corresponding pot of yoghurt. Finally, participants were required to remain on the scenario page for 40 s before proceeding to the questionnaire.

4.1.3. Measures

Similar to the two previous studies, participants were asked to rate their behavioural intention towards the product, namely *intention to recommend* (α = 0.92) and *repurchase intention* (α = 0.99). They were then asked to rate general attitude and product perceptions consisting of measures of *attitude towards the product* (α = 0.94), *perceived product quality* (α = 0.91) and *perceived contamination* (α = 0.86). They were also asked to evaluate the *environment-friendliness of the packaging* (ρ = 0.94). We also measured the aesthetic appearance *of the packaging* and individual *environmental consciousness* (α = 0.71).

The manipulation check consisted of a two-option multiple-choice question asking participants to indicate whether the packaging of the yoghurt they had bought in the scenario was recycled and single-use (aimed to be disposed of after use) or reusable (aimed to be reused after use).

4.2. Results

4.2.1. Manipulation and confounding checks

Three participants were excluded because they stated that the packaging they had received was recycled and single-use (aimed to be disposed of after use), while they were presented with a reusable packaging. Of the participants who were presented with the recycled packaging, three stated that it was reusable (aimed to be reused after use). Again, we ran all analyses both with and without these individuals for the reasons explained in Studies 1 and 2. We found no difference in the results and therefore kept these individuals in the sample. The final sample consisted of 77 individuals (Female = 56), with a mean age of 27.1 years (*SD* = 7.3).

We also conducted a *t*-test with the type of packaging as the independent variable and aesthetic appearance as the dependent variable and found no significant difference (p =.21).

4.2.2. Effects of packaging type on behavioural intentions

For each dependent variable, we first conducted an ANCOVA with the packaging type as the independent variable and EC as the covariate. When the covariate was not significant, it was removed from the analysis and the result of the independent *t*-test is presented instead.

The results of an independent *t*-test with intention to recommend as the dependent variable and packaging type as the independent variable indicated a significant effect of the type of package on the intention to recommend ($t(75) = -5.09$, $p < .001$, *Cohen's d* = 1.16; Fig. 6). Participants intended to recommend products in reusable packaging ($M_{reusable} = 5.86$) more than products in single-use recycled packaging ($M_{single\text{-}use} = 4.37$).

Interestingly, and contrary to the results of Study 2, the results with the variable repurchase intention were significant ($M_{reusable} = 5.55$; $M_{single\text{-}use} = 4.85$; $t(75) = -2.06$, $p = .04$, *Cohen's d* = 0.47; Fig. 7). Thus, overall participants seem to be more likely to repurchase the yoghurt in reusable packaging than in single-use packaging made from recycled materials.

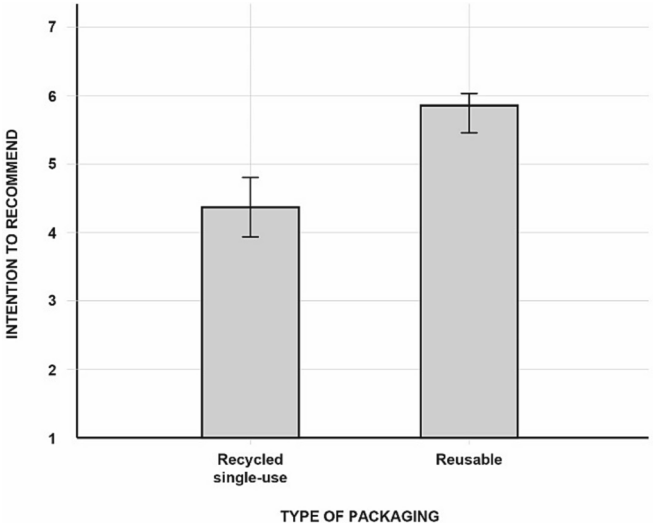

Fig. 6. Differences in intention to recommend between types of packaging (Study 3). The error bars indicate 95% confidence intervals.

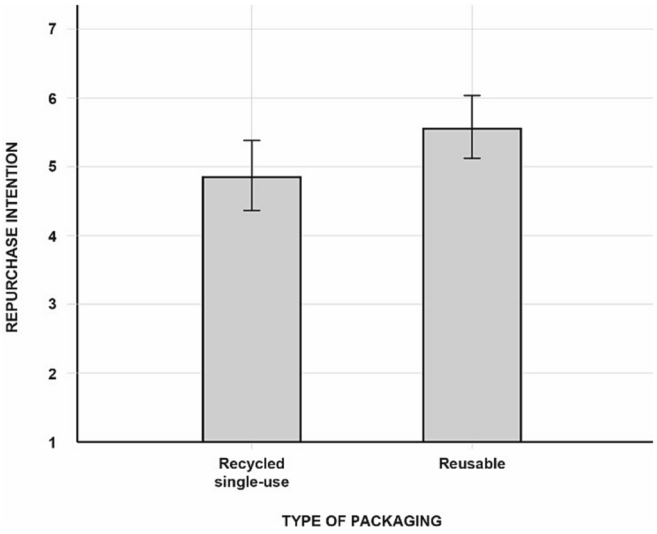

Fig. 7. Differences in repurchase intentions between types of packaging (Study 3). The error bars indicate 95% confidence intervals.

4.2.3. Effects of packaging type on overall attitude and product perceptions

First, the results of an ANCOVA demonstrated a significant effect of packaging type on attitudes towards the product after controlling for the effect of EC ($F(1, 74) = 10.60$, p =.002, $\eta^2 = 0.13$). Participants' attitudes were more positive towards the reusable packaging ($M_{reusable} = 5.99$) than towards the single-use one ($M_{single\text{-}use} = 5.19$). Similarly, participants perceived the quality of the product in the reusable packaging to be significantly higher than that of the product in the single-use packaging ($M_{reusable} = 5.39$; $M_{single\text{-}use} = 4.53$; $t(75) = -3.28$, $p = .002$, *Cohen's d* = 0.75). Again, there was a significant effect of the type of packaging on perceived contamination ($t(54.54) = -3.13$, $p = .004$, *Cohen's d* = 0.70), with participants assessing the reusable packaging ($M_{reusable} = 2.41$) as more contaminated than the single-use one ($M_{single\text{-}use} = 1.78$). However, as in previous studies, it should be noted that the contamination ratings were relatively low for both conditions.

4.2.4. Effects of packaging type on environment-friendliness

We conducted an independent *t*-test with packaging environment-friendliness as the dependent variable and packaging type as the independent variable. The results showed that the reusable packaging

($M_{reusable}$ = 6.27) was perceived as significantly more environmentally friendly than single-use packaging made from recycled plastic ($M_{single\text{-}use\_recycled}$ = 5.21; t(73.84) = -3.75, p <.001, *Cohen's d* = 0.85).

4.2.5. Mediating effect

In order to explore the underlying mechanisms by which reusable packaging influences repurchase intention, we decided to conduct a mediation analysis. Based on previous literature, we proposed that consumers are more likely to repurchase a product marketed in a reusable package because the type of packaging indirectly influences repurchase intention through its effect on environmental friendliness perception, consumer attitude and quality perception. According to our proposed model, consumers perceive reusable packaging to be more environmentally friendly than single-use packaging (Ertz et al., 2017; Lofthouse et al., 2009), which improves consumer attitudes towards reusable packaging (Ketelsen et al., 2020). In turn, this improved overall attitude towards the packaged product leads to a higher perceived quality of the product it contains (Magnier et al., 2016), which ultimately leads to a higher repurchase intention for reusable packaging than for single-use packaging (Wang et al., 2020). Therefore, given the existing literature on the subject, we considered it important to test this mediation model (Packaging type -> Packaging perceived environmental friendliness -> Attitude towards the packaged product -> Perceived product quality -> Repurchase intention). Thus, we conducted a serial mediation test (PROCESS macro v. 3.5, model 6 with 5000 bootstrap samples; Hayes, 2018) with packaging type (reusable or single-use) as the two-condition independent variable, environmental friendliness, attitude and quality as mediators (in that order), and repurchase intention as the dependent variable. The results support the mechanism described in this model (indirect effect = 0.14; 95 % CI: 0.02 to 0.34), and show that the direct effect of reusable packaging on repurchase intention is not significant (p =.15).

5. General discussion

This study aimed to analyse consumers' evaluations of reusable packaging in comparison to conventional single-use packaging, investigating how reusable packaging influences their perceptions of the packaged product and their behavioural intentions towards it. The results of three experiments show that overall, consumers tend to evaluate reusable packaging more positively than single-use packaging, regardless of the appearance of the reusable packaging (similar to the single-use packaging or different; Study 1), the type of single-use packaging involved (conventional or made from recycled plastic; Study 3), and the type of product contained in the packaging (sensitive or non-sensitive; Studies 1, 2 and 3).

5.1. Theoretical implications

Overall, our results demonstrate that consumers have positive attitudes towards reusable packaging, extending prior research by Ertz et al. (2017) on reusable products to the context of online FMCG shopping. We also show that this effect holds for products that are sensitive to spoilage even when the perceived contamination of the packaging is higher (although still low), providing answers to questions raised in prior literature (Coelho et al., 2020). Positive attitudes towards reusable packaging appear to be largely driven by perceived environmental benefits, as it is perceived as more environmentally friendly than single-use packaging. This also confirms prior literature on the negative perceptions of single-use packaging and the waste it generates (Ma et al., 2020; Steenis et al., 2017; Walker et al., 2021). In addition, our results indicate that these positive perceptions are higher for reusable packaging than for single-use packaging made from 100 % recycled materials, which is usually considered sustainable by consumers (Polyportis et al., 2022). Interestingly, consumer perceptions are in line with the principles of the circular economy (cf. Butterfly Diagram; Ellen MacArthur Foundation, 2015), where the inner loop regarding longevity through reuse is considered more virtuous than the outer loop regarding recycling.

In addition, our findings show that, with the exception of repurchase intention in Study 2, behavioural intentions were always more favourable for the reusable option. Specifically, the results of the floodlight analyses in Study 2 demonstrated that individuals with higher levels of EC were more likely to repurchase products in reusable packaging, confirming prior literature suggesting the role of EC in the adoption of reusable packaging (Cruz & Manata, 2020; Magnier & Schoormans, 2015). In contrast, individuals with lower levels of EC were more likely to repurchase the product sold in the single-use packaging. These findings add to prior literature on the influence of individual factors such as environmental consciousness in the adoption of more sustainable packaging (Magnier & Schoormans, 2015).

This study also provides further support to the literature on the effect of packaging on product inferences (Becker et al., 2011; Gil-Pérez et al., 2020; Magnier et al., 2016; Mugge et al., 2014), suggesting that products contained in reusable packaging are perceived to be of higher quality than those contained in single-use packaging. Moreover, by conducting a mediation analysis in Study 3, we were able to identify a significant serial mediation path that sheds light on the underlying mechanisms through which environmental packaging strategies can influence consumer behaviour. The results show that by improving attitudes towards the packaged product, the perceived quality of the product contained in the reusable packaging is perceived to be higher. Specifically, the mediation analysis suggested that the perceived environmental friendliness of the packaging improved the overall attitude towards the packaged product, which subsequently improved the perceived quality of the product contained in the reusable packaging. Moreover, these more positive perceptions led to higher intentions to repurchase the product compared to the same product in single-use packaging. These findings add to the existing literature on inferences about product quality based on packaging perceptions (Chen et al., 2020; Magnier et al., 2016; Mugge et al., 2014; Velasco & Spence, 2019), and require further research to analyse whether this effect may backfire in some cases, as the product may be perceived as more expensive as a result, discouraging some consumer groups from trying the reusable option (Völckner & Hofmann, 2007).

Furthermore, the findings of Study 1 contribute to the body of knowledge on reusable packaging by demonstrating that novel business models involving online shopping and returnable packaging (Coelho et al., 2020) seem to alleviate the perception of inconvenience highlighted in prior literature as a barrier to the adoption of reusable/refillable packaging (Lofthouse et al., 2009).

5.2. Practical implications

The results of this paper show that consumers appear to be positive about reusable packaging systems for FMCG and are therefore encouraging for designers, product and logistics managers and other actors of the value chain involved in the development of reusable packaging systems in this context. For example, this positive attitude could possibly also bring about benefits for retailers who would be perceived as more sustainable, which in turn might improve consumer brand loyalty (Gu et al., 2022).

Overall, we show that individuals claim to have a very positive view of this type of packaging and report that they are inclined to use it. However, the fact that consumers have a positive image of reusable packaging does not necessarily mean that they will have a positive image of a specific reusable system, nor that its implementation in the market will necessarily be successful. The ultimate acceptance of reusable packaging as an alternative to conventional single-use packaging will largely depend on the specifics of the reuse system itself, which were beyond the scope of this study. Due to the business model introduced in the scenarios, the perceived convenience of the two types of packaging

did not differ significantly from that of conventional single-use packaging. This highlights the importance of developing reusable packaging systems that are convenient and do not disrupt consumption experiences. More specifically, practitioners may want to focus on making the reuse systems convenient for both returnable and refillable systems. This could mean, for example, that the containers are designed to be easily portable or that the take-back service for used packaging allows the consumer to return it quickly so that it does not take up space in the home.

Additionally, the packaging used as stimuli in this study was branded and information regarding the product was available on the packaging, which could potentially hinder its graceful ageing due to, for example, colour fading and scratches (Lilley et al., 2019). We would like to advise practitioners to explore how to provide information about the product for neutral/ unbranded packages. In particular, the use of smart technologies might prove to be a valuable pathway in this regard (e.g., augmented reality; Bonetti et al., 2018; Hoffmann et al., 2022).

5.3. Limitations and avenues for future research

Although these studies demonstrate the potential of reusable packaging, they are not free from limitations, which could lead to future studies. Firstly, these studies were conducted with pre-defined scenarios and participants did not physically interact with the reusable packages. It is plausible that participants would have had a different experience when interacting with the packaging in real-life situations. Moreover, although previous research has found behavioural intentions to be good predictors of behaviour (Klöckner, 2013), the literature advises to take these results with caution. Many studies based on the application of Ajzen's Theory of Planned Behaviour (1991) refer to an "attitude-behaviour gap" (Nguyen et al., 2019), which describes the fact that intentions are not always followed by actions (Hanss et al., 2016; Peattie, 2010). Specifically, previous studies have shown that pro-environmental attitudes and values do not always translate into green actions (Auger & Devinney, 2007; Gatersleben et al., 2002; Kollmuss & Agyeman, 2002; White et al., 2019; Young et al., 2010), and that factors such as subjective norms, perceived behavioural control or consumer motivation can also influence behaviour (Ertz et al., 2017). Future studies could broaden the scope of this research by also considering factors proposed in other approaches adopted in the literature (Long et al., 2022; White et al., 2019; Yan et al., 2022) or strive to explore consumers' responses towards reusable packaging systems in field studies in order to enhance their ecological validity.

It is worth highlighting that the aim of this study was to analyse attitudes and behavioural intentions towards the concept of reusable packaging itself, and not towards a specific reusable packaging system. Thus, future studies should analyse the details of the possible reusable systems used to acquire and return the reusable packaging to assess whether the positive consumer evaluations shown in the results of this study hold true, and to identify possible barriers to their uptake. For example, the reusable packaging system described in the scenarios consisted of a 'branded' returnable packaging delivered to and collected from participants' homes (Coelho et al., 2020). Different types of reusable packaging systems are likely to lead to different evaluations. Furthermore, it would be interesting to replicate the studies reported in this paper with other types of reusable packages, such as refillable packaging with in-store dispensers, and to explore the extent to which individual responses would differ from those presented in this paper. Similarly, it is important to note that both our study involving a non-sensitive product and our studies involving a sensitive product were actually conducted with only one product category: all-purpose cleaner and yoghurt, respectively. Future studies could focus on replicating our results on different product categories. For example, it would be worthwhile to test other product categories sensitive to microbial contamination such as ice cream, cream cheese or other animal products.

Using the same design for single-use and reusable packaging was not be possible for all product categories. Specifically, for the sensitive product, we deemed it unsuitable to compare the reusable packaging with a metal appearance to a reusable packaging that would have the same look as the single-use one. Future studies could therefore replicate the results of Study 1 with other product categories that allow this type of comparison. In addition, it would be interesting to replicate our results with different types of material appearance for the returnable packaging design.

Product prices were deliberately not included in the scenarios and were thus assumed constant between the single-use and the reusable options. However, reuse initiatives are still often small-scale and marketed with a price premium. Future research could determine the extent to which consumers are willing to pay more for their products to prevent packaging waste, while still ensuring a large adoption (Bocken et al., 2022; Miao et al., 2023). Similarly, the deposit was only briefly mentioned as a small amount of money to be refunded on return of the packaging, and the scenario stated that the participant would only receive one product. As a result, this situation was unlikely to result in a significant upfront financial investment. Future research could investigate how the amount of the deposit, in combination with the number of containers required, might influence adoption (Grimes-Casey et al., 2007).

Reusable packaging is often made of more resistant materials than single-use packaging, such as glass or metal, which have a greater environmental footprint than that of plastics or paper commonly used in single-use packaging (Lindh et al., 2016; Steenis et al., 2017). The number of times the packaging is reused is therefore critical to ensuring its environmental benefits, as reusable packaging that is discarded after only a few uses can have a greater environmental impact than single-use packaging (Baird et al., 2022). Future research should therefore focus on finding ways to encourage consumers not only to buy their products in reusable packaging, but also to continue to reuse them (or return them to the system to be reused) thereby ensuring their environmental success.

Although it was not explicitly mentioned that the packages had never been used before, the scenarios explained that this was a new initiative by the retailer and the image showed a flawless packaging. In practice, however, the packages would likely show some signs of wear and tear after multiple uses. While Baird et al. (2022) show that above a certain level consumers are unlikely to accept such packages, it would be interesting to study how the level of acceptance of signs of wear and tear might differ between product categories. Different strategies to reduce the negative impact of wear and tear on the acceptance of reused packaging could also be developed and tested in future research.

Finally, it is important to note that although the types of packages used in this study would allow for branding, no recognisable brand name was mentioned on the packages. However, future research could explore how consumers respond to different types of brands sold in reusable packaging. Although reusable packaging can be expected to fit well with brands that already have a sustainable image due to congruence (Miyazaki et al., 2005; Steenis et al., 2022), it is unclear how its use might influence perceptions of different types of brand.

6. Conclusions

The aim of this study was to use a consumer research approach to analyse consumer response to the use of reusable packaging in the fast-moving consumer goods sector. The results show that attitudes towards reusable packaging appear to be positive, even better than towards other sustainable single-use alternatives such as recycled plastic packaging. The results also show that this positive attitude is independent of the material of the reusable packaging and the sensitivity of the product it contains. However, there is no doubt that the acceptance and success of reusable packaging systems is conditioned by the specifics of the service in which they are offered. Aspects such as how the packaging is returned, how it is integrated with the rest of the products in the

purchasing process, the price difference compared to traditional single-use alternatives, or signs of wear and tear will all influence the acceptance and success of these circular models. These results are however encouraging for companies, practitioners and researchers seeking to improve the sustainability of FMCG products and logistics.

CRediT authorship contribution statement

Lise Magnier: Conceptualization, Methodology, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Ignacio Gil-Pérez:** Conceptualization, Methodology, Visualization, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.foodqual.2023.105037.

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