



R3PACK – REDUCE, REUSE, RETHINK PACKAGING TOWARDS NOVEL FIBRE-BASED PACKAGING AND REUSE SCHEMES

Grant Agreement No. 101060806

Work package: WP2 – Market analysis and Consumers' behavioural change and engagement

Tasks: 2.3, 2.4, 2.5, 2.6

Deliverable: 2.2a – Guidelines for promoting behaviour change and social innovation.

Dissemination level: Public

Issue date: 20-11-2025

Lead beneficiary: Aarhus University (AU)

DOCUMENT INFORMATION

HISTORY OF CHANGES		
Version	Publication date	Changes
1.0	23-01-2024	Initial version
2.0	28-02-2025	Tasks 2.3,2.4 (partially) and 2.5 that are completed are presented
3.0	20-11-2025	Tasks 2.3, 2.4, 2.5 and 2.6 are completed and presented.

ADDITIONAL AUTHOR(S) CONTRIBUTION	
Name	Organization
Polymeros Chrysochou	Aarhus University
Arne Hørlück Høeg	Aarhus University
Nour Elhouda Zarrougui	Aarhus University
Vittoria Favari	Aarhus University
Jorge Rincon	Aarhus University
Gian Lucas Pasin	Italian National Research Council (CNR)
Vito Trianni	Italian National Research Council (CNR)

DOCUMENT DISTRIBUTION		
Issue	Date	Distributed to

VERIFICATION AND APPROVAL		
	Date	Distributed to
Amandine Combet, Manon Bessone	27-11-2025	European Commission

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Executive Summary

This deliverable presents results carried out within Work Package 2 on “Market analysis and consumers’ behavioural change and engagement”. Specifically, the results presented in this report stem from Task 2.3 “Consumer beliefs and choice context mapping”, Task 2.4 “Improving consumer acceptance of reuse systems and paper-based packaging”, Task 2.5 “Leveraging social norms for optimizing reuse systems and paper-based packaging” and Results from Task 2.6 “Intervention studies to maximize behaviour change”.

Task 2.3 examines consumer beliefs and maps the choice context for packaging reuse through a systematic literature review, two online surveys in Belgium and France, and focus group interviews. These studies investigate drivers of consumer acceptance, such as sustainability perceptions and economic incentives, as well as barriers, such as concerns about hygiene, convenience, and cost, that influence the adoption of reusable packaging. Task 2.4 builds on these insights to improve consumer acceptance of reuse systems and fiber-based packaging through a review of communication strategies and a series of online experiments. These experiments evaluate the impact of message framing (gain vs. loss frames) and self-construal level (independent vs. interdependent), with visual support, on purchase intention for food products in reusable packaging and on the return likelihood of reusable packaging. Task 2.5 focuses on exploring the extent to which social norms are responsible for consumer behaviour and can drive behaviour change in reuse systems and paper-based packaging. This task examines how economic incentives, and social norms influence individuals' willingness to return reusable packaging through a survey conducted in France and highlights the importance of fostering a sustainable culture to boost return rates. Finally, Task 2.6 builds on the previous tasks by testing behavioural interventions in real-world retail settings to support the adoption of reusable and fiber-based packaging. An intervention study was carried out with households in France during the demonstration phase, in collaboration with retail partners. Households were exposed to gain-framed “WE” or “YOU” messages through in-store materials and were followed across multiple survey waves to monitor purchase intention, return likelihood, self-reported behaviour, and preferences for fiber-based packaging. This task provides insight into how simple communication interventions can support behaviour change during real shopping experiences.

Guidelines for promoting behaviour change and social innovation

The following guidelines synthesize insights from Work Package 2 and outline best practices for encouraging both the adoption of reusable food packaging systems and the substitution for more sustainable packaging alternatives. To reflect the evidence accurately and support practical implementation, the guidelines are divided into: Reuse-specific guidelines, Cross-

cutting guidelines that apply to both reuse and substitution, and Substitution-specific guidelines.

A. Guidelines Specific to Reuse Systems

Context and System Design

The success of a reuse scheme depends strongly on how the system is designed and how easily it integrates into consumers' daily routines. Key elements include the availability of products in reusable packaging, simple and accessible return points, and clear information about how the system works. Safety and hygiene concerns are particularly relevant in this context, making transparent sanitation procedures and quality assurances essential for building trust.

Economic Incentives and Return Rates

Deposit return systems and other financial incentives can support engagement, particularly at early adoption stages. However, long-term environmental benefits depend on consistent return behaviour. Return rates strongly influence the actual ecological performance of reusable packaging, making it important to integrate reminders, cues, and reward structures that encourage repeated participation.

Social Norms Supporting Adoption and Return

Social norms play a central role in the effectiveness of reuse systems. Communicating high participation rates and visibly integrating reuse within local communities can increase willingness to adopt and return packaging. Both descriptive norms ("what others do") and injunctive norms ("what one should do") have been shown to increase engagement, and strong social norms can outperform small economic incentives in shaping return behaviour over time.

Practical Considerations in Everyday Use

Daily-life considerations, such as perceptions of hygiene, ease of cleaning, and the effort required to return packaging, significantly influence behaviour. Clear communication about product safety, design features that make packaging easy to clean, and a return process that requires minimal effort can help reduce perceived barriers.

Segmented Approaches for Different Consumer Groups

Consumers differ in what motivates them to participate in reuse systems.

- Right-leaning consumers tend to respond more strongly to financial incentives, particularly in contexts where social norms are not yet well established.
- Left-leaning and centrist consumers are more responsive to social proof and value-driven messages that emphasize collective environmental action.
- Individuals with limited prior experience benefit from low-risk introductory opportunities and partnerships with familiar brands, as positive initial experiences predict future engagement.

B. Cross-Cutting Guidelines for Reuse and Substitution

Price Format and Perceived Fairness

Transparent price communication supports acceptance of both reusable and fiber-based packaging solutions. Presenting packaging costs separately from product costs can enhance perceived fairness and help consumers understand the purpose of fees or premiums.

Message Framing and Communication Strategies

Communication strategies benefit from being data-driven and informed by consumer psychology. Gain-framed messages that highlight the benefits of participation, along with visuals that support understanding, can increase engagement. Aligning messages with consumers' self-construal, such as emphasizing personal benefits for individuals with an independent orientation, further strengthens effectiveness.

Targeting Early Adopters While Supporting Scalability

Environmentally conscious consumers often act as early adopters and can help demonstrate the feasibility and advantages of sustainable packaging. However, relying too heavily on this segment can limit wider adoption. Communication and system design should therefore appeal to mainstream consumers by emphasizing convenience, financial benefits, and social acceptance.

C. Guidelines Specific to Substitution Toward Sustainable Packaging

Supporting the Transition to Fiber-Based Packaging

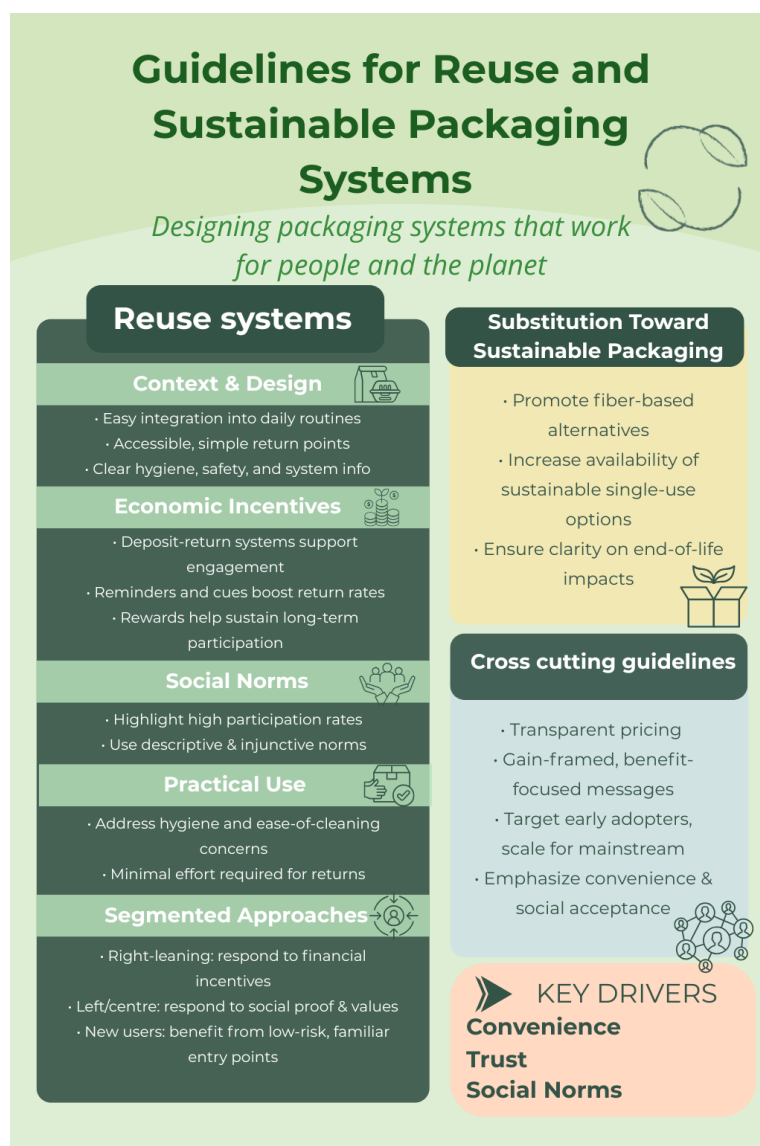
For consumers who may be hesitant to adopt reusable packaging, substituting to more sustainable single-use options such as fiber-based materials can still offer environmental

advantages. Promoting awareness of these alternatives, improving availability, and communicating their benefits can support substitution when reuse is not feasible.

Ensuring Clarity on Environmental Benefits

Clear and credible communication about the environmental performance of fiber-based packaging can help strengthen consumer trust and acceptance. Transparency regarding recyclability, resource use, and end-of-life impacts is important to avoid confusion and to reinforce the value of choosing more sustainable alternatives.

To support practical implementation, the following infographic summarises the key guidelines presented above. It provides a visual overview of the main principles for promoting behaviour change toward reusable and sustainable packaging systems.



Key findings

1. Task 2.3: Consumer beliefs and choice context mapping (Task Leader: AU)

Task 2.3 aimed to explore consumer beliefs, perceptions and willingness to pay for both food packaging reuse and fiber-based packaging through several complementary studies.

In the **exploratory study**, which included two online surveys in Belgium and France, the results on **reuse** showed a generally positive attitude towards reusable packaging, although consumers expressed some hesitation. In particular, on-the-go reuse options were perceived as more affordable compared to return from home systems, which were perceived as more expensive. Quality, functionality, durability, safety, convenience and the availability of deposit refunds were identified as key purchase drivers, while taxes and peer behaviour had little impact. Nearly half of the respondents preferred a weekly return routine at large supermarkets, and deposit refunds emerged as the most compelling incentive.

The study also included a focus group component that explored consumer beliefs about fiber-based packaging. These discussions revealed relatively low consumer awareness, with only 36% of Belgian and 51% of French consumers familiar with reusable fiber-based packaging. However, participants associated fiber-based packaging with strong environmental and recyclability benefits, although it was not perceived as cost-saving. More than 70% of consumers considered fiber-based packaging suitable for a wide range of food products, especially dry goods, while its applicability for liquid and greasy products was considered less. Although moderate price concerns were expressed, with expectations of a slight price increase of around 5-6 %, overall purchase intentions remained generally positive, especially among French consumers.

Separate **focus group interviews** in France and Belgium provided deeper qualitative insights. Participants criticized plastic packaging as excessive and difficult to avoid because of its convenience, low cost, and complicated recycling process. They saw reusable packaging as both environmentally and financially beneficial, although concerns were raised about convenience, lifestyle adjustments, and potential social judgment. Participants emphasized that clear information, financial incentives such as refunds or price reductions, and accessible drop-off points are critical to adoption. A positive public image, supported by policies such as taxes on single-use plastics, was also seen as essential to motivate both consumers and businesses to adopt sustainable packaging practices.

Together, these findings provide a comprehensive understanding of the factors that influence consumer behaviour toward packaging reuse and fiber-based packaging. They provide

actionable insights to inform effective strategies for promoting sustainable packaging solutions.

2. Task 2.4: Improving consumer acceptance of reuse systems and paper-based packaging (Task Leader: AU)

Task 2.4 aims to increase consumer acceptance of reuse systems and sustainable packaging by investigating effective communication strategies. In its **first phase**, three online communication experiments were conducted to examine how message framing (gain vs loss) and self-construal level (independent vs interdependent) influence consumer purchase intention and return likelihood for reusable packaging.

In the **first online pilot experiment**, the comparison between environmental and economic frames revealed no significant differences, allowing the two to be merged for subsequent analyses. Overall, gain framing produced a marginally higher purchase intention than loss framing, and messaging that addressed consumers on an individual basis ("YOU") yielded slightly higher intentions compared to a collective ("WE") approach. In addition, participants in the gain condition reported a higher willingness to return reusable packaging, with a notable interaction observed for both emotional response and engagement.

The **second pilot experiment** further refined these insights. Although purchase intention was not significantly affected by framing or self-construal level alone, it increased significantly when gain framing was paired with an individual perspective. Return likelihood similarly rose under gain framing, with evidence of a borderline interaction suggesting additional benefits for "YOU" messaging. Mediation analysis showed that emotion played a significant role in mediating the impact of framing on both purchase intention and return likelihood, and engagement further amplified this relationship. Incorporating visuals and merging environmental and economic content resulted in higher overall purchase intention and return likelihood compared to the earlier study.

The **main online study** conducted in Belgium and France showed that while message framing and self-construal level had limited direct effects on the measured constructs, a significant interaction effect was observed in Belgium regarding purchase intention. This finding implies that the combination of framing and self-construal level can influence consumer willingness to purchase reusable packaging in certain contexts. In addition, covariates such as the perceived realism of the message, along with demographic factors such as age and gender, emerged as important predictors, highlighting the role of personal and perceptual factors in shaping consumer responses.

Together, these experiments demonstrate that tailored message framing, particularly gain framing and individual ("YOU") messaging, especially when supported by visual elements, can effectively enhance consumer attitudes and behaviours toward reusable packaging. These findings provide a valuable foundation for developing communication strategies to promote sustainable packaging solutions.

3. Task 2.5: Leveraging social norms for optimizing reuse systems and paper-based packaging (Task Leader: ISTC-CNR)

Task 2.5 examines how economic incentives, social norms, and individual characteristics influence the adoption and return of reusable packaging, thereby optimizing reuse systems and paper-based packaging. A **survey** and **survey experiment** conducted with a nationally representative French sample (n=3060) revealed several key insights across three objectives.

First, regarding packaging choice, political identity and prior experience emerged as the strongest predictors, with right-wing political orientation significantly reducing adoption likelihood and prior usage experience showing a clear gradient from frequent users to unwilling non-users. Practical daily-life concerns outweighed abstract environmental benefits, with hygiene perceptions and resource savings significantly influencing choices while environmental impact perceptions showed no significant effect.

Second, in testing informational nudges, both descriptive social norms and injunctive normative messages proved equally effective at increasing reusable packaging choice **across waves (longitudinal)**, with no significant difference between message types, indicating they function as viable substitutes for communication campaigns.

Third, concerning return behavior, high economic incentives (€1 reward) significantly increase return rates, while low incentives (€0.20) provide no additional benefit over no incentives. Social norms demonstrated even stronger effects, with high norms increasing return probability by 5% compared to low norms. Crucially, social norms dominate economic incentives - when strong norms are present, incentives show limited additional impact, while in normative vacuums, economic incentives become essential, particularly for right-leaning individuals who show greatest responsiveness to financial rewards. Political orientation consistently moderates these effects, with left-leaning individuals showing higher intrinsic motivation on while right-leaning respondents demonstrate greater sensitivity to extrinsic incentives.

These findings underscore the importance of combining targeted approaches that consider political demographics, prioritize practical concerns over environmental arguments, and

strategically align economic incentives with social norm development to optimize reusable packaging systems.

Task 2.6: Intervention studies to maximize behavior change

Task 2.6 built on our earlier work by testing in real stores whether gain-framed “WE” versus “YOU” messages could boost people’s intentions to buy and return reusable packaging. We recruited about 100 households in Wave 0, 70 in Wave 1, and 39 in Wave 2.

Cross-sectional results: At each wave, there was no clear difference between the WE and YOU messages for purchase intention or return likelihood.

Longitudinal panel (n = 39): Those exposed to WE showed a small increase in return likelihood at Wave 0 that disappeared by Wave 2, while purchase intention stayed high and stable in both groups.

In plain terms, simply framing the message as “WE” or “YOU” gave only a brief lift in people’s willingness to return packaging, and it had no lasting effect on buying intentions. Sustained behavior change will likely require additional tools—such as deposit systems or social-norm cues—alongside message framing.

Challenges

The implementation of the field experiment and intervention study required extensive coordination with retail partners, which introduced several practical constraints. Although initial plans aimed to involve multiple retailers, only one partner ultimately granted in-store access, limiting the study to two locations. Securing approval, aligning procedures, and coordinating timelines required several months of negotiation, which delayed the start of activities and reduced the flexibility available for analysis once data were received. In addition, daily sales data were delivered several months after the experiment, further compressing the analysis and reporting period.

Recruitment for the intervention study also proved challenging. Despite combining in-store engagement, email follow-ups, and targeted online advertising, the final sample remained smaller than initially planned. The limited number of participating stores and the highly localised nature of the study restricted the pool of potential participants, which affected retention across waves and reduced the size of the longitudinal sample.

Overall, these challenges reflect the realities of conducting behavioural field research in operational retail settings, where research timelines must adapt to partner procedures and

where logistical constraints can affect recruitment, data availability, and the generalisability of findings.



Introduction

The escalating environmental impact of single-use plastics has prompted a critical search for sustainable packaging solutions. Reusable packaging systems and fiber-based alternatives offer promising strategies for reducing waste, conserving resources, and lowering the environmental footprint of packaging. However, their effectiveness depends fundamentally on consumer behaviour, a complex phenomenon influenced by individual beliefs, communication strategies, and behavioural incentives.

Task 2.3 of the R3PACK project investigates consumer beliefs and maps the choice context for packaging reuse through a comprehensive literature review and complementary studies. The literature shows that consumer acceptance is driven by positive environmental attitudes and green consumerism (Magnier & Gil-Pérez, 2021; Miao et al., 2022), but practical barriers remain. Consumers' willingness to engage with reuse schemes is moderated by factors such as convenience, hygiene, and cost. For example, while economic incentives such as deposit refunds can motivate participation, misconceptions about the environmental benefits of recycling versus reuse often inhibit behavior (Lindh et al., 2016; Kunamaneni et al., 2019). In addition, the design of reuse systems, including structural features and communication approaches, plays a critical role in shaping consumer perceptions and adoption.

Building on this foundation, Task 2.4 examines how effective communication strategies can increase consumer acceptance of reuse systems and sustainable, paper-based packaging. Based on theories such as prospect theory (Kahneman & Tversky, 1979) and self-construal theory (Markus & Kitayama, 1991), the literature indicates that message framing significantly influences consumer behaviour. Research shows that gain-framed messages, particularly when delivered from an independent "you" perspective and supported by visual elements, are more effective at increasing purchase intention and encouraging the return of reusable packaging (Lee & Pounders, 2019; Lin et al., 2012). This suggests that tailoring sustainability messages to resonate with individual values can help bridge the gap between positive attitudes and actual pro-environmental behaviour.

Task 2.5 further explores the role of economic incentives and social norms in optimizing the return phase of reusable packaging. Based on rational choice theory, this research posits that individuals are more likely to return packaging when the benefits, such as financial rewards, outweigh the costs. In addition, social norms, defined as shared beliefs about acceptable behaviour (Bicchieri, 2005), exert a strong influence on consumer behaviour. When consumers perceive returning packaging as a widespread and socially sanctioned practice, their willingness to engage increases significantly.

Together, these tasks provide a comprehensive framework for understanding and influencing consumer behaviour in the realm of sustainable packaging. By integrating insights into consumer beliefs, message framing, and the interplay between economic incentives and social norms, the R3PACK project provides actionable recommendations for policy makers and industry stakeholders. These strategies are essential for promoting the adoption of reusable and fiber-based packaging solutions and ultimately fostering a culture of sustainability.

Objectives

Task 2.3: Consumer Beliefs and Choice Context Mapping (Task Leader: AU)

The primary objective of Task 2.3 is to gain an in-depth understanding of consumer beliefs related to packaging reuse, recyclability, and upcycling, including sustainable fiber-based packaging. This task aims to map the consumer choice context by identifying key drivers, barriers, and individual factors that influence acceptance of reusable packaging. Findings from this task will help define target audiences for subsequent intervention studies by outlining the characteristics, preferences, and behavioural patterns that shape consumer engagement.

Task 2.4: Improving Consumer Acceptance of Reuse Systems and Paper-Based Packaging (Task Leader: AU)

Task 2.4 focuses on identifying effective communication strategies to increase consumer acceptance of reuse systems and sustainable packaging alternatives. The objective is to explore how tailored message framing, including gain versus loss approaches and individual versus collective self-construal, can enhance purchase intentions and return behaviours. By understanding the role of these communication factors, this task seeks to provide actionable avenues to improve consumer acceptance and support the transition to more sustainable packaging practices.

Task 2.5: Leveraging Social Norms for Optimizing Reuse Systems and Paper-Based Packaging (Task Leader: ISTC-CNR)

The objective of Task 2.5 is to examine the extent to which social norms influence consumer behaviour in the context of reusable packaging. This task examines how economic incentives, and social pressures interact to drive behavioural change, specifically regarding the return of reusable packaging. By analyzing the power of social norms and their interplay with monetary

rewards, this task provides insights into how fostering a culture of sustainability can optimize the effectiveness of reuse systems and paper-based packaging initiatives.

Task 2.6: Intervention Studies to Maximize Behavior Change (Task Leader: AU)

The objective of Task 2.6 is to test, in real-world grocery settings, whether simple gain-framed “WE” versus “YOU” messages can turn positive intentions into actual reuse and recycling habits. In collaboration with Carrefour, AU will recruit 50 households in France at two pilot stores, expose them to in-store banners and leaflets, and then track their purchase intention, return likelihood, self-reported behavior, and fiber-packaging preferences over three online survey waves. By comparing outcomes across framing conditions and over time, this task will pinpoint which message approach most effectively embeds sustainable-packaging practices into everyday shopping routines.

1. Task 2.3: Consumer beliefs and choice context mapping (Task Leader: AU)

1.1 Literature review

Introduction

This report presents the findings of a systematic literature review on consumer beliefs regarding packaging reuse schemes, alongside a non-systematic review of consumer acceptance of fiber-based packaging. It also incorporates insights from a literature review on plastic packaging recycling and avoidance conducted by colleagues at Aarhus University (Jacobsen et al., 2022).

The report begins by outlining the key drivers and barriers influencing consumer acceptance of packaging reuse schemes. It then examines the factors shaping consumer behaviour toward packaging recycling and avoidance. Following this, the report explores the main drivers impacting the adoption of fiber-based packaging. Finally, it concludes with a set of recommendations to guide future R3PACK activities.

Consumer beliefs about packaging reuse schemes

The model summarizing the findings from the literature review (**Error! Reference source not found.**) highlights three primary factors influencing the adoption of packaging reuse schemes: (1) individual factors, referring to consumer characteristics; (2) context and scheme design, which includes elements such as incentives and structural features of the reuse scheme; and (3) product and packaging, encompassing the type of packaging material used. The influence of these factors on adoption is further shaped by two moderating elements: (1) communication, relating to message framing, and (2) market readiness, which considers regulatory frameworks, cultural context, and consumer familiarity with reuse schemes. The following sections provide a detailed overview of each factor.

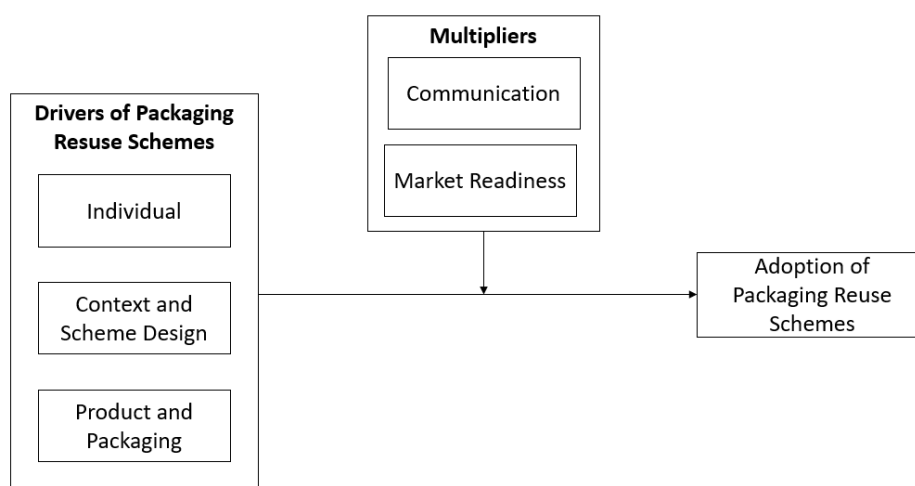


Figure 1 Model on consumer adoption of packaging reuse schemes

Individual factors

Consumers generally hold positive attitudes toward packaging reuse schemes, regardless of the type, whether refill at home, refill on the go, return from home, or return on the go, largely due to favorable perceptions of sustainable packaging (Magnier & Gil-Pérez, 2021; Miao et al., 2022; Schuermann & Woo, 2022). Environmentally concerned consumers and those with strong green consumerism values are more likely to participate in such schemes (Bocken et al., 2022; Magnier & Gil-Pérez, 2021; Miao et al., 2022).

Knowledge of the environmental impact associated with different packaging types is another key driver of engagement in plastic packaging reuse. However, many consumers remain uncertain about the environmental consequences of plastic packaging (Lindh et al., 2016). Misconceptions are also common, with consumers often perceiving recycling as more environmentally friendly than reuse, which can reduce participation in reuse schemes (Kunamaneni et al., 2019). Socio-demographic factors further influence environmental values. Higher engagement in packaging reuse is associated with individuals who have high incomes, live in urban areas, or have children in their household (Gill et al., 2020).

Context and scheme design factors

Convenience and *effort* required from users are instrumental for the success of any packaging reuse scheme. For example, distance from a drop-off point impacts consumers' time and effort when engaging in a packaging reuse scheme (Jiang et al., 2020). This explains why return-from-home schemes are more attractive than other schemes (Schuermann & Woo, 2022). Another driver is economic incentives provided through a deposit refund (Bocken et al., 2022).

Product and packaging factors

Packaging reuse may result in the "degradation" of packaging materials, which may affect perceptions of quality and safety. Such changes in the packaging of products may therefore affect product purchases (Magnier & Gil-Pérez, 2021), which may affect the effectiveness of packaging reuse programs. Another barrier for consumers is hygiene and safety concerns, which have been found to impact willingness to participate in packaging reuse schemes (Bocken et al., 2022; Jiang et al., 2020; Lofthouse et al., 2017; Long et al., 2022; Miao et al., 2022; Winton et al., 2022). Hygiene concerns relate to the cleanliness of the packaging after multiple uses, while safety concerns relate to the risk of contamination of the product within the packaging. Finally, the functionality of the packaging is a crucial factor for consumers to engage in packaging reuse programs (Lofthouse et al., 2017). That is, consumers expect packaging to be durable and easy to use, while reducing plastic waste (Lofthouse et al., 2017).

Communication factors

Message framing strategies can be an effective way to influence reuse behavior. For example, in an online experiment, Ratnichkina et al. (2021) find that communicating ease of use through labeling increases consumers' intention to return packaging for reuse. In addition, Essl et al. (2021) find that sending weekly reminders increases the return rate of reusable packaging for vegetables. Finally, Long et al. (2022) find that perceptions of cleanliness can be increased by having store personnel disinfect bottles before refilling.

In addition, a few studies examine social norms related to packaging reuse. Yang and Vassanadumrongdee (2022) find that consumers who believe that reuse is the norm among friends and family are more willing to pay a premium for reusable packaging. Moreover, Ertz et al. (2017) show that subjective norms have a positive effect on consumers' intention to participate in packaging reuse programs. When consumers expect that reusing packaging will be approved by the people most important to them, they are more likely to purchase reusable packaging. Lastly, Dorn and Stockli (2018) find that social modeling increases the adoption of reusable takeout containers. That is, if at least one person in the outlet chooses to reuse, subsequent customers are more likely to choose reusable packaging.

Nevertheless, raising awareness of social norms has been difficult in the context of packaging reuse. Dorn and Stockli (2018) show that communication about social norms does not affect consumers' likelihood of choosing reusable containers for takeout food. Furthermore, Ratnichkina et al. (2021) find no effect of communicating social norms via labeling on consumers' intention to return packaging for reuse.

Market readiness

The report reviews studies conducted in a variety of settings where existing regulations, market dynamics, and overall culture can influence outcomes. These factors are collectively referred to as market readiness. In particular, policies and regulations related to packaging reuse can accelerate the impact of consumer drivers on the adoption of reuse programs. In addition, market dynamics - such as competition among retailers and brands implementing initiatives to reduce their packaging footprint - can drive consumer readiness to adopt such programs. Finally, market culture encompasses the structure of the retail market (e.g., retailer positioning and market intensity) and the broader consumer culture (e.g., societal readiness to embrace packaging reuse), both of which can amplify the adoption of these initiatives.

Consumer avoidance and recycling of plastic packaging waste

Key points on plastic recycling and avoidance are presented below. These points are based on the systematic literature review carried out by Jacobsen et al. (2022).

- a) General positive attitude toward both recycling and avoidance of plastic waste.
- b) Willingness to recycle or avoid plastic is highest among environmentally concerned consumers.
- c) Consumers lack knowledge on how to engage correctly in plastic recycling systems.
- d) Consumers are less willing to recycle if they are required to clean packaging.
- e) Consumers expect packaging to be easy to use, of high quality and durable.
- f) Required time and effort are strong predictors of plastic waste avoidance and recycling.
- g) Communication on plastic characteristics increases willingness to pay for recycled plastic.
- h) Financial incentives positively affect both plastic waste recycling and avoidance.

Consumer acceptance of fiber-based packaging

Fiber-based packaging is generally perceived as more natural and sustainable than other packaging materials (Karana & Nijkamp, 2013; Magnier & Schoormans, 2017). Besides, consumers are positive about engaging in the recycling of fiber-based packaging (Oloyede & Lignou, 2021).

Individual factors

Fiber-based packaging is generally perceived as more sustainable compared to other packaging materials (Lindh et al., 2016; Magnier & Schoormans, 2017). This perception is

largely based on environmental assessments focused on the end-of-life stage, while the production phase is often overlooked (Boesen et al., 2019; Lindh et al., 2016). Additionally, fiber-based packaging has been found to enhance a brand's socially responsible image (Magnier & Schoormans, 2017).

Product and packaging factors

Consumers expect fiber-based packaging to offer properties comparable to standard packaging, emphasizing functionality, ease of use, and ease of opening (Lindh et al., 2016; Oloyede & Lignou, 2021). Texture and transparency play a significant role in shaping consumer perceptions, with smooth surfaces and transparent windows identified as preferred attributes (Karana & Nijkamp, 2013; Oloyede & Lignou, 2021). Although fiber-based packaging may be perceived as less conventional than plastic, studies indicate no significant differences in perceived product quality or shelf-life extension (Karana & Nijkamp, 2013). However, consumers may associate fiber-based materials with a higher risk of product contamination (Oloyede & Lignou, 2021).

Recommendations

Section Summary

- Educating consumers about environmental impacts can increase their willingness to use sustainable packaging.
- Credible environmental and hygiene claims (e.g. third-party labels) increase consumer confidence.
- Clear instructions and reminders promote the correct use of recyclable and reusable packaging.
- Targeted communication should focus on environmentally concerned consumers but remain inclusive.
- Improving convenience through more drop-off points and simplified systems can reduce barriers.

This section presents recommendations to improve the reuse and substitution systems within R3PACK, focusing on enhancing consumer engagement, addressing concerns, and increasing system efficiency.

Information provision on environmental friendliness

There is a general need for consumer education regarding the environmental impacts of reuse, recycling, and fiber-based packaging. Studies indicate that providing information on plastic characteristics increases consumers' willingness to pay for sustainable packaging. For fiber-based packaging, environmental claims displayed on packaging are perceived as credible, offering a promising communication strategy.

Addressing hygiene and safety concerns

To alleviate hygiene concerns associated with reusable and fiber-based packaging, credible hygienic claims should be provided, potentially through third-party certifications. In-store staff

can further enhance perceptions of cleanliness by offering disinfection options and explaining cleaning procedures.

Supporting correct use of recyclable and reusable packaging

Encouraging correct use requires consumer engagement strategies. Communicating the packaging's after-life can motivate consumers to participate in recycling and reuse schemes. Reminders to return packaging and clear instructions for first-time users can further improve correct usage.

Targeting environmentally concerned consumers

Environmentally conscious consumers - often individuals with higher incomes, living in urban areas, or with children - are more likely to engage in sustainable packaging practices. However, socio-demographic factors show mixed associations with pro-environmental behaviours, suggesting that communication strategies should be broadly inclusive.

Increasing convenience and decreasing task-difficulty

Perceived time constraints and task complexity are significant barriers to consumer participation. To reduce behavioural costs, the number of drop-off points and waste bins should be increased. For reuse schemes requiring applications, minimizing user touchpoints can enhance convenience. Additionally, framing messages around ease of use has proven effective in overcoming these barriers.

1.2 Exploratory survey study

This section presents the findings from two online surveys and two focus group interviews, conducted as part of the second phase of Task 2.3. The objective of the two studies is to explore consumer beliefs, perceptions, and willingness to pay regarding food packaging reuse and fiber-based packaging.

The online survey focused on two key areas. First, it examined consumer perceptions and beliefs regarding four types of food packaging reuse, based on definitions from the Ellen MacArthur Foundation (see Table 1). The survey explored consumer awareness and perceptions of reusable packaging and products, preferences for reuse schemes, willingness to adopt, and the drivers influencing adoption. Particular attention was given to consumer preferences for “*Return on the go*” schemes. Second, the survey investigated consumer beliefs and attitudes towards fiber-based packaging, covering topics such as awareness, willingness to pay and adopt, and perceptions of packaging and product quality.

Complementing the survey, the focus group study consisted of two online sessions conducted in France and Belgium. These discussions aimed to gain in-depth insights into consumer perceptions of food packaging reuse, with a primary focus on the “*Return on the go*” scheme, and to validate the findings from the survey study.

Together, these studies provide a comprehensive understanding of consumer attitudes, supporting the development of effective reuse and substitution strategies.

Table 1 Description of food packaging reuse schemes included in study

Reuse scheme	Description
Reuse in general	Food packaging reuse refers to the practice of using food packaging multiple times, either by refilling or reusing it for its intended purpose.
Refill at home	Users refill their reusable container at home (e.g., with refills delivered)
Refill on the go	Users refill their reusable container outside home (e.g., at in-store dispensing systems).
Return from home	Packaging is picked up from home by a pick-up service (e.g., logistic service)
Return on the go	Users return the packaging at a store or drop-off point.

Source: EMF (2020)

Survey protocol and description of sample

The survey was programmed in Qualtrics and administered using panels provided by Norstat Denmark A/S in both Belgium and France. Data collection took place between March 3rd and March 26th, 2023. Ethical approval was obtained from the internal review board at Aarhus

University. The questionnaire and ethical approval can be found in the appendix (A1. Survey study: Questionnaire & A2. Focus group study: Questionnaire).

A total of 1,821 consumers participated in the survey: 862 from Belgium (BE) and 959 from France (FR). The demographic breakdown of the sample is presented in Table 2. Efforts were made to ensure the sample was representative of gender and age. Both countries reflect the country-level distribution of gender. However, there was a slight overrepresentation of the 65+ age group and an underrepresentation of the younger age group (below 34 years old).

Table 2 Socio-demographic background of respondents

Socio-demographics	Total (N = 1821)	BE (N = 862)	FR (N = 959)
Gender N (%)			
Male	846 (46.46)	418 (48.49)	428 (44.63)
Female	969 (53.21)	441 (51.16)	528 (55.06)
Other	6 (0.33)	3 (0.35)	3 (0.31)
Average age (SD)	50.51 (16.44)	50.48 (16.88)	50.53 (16.04)
Education level N (%)			
Low	711 (39.04)	406 (47.10)	261 (31.80)
Medium	252 (13.84)	181 (21.00)	71 (7.40)
High	858 (47.12)	275 (31.90)	583 (60.79)
Marital status N (%)			
Single	493 (27.07)	232 (26.91)	261 (27.22)
Married / Cohabiting	1056 (57.99)	511 (59.28)	545 (56.83)
Divorced / Widowed	272 (14.94)	119 (13.81)	153 (15.95)
City size N (%)			
Small	506 (27.79)	165 (19.14)	261 (27.22)
Medium	781 (42.89)	444 (51.51)	545 (56.83)
Large	534 (29.32)	253 (29.35)	153 (15.96)
Grocery shopping responsibility in household N (%)			
No	59 (3.24)	39 (4.52)	20 (2.09)
I am sharing responsibility	599 (32.9)	306 (35.50)	293 (30.60)
Yes, I am the main responsible	1163 (63.9)	517 (60.00)	646 (67.40)

Results on reuse

Section Summary

- Mild reluctance: Belgian and French consumers generally support reusable packaging but show slight hesitation.
- Cost perceptions: On-the-go options seem cheaper; return-from-home schemes are seen as costlier.
- Purchase drivers: Quality, functionality, durability, safety, convenience, cost, and deposit returns matter most; taxes and peer behavior have minimal influence.
- Return habits: Nearly half prefer weekly returns, mainly at large supermarkets.
- Top incentive: Cash-out deposit refunds best motivate on-the-go returns.

Table 1 outlines the reuse schemes examined in the study. Participants were presented with four reuse schemes, each with a general description of food packaging reuse. The order of schemes presented was randomized to minimize any potential order effects. For each scheme, participants answered questions about their perceptions and beliefs regarding the specific scheme. Results for all reuse schemes are discussed in the following section, with a particular focus on the *"Return on the Go"* scheme.

Consumer awareness, packaging and product perceptions, and pro-environmental values

Consumer awareness of reusable packaging is generally high in both Belgium and France, with 71% and 72% of respondents, respectively, reporting familiarity with the concept (Figure 2). However, when it comes to specific reusable packaging schemes, the recognition drops. For instance, the Refill on the Go scheme stands out as the most well-known, with 39% of Belgians and 54% of French participants aware of it. Following closely is the Return on the Go scheme, recognized by 36% of respondents in both countries. Refill at home is recognized by 24% of Belgians and 27% of French participants. Return from home is the least recognized scheme, with 15% of Belgians and 13% of French participants aware of it.

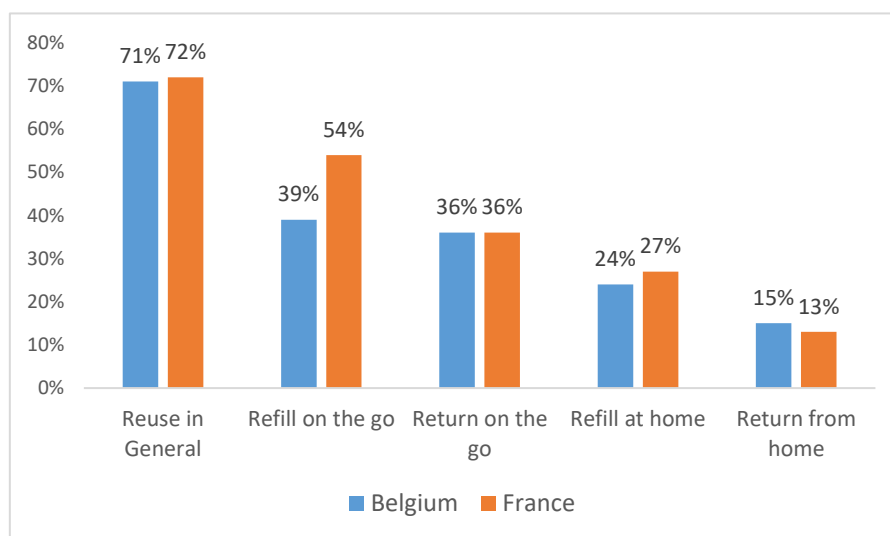


Figure 2 Awareness of reuse by scheme

Interestingly, the general concept of reuse is the most widely recognized, with the Belgian and French populations showing similar patterns in their familiarity. Belgium and France show slight differences in their familiarity with certain schemes. The Belgian consumers are more familiar with the Return on the Go scheme, with 27% of respondents recognizing it, while in France, 23% are familiar with the Refill on the Go scheme as shown in Figure 3.

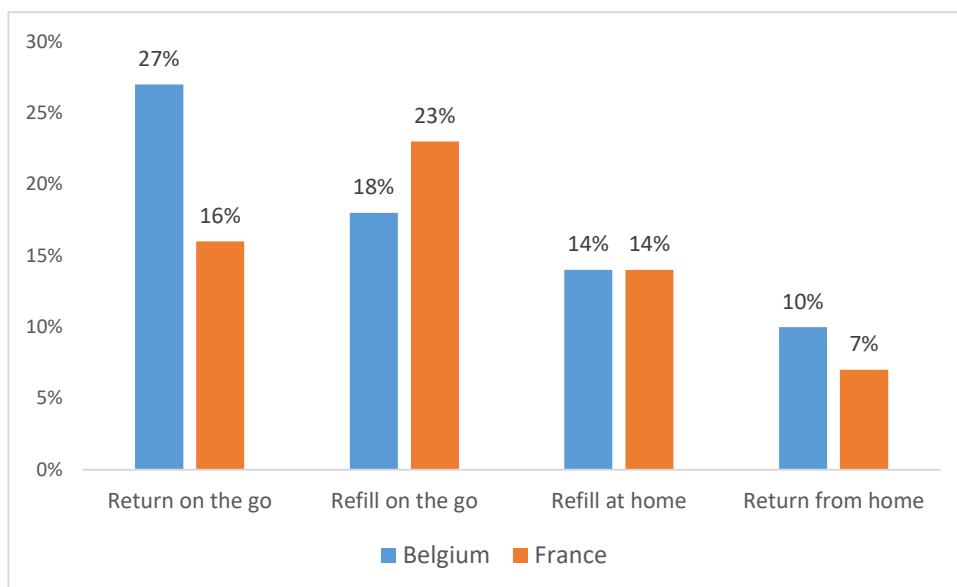


Figure 3 Familiarity of reuse by scheme

When it comes to consumer perceptions of reusable packaging, opinions are generally positive, particularly toward the Reuse in General scheme. Among the on-the-go schemes, Return on the Go shows some of the most favourable responses. For example, when asked if the scheme is a “Good Idea,” 5.7 out of 7 Belgians agreed, compared to 5.3 in France. Similarly, both countries showed strong agreement that the scheme is “Good for the environment” and “Better than recycling,” with Belgians slightly more positive on average. These results are reflected in Table 3, where the Return on the Go scheme shows the highest levels of agreement in both countries, especially regarding its environmental benefits.

However, despite these generally positive perceptions, there are some reservations. Responses for both countries mostly fell between “somewhat agree” (5) and “agree” (6), suggesting that while participants see the benefits, they also have reservations. The lowest agreement was observed when respondents were asked if the Return on the Go scheme is “Hygienic” or “Convenient,” with French respondents rating these aspects particularly lower. This is also illustrated in Table 3, where perceptions of hygiene and convenience for the Return on the Go scheme are rated more moderately compared to other aspects.

Table 3 Perception of reuse by scheme and country

Perceptions (mean)	BE	FR	BE	FR	BE	FR	BE	FR	BE	FR
	Refill at home		Refill on the go		Return form home		Return on the go		Reuse in general	
Good idea	4.6	5.1	5.1	5.7	4.4	5	5.3	5.7	5.8	6.2
Good for the environment	4.9	5.1	5.3	5.6	4.5	4.8	5.4	5.5	5.7	5.8
Better then recycling	4.7	5	5.1	5.5	4.4	4.8	5	5.4	5.4	5.7
The right thing to do	4.5	4.7	4.9	5.2	4.1	4.5	4.9	5.2	5.3	5.7
Hygienic	4.6	5.1	4.5	5	4.5	5	4.7	5.2	4.6	5.2
Convenient to use	4.4	4.9	4.4	5	4.4	4.9	4.6	5	4.9	5.5
Save a lot of recourses	4.6	4.4	4.9	4.9	4.2	4.3	4.9	4.9	5.3	5.2
Require low effort	4.2	4.8	4.1	4.9	4.2	4.8	4.3	4.7	4.4	5.2

Note: measurement is 7- point bipolar scale (Ertz, M. et al., 2017)

In addition to the overall positive perception of reusable packaging, the suitability of such packaging for different food products varies between Belgium and France. In Belgium, most respondents found reusable packaging suitable for a wide range of foods, with percentages ranging from 61% to 71%. However, even among Belgians, only about half of the respondents considered it suitable for food products, indicating some hesitation. As shown in Table 4, although there is relatively little variation in the Belgian responses, there is still a clear degree of caution. In contrast, French consumers are more divided. A majority believe that reusable packaging works for items such as yoghurt, soups, bagged salads, milk and sliced meats, but there is notable reluctance when it comes to unprocessed fruit and prepared salads. These products are considered unsuitable by the majority of French respondents, further highlighting the differences in perceived applicability of returnable packaging between the two countries.

Table 4 Perceived applicability of products in reusable packaging by country

Products (%)	Total	Belgium	France
Yogurt	65	61	68
Soups	65	71	59
Bagged salads	62	66	59
Butter	60	64	57
Milk	60	64	55
Cheese	59	71	49
Cold cuts	59	68	52
Juices	58	68	49
Chips	56	64	49
Savory biscuits	54	71	39
Unprocessed vegetables	52	71	35
Unprocessed fruits	52	69	36
Prepared salads	52	67	38

Scheme preferences, willingness to pay and adopt, and drivers influencing the adoption of reusable packaging.

At the end of the survey, participants were asked to select their most preferred reusable packaging system from the four options presented in Table 1. As shown in Figure 4, *Return on the Go* emerged as the most preferred system in both Belgium and France, with 36% and 38% of respondents selecting it, respectively. In contrast, *Return from Home* was the least popular option, with only 15% and 10% of respondents in Belgium and France, respectively, choosing it. Notably, there was a clear difference between the two countries in preference for Refill on the Go, with a higher percentage of French participants (34%) selecting it compared to their Belgian counterparts (25%). Similarly, Refill at Home was more preferred in France, with 25% of French participants choosing it as their preferred system, compared to 17% in Belgium.

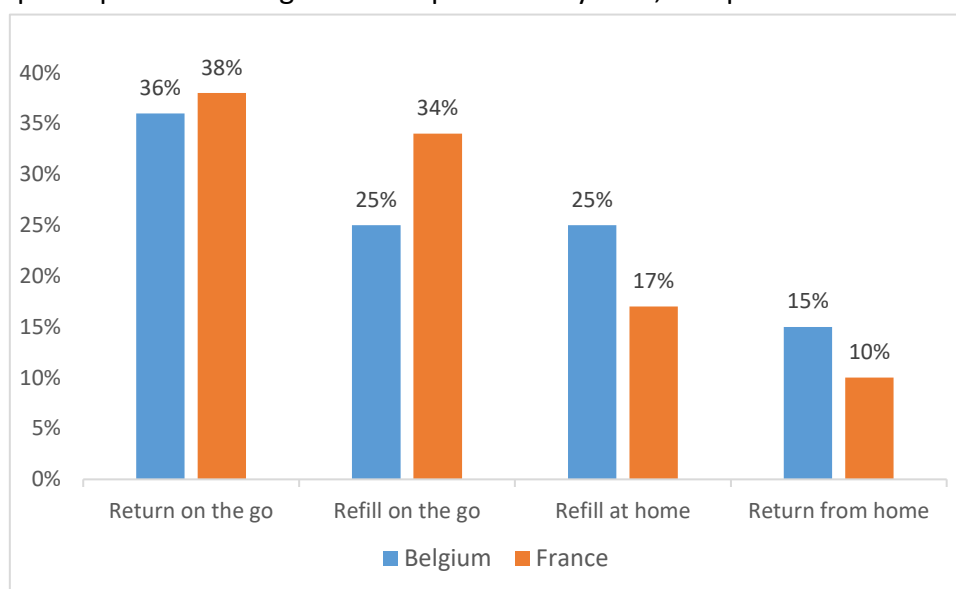


Figure 4 Preferred scheme by country

Further analysis of consumer willingness to adopt different reusable packaging systems reveals generally high average scores for the concept of reusable packaging itself (5.2 for Belgium and 5.7 for France). On-the-go systems also received relatively high ratings. However, most averages fall within the range of 4 ("neither likely nor unlikely") and 5 ("somewhat likely"), indicating that while there is interest in these schemes, consumers are still somewhat hesitant to fully adopt them (Figure 5).

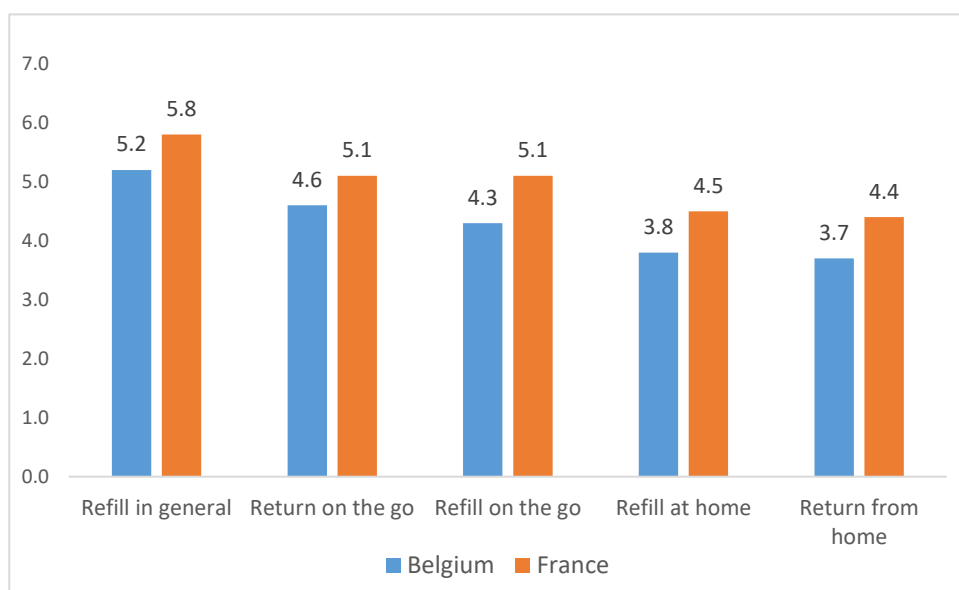


Figure 5 Willingness to adopt a scheme by country

In addition to preferences for reusable packaging schemes, consumers also have specific expectations regarding the cost of these options. As shown in Figure 6, respondents expect reusable packaging schemes to cost less than standard packaging, while *Return from Home* schemes are perceived as more expensive. *Refill at Home* schemes show little variation across the two countries, with consumers expecting them to cost roughly the same as standard packaging. Figure 6 further illustrates that, with the exception of Return from Home, all other schemes are anticipated to cost between 4% and 15.6% less than standard packaging. Specifically, for Return on the Go schemes, both Belgium and France expect packaging to be around 10% less expensive than standard packaging (10.6% vs. 9.8%).

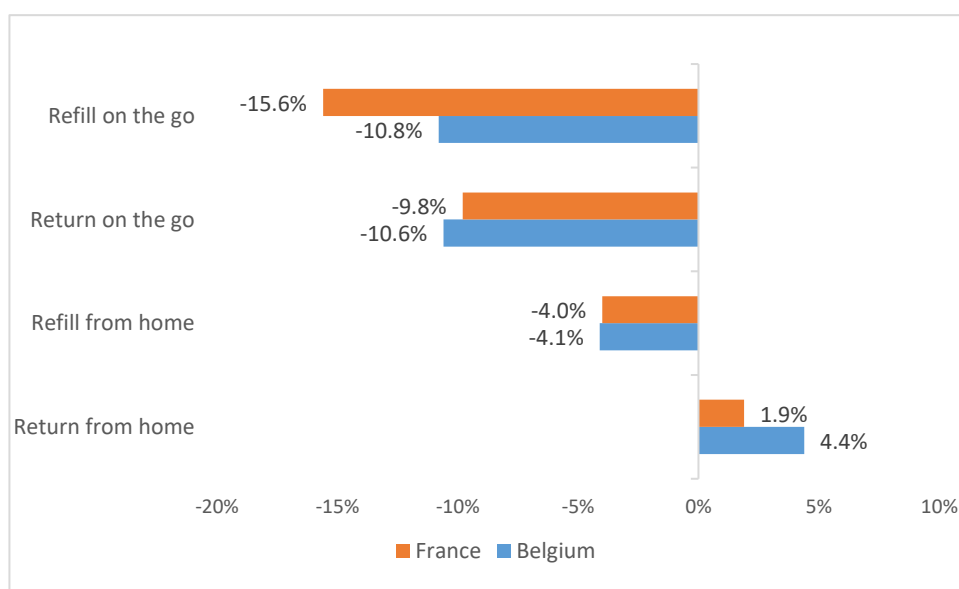


Figure 6 Expected price by country

Further examining consumer priorities, Figure 7 displays the degree to which different aspects of reusable packaging are seen as important by consumers. Both in Belgium and France, packaging properties such as quality, functionality, durability, and food safety emerge as the most influential factors, with averages falling above 4 ("important"). Contextual factors such as availability, convenience, cost of reusable packaging, and deposit and cash returns are also reported as important or very important by the majority of consumers. However, taxes and the opinions of others do not seem to have a significant impact on consumer behaviour towards reusable packaging. Environmental concerns have a greater impact on French consumers' decisions to buy reusable packaging, with an average of 4.03 compared to 3.76 for Belgian consumers.

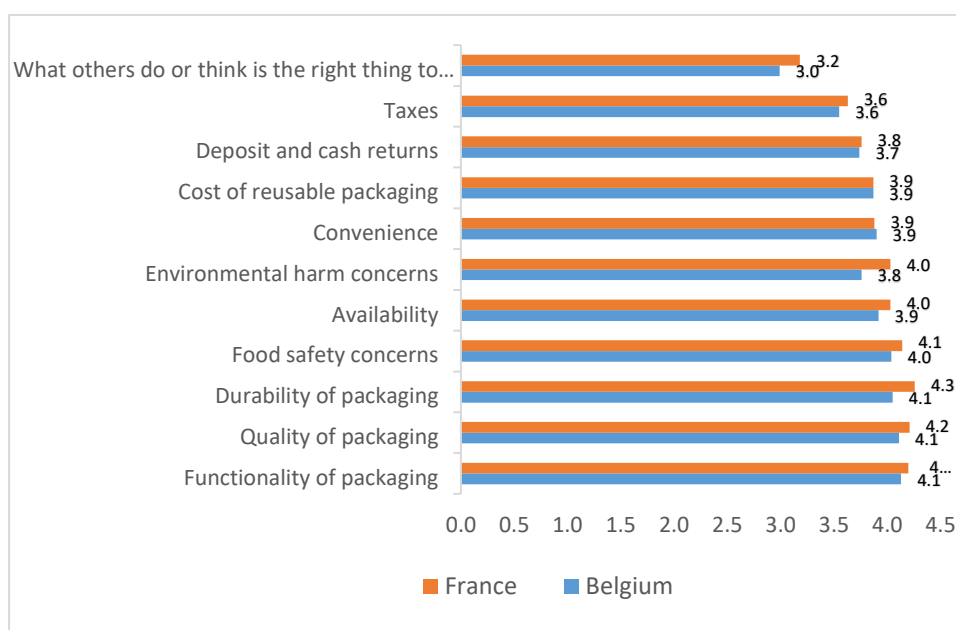


Figure 7 Factors influencing general reuse behavior

Specific preferences towards return on the go scheme

Figure 8 shows the preferred return frequency for both Belgium and France. For both countries close to half of the participants prefer to return used packaging once a week (45% vs. 49%), whereas returning packaging more frequently is preferred the least (7%). In connection to frequency of return, consumers were asked where they would prefer to return packaging after use.

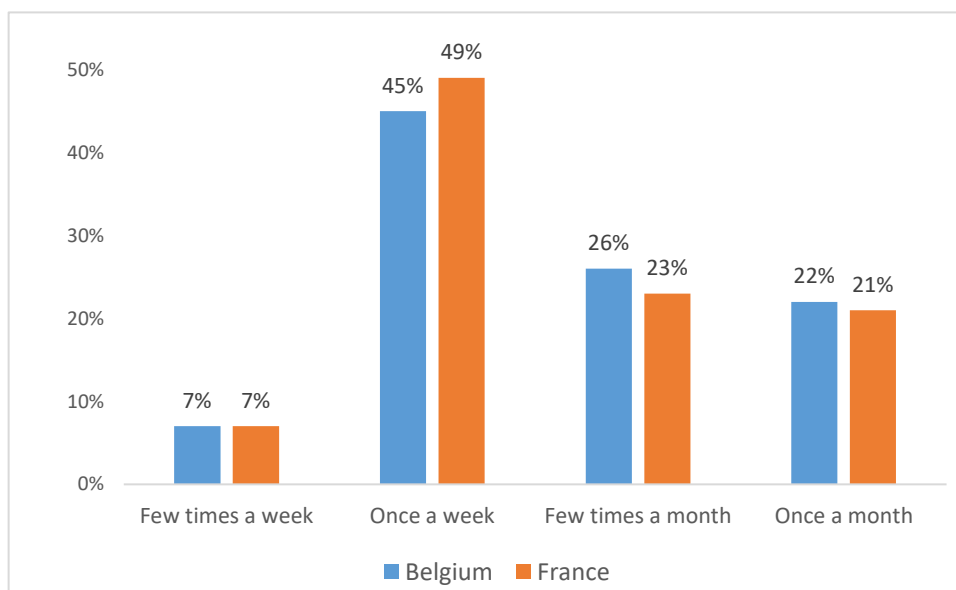


Figure 8 Preferred return frequency by country

The results are shown in Figure 9 where both Belgium and France report the highest preference towards returning packaging in large super-markets from where they do most of their grocery shopping (66% vs. 53%). In France, more consumers prefer a drop-off point outside the store (26%), compared to consumers in Belgium (17%).

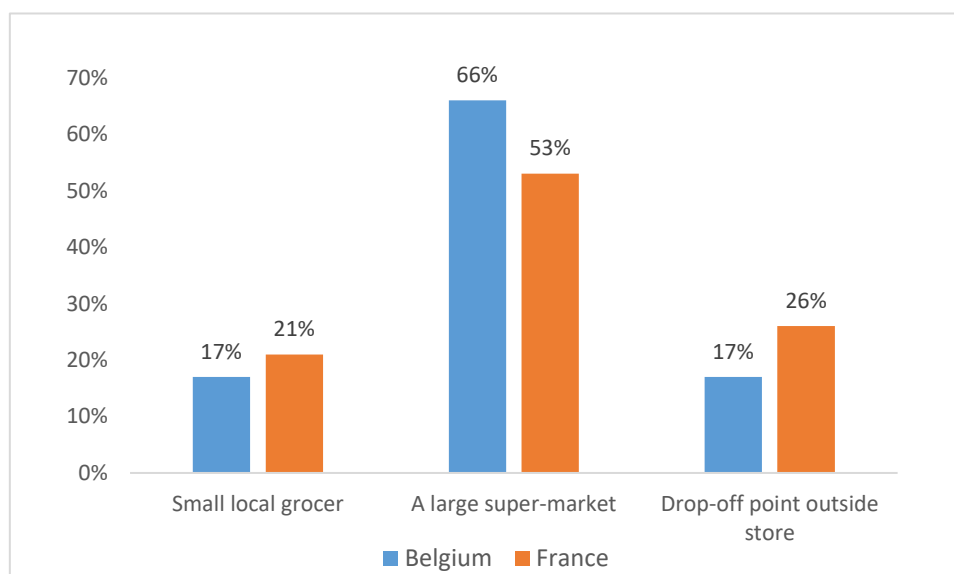


Figure 9 Preferred location for returning packaging by country

The survey also included a question about the preferred type of refund that would motivate consumers the most to return the packaging. As shown in Figure 10 the majority of consumers prefer a 'cash-out' deposit refund (71% vs. 58%), followed by 'receiving loyalty points' (27% vs. 37%) and 'donating refund to charity' (2% vs. 5%). Interestingly, consumers in France are more likely to choose loyalty points and donating to charity as their preferred types of refund, whereas consumers in Belgium show a higher preference for cash-out refunds. Lastly, consumers were asked how likely it would be for them to return the packaging after use,

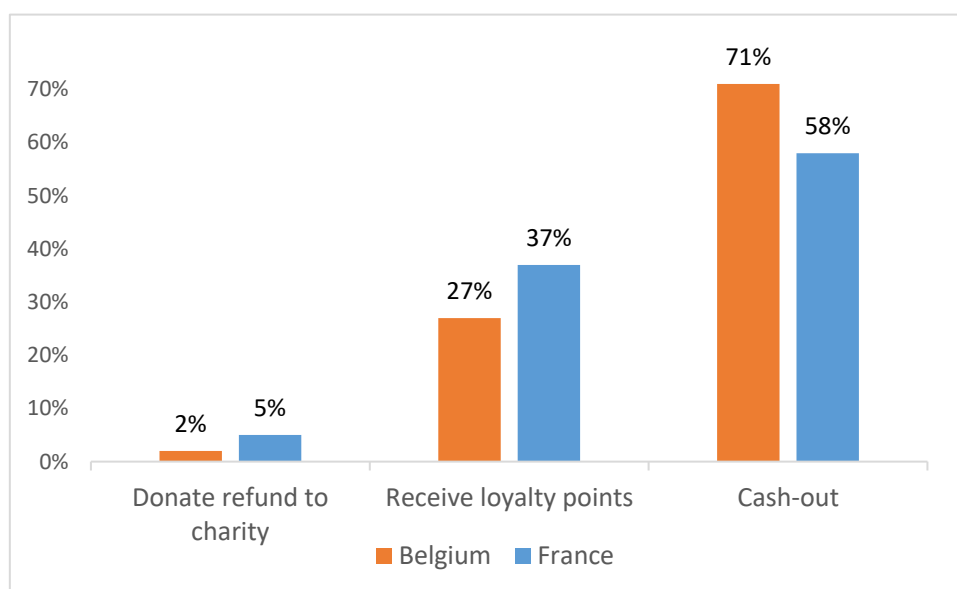


Figure 10 Preferred type of deposit

Figure 11 displays the frequency for each of the possible responses with 1 being 'No chance, almost no chances (1 chance in 100)' and 11 being 'Certain, practically certain (99 chances in 100)'. Most consumers report a likelihood of 7 ('Good possibility') or above indicating an overall high likelihood for consumers to return packaging. Response patterns in France and Belgium are similar. However, when calculating the stated probability of returning packaging the average probability of returning is 68% for both countries. Based on these results, there is a 32% probability that packaging will not be returned after use but rather disposed.

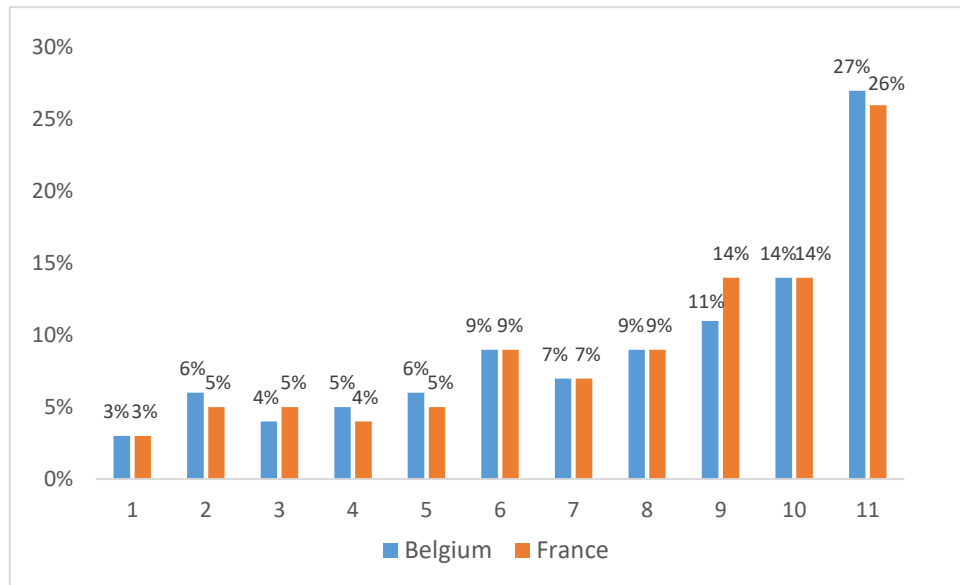


Figure 11 Consumer likelihood of returning reusable food packaging after use

Results on substitution

Section Summary

- Low consumer awareness: Only 36% of Belgians and 51% of French consumers are familiar with reusable fiber-based packaging.
- Positive environmental perception: Consumers associate reusable fiber-based packaging with strong environmental and recyclability benefits but do not perceive it as cost-saving.
- High product applicability: Over 70% consider it suitable for most food products, especially dry goods (e.g., biscuits, vegetables), but less so for liquids and greasy items (e.g., milk, yogurt).
- Moderate price concerns and purchase intent: Consumers expect slightly higher prices (5-6% increase) but show generally positive purchase intentions, with French respondents being more favorable.

This section presents the findings from a focus group study exploring consumer beliefs and perceptions of fiber-based packaging. Participants were introduced to the following description:

“Fiber packaging is produced with reusable, renewable, or biodegradable materials. Such materials may include recycled content (such as newspaper and cardboard) or natural fibers such as wood pulp, bamboo, bagasse, and wheat straw.”

Subsequently, the participants were asked questions to assess their awareness and perceptions of packaging and product applicability, as well as their willingness to pay and purchase intention for fiber-based packaging.

Consumer perceptions of fiber-based packaging

Consumer awareness of fiber-based packaging is generally low in both Belgium and France. In Belgium, only 36% of respondents reported familiarity, while 51% of French participants were aware of it (see Table 5).

Table 5 Awareness of fiber-based packaging by country

Awareness (%)	Belgium	France
Knowledge about fiber-based packaging	36	51

In the study, consumers were asked to compare their perception of fiber-based packaging with other forms of packaging in terms of various packaging properties. The results are shown in Figure 12 for both Belgium and France. Overall, consumers perceive fiber-based packaging slightly better than other forms of packaging with average scores falling above the neutral category of 4. However, consumers tend to disagree with the notion that fiber-based packaging is less expensive than other forms of packaging, with both countries averaging around 3.2-3.3 on this property. Across both countries, fiber-based packaging was perceived most positively in terms of environmental friendliness and recyclability, while properties such as convenience, safety, quality, hygienic, and product protection showed little difference between fiber-based packaging and other forms of packaging, with both types of packaging being perceived equally favourably on these aspects with averages around 4.5-4.7. Consumers generally perceive fiber-based packaging as suitable for a wide range of food products. Applicability rates range from 51% to 86%, with similar patterns observed across both countries. Products such as savoury biscuits (84.4% vs. 86.1%) and unprocessed vegetables (81.2% vs. 85.2%) are considered the most appropriate for fiber-based packaging. In contrast, liquid and greasy products like milk (52.5% vs. 51%) and yogurt (54.6% vs. 55.9%) are seen as less suitable. Despite these differences, the majority of consumers - over 70% - find fiber-based packaging appropriate for most food categories. These results, presented in Table 6. These results, presented in Table 6, highlight a generally positive consumer perception of fiber-based packaging across various product types.



Figure 12 Perception of fiber-based packaging by country

Table 6 Consumer perceptions of product suitability for fiber-based packaging

Products (%)	Total	Belgium	France
Yogurt	55	55	56
Soups	56	60	53
Bagged salads	73	72	74
Butter	62	63	62
Milk	52	53	51
Cheese	75	74	76
Cold cuts	72	72	73
Juices	55	53	51
Chips	81	78	84
Savory biscuits	85	84	86
Unprocessed vegetables	83	81	84
Unprocessed fruits	83	81	85
Prepared salads	75	74	77

Willingness to pay and purchase intention of fiber-based packaging

Consumers in Belgium and France generally expect fiber-based packaging to cost more than standard packaging, though the perceived difference remains moderate (Table 7). In Belgium, 42% of respondents believe prices will be higher, while 48% expect them to remain unchanged and 11% foresee lower prices. French consumers show a similar pattern, with 41% anticipating an increase, 45% expecting no change, and 14% predicting a decrease.

Table 7 Expected price by country

%	Belgium			France		
	Less	Same	More	Less	Same	More
Expected price difference	11	48	42	14	45	41

In terms of specific price increase expectations, Table 8 shows that Belgian consumers expect an average price increase of 6.2%, while French consumers expect a slightly lower increase of price.

Despite these price concerns, purchase intention data presented in Table 9 reveals a cautiously positive attitude toward fiber-based packaging. Belgian respondents report an average likelihood of 4.5, suggesting mild hesitation but a leaning toward willingness to buy.

Table 8 Expected percentage price increase for fiber-based packaging

%	Belgium	France
Expected Price Increase (%)	6,2	5,3

Table 9 Average purchase intention for fiber-based packaging

Average Purchase Intention (mean)	Belgium	France
Fiber-based packaging	4,5	5

Note: Measurement 7-point Likert scale (1 = 'Extremely unlikely', 7 = 'Extremely likely')

French consumers show slightly stronger interest, with an average score of 5, indicating a more favourable yet still somewhat reserved stance.

1.3 Focus group study

Protocol and description of participants

Focus group study consists of two online focus group interviews in France and Belgium. The main aim of the focus groups is to achieve in-depth insights into consumer perceptions of food packaging reuse focusing mainly on the return on the go scheme. Further, the focus group aimed at validating the results from the survey study. An online invitation was sent to participants through Prolific. The invitation was programmed in Qualtrics. After a screening, eligible participants were selected and asked to give their consent to participate in the online focus group. The online focus group discussions were hosted on Teams and were held the 12th and 13th of June in the afternoon. Aarhus University moderated the discussions following a semi-structured interview guide. Both interviews were scheduled for 1.5 hours. Questionnaire and interview guide can be found in the appendix (A2. Focus group study: Questionnaire & A3. Focus group study: Interview guide).

A total of 12 consumers participated in the online focus groups, from Belgium (BE) and 5 from France (FR). Participant backgrounds are summarized in Table 10.

Table 10 Background of respondents

Demographics	Total (N = 12)	BE (N = 7)	FR (N = 5)
Gender N (%)			
Male	6 (50)	3 (42.86)	3 (60)
Female	6 (50)	4 (57.14)	2 (40)
Average age	28.13	27.5	29
Grocery shopping responsibility in household N (%)			
No	0 (0)	0 (0)	0 (0)
I am sharing responsibility	5 (41.66)	4 (57.14)	1 (20)
Yes, I am the main responsible	7 (58.33)	3 (52.86)	4 (80)

Results

Section Summary

- 80% of participants find plastic packaging excessive but difficult to avoid due to convenience, price, and complicated recycling.
- Reuse seen as environmentally and financially beneficial, while main barriers include convenience, lifestyle differences, and fear of judgment.
- Financial incentives (refunds, price cuts) and clear information are main drivers for adoption. Hygiene concerns and accessible drop-off points are critical points.
- Positive public image motivates consumers and companies, taxes on single-use plastics and strong incentives encourage industry compliance.

Perception of food packaging

Consumer perceptions of excessive plastic packaging in food products

The findings indicate consensus among the participants in both countries regarding excessive and unnecessary plastic usage. One participant stated, *"I feel tricked when there are single-use individual wrappings inside, like for each cookie would be another plastic wrap"*. This echoed the negative opinion towards unforeseen excess packaging.

Challenges in avoiding plastic in food packaging

Consumers perceive a trade-off between sustainable packaging, price and convenience. Many participants noted that products are often packaged for convenience, making it difficult to avoid plastic. Plastic packaging is also seen as a cheaper option, with one Belgian participant commenting: *"A contradiction because the more you pay, the less plastic you have."* (Interview, Belgium).

There was a consistent negative sentiment towards single-use packaging. Participants described plastic as an *"evil"* that is difficult to eliminate, and complex recycling methods further discourage sustainable behavior. Belgian participants in particular found recycling systems *"Way too complicated"* (Interview, Belgium). While clearer recycling methods were seen as necessary, financial incentives also emerged as a strong motivator. As one Belgian participant noted, *"I want to avoid plastic and waste because the garbage bags are expensive"*. Overall, sustainable habits seem to be driven by potential cost savings, either by using cheaper alternatives or by receiving rewards for environmentally friendly actions.

Attitudes towards the general idea of reuse

Participants' positive views on food packaging reuse align with the research objective of exploring consumer usage and perceptions of food packaging. In France, reuse solutions are perceived as both environmentally friendly and cost-saving. As one participant noted, *"At the end of the day, we aren't dumping plastics or other packaging materials, which can be worse for the environment. We are just using extensive material, but in the end of it, it will actually save a lot of money because we are reusing"*.

Drivers and barriers towards reuse

Based on the participants' view, consumers need good instructions and incentives to make packaging reuse convenient for them. *"If it's not convenient, people are not gonna use it."* (Interview, Belgium).

In Belgium, participants outlined how consumers already use their creativity to reuse durable packaging, which was even more common in the previous generations. *"Sometimes I even know that I'm paying more for the more durable packaging that I will reuse."* (Interview, Belgium). This compliments the willingness to try.

Further, consumers also need to develop different shopping behaviours, that will fit their own lifestyles as *"It's always a bit hard to implement such measures because people, they also have a different lifestyle when they're living in the city"* (Interview, France).

Other doubts have been expressed regarding convenience, as *"Sometimes you don't know that you are going to the shop"* therefore it is hard to plan ahead. Others have mentioned that remembering to bring back packaging can also become a barrier, especially with different means of transportation.

Moreover, perception by the public was another restraint. Firstly, as older generations used to reuse a lot, being perceived as old-fashioned was a concern, and from another point of view, it could seem like going back in time. Furthermore, reusing packaging also raised the concern of showing how much people consume, therefore being judged by others.

Attitude towards the return on the go

In line with the survey's findings, focus group participants also agreed that the return on the go scheme is a good idea in general.

Drivers and barriers towards return on the go

As the result in the survey, during the focus group interviews money return was a high motivation to return packaging. In France, it was also found that money in return for the scheme could be an excellent incentive for consumers to engage in. In Belgium, participants also agreed that consumers need incentives (e.g. price reduction or point-earning system) in order to commit to the scheme. One participant stated, *“Overall there just needs to be some kind of incentive for people to put in the effort because it's another layer of friction that gets added to the shopping experience”* (Interview, Belgium).

Awareness and education regarding reuse schemes play a significant role in familiarizing with the scheme, according to participants in Belgium. *“If we start there and people know what happens with all the bottles and what is the impact from everything that happens, then we can think together with everyone, and I think more people will do certain things”* (Interview, Belgium).

Age can also have a role regarding these decisions as one of the participants stated *“if you go to medium age and old people, it's more difficult to change their habits and I think the one of the solutions for this is the education and there's something that we need to change from the beginning and if not, I think it's difficult”* (Interview, France), which was also agreed by several others in the group. *“People would adhere to this scheme a bit easier if you are explained”* (Interview, Belgium).

Results regarding barriers of the scheme align with Survey study, where return on the go had the lowest levels of agreement regarding hygiene. The participants in Focus group study also have expressed concerns regarding hygiene issues. *“You need to really convince customers of the fact that they're cleaned thoroughly and that it's done really well, that it's professional, that it's safe, that there have been several trials”* (Interview, Belgium). It is important to examine the product category that consumers would be willing to try and implement return on the go packaging with. Belgian focus group participants have discussed ideas of sticker usage on the packaging in order to show the product had not been open before for more reassurance. *“I have to see that the product is closed and not been opened before”* (Interview, Belgium).

Convenience was frequently mentioned regarding implementation questions in both countries. If returning is difficult, and possibly more expensive, consumers might buy one-use plastic *“because most people care more about their own convenience than the long-term detriment of the environment.”* (Interview, Belgium). However, if there were a small fee and people are forced to return, participants in France can imagine a successful implementation. Convenience was an outstanding factor for drop-off locations simultaneously. Participants in France believe that consumers would return packaging at drop-off points if it were at

convenient spots. This was connected to the generally fast-paced lifestyle which in their belief leads them to stick to convenient solutions.

Contribution to something better and public image are motivational factors

Additionally, the participants were queried regarding the factors conducive to the attainment of success for the scheme. In France, money in return, the feeling of contributing to something bigger and positive public image were discussed. One of the participants mentioned *“I think it's something that would make people feel a bit better”*. According to others using the reuse scheme is *“something active that you feel you are contributing personally to something more”* (Interview, France).

Positive public image was seen as a success factor for both consumers and companies in both countries. For consumers *“if it's good publicity, it could be a favourable popular opinion of people that are conscious about this because it's becoming trendy to be careful about those bad wrappings, to recycle and everything”* (Interview, France). For the perspective of companies *“they will get like public recognition for doing something in that direction, which is of course good for the business in the long term.”* (Interview, France). For this movement, dedicated firms can stand in front to support the cause, since it was discussed among the participants how some companies seemingly only take steps towards green and sustainable actions because they have to and for popularity.

Other important motivators

In Belgium, success was entangled in education, great incentives, and possible reduced taxes. As stated in the interview, unless more steps on education take place, people will act based on the price and availability, but resistance and concerns will take place without enough knowledge. Moreover, participants indicated that if the return packaging are incentivized and made as commonplace, the usage of them can become a habit. Some mentioned that *“it all depends on how you would disguise the pick-up point (...) It should be easy. It's fun.”* (Interview, Belgium). Other incentives like reusable packaging being the cheaper option also were discussed.

Reduced taxes were another factor for success during the focus group interview in Belgium. One participant stated *“I consider it to be free because they reuse it. The company makes it one time and they keep using it.”* (Interview, Belgium). The idea was raised that plastic products should be taxed more, so the government could help by taxing the wasteful products, thereby reusable packaging would seem free, and single-use packaging would cost money to buy. Participants also outlined how money is the most important factor to companies by stating *“the only real thing that would motivate companies to join is if it makes them more money or if you enforce it”* (Interview, Belgium). Some participants recommended fines for companies that do not use green labels for examples, where it is important that fines

need to be great enough to impact the company (as in other scenarios companies can skip certain laws by paying the fine).

Discussion of the survey results with the focus groups

During the focus group interview, the results of the survey were shared with participants for further discussion. Firstly, the cost change of such packaging was in discussion. Some participants agreed in both countries with the packaging costing less, as for example one participant mentioned *“you remove the cost of the packaging from the overall cost, so maybe you pay it once, but then it comes cheaper”* (Interview, France). However, others have thought that reusable packaging would cost more *“because with the reusable one, if you bring it in, you receive a reduction.”* (Interview, Belgium). Overall, no consensus was reached. Furthermore, the 70% probability of return at drop-off points was discussed. The habit of returning can depend on routines, income or tidiness as well, according to the participants. Habits and the point of life matters, as, *“if you have more time, if it's like a weekly planned activity to go grocery shopping, you can really prepare for it”* (Interview, Belgium). Also people living further *“might use different modes of transport that make it easier to carry more stuff”* (Interview, Belgium). It was discussed that the point of life for a person has an impact on adapting such a system set by an example – for young people it might be easier to adapt, whereas elderly people might be more stubborn, besides not having a car, going to shopping with smaller bags therefore trying to shop light. Lastly, the influence of closeness to the drop off point was considered, where the survey found that people who live far from drop off point are more likely to return packaging. The interviews show similar findings as participants agreed that consumers living further might grocery shop less often and by car, therefore saving up, remembering, and transporting the packaging becomes easier. *“If you go farther away, you plan before going and if it's close by, you just go and get your things and you come back home, and you do it more frequently.”* (Interview, France).

2. Task 2.4: Improving consumer acceptance of reuse systems and paper-based packaging (Task Leader: AU)

2.1 Literature review

This report presents the findings of a review on communication strategies for improving consumer acceptance of reuse systems and sustainable paper-based packaging. It examines how message framing, emphasis on gains or losses, and self-construal perspectives (individual versus collective) influence consumer purchase intention and return behaviour. The report then explores broader sustainability communication approaches and their implications for promoting behaviour change.

Sustainability and message framing

Consumer behavior plays a crucial role in achieving sustainability policies, as their collective actions can have a significant cumulative effect (Prothero et al., 2011). While consumers often show positive attitudes toward sustainability, these attitudes do not always translate into actual behavior (Grunert et al., 2014). Sustainable consumption, however, requires that consumers act in their self-interest (Huang & Rust, 2011). Yet, resistance to sustainability interventions can arise when these initiatives overwhelm consumers with responsibility, create emotional discomfort, and disrupt deeply embedded practices in their lives (Gonzalez-Arcos et al., 2021).

In communication theory, persuasion can be strengthened by highlighting certain aspects of a message, influencing the decision-making process of the audience (Chong & Druckman, 2007). Framing is defined by Levin et al. (1998) as "*decision-makers respond differently to different but objectively equivalent descriptions of the same problem.*" To encourage sustainable consumer behavior, previous research has focused on framing messages based on theories like prospect theory and self-construal theory (Florence et al., 2022; Markus & Kitayama, 1991).

Prospect theory

Consumers exhibit different behaviors depending on whether a message is framed as a gain or a loss (Kahneman & Tversky, 1979). Specifically, gains are often discounted compared to losses, a tendency known as loss aversion or negativity bias, where people place greater value on the loss scenario. This tendency extends to the sustainability domain, where loss framing

tends to be more effective in encouraging pro-environmental behaviors (Ropret Homar & Knežević Cvelbar, 2021).

In sustainable consumption, loss-framed messages can effectively reduce electricity use (Ghesla et al., 2020) and increase willingness to pay for climate policies (Svenningsen & Thorsen, 2021). They also enhance voluntary pro-environmental behaviors (Hauser & Bregulla, 2024). However, gain-framed messages have been found to be more effective in promoting carbon offset purchases (Chi et al., 2021), while both positive and negative messages perform equally well in reducing plastic bag use (Nelson et al., 2021). In circular consumption, loss-framed messages are more effective in encouraging the return of pharmaceutical waste (Mitkidis et al., 2022). However, when normative elements are included, gain-framed messages lead to higher towel reuse (Do et al., 2021). Conversely, loss-framed messages are more effective for promoting linen reuse in hotels (Bloose et al., 2015).

In sustainable eating, gain-framed messages are more effective in encouraging support for plant-based diets (Carvalho et al., 2022). Yet, both loss- and gain-framed messages lead to similar intentions to reduce food waste (Y. Huang et al., 2021) and increase willingness to purchase aesthetically imperfect food (Lagerkvist et al., 2023). Additionally, the effectiveness of loss vs. gain framing in organic food purchases can depend on the inclusion of cuteness cues (Lei et al., 2024). Support for sustainable food production can also be elicited through both framing approaches (Ploll et al., 2023).

Consumers' characteristics influence their response to loss vs. gain framing. For instance, consumers high in guilt are more likely to conserve water when presented with gain-framed messages, whereas those high in shame respond better to loss-framed messages (Baek & Yoon, 2017). Mindset also plays a role: loss frames are more effective for consumers with a fixed mindset, while gain frames are more effective for those with a growth mindset (Su & Li, 2024). For consumers with low environmental concern, loss frames tend to work better (Newman et al., 2012). Additionally, loss frames are more effective for consumers with a low-level construal mindset, while gain frames resonate better with those with a high-level construal mindset (White et al., 2011).

Self-construal

Individuals may differ in their views of the relationship between them and the environment (Markus & Kitayama, 1991). Individuals with an interdependent self-construal emphasize attending to others, fitting in and harmony. In contrast, individuals with an independent self-construal emphasize their uniqueness and their differences with other individuals. These self-construal differ with respect to individuals' cognition, emotion and motivation. Self-construal

can further affect social judgments and behaviour by mediating the effect of the cultural context (Gardner et al., 1999).

Individualism versus collectivism emerged as a major theme in cross-cultural studies (Aaker & Maheswaran, 1997; Triandis et al., 1998). Individualism prioritizes the autonomy of the individual and therefore reflects an independent self, while collectivism has a collective (family, tribe, team etc.) as the central theme demonstrating an interdependent self. However, such distinction is highly contextual as one can be individualistic towards one person and collectivistic towards another (Triandis, 1993). Collectivism is related to feelings, beliefs, behavioral intentions and behaviors that reflect solidarity and care for others (Hui, 1988). In some cases, individuals are collectivistic towards a person, and individualistic towards another (Hui, 1988). Collectivism and individualism are further described as cultural syndromes as they are organized around a common theme, the between-countries variance is greater than the within-cultural variance and these subjective cultures are linked to geography (Triandis, 1993).

Individualistic and collectivistic cultures show a series of attitudinal and behavioural differences (Aaker & Maheswaran, 1997). The self-construal in individualism is defined internally through the personal traits while in collectivism is defined by important others, such as family and friends. The role of others in individualistic cultures is self-evaluation, by setting for example standards, while in collectivistic cultures is self-definition. Values in individualistic cultures emphasize separateness and individuality while in collectivistic cultures connectedness and relationships. Motivational drivers are focus on differentiation and a relatively greater need for uniqueness, while in collectivistic cultures focus on similarity and a greater need for blending in. Behaviour in individualistic cultures reflect the personal preferences and needs, while in collectivistic cultures is influenced by the preferences and needs of others.

Even though, individualism and collectivism cut across society affecting individuals' judgment and behaviour, the cultural context diversifies the meaning of those concepts across countries. Consumers can be distinguished between horizontal ("Self at the Same Level as Others") or vertical ("Self in a Hierarchy Relative to Others") cultural oriented (Shavitt et al., 2006). Horizontal individualists prioritize their uniqueness, their self-directness and self-reliance, and they are modest and not conspicuous. Horizontal collectivists prioritize the maintenance of benevolent relationships, having common goals with others, being socially appropriate, demonstrating sociability and cooperation. Vertical individualists prioritize the improvement of social status through competition, seek achievements, power and prestige, they stand out while displaying their success or status. Vertical collectivists prioritize conformity, harmony, the maintenance and protection of in-group status, defer to authorities and in-groups. This quadratic approach can explain various phenomena such as personal values, consumer persuasion, advertising, self-presentation and gender differences (Shavitt et al., 2006).

Self-construal and sustainability

Self-construal plays a key role in sustainable decision-making. Consumers with an independent self-construal are more price-sensitive to green products than those with an interdependent self-construal (Gao et al., 2021). Additionally, after engaging in pro-environmental behaviour, independent consumers are less likely to continue such actions, believing their goal has been achieved (Xiong et al., 2023). In contrast, consumers with higher interdependent self-construal are more inclined to purchase ethical products (Xu, 2019) and show stronger intentions to buy electric cars (Dogan & Ozmen, 2019).

Previous research highlights the importance of self-construal in shaping the effectiveness of message framing (Lee & Pounders, 2019; Lin et al., 2012). Messages emphasizing self-transcendent goals, like environmental protection, are more effective for individuals with an interdependent self-construal in encouraging sustainable behaviour (Banovic & Barone, 2021). However, these individuals also show stronger psychological reactance to loss-framed charity appeals (Xu, 2019). Promotion-focused messages paired with an independent self-construal boost green consumption (Luan et al., 2023). In Confucian cultures, interdependent self-construal promotes ethical consumption, though guilt appeals can reverse this effect (Chen & Moosmayer, 2020). Additionally, gain-framed messages resonate more with interdependent self-construals, while loss-framed messages are more persuasive for those with an independent self-construal (Dai et al., 2022).

2.2 Online communication experiments

As part of the first phase of Task 2.4, which aims to increase consumer acceptance of reuse systems and sustainable packaging, three online communication experiments were conducted to investigate how different message framing (loss vs. gain) and self-construal level (interdependent "WE" vs. independent "YOU") affect consumer purchase intention and return likelihood of reusable food packaging. Two pilot studies were initially conducted in the UK via Prolific, providing preliminary insights that informed the design and measures of a subsequent main online experiment in France and Belgium. Together, these studies form a fundamental exploration of effective communication strategies to increase consumer uptake of reusable packaging solutions.

Pilot online experiment 1

This study aims to gain insights into which type of message framing are most effective in influencing consumer's purchase intention and return likelihood of reusable food packaging. Three frames have been used: 1) loss versus gain frame, 2) message subject (environmental versus economic) and c) self-construal level (interdependent "we" versus independent "you").

Method

Survey Design

The pilot study consisted of two online experiments, labelled study 1A and study 1B, both conducted via Prolific in the UK. The overarching goal was to identify which types of message framing most effectively influence consumers' purchase intention and return likelihood of reusable food packaging. Three factors were initially examined:

- 1) Message framing (loss vs. gain)
- 2) Message subject (environmental vs. economic)
- 3) Self-construal level (interdependent "WE" vs. independent "YOU")

Study 1A adopted an interdependent perspective (WE), while study 1B adopted an independent perspective (YOU). Each sub-study followed a 2×2 design that combined loss or gain framing with either environmental or economic content, resulting in four conditions per sub-study:

- Loss/Environmental
- Gain/Environmental
- Loss/Economic
- Gain/Economic

Participants

Study 1A included 406 participants, and study 1B included 404 participants, all legally competent adults residing in the UK. Ethical approval was granted by the Research Ethics Committee at Aarhus University (Approval No. BSS-2023-088). Each participant reviewed the study information and provided informed consent before proceeding. Individuals who failed to complete the survey or did not pass the manipulation check were excluded from the final sample.

Procedures and Outcome Measures

After giving consent, participants were randomly assigned to one of the four conditions in their respective sub-study. In study 1A, all messages used "WE" to reflect an interdependent perspective (for example, "Think how much we harm the environment if we do not buy food products in reused packaging..."). In Study 1B, all messages used "YOU" to reflect an independent perspective (for example, "Think how much you harm the environment if you do not buy food products in reused packaging..."). Each condition also included either

environmental or economic emphasis, framed as either a loss or a gain. The full text of all messages can be found in the appendix A4. Pilot study 1: Questionnaire.

Following exposure to the assigned message, participants reported their purchase intention for reusable packaging using a three-item scale (Bashir et al., 2020) on a seven-point Likert scale (1 = “Very unlikely” to 7 = “Very likely”). They also completed a parallel three-item scale measuring return likelihood, using the same seven-point format. Engagement was measured with five items adapted from Bruner (2009), Lee et al. (2010), and Mathmann et al. (2017), and emotion (positive affect) was captured using four items adapted from Watson et al. (1988). Finally, participants provided socio-demographic information (for example, age, gender), indicated prior awareness of reusable packaging, completed a manipulation check verifying the intended framing, and rated the realism of the scenario. Full questionnaire of this study can be found in the appendix A4. Pilot study 1: Questionnaire.

Data Analysis

Initial t-tests within each sub-study (1A and 1B) showed no significant differences between environmental and economic messages on purchase intention or return likelihood. Consequently, these message subjects were collapsed in subsequent analyses. This left message framing (loss vs. gain) and self-construal level (WE in study 1A vs. YOU in study 1B) as the primary factors of interest. The datasets from study 1A and study 1B were then combined, and participants were classified according to whether they received a loss or gain message and whether they were in the interdependent or independent perspective. A two-way ANOVA was conducted to examine the main and interaction effects of framing and self-construal level on purchase intention and return likelihood. In addition, engagement and emotion were tested as potential mediators to determine whether these factors influenced the relationship between the experimental conditions and the primary outcome variables.

Results

Section Summary

- **Message Subject:** Environmental vs. Economic frames did not differ significantly, so they were merged for subsequent analyses.
- **Purchase Intention:** Gain framing marginally outperformed loss framing, and the individual (“YOU”) perspective led to slightly higher intentions compared to the collective (“WE”).
- **Return Likelihood:** Participants in the gain condition reported higher willingness to return reusable packaging than those in the loss condition, whereas self-construal level had no significant effect.
- **Emotion and Engagement:** Gain framing led to higher emotional response than loss framing, with a notable interaction for both emotion and engagement, implying that how participants feel and engage depends on the specific combination of framing and pronoun usage.

Sample Background Overview

Socio-Demographics

A total of N = 810 participants took part in the two pilot studies, with 406 in study 1A (interdependent “WE”) and 404 in study 1B (independent “YOU”). Overall, 50.2% of the participants were male and 49.1% were female. The mean age of the combined sample was 40.9 years, with participants in study 1A averaging 40.5 years and participants in study 1B averaging 41.4 years. These demographic characteristics provide a diverse representation of UK adults. Table 11 offers a detailed summary of the socio-demographic data for both studies.

Table 11 Socio-demographic characteristics of the pilot study samples

Socio-Demographics	Total (N= 810)	Study 1A (N= 406)	Study 1B (N= 404)
Gender (%)			
Male	50.2	47.5	53
Female	49.1	51.5	46.8
Age (mean)	40.9	40.5	41.4

Means of Key Variables

Five main variables were measured to examine the effects of message framing (loss vs. gain) and self-construal level (WE vs. YOU) on purchase intention and return likelihood for reusable packaging: purchase intention, return likelihood, engagement, emotion, and attitude. Table 12 presents the descriptive statistics (mean and standard deviation) for each variable in study 1A and study 1B.

Overall, the pilot data suggests that participants in both studies exhibited comparable patterns on these outcome and mediator variables, providing a strong foundation for subsequent analyses of how framing and pronoun usage may shape consumer behaviour toward reusable packaging.

Table 12 Descriptive statistics for key variables (Pilot Studies)

Variable	Mean (study 1)	SD (study1)	Mean (study2)	SD (study)
Purchase intention	5.12	1.49	5.30	1.36
Return likelihood	5.34	1.45	5.45	1.44
Engagement	4.50	1.37	4.48	1.44
Emotion	4.81	1.15	4.86	1.12
Attitude	6.18	1.80	6.35	1.64

Effects of Message Framing and Self-Construal Level

Both study 1A and study 1B initially compared environmental vs. economic message subjects. Independent-samples t-tests showed no significant differences between environmental and economic frames for either purchase intention or return likelihood. Consequently, these two message subjects were collapsed in subsequent analyses (Griskevicius et al., 2009; Otterbring & Sela, 2020).

Purchase Intention

After merging message subjects, a two-way ANOVA (message framing: loss vs. gain $\times$ self-construal level: WE vs. YOU) was conducted on purchase intention by merging the data from study 1A and study 1B. Results indicated a borderline significant main effect of message framing, $F(1, 772) = 3.30, p = .07$, where participants in the gain condition ($M = 5.33, SE = 0.07$) reported slightly higher purchase intention than those in the loss condition ($M = 5.15, SE = 0.07$). A significant main effect of self-construal level also emerged, $F(1, 772) = 3.85, p = .05$, with those addressed as “YOU” ($M = 5.34, SE = 0.07$) indicating higher intention than those addressed as “WE” ($M = 5.14, SE = 0.07$). The interaction between framing and self-construal was borderline significant, $F(1, 772) = 3.73, p = .054$, suggesting that the impact of loss vs. gain framing may depend on whether participants are addressed individually or collectively.

Return Likelihood

A two-way ANOVA on return likelihood showed a significant main effect of message framing, $F(1, 772) = 5.12, p < .05$, with participants in the gain frame ($M = 5.55, SE = 0.07$) reporting higher return likelihood than those in the loss frame ($M = 5.32, SE = 0.07$). Self-construal level did not differ significantly, $F(1, 772) = 2.03, p = .15$ (WE: $M = 5.37, SE = 0.07$ vs. YOU: $M = 5.51, SE = 0.07$), and the interaction was non-significant, $F(1, 772) = 0.23, p = .63$.

Emotion

A two-way ANOVA on emotion (positive affect) revealed a significant main effect of message framing, $F(1, 772) = 25.15, p < .001$, with participants in the gain frame ($M = 5.05, SE = 0.57$) reporting higher emotional response than those in the loss frame ($M = 4.64, SE = 0.57$). Self-construal level did not yield a main effect, $F(1, 772) = 0.37, p = .54$, but the interaction was significant, $F(1, 772) = 7.19, p = .008$, suggesting that framing’s impact on emotion differs depending on whether the message is framed in terms of “we” or “you.”

Engagement

For engagement, there were no significant main effects of framing ($F(1, 772) = 1.97, p = .16$) or self-construal ($F(1, 772) = 0.04, p = .84$). However, the interaction between framing and

self-construal was significant, $F(1, 772) = 6.54$, $p = .01$, indicating that participants' engagement levels depend on the combination of loss vs. gain framing and WE vs. YOU perspectives.

Pilot online experiment 2

This study builds on the results of Study 1 further adding visuals to see their Interferences with the frames. In fact, Study 1 showed that there is no significant difference between message framing on the environment versus the economy. Therefore, we merged the two messages. In Study 2, we replicated the results from Study 1, and we further studied how loss versus gain interacts with independent versus interdependent construal message framing. Similarly to Study 1, we propose that gain framing will induce positive emotion thereby enhancing engagement to the matter which translates into higher purchase intention and likelihood of returning packaging after use.

Method

Survey Design

Building on insights from the first study, this online experiment examined how loss vs. gain framing interacts with independent ("YOU") vs. interdependent ("WE") self-construal levels, while visual elements were added to assess their influence on consumer responses. To simplify the design based on earlier findings showing no significant difference between environmental vs. economic frames, these messages were merged into a single version emphasizing either losses or gains from using reusable packaging. This resulted in a 2×2 between-subjects design with four conditions:

- Loss / Independent (YOU)
- Gain / Independent (YOU)
- Loss / Interdependent (WE)
- Gain / Interdependent (WE)

Participants

A total of $N = 400$ participants were recruited through Prolific in the UK, all legally competent adults. Ethical approval was obtained from the Internal Review Board at Aarhus University. Participants provided informed consent before entering the study, and those who failed attention checks or did not complete the survey were excluded from the final sample.

Procedures and Outcome Measures

After consenting, participants were randomly assigned to one of the four experimental conditions, each presented in a visual format. They then responded to measures of purchase intention (Bashir et al., 2020) via a three-item scale on a seven-point Likert (1 = “very unlikely” to 7 = “very likely”), return likelihood (three items, reference) also on a 1–7 scale, engagement (five items, adapted from Bruner, 2009; Lee et al., 2010; Mathmann et al., 2017) and emotion (Positive Affect) (four bipolar items, adapted from Watson et al., 1988).

Participants also completed regularity (Higgins et al., 2001) and values items, along with socio-demographic questions (e.g., age, gender), an awareness check (whether they had heard of reusable packaging before), a manipulation check confirming they perceived the intended framing and self-construal level, and a realism rating of the message scenario. Full questionnaire details appear in the appendix A5. Pilot study2: Questionnaire.

Data Analysis

Descriptive statistics (means, standard deviations) were first computed for all variables to profile the sample and verify randomization. Next, t-tests examined the independent effects of message framing (loss vs. gain) and self-construal level (independent vs. interdependent) on purchase intention and return likelihood. A two-way ANOVA then tested the interaction between framing and self-construal for each outcome variable. Finally, moderated mediation analyses were performed to see if positive affect alone or in combination with engagement mediated the effect of framing on the dependent variables, moderated by self-construal level.

Results

Section Summary

- **Purchase Intention** was unaffected by framing or self-construal alone but increased significantly when gain framing was paired with an individual perspective.
- **Return Likelihood** rose under gain framing, with a borderline interaction suggesting further boosts for “YOU” messaging.
- **Positive Affect** mediates the effect of framing on both purchase intention and return likelihood, and engagement further amplifies this relationship in a sequential mediation path.
- By merging environmental and economic content and incorporating visuals, overall purchase intention and return likelihood were higher than in earlier studies, suggesting that visually supported, integrated framing strategies may be particularly effective.

Sample Background Overview

Socio-Demographics

A total of N = 400 participants completed the study. 50% identified as male, 49.4% as female, and 0.6% as other, with an average age of 44.2 years (SD = 14.78). Table 13 summarizes the main demographic characteristics. Randomization checks showed no significant imbalances in

participant background across conditions, indicating successful random assignment. Manipulation checks confirmed that respondents recognized both the intended loss vs. gain framing and the independent vs. interdependent construal.

Table 13 Descriptive statistics and demographic overview

Socio-Demographics	Total (N= 400)
Gender (%)	
Male	50.0
Female	49.4
Age (mean)	44.2

Means of key variables

Descriptive statistics for the primary outcomes and mediators are presented in Table 14. Purchase intention averaged 5.55 (SD = 1.24), while return likelihood was 5.69 (SD = 1.41). Participants' positive affect (emotion) stood at 5.05 (SD = 1.14), and engagement was 4.82 (SD = 1.39). The overall attitude toward reusable packaging measured 5.91 (SD = 1.25). Integrating visuals and merging environmental/economic content appeared to boost purchase intention and return likelihood compared to earlier studies.

Table 14 Descriptive statistics for key variables

Variable	Mean	SD
Purchase intention	5.55	1.24
Return likelihood	5.69	1.41
Engagement	4.82	1.14
Emotion	5.05	1.39
Attitude	5.91	1.25

Effects of Message Framing and Self-Construal Level

After confirming that environmental vs. economic messages could be collapsed (based on previous results), we investigated how loss vs. gain framing and independent vs. interdependent construal levels jointly influenced purchase intention and return likelihood. Independent t-tests assessed each factor separately, followed by a two-way ANOVA to examine their interaction.

Purchase Intention

Neither framing (loss vs. gain) nor self-construal level (independent vs. interdependent) alone significantly affected purchase intention ($p = .58$; $p = .86$). However, the two-way ANOVA revealed a significant interaction ($b = 0.48$, $p = .03$), indicating that the effect of loss vs. gain framing increased by 0.48 scale points when participants were addressed at the individual ("YOU") level rather than the interpersonal ("WE") level. Figure 1 illustrates this interaction.

Return Likelihood

A t-test showed a significant positive effect of gain framing on return likelihood ($b = 0.26$, $p = .03$), but self-construal level alone did not significantly influence return likelihood ($p = .46$). The two-way ANOVA indicated a borderline significant interaction ($b = 0.46$, $p = .06$), suggesting that the impact of framing on return likelihood may be stronger when emphasizing individual benefits. Figure 2 presents these results.

Moderated mediation

A moderated mediation analysis first tested whether positive affect mediates the relationship between message framing (loss vs. gain) and both purchase intention and return likelihood, with self-construal level (individual vs. interpersonal) acting as the moderator. The results revealed a significant moderated mediation index for purchase intention ($ab = .11$, $SE = .05$, 95% CI [0.03, 0.23]) and return likelihood ($ab = .14$, $SE = .06$, 95% CI [0.04, 0.28]). These findings indicate that the indirect effect of framing on the outcome variables through positive affect varies depending on whether participants are addressed at the individual or interpersonal level.

Next, the model was extended to include engagement as a second mediator, creating a sequential path from message framing to positive affect, from positive affect to engagement, and finally to purchase intention or return likelihood. This extended analysis again yielded significant moderated mediation indices for purchase intention ($ab = .18$, $SE = .06$, 95% CI [0.06, 0.32]) and return likelihood ($ab = .12$, $SE = .05$, 95% CI [0.03, 0.23]). These results suggest that gain vs. loss framing, in conjunction with an individual vs. interpersonal perspective, can shape consumer behavior through a chain of heightened positive affect and engagement, ultimately boosting purchase intention and return likelihood for reusable food packaging.

Main online experiment

Method

Survey Design

This study was conducted as an online experiment, building on the survey questions used in two earlier pilot studies but with refined message frame content and updated flyer designs. A 2×2 between-subjects design was implemented, featuring two factors: message framing (gain vs. loss) and self-construal level (interdependent “WE” vs. independent “YOU”). As a result, participants were randomly assigned to one of four conditions: gain/interdependent, gain/independent, loss/interdependent, or loss/independent. Visual flyers were created to present these specific combinations, and each participant viewed only one flyer.

Participants

Ethical approval for the study was granted by the Research Ethics Committee at Aarhus University (Approval No. BSS-2023-088). Participants were recruited through a professional market research agency (Norstat Danmark A/S) in Belgium and France, targeting legally competent adults in both countries. Data collection began on June 28, 2024, and ended on July 2, 2024, in France, while it continued until July 8 in Belgium to ensure a sufficient response rate. All participants provided informed consent at the beginning of the survey. After data collection, several quality-control steps were applied, such as excluding participants who failed attention checks or spent fewer than eight seconds on the assigned flyer, thereby resulting in the final sample used for analysis.

Procedures and Outcome Measures

The survey was initially developed in English and then translated into French and Flemish. Qualtrics software was used for its robust survey design features and comprehensive data collection capabilities. After consenting, each participant was randomly assigned to view one of the four flyers combining either gain or loss framing with an interdependent (“WE”) or independent (“YOU”) self-construal level.

Subsequently, respondents answered questions about their purchase intention, measured using a three-item scale adapted from Bashir et al. (2020), on a seven-point Likert scale ranging from 1 (“very unlikely/unwilling”) to 7 (“very likely/willing”). Next, they completed a three-item scale assessing their likelihood to return the reusable food packaging, also on a seven-point scale. Engagement was measured with a five-item scale adapted from Bruner (2009), Lee et al. (2010), and Mathmann et al. (2017), while emotion (positive affect) was captured using a four-item scale based on Watson et al. (1988). Attitude toward reusable packaging was evaluated with bipolar adjective pairs on a seven-point scale, and responsibility items were included to gauge perceptions of who should reduce single-use packaging. Additional sections measured values with a 15-item list and regularity with an 11-item scale adapted from Higgins et al. (2001).

At the end of the survey, participants provided socio-demographic information (e.g., age, gender), completed manipulation checks to verify perceived message framing and self-construal level, indicated their awareness of reusable packaging, and rated the realism of the flyer they saw. A final feedback section allowed participants to offer comments or suggestions about the survey. Full questionnaire details can be found in the appendix A6. Main online study: Questionnaire.

Data Analysis

The primary outcome variables were purchasing intention and return likelihood (Bashir et al., 2020), each measured via seven-point items. Engagement, emotion, and attitude served as secondary outcome or mediator variables, depending on the analysis. Data were processed and analyzed in SPSS, where a series of two-way ANOVAs (message framing × self-construal level) was conducted separately for Belgium and France, controlling for potential covariates such as age, gender, awareness, and realism. When significant main or interaction effects emerged, post-hoc tests with Bonferroni adjustments were employed to clarify pairwise comparisons. This methodological approach provided a comprehensive assessment of how message framing and self-construal level, both independently and in combination, affected participants' intentions, engagement, emotional responses, and attitudes regarding reusable food packaging.

Results

Section Summary

- Across both Belgium and France, message framing and self-construal level produced limited direct effects on the measured constructs.
- In Belgium, purchase intention was the one outcome showing a significant interaction effect, implying that framing and self-construal level in combination can influence how willing Belgian consumers are to purchase reusable packaging.
- In general, covariates such as realism (and occasionally age or gender) emerged as significant predictors, underscoring the importance of personal or perceptual factors in shaping participants' responses.

Sample Background Overview

Socio-demographics

A total of N = 765 participants from Belgium (N = 374) and France (N = 391) participated in the study. Overall, 41% of the participants were male and 58.45% were female. The mean age of all participants was 51.05 years, with Belgian respondents averaging 48.7 years and French respondents averaging 53.4 years. These demographic characteristics provide a balanced representation of both genders and a moderate age range between the two subsamples. Table 15 presents a comprehensive overview of these socio-demographic data.

Table 15 Sociodemographic characteristics of the sample

Socio-Demographics	Total (N= 756)	Belgium (N = 374)	France (N = 391)
Gender (%)			
Male	41	40.6	41.4
Female	58.45	59.1	57.8
Age (mean)	51.05	48.7	53.4

Means of key variables

Five main variables were measured to examine the impact of message framing (gain vs. loss) and self-construal level (you vs. we) on purchase intention and return likelihood of reusable packaging: purchase intention, return likelihood, engagement, emotion, and attitude. In Belgium, the average purchase intention was 5.62 (SD = 1.08), while in France it was 5.50 (SD = 1.15). The return likelihood was on average 5.67 (SD = 1.32) for the Belgian participants and 5.69 (SD = 1.25) for the French participants. Regarding engagement, Belgian respondents reported a mean of 5.17 (SD = 1.17) compared to 5.56 (SD = 1.08) in France. Emotion scored 5.29 (SD = 1.16) in Belgium and 5.34 (SD = 1.20) in France. Finally, attitude was measured at 5.83 (SD = 1.12) for Belgian participants compared to 5.41 (SD = 1.12) for French participants. Table 16 provides a summary of the descriptive statistics for these variables.

Overall, these results indicate that Belgian and French respondents show relatively similar, though not identical, patterns on the main outcome and mediator variables. These findings provide a solid basis for further analysis of how message framing and self-construal level may influence both purchase intention and likelihood to return reusable packaging.

Table 16 Descriptive statistics for key variables of the study

Variable	Mean (Belgium)	SD (Belgium)	Mean (France)	SD (France)
Purchase intention	5.62	1.08	5.50	1.15
Return likelihood	5.67	1.32	5.69	1.25
Engagement	5.17	1.17	5.56	1.08
Emotion	5.29	1.16	5.34	1.20
Attitude	5.83	1.12	5.41	1.12

Effects of message framing and Self-construal level

To investigate how message framing (gain vs. loss) and self-construal level (“you” vs. “we”) influenced the outcome variables, a series of two-way ANOVAs was conducted for both Belgium and France. Age, gender, awareness, and realism were included as covariates in each model to control for potential demographic or perceptual influences. Although these covariates were included in the model, the focus here is on the main experimental factors.

Purchase intention (Belgium)

The overall model was significant, $F(7, 366) = 20.032$, $p < .001$, with approximately 28% of the variance in purchase Intention explained ($R^2 = .277$). Neither message framing, $F(1, 366) = 0.047$, $p = .829$, nor self-construal level, $F(1, 366) = 2.159$, $p = .143$, showed a significant main effect. However, there was a significant interaction between the two factors, $F(1, 366) = 4.966$,

$p = .026$, indicating that the impact of framing on purchase intention varies depending on whether the message is framed using “you” or “we” (Figure 13).

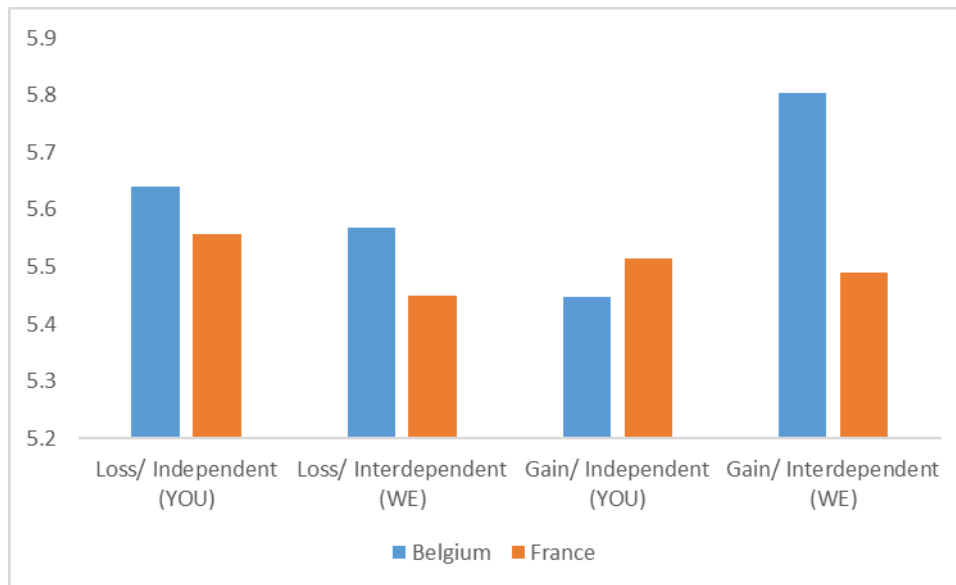


Figure 13 Combined effects of message framing and self-construal level on mean purchase intention in Belgium and France

Purchase intention (France)

For the French sample, the overall model was also significant ($F(7, 383) = 11.794, p < .001$), explaining about 18% of the variance in Purchase Intention ($R^2 = .177$). In contrast to Belgium, there were no significant main effects of message framing ($F(1, 383) = 0.000, p = .993$) or self-construal level ($F(1, 383) = 0.378, p = .539$). Moreover, the interaction term was likewise non-significant ($F(1, 383) = 0.144, p = .704$). Thus, the manipulations did not yield notable differences in purchase intention among French participants (Figure 13).

Return likelihood (Belgium)

The two-way ANOVA for return likelihood was significant overall ($F(7, 366) = 14.231, p < .001$), explaining around 21% of the variance ($R^2 = .214$). Neither Message Framing ($F(1, 366) = 0.419, p = .518$) nor self-construal level ($F(1, 366) = 1.357, p = .245$) showed a significant main effect, and their interaction also was non-significant ($F(1, 366) = 0.403, p = .526$). Thus, for Belgian participants, neither framing (gain vs. loss) nor pronoun usage (“you” vs. “we”) influenced return likelihood to a statistically meaningful degree (Figure 14).

Return likelihood (France)

The two-way ANOVA for return likelihood was significant overall ($F(7, 383) = 11.589, p < .001$), accounting for about 18% of the variance ($R^2 = .175$). Neither message framing ($F(1, 383) = 0.295, p = .587$) nor self-Construal Level ($F(1, 383) = 0.105, p = .746$) produced a significant

main effect, nor did the two factors significantly interact ($F(1, 383) = 1.526, p = .217$). Thus, similar to the Belgian subsample, the framing and self-construal manipulations did not reliably influence Return Likelihood among French participants (Figure 14)

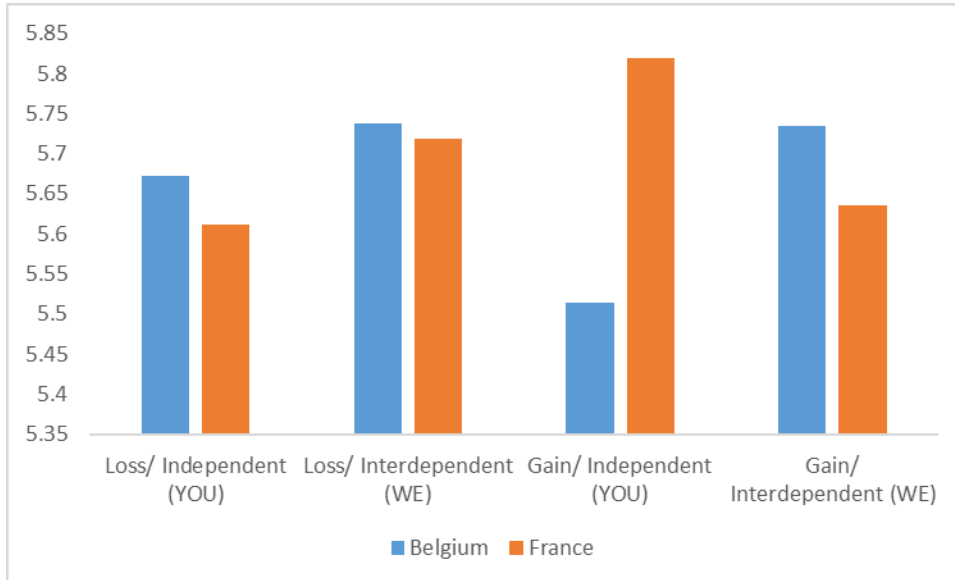


Figure 14 Combined effects of message framing and self-construal level on mean return Likelihood in Belgium and France

Engagement (Belgium)

For engagement, the two-way ANOVA yielded a significant overall model, $F(7, 366) = 35.970, p < .001$, with an R^2 of .408, indicating that about 41% of the variance was explained by the factors and covariates. While Realism exerted a strong effect ($p < .001$), neither message framing ($p = .139$) nor self-construal level ($p = .097$) reached statistical significance. Moreover, the interaction between these two factors was not significant ($p = .571$).

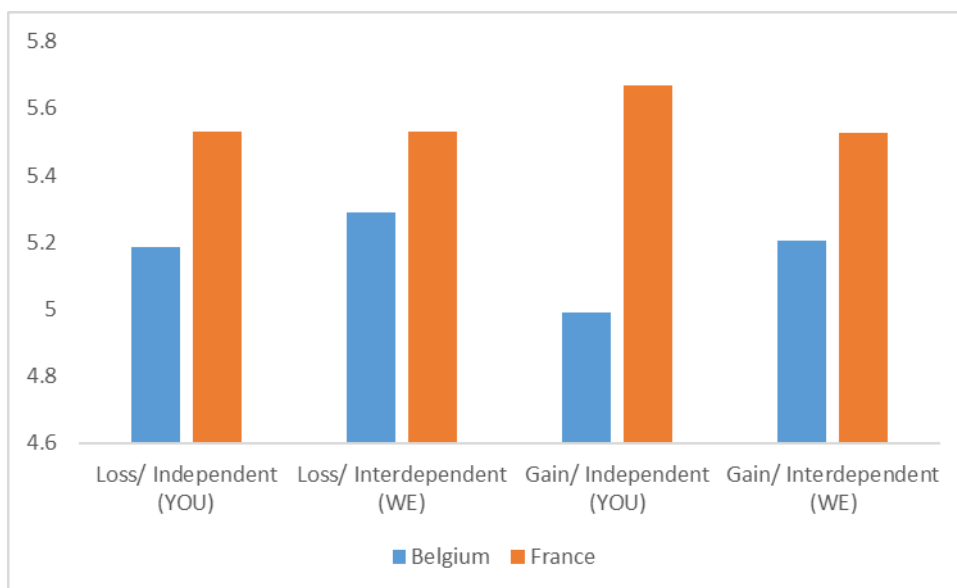


Figure 15 Combined effects of message framing and self- construal level on mean engagement in Belgium and France

Thus, similar to the previous outcomes, framing (gain vs. loss) and self-construal level (“you” vs. “we”) did not substantially influence engagement within the Belgian sample (Figure 15).

Engagement (France)

A two-way ANOVA on Engagement produced a significant overall model, $F(7, 383) = 21.554$, $p < .001$, explaining roughly 28% of the variance ($R^2 = .283$). However, neither Message Framing ($p = .483$) nor self-construal level ($p = .452$) yielded a notable main effect, and their interaction term also failed to reach significance ($p = .459$). As such, the framing (gain vs. loss) and pronoun usage (“you” vs. “we”) manipulations did not substantially alter participants’ sense of Engagement in the French subsample (Figure 15).

Emotion (Belgium)

For emotional Response, the overall two-way ANOVA model was significant, $F(7, 366) = 9.925$, $p < .001$, accounting for about 16% of the variance ($R^2 = .160$). Realism (REAL) stood out as a key predictor ($p < .001$), but the manipulations themselves did not exhibit notable effects: message framing approached but did not reach significance ($p = .071$), self-construal level was not significant ($p = .459$), and the interaction between framing and self-construal was likewise non-significant ($p = .803$). As a result, neither framing (gain vs. loss) nor pronoun usage (“you” vs. “we”) produced meaningful changes in emotional response within the Belgian sample (Figure 16).

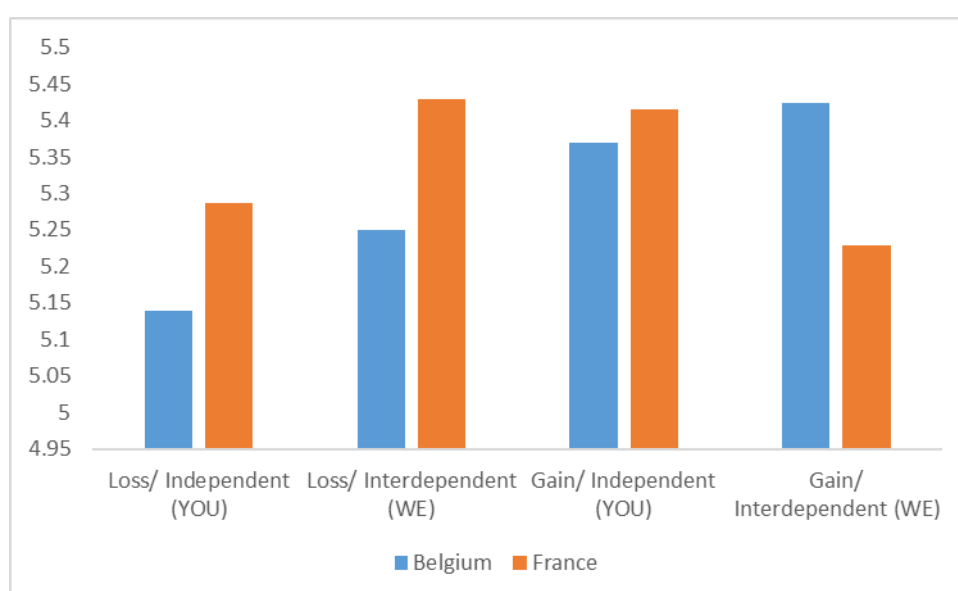


Figure 16 Combined effects of message framing and self-construal level on mean emotion in Belgium and France

Emotion (France)

In the French subsample, the two-way ANOVA on emotional response yielded a significant overall model, $F(7, 383) = 10.921$, $p < .001$, which accounted for around 17% of the variance ($R^2 = .166$). Age ($p = .009$) and Realism ($p < .001$) emerged as significant covariates. However, neither Message Framing ($p = .751$) nor self-construal level ($p = .843$) demonstrated a notable main effect, and their interaction was also non-significant ($p = .148$). Thus, as seen in the Belgian data, the framing (gain vs. loss) and pronoun usage (“you” vs. “we”) manipulations did not substantially shape emotional responses among French participants (Figure 16).

Attitude (Belgium)

For Attitude, the two-way ANOVA was significant overall ($F(7, 366) = 18.082$, $p < .001$), explaining roughly 26% of the variance ($R^2 = .257$). Among the covariates, realism emerged as a strong predictor ($p < .001$). However, neither message framing ($p = .703$) nor self-construal level ($p = .188$) produced a meaningful main effect, and their interaction was likewise negligible ($p = .888$). Consequently, in the Belgian sample, neither framing (gain vs. loss) nor pronoun usage (“you” vs. “we”) had a discernible impact on participants’ attitudes toward reusable packaging (Figure 17)

Attitude (France)

For attitude, the two-way ANOVA was significant overall ($F(7, 383) = 14.966$, $p < .001$), accounting for approximately 22% of the variance ($R^2 = .215$). Age, Gender, Awareness (AW_R), and realism emerged as significant covariates (all $p < .05$). Nevertheless, neither message framing ($p = .930$) nor self-construal level ($p = .226$) showed a significant effect, and

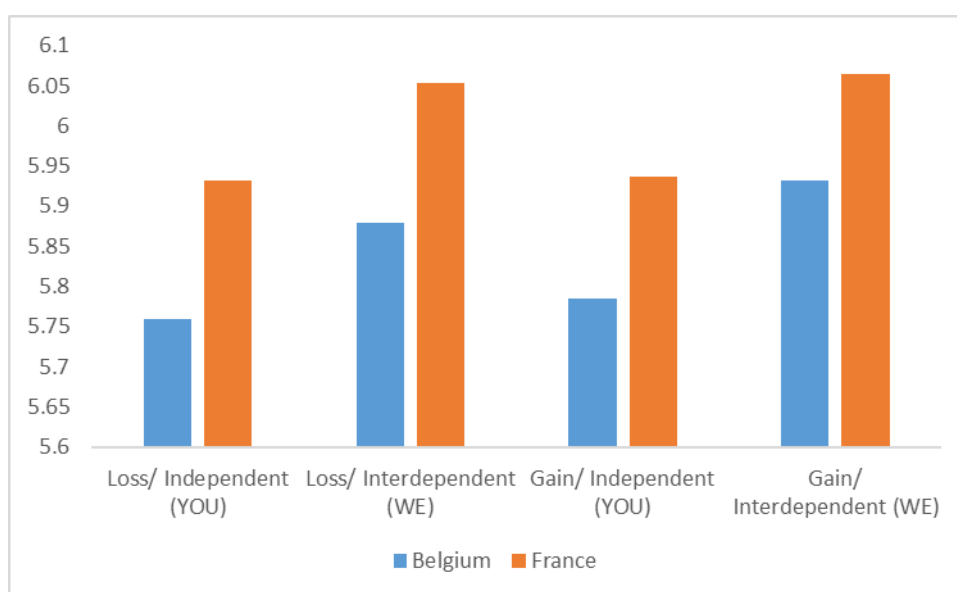


Figure 17 Combined effects of message framing and self-construal level on mean attitude in Belgium and France

the interaction between these variables was also non-significant ($p = .978$). These findings suggest that, within the French sample, different framing (gain vs. loss) and pronoun usage (“you” vs. “we”) did not substantively affect participants’ attitudes toward reusable packaging (Figure 17).

2.3 Field experiment

Method

The “Rapportez-moi pour réemploi” initiative, and its associated reusable-packaging products, have so far been introduced only in France by our retail partners (Carrefour and Système U). Consequently, the Phase 2 field experiment was conducted exclusively in France at two Carrefour stores in Besançon.

Building on Phase 1 online communication experiments (which showed no difference between gain and loss framing), we retained the gain frame and varied only the self-construal level (interdependent vs. independent) in all materials. We produced two formats in French:

- **Construal-level leaflets (A5)** detailing the environmental and practical benefits of reusable packaging can be found in the appendix A7. Field experiment (T2.4) and intervention study (T2.6): Leaflets
- **Construal-level roll-up banners (200 × 85 cm)** presenting the same benefits in a concise, at-a-glance layout, can be found in the appendix A8. Field experiment (T2.4) and intervention study (T2.6): Banners.

Both formats share identical design, imagery, and benefit statements, differing only in in construal level (WE Vs. YOU)

These materials were displayed for two weeks in the two Carrefour shops at Besançon:

- **Valentin (3 – 18 April 2025):** interdependent (“Nous...”) leaflets on the entrance counter and reusable-packaging shelves, with roll-ups at the store entrance and beside the reverse-vending machine. Photographs of the field experiment installation in Carrefour Valentin appear in the appendix A9. Field experiment (T2.4) and intervention study (T2.6): setup photos.
- **Chalezeule (4 – 19 April 2025):** independent (“Vous...”) versions in the same locations and on the same schedule. Photographs of the field experiment installation in Carrefour Chalezeule appear in the same appendix A9. Field experiment (T2.4) and intervention study (T2.6): setup photos.

Carrefour and LOOP provided daily sales data for reusable-packaging items and their single-use equivalents. The dataset covered one week before and two weeks during the experiment. Data were received in October 2025, approximately six months after the intervention period.

The dataset included five food products that were marketed in both single-use and reusable packaging formats before and during the intervention: one pasta salad: “Sodebo pasta salade poulet comté”, two snacks: “Crackster original 100g - CRF CLASSIC” and “CROUSTIZ EMMENTAL 140g - CRF SENSATION”, and two soft fresh cheese products varying in their fat percentage: “Fromage Frais Nature 0% 500g - Carrefour BIO” and “Fromage Frais Nature 3.2% 500g - Carrefour BIO”

Results

Section Summary

- Comparing sales before and during the experiment, self-construal framing showed modest but distinct effects on the share of products sold in reusable packaging. In the independent (“YOU”) condition, this share increased by approximately 3 percentage points, whereas in the interdependent (“WE”) condition, it decreased by around 4 percentage points.
- At the product level, changes between the pre- and during-experiment periods varied by category: both cheese products showed moderate increases under the “YOU” condition, while Pasta salad displayed the largest increase in reusable packaging sales under the “WE” condition.
- Daily sales patterns showed considerable fluctuations across the two-week period, with no strong cumulative trend, suggesting that the framing effect influenced short-term purchasing behaviour more than sustained changes over time.

Effects of self-construal framing at the store level

Figure 18 compares the overall share of products sold in reusable packaging before and during the experiment for each construal-level condition. In the independent (“YOU”) condition (Carrefour Chalezeule), this share increased from 10.7 % to 13.7 %, a rise of roughly +3 percentage points. In contrast, the interdependent (“WE”) condition (Carrefour Valentin) showed a decline from 9.6 % to 5.2 % (–4 pp).

These results indicate that the individual-responsibility framing was more effective at encouraging customers to choose reusable packaging than the collective-responsibility framing.

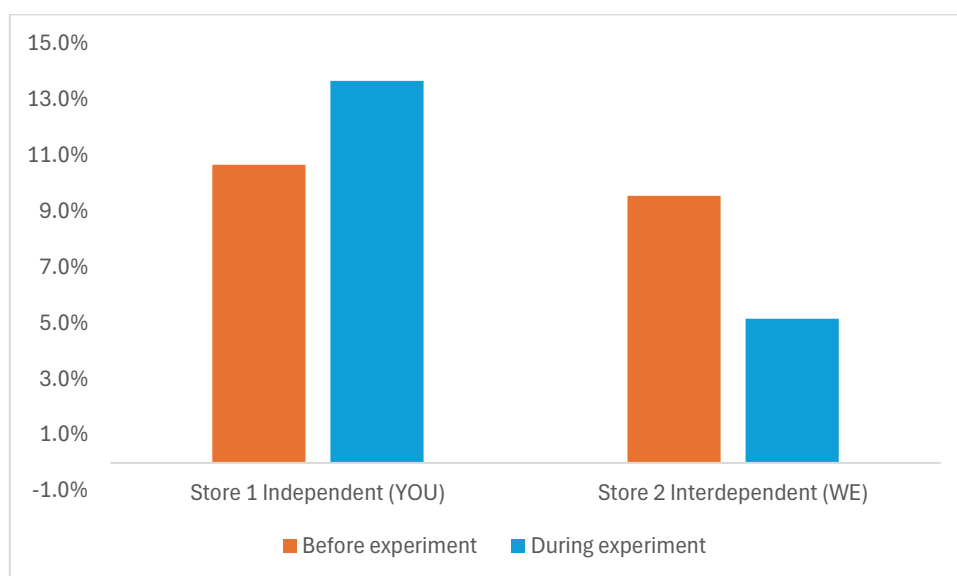


Figure 18 Share of products sold in reusable packaging before and during the intervention, by store

Effects of self-construal framing across product categories

Figure 19 presents the change in the share of products sold in reusable packaging (percentage-point difference between during and before periods) for each product category across both stores.

In the independent (“YOU”) store, most categories showed positive changes, notably Croustiz (+18 pp) and cheese 3.2 fat (+14 pp).

In the interdependent (“WE”) store, results were mixed: pasta salad increased markedly (+27 pp), while Croustiz (–12 pp) and Crackster (–8 pp) declined.

These findings suggest that the independent framing generated more consistent improvements across products, while the interdependent framing produced isolated effects.

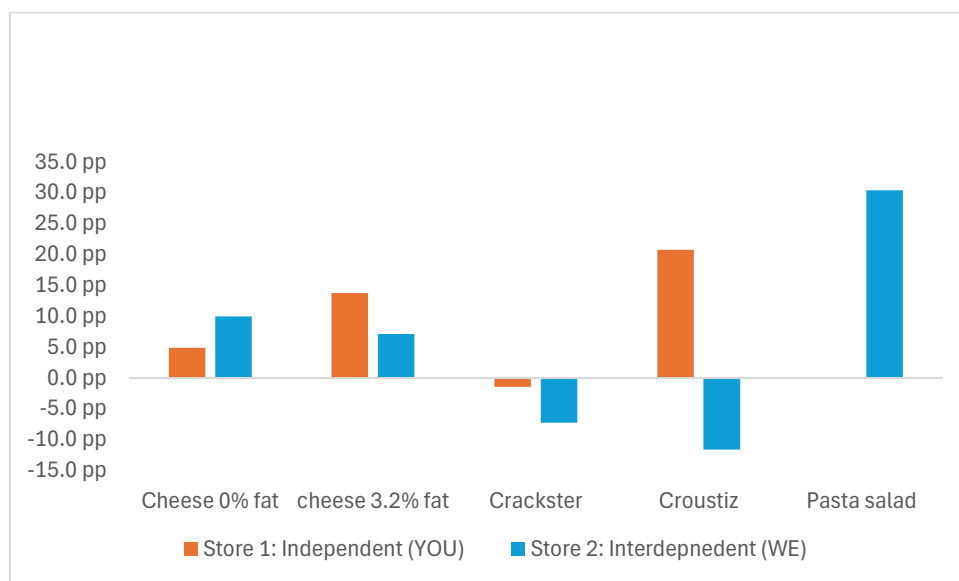


Figure 19 Change in reusable-packaging share by product category and store

Daily dynamics of reusable-packaging sales

Figure 20 shows the daily evolution of the share of products sold in reusable packaging for both stores. The intervention started on 3 April 2025 in Carrefour Valentin (“WE”) and on 4 April 2025 in Carrefour Chalezeule (“YOU”). Before these dates, both stores exhibited low, stable shares (below 20 %). After the intervention, the “YOU” store displayed several upward peaks — exceeding 30 % on certain days — while the “WE” store remained nearly flat, rarely surpassing 10 %.

These daily dynamics reinforce the aggregate finding that independent (“YOU”) framing was more effective at stimulating purchases in reusable packaging.

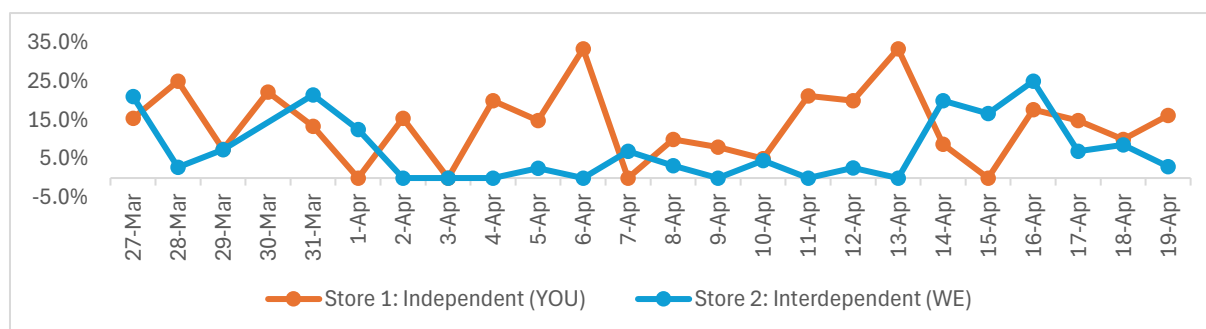


Figure 20 Daily evolution of reusable packaging share during the intervention period

3. Task 2.5: Leveraging social norms for optimizing reuse systems and paper-based packaging (Task Leader: ISTC-CNR)

3.1 Introduction

The detrimental environmental impact of single-use plastics waste has initiated a growing interest in sustainable alternatives, with reusable packaging emerging as a promising solution. Reusable packaging, which relies on durable containers that can be returned and reused multiple times, offer an alternative to disposable packaging, minimizing waste, conserving resources, and reducing pollution associated with production and disposal.

The potential environmental benefits of reusable packaging are contingent on widespread adoption and proper return practices. Without sufficient return rates, the environmental impact of producing durable reusable containers may outweigh the benefits of reduced single-use packaging.

The study has three objectives:

- First objective: to investigate participants' willingness to choose products in reusable packaging instead of single use, and how this choice varies across individual characteristics.
- Second objective: to study how different informational messages about other people choice affect personal choice.
- Third objective: to investigate the factors influencing individuals' willingness to return reusable packaging after use, studying the interplay between economic incentives and social norms as drivers of behaviour.

To address these points, we conducted a survey and a survey experiment on a nationally representative sample of the French population (n=3060).

Concerning individual willingness to choose products in reusable packaging we created a "virtual shopping market" where we measured individuals' stated choice preference for reusable food packaging, measured on an ordinal scale from 1 to 5 representing the percentage of grocery purchases for which respondents would choose reusable packaging: 1 "0%", 2 "25%", 3 "50%", 4 "75%", and 5 "100%". This variable captures behavioral intention rather than actual behavior, reflecting respondents' willingness to adopt reusable systems across their shopping activities.

The variables measured to capture participants' characteristics comprises several domains: demographic characteristics (age groups, education level, economic status), political orientation across the left-right spectrum, prior experience with reusable packaging (awareness and frequency of use), and psychological factors including attitudes toward various packaging attributes (environmental impact, hygiene, effort, convenience, resource savings, comparison to recycling, and moral judgment) and self-efficacy beliefs (personal effectiveness beliefs, motivation levels, and collective efficacy). This allows for examination of how socioeconomic factors, political identity, practical experience, and psychological perceptions collectively shape consumers' packaging preferences, providing insights into potential barriers and facilitators of reusable packaging adoption across different consumer segments.

Table 17 and Table 18 report some characteristics of the sample. It consists of 3060 French respondents with relatively balanced gender distribution (51.8% female, 48.0% male) and good age representation across adulthood, particularly skewed toward older demographics with 30.0% aged 55-75. Concerning educations, the sample is highly educated, with over half (53.0%) holding university degrees and an additional 38.6% completing high school. Concerning the economic status, most respondents report moderate comfort levels, with 43.1% feeling "neither comfortably nor uncomfortably" and 36.4% reporting living "rather comfortably." Concerning the political orientation, the sample shows a balanced distribution across the spectrum, with center-right (23.5%) and center-left (22.0%) being the largest groups. Regarding reusable packaging, two-thirds (66.8%) had prior awareness, while usage patterns reveal that 49.8% have some experience with reusable packaging (13.9% frequent users, 35.9% occasional users), and importantly, 41.3% of non-users express willingness to adopt such systems, suggesting substantial potential for market growth.

Table 17 Sample size and proportions of socio-demographic characteristics of the sample

Demographics	N (%)
Gender	
Male	1470 (48.0%)
Female	1586 (51.8%)
Other	4 (0.1%)
Age	
18-24	369 (12.1%)
25-34	549 (17.9%)
35-44	608 (19.9%)
45-54	617 (20.2%)
55-75	917 (30.0%)
Education	
Primary school	13 (0.4%)
Secondary school	145 (4.7%)
High school	1182 (38.6%)
University (bachelor or master)	1621 (53.0%)
Post-graduate degree	99 (3.2%)
Economic status	
Uncomfortably	129 (4.2%)
Rather uncomfortably	388 (12.7%)
Neither comfortably nor uncomfortably	1318 (43.1%)
Rather comfortably	1114 (36.4%)
Very comfortably	111 (3.6%)
Political orientation	
Very left wing	117 (3.8%)
Left wing	638 (20.8%)
Center-left	672 (22.0%)
Center-right	719 (23.5%)
Right wing	615 (20.1%)
Very right wing	299 (9.8%)
Total	3060

Table 18 Sample size and proportions of socio-demographic characteristics of the sample

Awareness and familiarity	N (%)
<i>Had you ever heard of reusable food packaging?</i>	
No	1016 (33.2%)
Yes	2044 (66.8%)
<i>Have you ever used any kind of reusable food packaging?</i>	
Yes, I often use	424 (13.9%)
Yes, I have used this before but don't use this often	1098 (35.9%)
No, I have never used this before but I would be happy to	1263 (41.3%)
No, I have never used this before and I would not be happy to	275 (9.0%)
Total	3060

Table 19 reveals predominantly positive attitudes toward reusable packaging across multiple dimensions, though with notable areas of concern. A strong majority (66.5%) perceive reusable packaging as environmentally beneficial, and over half believe it saves substantial resources (56.1%) and represents the morally right choice (53.9%). However, more mixed perceptions emerge regarding practical implementation aspects. While 50.3% view reusable packaging as superior to recycling, a significant portion remains neutral (44.6%), suggesting uncertainty about its comparative environmental advantage. Practical concerns are evident in hygiene perceptions, where only 42.3% find it hygienic compared to 50.1% neutral, and effort requirements, where just 26.0% perceive low effort despite 61.9% being neutral. Convenience shows similar patterns, with only 39.8% finding it convenient. These results indicate that while respondents broadly endorse reusable packaging's environmental and moral value, practical concerns about hygiene, effort, and convenience may represent barriers to widespread adoption that need addressing through system design and education.

Table 19 Attitudes towards reusable packaging of the sample

Attitudes	N (%)
Environmental impact	
Bad	53 (1.7%)
Neutral	973 (31.8%)
Good	2034 (66.5%)
Hygiene	
Unhygienic	234 (7.6%)
Neutral	1532 (50.1%)
Hygienic	1294 (42.3%)
Effort	
High effort	370 (12.1%)
Neutral	1895 (61.9%)
Low effort	795 (26.0%)
Convenience	
Inconvenient	200 (6.5%)
Neutral	1642 (53.7%)
Convenient	1218 (39.8%)
Resource savings	
Low savings	136 (4.4%)
Neutral	1208 (39.5%)
High savings	1716 (56.1%)
vs Recycling	
Worse	154 (5.0%)
Neutral	1366 (44.6%)
Better	1540 (50.3%)
Moral judgment	
Wrong	135 (4.4%)
Neutral	1275 (41.7%)
Right	1650 (53.9%)
Total	3060

Table 20 reveals positive self-efficacy beliefs regarding reusable packaging. 83.1% of respondents express high personal belief in the effectiveness of reusable packaging for reducing waste and pollution, while nearly as many (80.1%) report high personal motivation to reduce their single-use packaging consumption. Collective efficacy beliefs, though slightly lower, remain strongly positive with 74.2% expressing high confidence in their community's ability to protect the environment through reusable packaging adoption. The consistently low proportions of negative beliefs (ranging from 6.5% to 8.9% across dimensions) indicate minimal resistance. These findings suggest a population that is not only convinced of reusable packaging's environmental value but also personally motivated and confident in collective action, presenting favorable conditions for implementation with particularly strong foundations in personal conviction and willingness to change individual behavior.

Table 20 Beliefs about the effectiveness and motivation of using reusable packaging of the sample

Effectiveness and motivation beliefs	N (%)
Reusable packaging personal effectiveness belief	
Low	199 (6.5%)
Neutral	318 (10.4%)
High	2543 (83.1%)
Reusable packaging personal motivation to use	
Low	199 (6.5%)
Neutral	410 (13.4%)
High	2451 (80.1%)
Reusable packaging collective effectiveness belief	
Low	272 (8.9%)
Neutral	516 (16.9%)
High	2272 (74.2%)
Total	3060

3.2 First objective: variation in participants' willingness to choose products in reusable packaging

Section Summary

- Objective & Method:** A regression analysis was conducted to investigate how individual characteristics influence the choice of reusable packaging, examining demographic factors, political orientation, prior experience, attitudes, and self-efficacy beliefs.
- Key Finding - Political & Experiential Factors:** Political identity and prior experience emerged as the strongest predictors. Right-wing political orientation significantly reduces adoption likelihood, while prior usage shows a clear pattern: unwilling non-users are least likely to adopt, followed by willing non-users and occasional users, compared to frequent users.
- Key Finding - Practical vs. Environmental Concerns:** Practical daily-life concerns outweigh environmental arguments in decision-making. Positive perceptions of hygiene and resource savings significantly increase choice, whereas abstract environmental benefits and moral judgments show no significant effect.
- Additional Insights:** Personal motivation demonstrates a strong positive effect on packaging choice, while most traditional demographic factors (age, education) show limited impact, and the model explains 24% of variance in packaging choices.

To investigate participants' willingness to choose products in reusable packaging instead of single use, and how this choice varies across individual characteristics we use a regression analysis examining the determinants of reusable packaging choice. Several distinct patterns emerge that highlight both significant barriers and facilitators of adoption. See Table 21 for the full outcome.

The analysis reveals that political orientation is one of the most powerful predictors: both right-wing ($\beta = -0.231$) and very right-wing ($\beta = -0.376$) identifications substantially decrease the likelihood of choosing reusable packaging compared to left-wing references, suggesting that environmental consumption behaviors may be influenced by broader political identities and values. Prior usage experience demonstrates an equally crucial role, revealing a striking usage gradient where unwilling non-users show the most substantial negative effect ($\beta = -0.765$), followed by willing non-users ($\beta = -0.236$) and occasional users ($\beta = -0.139$) compared to frequent users, indicating that direct experience with reusable systems strongly shapes future choices.

Regarding attitudinal factors, practical daily-life concerns appear more influential than abstract environmental benefits. Positive perceptions of hygiene ($\beta = 0.151$) and low effort requirements ($\beta = 0.138$) significantly increase packaging choice, whereas environmental impact perceptions, convenience, resource savings, recycling comparisons, and moral considerations show no statistically significant effects. This suggests consumers prioritize practical implementation concerns over broader environmental arguments when making packaging decisions. The psychological factors reveal a nuanced picture: personal motivation demonstrates a modest positive effect ($\beta = 0.108$), while beliefs about personal effectiveness and collective efficacy show no significant relationships with choice behavior. Notably, most traditional demographic characteristics—including age, education, and economic status—fail to reach statistical significance, indicating that packaging choices may be less determined by socioeconomic position than by the identified attitudinal, experiential, and political factors. The model explains approximately 24% of the variance in packaging choices ($R\text{-squared} = 0.239$), providing substantial explanatory power. These findings collectively suggest that effective intervention strategies should prioritize addressing political reservations through targeted messaging, facilitating positive initial usage experiences to overcome adoption barriers, and emphasizing practical benefits related to hygiene and convenience rather than relying primarily on environmental benefit arguments.

Table 21 Variation in participants' willingness to choose products in reusable packaging

Predictors of willingness to choose products in reusable packaging		
Age	0.007 [-0.025;0.040]	
Education	0.024 [-0.046;0.094]	
Economic status	0.063 [0.010;0.115]	*
Political orientation		
Left wing	-0.231 [-0.473;0.011]	
Centre-left	-0.181 [-0.422;0.061]	
Centre-right	-0.226 [-0.467;0.015]	
Right wing	-0.397 [-0.641;-0.153]	**
Very right wing	-0.376 [-0.639;-0.112]	**
Awareness		
Yes	-0.056 [-0.156;0.044]	
Familiarity		
Yes, I have used this before but don't use this often	-0.139 [-0.281;0.004]	
No, I have never used this before but I would be happy to	-0.236 [-0.381;-0.091]	**
No, I have never used this before and I would not be happy to	-0.754 [-0.975;-0.534]	***
Environmental impact: Bad - Neutral - Good	0.041 [-0.069;0.152]	
Hygiene: Unhygienic - Neutral - Hygienic	0.151 [0.059;0.243]	**
Effort: High effort - Neutral - Low effort	0.054 [-0.031;0.138]	
Convenience: Inconvenient - Neutral - Convenient	0.088 [-0.010;0.185]	
Resource savings: Low savings - Neutral - High savings	0.108 [0.005;0.211]	*
vs Recycling: Worse - Neutral - Better	0.027 [-0.071;0.125]	
Moral judgment: Wrong - Neutral - Right	0.054 [-0.058;0.166]	
Personal efficacy	-0.007 [-0.058;0.043]	
Personal motivation	0.275 [0.227;0.324]	***
Collective efficacy	0.037 [-0.008;0.083]	
Intercept	0.393 [-0.112;0.897]	
Number of observations	3060	
R-squared	0.239	

*** p<.001, ** p<.01, * p<.05

3.3 Second objective: how different informational messages (“nudges”) affect personal choice

Section Summary

1. **Objective & Method:** A two-part survey experiment was conducted to determine how different informational campaigns affect consumer choice between reusable and single-use packaging. The study tested two messages: one highlighting peer behavior (a "social norm") and another emphasizing environmental responsibility (a "normative message").
2. **Primary Finding:** Both informational campaigns proved effective, leading to a statistically significant increase in participants' intention to choose products with reusable packaging over time. This shows that targeted information can successfully promote more sustainable consumer habits.
3. **Comparative Result & Implication:** The study found no significant difference in effectiveness between the two types of messages. This suggests that both data-driven social norm campaigns and value-based environmental appeals are equally effective and can be treated as substitutes for encouraging the use of reusable packaging.

The second part of our study investigates a critical aspect of consumer behavior: the impact of targeted informational campaigns on the preference for reusable packaging over single-use alternatives. To achieve this, we have designed and implemented a survey experiment conducted with the same group of participants across two distinct time periods. This longitudinal approach allows us to track shifts in behavioral intentions over time, providing a dynamic view of how information can influence sustainable choices. This part of the study is structured around a two-phase survey experiment.

In the first phase (Baseline Measurement), we establish a baseline by measuring the initial behavioral intentions of our participants. Specifically, we assess their propensity to choose products packaged in reusable packaging versus those in single-use packaging. This initial data point is crucial as it provides a reference against which we can measure any subsequent changes.

In the second phase (Intervention and Re-measurement), we introduce our experimental treatments. The same participants are recalled, but this time they are exposed to specific informational messages before we once again measure their behavioral intentions. This phase is divided into two distinct experimental groups:

- **Treatment 1 (Descriptive Social Norm):** Participants in this group receive a purely informational, data-driven message. They are informed of the proportion of survey participants from the first phase who reported choosing reusable packaging for more than half of their product selections. This approach is designed to leverage the power of social norms by showing participants what their peers are actually doing, creating a "descriptive norm".

- Treatment 2 (Injunctive Normative Message): This group receives a message that is more explicitly persuasive and normative in nature. In addition to the statistical information provided in Treatment 1, this message includes a statement emphasizing the environmental importance of choosing reusable packaging. This "injunctive norm" appeals to the participants' sense of social and environmental responsibility, highlighting what they should do for the good of the planet.

This experimental framework was developed to address three primary research questions:

1. Following the introduction of Treatment 1 (the descriptive social norm), do we observe a statistically significant increase over time in participants' intention to choose products in reusable packaging?
2. Similarly, following the introduction of Treatment 2 (the injunctive normative message), is there a significant temporal increase in the preference for reusable packaging?
3. When comparing the effectiveness of the two interventions, which treatment—Treatment 1 or Treatment 2—results in a greater increase in the intention to choose reusable packaging?

We found that both Treatment 1 and Treatment 2 led to a statistically significant increase in the participants' stated intention to choose products in reusable packaging over time (Figure 21). This fundamental finding confirms that informational campaigns, regardless of their specific framing, can be a powerful tool in promoting more sustainable consumer behaviors. The very act of providing information and drawing attention to the choice between reusable and single-use options appears to effectively encourage a shift towards more environmentally friendly consumption patterns.

However, when we directly compared the impact of the two different messages, our analysis revealed no statistically significant difference between the growth prompted by Treatment 1 and that prompted by Treatment 2. While both messages were successful, neither proved to be demonstrably superior to the other in fostering a greater shift in consumer preference.

This outcome suggests that, for the purpose of encouraging the adoption of reusable packaging, these two types of informational interventions can be considered effective "substitutes." One approach relies on the power of social proof (knowing what others do), while the other relies on a more direct appeal to environmental values (knowing what one should do). The fact that both yield similar positive results is significant. It implies that policymakers, businesses, and environmental organizations have flexibility in how they design their campaigns. Whether they choose to highlight the growing trend of reusable packaging adoption or to emphasize the ecological imperative of such choices, the expected positive impact on consumer behavior appears to be comparable. Neither a purely data-driven message nor a more value-laden one seems to hold a distinct advantage over the other, allowing for a more varied and adaptable communication strategy.

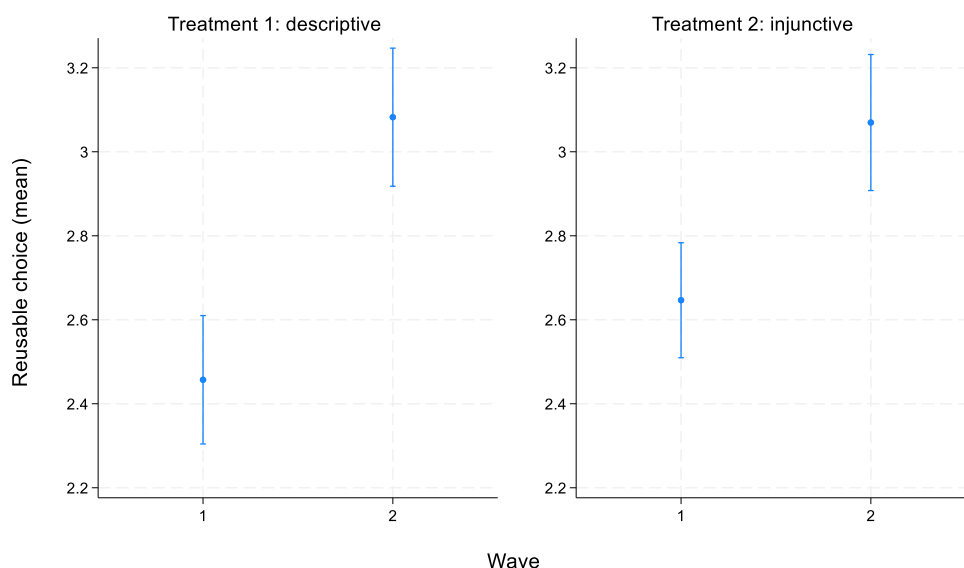


Figure 21 Effect of treatment 1 (left) and treatment 2 (right) on reusable packaging choice (on average)

3.4 Third objective: economic incentives and social norms as drivers of return behaviour.

The third part of the study concerns the return phase. Drawing on rational choice theory and the literature on social norms, we posit that both economic and social mechanisms play a significant role in shaping return behavior. Rational choice theory suggests that individuals are more likely to engage in a behavior when the perceived benefits outweigh the costs. In the context of reusable packaging, economic incentives, such as discounts or deposits, can increase the perceived benefits of returning packaging by providing a direct financial reward. Conversely, social norms, defined as shared beliefs about what is considered the widespread and acceptable behavior within a group (Bicchieri 2005), can influence individuals through social pressure and the desire to conform.

Here we study to what extent economic incentives, i.e., monetary reward for returning the reusable packaging, and social norms, i.e., descriptive norm information about how widespread is the practice of returning the packaging, shapes the willingness to return the packaging after use. Crucially, we both assess the impact of economic incentives and social norms when treated separately, but also when they interplay between each other.

In doing so, we aim to address the following research questions:

1. Do economic incentives affect people's willingness to return the reusable packaging after use?
2. Do social norms affect people's willingness to return the reusable packaging after use?
3. Do economic incentives have an independent effect on people's willingness to return the packaging after use or is such a relationship mediated by social norms of returning the packaging?

To address these questions, we run a survey experiment using a nationally representative sample of the French population on age, gender, area of residence, educational level (N=3060) by embedding hypothetical scenarios into an established panel survey (run by Norstat in December 2024).

Literature review

Economic incentives are monetary rewards that act as extrinsic motivators, providing a material benefit for returning packaging. This aligns with rational choice theory, which posits that individuals weigh costs and benefits when making decisions.

Economic incentives have been widely recognized as a powerful tool for encouraging sustainable behaviors, such as recycling, energy conservation, and the adoption of eco-friendly products. Research has shown that monetary rewards, such as deposit-refund systems, significantly increase recycling rates (Schultz et al., 1995). Similarly, financial incentives like reduced utility bills have effectively promoted energy-saving behaviors, especially when paired with feedback on consumption (Allcott & Mullainathan, 2010). In the context of sustainable consumption, price reductions for eco-friendly products, such as organic food, have been shown to boost purchase rates, particularly among price-sensitive consumers (Thøgersen, 2003).

However, economic incentives are not without limitations. Some studies suggest that they can undermine intrinsic motivation through the "crowding-out effect," as seen in Frey and Oberholzer-Gee's (1997) study, where monetary compensation for hosting a nuclear waste facility reduced public support by shifting perceptions from moral duty to transactional exchange. Additionally, economic incentives often lead to short-term behavior change rather than long-term habit formation, as observed by Abrahamse et al. (2005) in the context of energy conservation. There are also equity concerns, as incentives like subsidies for solar panels may disproportionately benefit wealthier individuals, limiting their overall effectiveness (Stern, 2011).

To address these challenges, research highlights the importance of combining economic incentives with other strategies, such as social norms. For example, Nolan et al. (2008) found that pairing financial rewards with information about community energy-saving behaviors led to greater reductions in energy use than either approach alone. Furthermore, the success of economic incentives often depends on the broader policy context, such as the presence of strong waste management infrastructure for deposit-refund systems (Linderhof et al., 2001). In summary, while economic incentives are a powerful tool for promoting sustainable behaviors, their effectiveness can be enhanced by addressing potential drawbacks, such as the crowding-out effect and short-term impacts, and by integrating them with complementary strategies like social norms and policy support.

Analysis plan

The objective of the current research is to study the effect of economic incentives and social norms in shaping people's willingness to return the reusable packaging after use. To do so, we use a survey experiment in the form of a vignette study.

Vignette experiments are a research method commonly used in social sciences, psychology, marketing, and other fields to study how people perceive, interpret, and respond to specific scenarios or situations. In a vignette experiment, participants are presented with short, carefully constructed descriptions of hypothetical scenarios (vignettes) that vary in certain details or factors (dimensions). These variations are systematically manipulated to test how different factors influence participants' judgments, decisions, or attitudes.

We manipulated economic incentives as *high* (i.e., 1€ paid back if packaging returned to the supermarket) or *low* (i.e., 0.20€ paid back if packaging returned to the supermarket). We also manipulated social norms as *high* (i.e., most other people returned the packaging after use) or *low* (i.e., very few other people returned the packaging after use). In both cases we measured participants' willingness to return the packaging if he/she was in the same situation as the fictitious character as the dependent variable. The former was designed to test the direct effect of economic incentives on the intention to return the packaging. The latter was designed to test the direct effect of social norms on the intention to return the packaging.

Beyond the direct effects, we study the interplay between economic incentives and social norms. More specifically, we examine whether the effectiveness of economic incentives in increasing the likelihood of returning the packaging is mediated (i.e., increase or decrease) in the presence of strong and low social norms.

Experimental design and dependent variable

We conducted a survey experiment using a nationally representative sample of the French population on age, gender, area of residence, educational level (N=3000) by embedding questions into an established panel survey (run by Norstat; December 2024). Respondents first participated in the vignette experiment and then answered a series of survey questions.

Each subject was exposed to one vignette in a between-subjects design and asked to indicate what a hypothetical person similar to themselves would do with regard to returning a product bought in reusable packaging. We used the following wording (translated from French):

Sacha is a working French citizen. After work, Sacha goes shopping and buys olive oil (25 cl) which costs €3 in a reusable bottle. Sacha is told that buying products in reusable packaging gives customers the option of returning the packaging to the shop after use, so that it can be washed and reintroduced to the market.

The use of a fictitious character should lead participants to adopt the perspective of the vignette character, thereby increasing impersonality. Furthermore, vignettes are particularly effective in reducing social desirability bias.

We experimentally manipulate economic incentives as High/Low/No using the following messages:

High: *The €3 includes a deposit of €1, which will be returned to Sacha if the packaging is returned to the shop after use.*

Low: *The €3 includes a deposit of €0.20, which will be returned to Sacha if the packaging is returned to the shop after use.*

No: no message (control condition).

We experimentally manipulate social norms as High/Low/No using the following messages:

High: *It has been estimated that in the region where Sacha lives, most people usually return packaging after use.*

Low: *It has been estimated that in the region where Sacha lives, very few people usually return packaging after use.*

No: no message (control condition).

This results in 3x3 factorial design that combines the economics incentives and social norms experimental manipulations. To measure participants' willingness to return the packaging after use we measure the following dependent variable on a 7-point likelihood scale from *extremely unlikely* to *extremely likely*:

*Please keep in mind that you have to go back to the shop to return the packaging.
If you were Sacha, how likely would you be to return the reusable packaging after use?*

Results

Section Summary

1. **Economic incentives:** high incentives (i.e., €1 reward for returning the packaging) significantly increase return rates, but low incentives (i.e., €0.20 reward) are no more effective than no incentive, highlighting the need for meaningful financial rewards to drive behavior.
2. **Social norms:** strong social norms (perceived widespread return behavior) foster return rates, while weak norms reduce them by 5%. The absence of information about other people's adoption also slightly decreases returns, emphasizing the power of social influence.
3. **Interplay between economic incentives and social norms:** social norms dominate over economic incentives. When norms are strong, incentives have little added effect; when norms are weak, incentives lose impact. This suggests that fostering a culture of sustainability is crucial for reusable packaging success.

In describing our results related to the research questions, we distinguish between the direct effect of economic incentives and social norms on willingness to return the packaging after use, and the indirect effect of economic incentives on willingness to return the packaging after use through the effect of social norms. As the statistical technique, we used ordinary least squares (OLS) linear regression models.

Direct effect of economic incentives on willingness to return the packaging after use

Compared with High economic incentives, Low and No economic incentives both decrease the probability of returning packaging after use by 2% ($p=0.05$). While the difference in the probability of return between having Low or No economic incentives is null (Figure 22). The results reveal that economic incentives can significantly influence the probability of returning reusable packaging after use, but their effectiveness depends on the magnitude of the incentive. Compared to High economic incentives, both Low and No economic incentives reduce the probability of returning packaging by 2%. Notably, there is no difference in the probability of return between Low and No economic incentives. This suggests that while economic incentives can play a role in promoting sustainable behaviors, their impact is only

substantial when the incentives are significant. Low incentives may not provide enough motivation to change behavior compared to no incentive at all. This finding highlights the importance of designing economic incentives that are sufficiently meaningful to drive action.

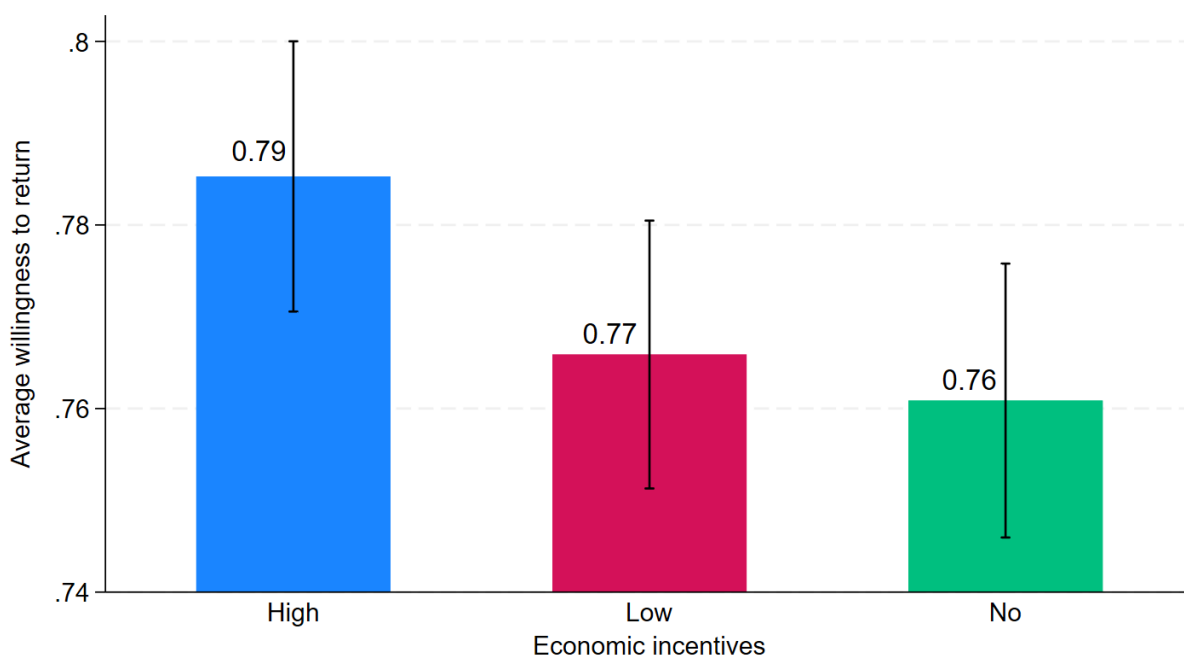


Figure 22 Economic incentives (High, Low, No) on willingness to return the packaging after use. OLS linear regression models

Direct effect of social norms on willingness to return the packaging after use

Compared with High social norms, Low social norms decrease the probability of returning packaging after use by 5% ($p < 0.001$), while No social norms decrease the probability of returning packaging after use by 2% ($p = 0.05$) ().

The results indicate that social norms significantly influence the probability of returning reusable packaging after use, with High social norms (where returning packaging is perceived as a common practice) encouraging the behavior. In contrast, Low social norms reduce the probability of returning packaging by 5%, and No social norms reduce it by 2%. These findings suggest that individuals are more likely to conform to actions they believe are widely adopted by others. The significant drop under Low social norms highlights the detrimental effect of perceiving the behavior as uncommon, potentially due to a lack of social validation or perceived impact. The smaller but still notable decrease under No social norms suggests that the absence of normative information can also hinder the establishment of a sustainable behavior, though to a lesser extent.

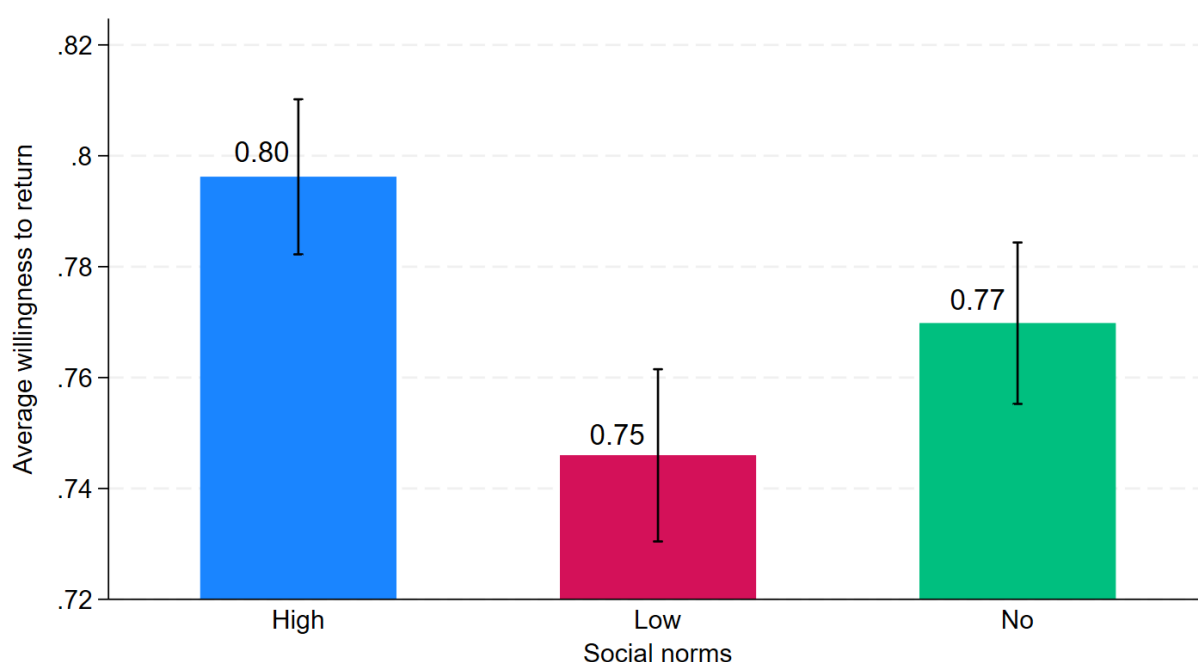


Figure 23 Social norms (High, Low, No) on willingness to return the packaging after use. OLS linear regression models

Indirect effect of economic incentives on willingness to return the packaging after use through social norms

We also study whether economic incentives have an independent effect on the willingness to return reusable packaging or if their relationship is mediated by social norms. To explore this, we compare the willingness to return packaging under different levels of economic incentives while varying social norms. If economic incentives were the only driver of behavior, there should be no differences in willingness to return packaging when social norms are held constant. Conversely, if social norms were the primary driver, differences in willingness should be observed between High and Low social norms, regardless of economic incentives. The results support the latter scenario: when social norms are kept constant as High or Low, there are no statistically significant differences in participants' willingness to return packaging across

High, Low, and No economic incentives, as shown in Figure 24. This suggests that social norms play a more dominant role in shaping behavior than economic incentives in this context. Specifically, when individuals perceive that returning packaging is a widely practiced behavior (High social norms), they are more likely to return it, regardless of the presence or magnitude of economic incentives. Similarly, when social norms are Low, the absence of a strong social influence reduces willingness, even when economic incentives are present. These findings imply that economic incentives alone may not be sufficient to drive sustainable behaviors like returning packaging unless they are accompanied by strong social norms. This has important implications for designing interventions, as it highlights the need to leverage social norms together with economic incentives to maximize effectiveness. For example, campaigns that combine financial rewards with messaging about widespread participation could be more impactful than relying only on monetary incentives. Additionally, the results suggest that policymakers should focus on creating a "culture" of sustainability where pro-environmental behaviors are perceived as the norm, as this may have a stronger and more lasting influence on behavior than economic incentives alone. This result highlights the importance of social norms in mediating the relationship between economic incentives and sustainable behaviors, providing valuable insights for promoting reusable packaging systems.

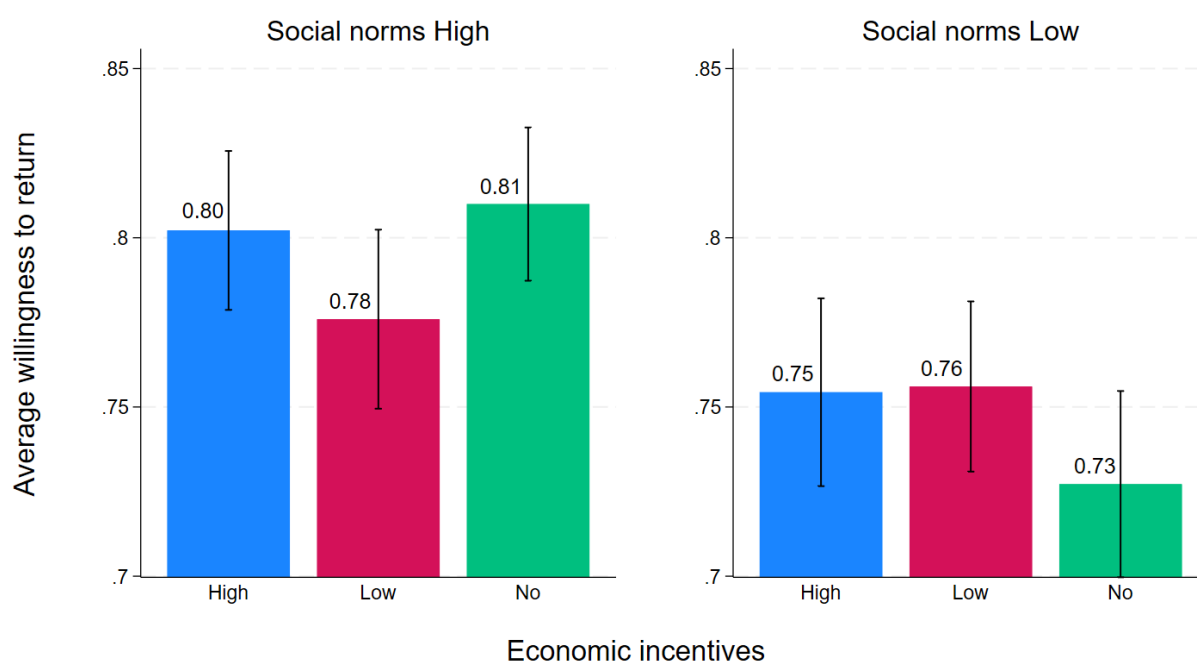


Figure 24 Economic incentives (High, Low, No) on willingness to return the packaging after use when social norms are High (left) and Low (right). OLS linear regression models

The analysis identifies several key factors influencing willingness to return reusable packaging. Demographically, older adults (particularly ages 55-75) and higher-income individuals show greater return willingness, while women are slightly more willing than men. Political orientation emerges as a strong predictor, with right-wing identification correlating negatively with return behavior. Education, however, shows no significant impact.

Awareness and experience also play important roles. Prior knowledge of reusable packaging positively influences returns, but usage experience proves more impactful. Regular users demonstrate the highest return rates, while non-users—especially those unwilling to adopt—show substantially lower willingness.

Attitudinal factors reveal that environmental benefits and practical concerns matter most. Positive perceptions of environmental impact, convenience, and hygiene significantly predict return behavior, while moral judgment has modest effects. Resource savings and recycling comparisons show no significant influence.

Finally, self-efficacy dimensions demonstrate distinct effects. Belief in packaging effectiveness and collective efficacy show positive gradients with return willingness, but personal motivation proves most crucial: low motivation substantially reduces compliance while strong motivation strongly promotes it. These findings collectively suggest that successful interventions should target younger, lower-income, and right-leaning demographics while emphasizing environmental benefits, addressing practical concerns, and particularly fostering personal motivation through effective communication strategies.

The analysis of the interaction between economic incentives and political orientation reveals a nuanced relationship shaping individuals' willingness to return reusable packaging. While higher economic incentives consistently increase return willingness across all political groups, their effectiveness varies significantly by political affiliation. Left-leaning individuals demonstrate the highest baseline willingness to return packaging, showing relatively modest responsiveness to financial incentives. Conversely, right-leaning respondents, while displaying lower overall return willingness, prove substantially more responsive to economic incentives, with high incentives producing the most pronounced improvement in their return intentions. Centrist individuals occupy an intermediate position in both baseline willingness and incentive responsiveness. This pattern suggests that intrinsic motivation drives return behavior among left-wing individuals, whereas right-wing individuals are more influenced by extrinsic financial incentives. These findings highlight the importance of tailoring incentive structures to different political constituencies, with standardized approaches potentially yielding suboptimal results across the political spectrum (Figure 25**Error! Reference source not found.**).

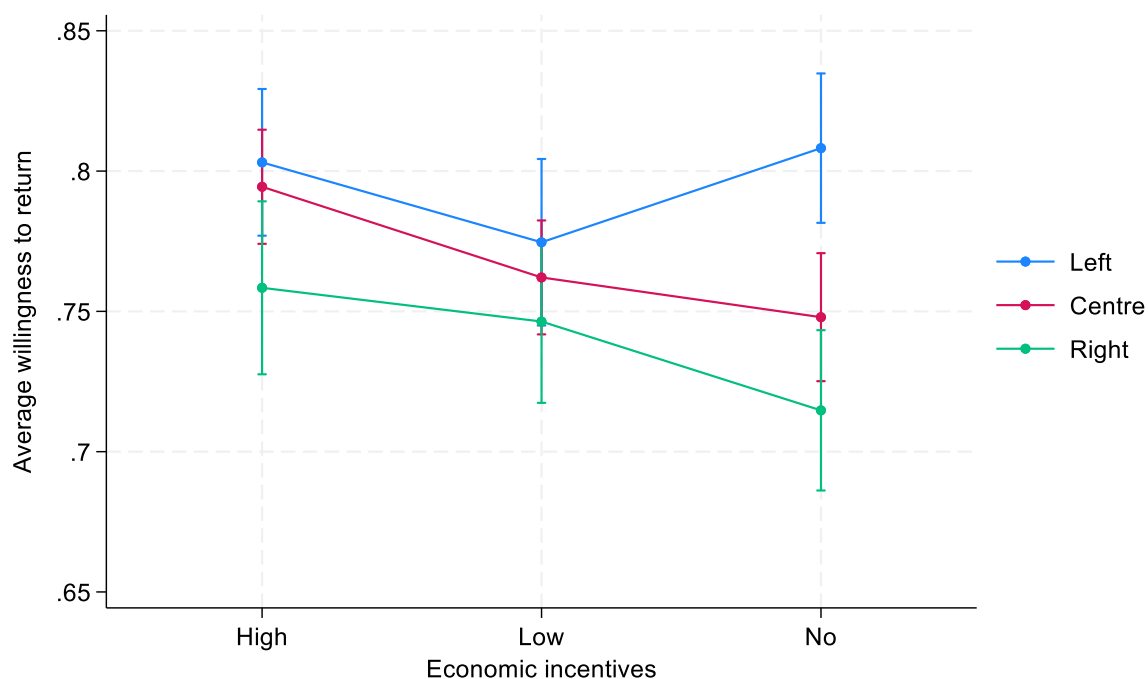


Figure 25 Economic incentives (High, Low, No) on willingness to return the packaging after use and across political orientation (Left, Centre, Right). OLS linear regression models

The analysis of how social norms interact with political orientation reveals distinct patterns in shaping return willingness for reusable packaging. Across all political groups, strong social norms (indicating widespread return behavior) consistently yield the highest willingness to return, while weak norms produce the lowest. However, political orientation significantly moderates this relationship: left-leaning individuals demonstrate the highest overall responsiveness to social norms, showing substantially greater willingness under strong normative conditions compared to other groups. Centrist respondents display moderate sensitivity to social norms, while right-leaning individuals show the flattest response curve, indicating lower overall susceptibility to normative influences. This pattern suggests that social norm interventions are particularly effective for motivating left-wing and centrist populations, whereas right-leaning individuals appear less influenced by perceptions of others' behavior. The findings emphasize that social norm messaging should be strategically targeted, as its effectiveness varies considerably across the political spectrum, with normative approaches showing diminished returns for conservative segments of the population (Figure 26).

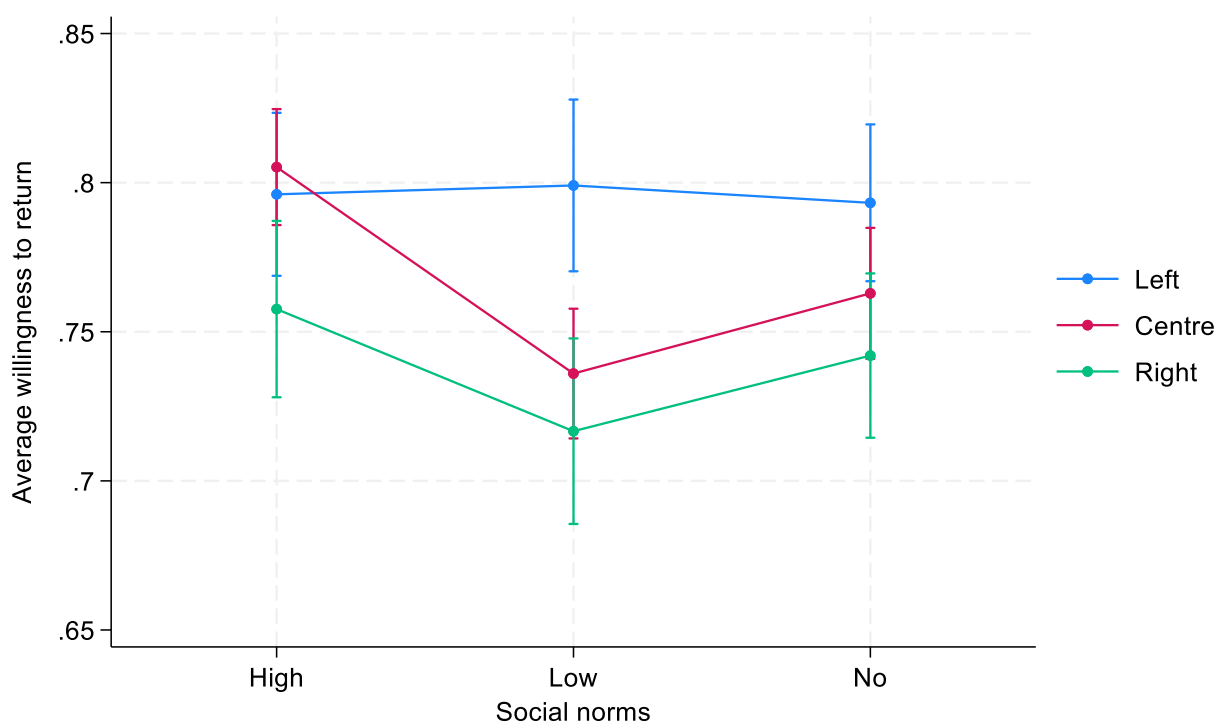


Figure 26 Social norms (High, Low, No) on willingness to return the packaging after use and across political orientation (Left, Centre, Right). OLS linear regression models

The three-way interaction analysis between economic incentives, political orientation, and social norms reveals crucial insights into the conditional effectiveness of policy interventions. When strong social norms are present (left panel), economic incentives show limited additional impact across all political groups, with left-leaning individuals maintaining high return willingness regardless of incentive levels. However, under weak social norms (right panel), a starkly different pattern emerges: economic incentives become substantially more influential, particularly for right-leaning individuals who demonstrate the greatest responsiveness to financial rewards in the absence of supportive social norms. This contrast highlights that social norms and economic incentives function as partial substitutes—strong normative contexts diminish the marginal utility of financial incentives, while in normative vacuums, economic incentives become essential for motivating behaviour, especially among politically conservative segments. The findings suggest that policy effectiveness can be optimized by strategically combining these approaches: leveraging social norms where they are strong and deploying targeted economic incentives where normative support is weak, particularly for right-leaning populations who show the greatest behavioural plasticity in response to financial motivations (Figure 27).

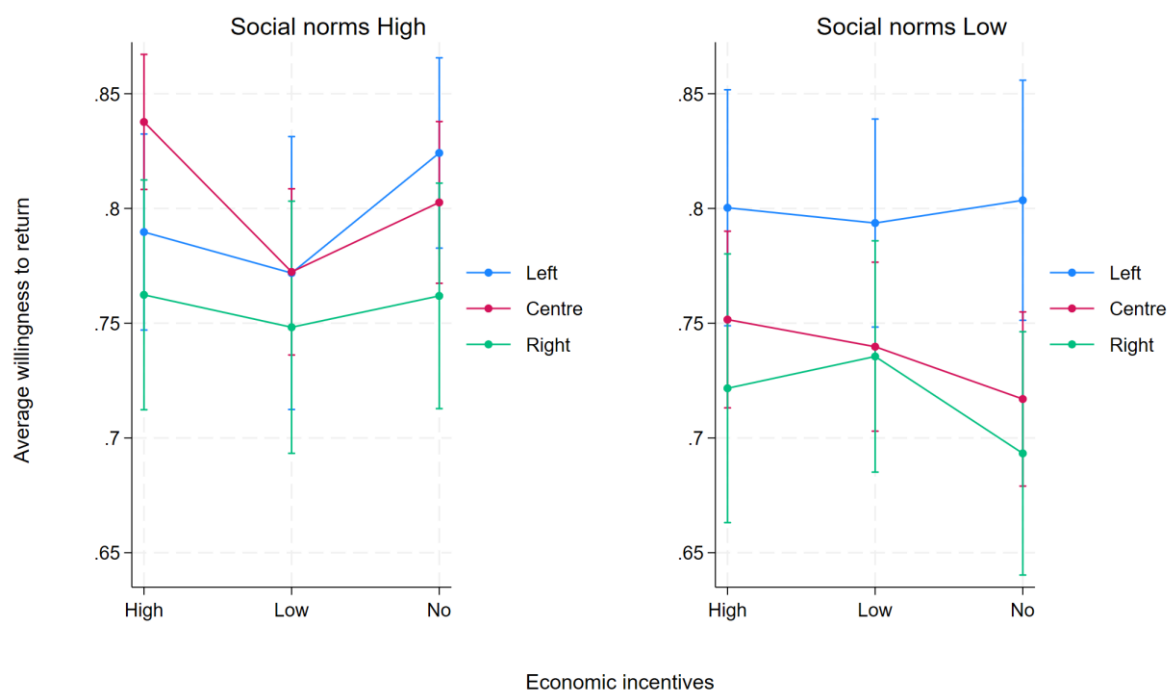


Figure 27 Economic incentives (High, Low, No) on willingness to return the packaging after use when social norms are High (left) and Low (right) and across political orientation (Left, Centre, Right). OLS linear regression models

4. Task 2.6: Intervention studies to maximize behavior change (Task Leader: AU)

Building on the results of Tasks 2.4 and Task 2.5, Task 2.6 tests in a real-world retail setting whether gain-framed messages, delivered at either an interdependent (“WE”) or independent (“YOU”) self-construal level, can produce lasting increases in purchase intention (PI) and return likelihood (RL) for reusable food packaging.

This study has obtained an ethical approval by the Research Ethics Committee at Aarhus University (Approval No. BSS-2024-154-S1). All participants provided informed consent before beginning any survey.

1. Method

Field intervention design

We held three in-store recruitment days in Besançon, France, during the first three days of Task 2.4’s field experiment, using the same store layout and equipment but varying only the construal level:

- **Carrefour Valentin (3 & 5 April 2025):** Gain frame and interdependent version through roll-up banners and A5 leaflets. Details of these materials can be found in the appendix (A7. Field experiment (T2.4) and Intervention study (T2.6): Leaflets and A8. Field experiment (T2.4) and intervention study (T2.6): Banners).
- **Carrefour Chalezeule (4 April 2025):** Gain frame and independent version through roll-up banners and A5 leaflets. Details of these materials can be found in the appendix (A7. Field experiment (T2.4) and Intervention study (T2.6): Leaflets and A8. Field experiment (T2.4) and intervention study (T2.6): Banners).

In both formats, participants were invited to complete the household recruitment survey via a QR code. In addition, our team was present in the two stores to distribute leaflets and recruit households directly on-site using tablets.

Procedures and surveys

All questionnaires were translated into French and administered via QuestionPro across three waves. At the end of the household recruitment survey (wave 0), participants were asked for consent to take part in two follow-up surveys. Those who completed all three surveys received a €10 digital gift card as compensation.

Each participant was exposed to the same message throughout the three waves, either a gain-framed message with an interdependent perspective (“WE”) or an independent perspective (“YOU”). After exposure, purchase intention and return likelihood were measured to assess whether repeated exposure influenced participants’ intentions.

Participants who consented at recruitment received the first follow-up survey (wave 1) by email one week later, and those who completed wave 1 were invited to wave 2 another week thereafter. Reminder emails were sent twice per week during the first two weeks, and once weekly for up to six weeks thereafter.

In addition, each wave included questions on actual behaviour, asking whether participants had purchased food in reusable packaging through the *Rapportez-moi pour réemploi* initiative and about their experiences with returning the packaging. The products shown were adapted according to availability in the two Carrefour stores where participants were recruited. Demographic questions were also included.

To maintain engagement and limit survey length, additional items were distributed across the follow-ups: wave 1 contained questions on deposit preferences and product choice within the initiative, while wave 2 included questions on fiber-based packaging opinions, preferences, and willingness to purchase. Full survey questionnaires for wave 0, wave 1, and wave 2 are provided in Appendix A10–A12.

Participants and recruitment

Our initial target was 50 households total (25 WE, 25 YOU). To boost numbers, from 7 May 2025 until June 1st, we ran two Google Ads campaigns (3 km radius around each store) using the same leaflet designs. Across all in-store recruitment, reminders, and Google Ads, our final counts were:

- Survey 1: 100 respondents
- Survey 2: 70 respondents
- Survey 3: 39 respondents

Despite these combined efforts, we did not reach the 50-household goal by the end of Survey 3.

Note on age data: the age variable in Survey 1 was mis-recorded, so we will report age only for the 39 participants who completed all three waves.

Data structure and analysis plan

We will analyse the data in two stages:

A. Cross-sectional analyses

At each wave we use all available cases to compare WE vs. YOU:

- **Wave 1 (Survey 1; N=100):** independent-samples t-tests on PI and RL, plus descriptive summaries of attitudes, demographics, shop choices.
- **Wave 2 (Survey 2; N=70):** t-tests on PI, RL2 and self-reported behaviours.
- **Wave 3 (Survey 3; N=39):** t-tests on PI, RL, and actual purchase/return behaviours.

This maximizes power at each time point and shows how framing effects emerge or fade.

B. Longitudinal analysis (complete-case panel; N=39)

We will select respondents with non-missing PI and RL at all three waves and conduct a repeated-measures ANOVA on PI1 (wave 0) → PI2 (wave 1) → PI3 (wave 2) and RL1 (wave 0) → RL2 (wave 1) → RL3 (wave 2). This within-subjects analysis tests both the main effect of Time and its interaction with self-construal level (WE vs. YOU), isolating true change while controlling for between-subject variability.

2. Results

Cross-sectional analyses

Section Summary

Results on reuse:

1. **Wave 0:** Household-recruitment respondents were moderately positive about both buying and returning reusable packaging and held favorable overall attitudes toward reuse; framing at the “WE” vs. “YOU” level had no detectable effect.
2. **Wave 1:** One week later, participants’ intentions to purchase and return remained similar, but actual uptake (purchase/return behaviors) was low; again, there was no difference between the “WE” and “YOU” groups.
3. **Wave 2:** At the final follow-up, participants still reported strong intentions and higher rates of purchase/return behavior than in Wave 1, yet self-construal framing continued to have no impact on any outcome.

Results on substitution:

1. At Wave 2, participants also evaluated fiber-based packaging. Awareness was relatively high, with over sixty percent reporting prior knowledge. Willingness to buy fiber-based packaging was strong, and translucent versions generated more interest than opaque ones. Best–worst scaling results showed that environmental benefits were the most influential motivator, followed by cost savings and food safety. The strongest deterrent was concern about taxes or fees on single-use packaging, while social influence played the least important role. Quality and functionality had

Wave 0 (households recruitment) results

Sample background overview

Socio-demographics

A total of N = 145 French participants completed the household recruitment survey (wave 0). Table 22 presents the gender distribution overall and broken down by construal level (interdependent “WE” vs. independent “YOU”). Overall, 35.2% of participants were male, 62.1 % were female and 2.8% preferred not to disclose gender. Among those exposed to the interdependent (“WE”) message (N = 88), 36.4 % were male, 61.4 % were female, and 2.3 % preferred not to say. In contrast, of the independent (“YOU”) group (N = 57), 33.3 % were male, 63.2 % were female, and 3.5 % preferred not to say. Age data was not captured correctly in Wave 0 due to a survey error; therefore, age statistics cannot be reported.

Table 22. Sample socio-demographic characteristics (Wave 0, N = 145)

Socio-Demographics	Total (N= 145)	Construal level “WE” (N = 88)	Construal level “YOU” (N = 57)
Gender (%)			
Male	35.2	36.4	33.3
Female	62.1	61.4	63.2
Prefer not to say	2.8	2.3	3.5
Age (mean)	NA	NA	NA

Means of key variables

Descriptive statistics for the primary outcomes are presented in Table 23 for the overall sample. Purchase intention averaged 5.55 (SD = 0.99), while for return likelihood was 5.96 (SD = 1.00). The attitude toward reusable packaging averaged 5.51 (SD = 1.95).

Overall, participants in wave 0 reported moderate to high intentions for buying food products in reusable packaging as well as for returning reusable packaging and expressed favourable attitudes toward reuse.

Table 23. Descriptive statistics for key variables

Variable	Mean	SD
Purchase intention	5.55	0.99
Return likelihood	5.96	1.00
Attitude	5.51	1.95

Other descriptive items

Table 24 displays the overall frequencies for all key single-item questions in Wave 0. For questions shown only to certain respondents (e.g., those who had seen the initiative, made a purchase, or returned packaging), the valid-case sample size is given in parentheses. Percentages for store choices sum to more than 100% because multiple selections were allowed.

66.2% of respondents had heard of “reusable food packaging” prior to the survey, while 60.0% had noticed the in-store “Rapportez-moi pour réemploi” initiative. Among those 87 participants who saw the initiative, nearly all (98.9%) expressed a positive opinion.

Around 45% of the full sample claimed to previously purchase food in reusable packaging after being shown products photos from the initiative; of those 66, the most common outlets were Carrefour (93.9%), Super U (34.8%), and Intermarché (25.8%).

Only 14.5% of all respondents had ever returned packaging; among those 21 returners, 95.2% were satisfied with the return system and 95.2% judged the deposit amount to be neutral. Finally, 70.3% of the sample agreed to take part in the two follow-up surveys.

Table 24. Frequencies for key survey items

Survey Item	Category	N	%
Heard of “reusable food packaging”?	No	49	33.8
	Yes	96	66.2
<i>(All respondents; N = 145)</i>			
Noticed in-store “Rapportez-moi pour réemploi”?	No	58	40.0
	Yes	87	60.0
<i>(All respondents; N = 145)</i>			
Opinion of “Rapportez-moi pour réemploi”	Neutral	1	1.1
	Positive	86	98.9
<i>(Only if noticed initiative; N = 87)</i>			
Ever purchased food in reusable packaging?	No	79	54.5
	Yes	66	45.5
<i>(All respondents; N = 145)</i>			
Top store choices among those who purchased	Carrefour	62	93.9
	Super U	23	34.8
	Intermarché	17	25.8
<i>(Multiple selections allowed; N = 66)</i>			
Ever returned reusable packaging?	No	45	31.0
	Yes	21	14.5
<i>(All respondents; N = 145)</i>			
Satisfaction with return system	Neutral	1	4.8
	Satisfied	20	95.2
<i>(Only if returned; N = 21)</i>			
Perception of deposit amount	Expensive	1	4.8
	Neutral	20	95.2
<i>(Only if returned; N = 21)</i>			
Willing to participate in follow-up surveys?	No	43	29.7
	Yes	102	70.3
<i>(All respondents; N = 145)</i>			

Effects of self-construal level on purchase intention, return likelihood and attitude

An independent-samples t-test showed that the interdependent (“WE”) group reported marginally higher purchase intention ($M = 5.64$, $SD = 0.99$) than the independent (“YOU”) group ($M = 5.40$, $SD = 1.01$), $t(143) = 1.42$, $p = .079$, Cohen’s $d = .24$. A comparable non-significant trend appeared for return likelihood (“WE”: $M = 6.05$, $SD = 0.99$; “YOU”: $M = 5.82$, $SD = 1.01$), $t(143) = 1.34$, $p = .091$, $d = .23$. There was no difference in attitude toward Reuse (“WE”: $M = 5.46$, $SD = 2.04$; YOU: $M = 5.58$, $SD = 1.83$), $t(143) = -0.37$, $p = .71$, $d = -.06$. Overall, self-construal level didn’t have any significant effect on purchase intention, return likelihood and attitude (Figure 28).

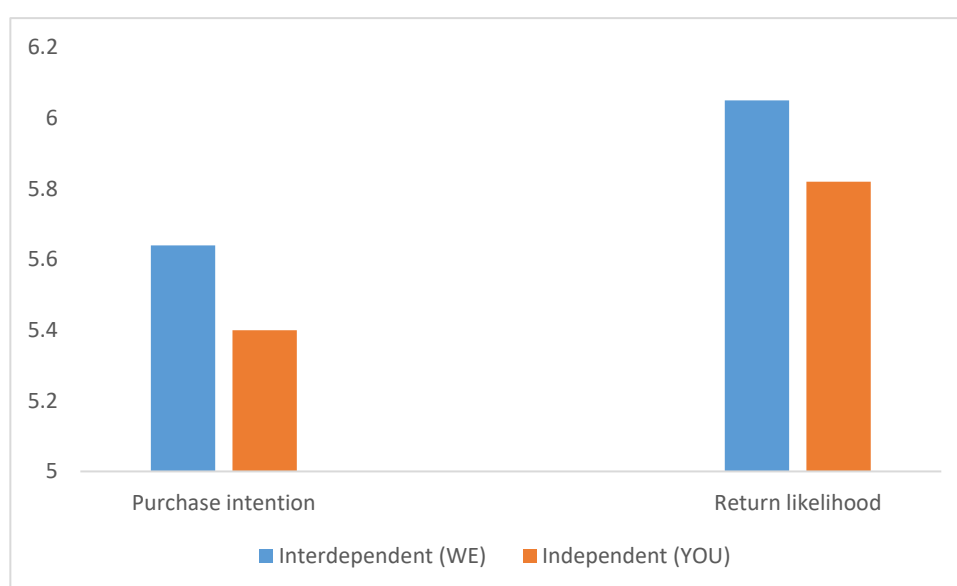


Figure 28. Effects of construal level on mean purchase intention and return likelihood

Wave 1 (follow-up 1) results

Sample background overview

Socio-demographics

A total of $N = 52$ French participants completed the first follow-up survey (Wave 1). Overall, 36.5 % of respondents were male and 63.5 % were female. In the “WE” condition ($N = 27$), 37.0 % were male and 63.0 % female; in the “YOU” condition ($N = 25$), 36.0 % were male and 64.0 % female. Age data was not captured correctly in Wave 0 due to a survey error; therefore, age statistics cannot be reported. Participants’ highest education ranged from middle school (21.2%) through graduate degree (7.7%). Marital status was diverse: 40.4% married, 26.9% single, 25.0% cohabiting, and 7.7% divorced/widowed. Number of household members averaged between 1 and 2 persons, with 36.5% living in two-person households. Table 25 summarizes these characteristics overall and by self-construal level (interdependent “WE” vs. independent “YOU”).

Table 25. Sample socio-demographics characteristics (Wave 1, N = 52)

Socio-Demographics	Total (N = 52)	Self-construal level “WE” (N = 27)	Self-construal level “YOU” (N = 25)
Gender (%)			
Male	36.5	37.0	36.0
Female	63.5	63.0	64.0
Age (mean)	NA	NA	NA
Education (%)			
Middle school	21.2	29.6	12
High school	25	22.2	28
Technical qualification‡	15.4	11.1	20
Undergraduate	30.8	29.6	32
Graduate degree	7.7	7.4	8
Marital status (%)			
Single	26.9	33.3	20
Married	40.4	44.4	36
Cohabiting	25.0	11.1	40
Divorced/Widowed‡	7.7	11.1	4
Household members			
1 person	19.2	22.2	16
2 persons	36.5	33.3	40
3 persons	19.2	18.5	20
4+persons‡	25	25.9	24

Note: “Technical qualification” = post–high school vocational training; “4+ persons” combines 4, 5, 6+.

Means of key variables

Table 26 reports the overall means and standard deviations for Purchase Intention and Return Likelihood in Wave 1. Participants maintained moderately strong intentions to purchase reusable packaging (M = 5.47, SD = 1.00) and to return it (M = 5.95, SD = 1.02), similar to the levels seen in the initial household recruitment survey (Wave 0).

Table 26. Descriptive statistics for key variables (wave 1, N = 52)

Variable	Mean	SD
Purchase intention	5.47	1.00
Return likelihood	5.95	1.02

Other descriptive items

Purchase behaviour and satisfaction

Only 6 participants (11.5%) reported having bought at least one of the four reusable-packaged products shown that were available at both Besancon stores when wave 1 was launched. Among these purchasers, overall satisfaction with the buying experience was high (83.3% “Satisfied,” 16.7% “Neutral”), and all said they plan to continue buying those products in reusable packaging.

Top product choices in reusable packaging

When all participants have been asked to select product(s) (if any) they would consider buying among the list of products in reusable packaging that were and or will be available in both stores, the most selected items were mayonnaise (61.5%), Parisian salad (34.6 %) and grenade sirop (34.6%), specifically, mayonnaise Fine et Douce LESIEUR 475 g, Salade Parisienne Jambon Emmental 250g les Crudettes and Sirop de Grenadine 70 cl Maison Guiot. Because respondents could choose multiple items, these percentages reflect the share of participants who included each product in their list.

Perceived fairness of the deposit

All 52 respondents rated the fairness of the deposit amount for each product. Ratings skewed positive for most items for example for Mayonnaise Fine et Douce LESIEUR (475 g), 57.7% perceived the proposed deposit as “Fair,” 34.6% “Neutral” and 7.7% as “Unfair” and for white cheese Fromage frais BIO 0% 500 g: 61.5% of participants perceived the deposit as “Fair,” 30.8% as “Neutral” and 7.7% as “Unfair”. A full breakdown for all 12 products is shown in Figure Y2. Please note that food products within the same food category that their packaging had the same deposit were not shown in the survey of wave 1.

Return behaviour and perceptions

Just 6 participants (11.5%) had returned packaging via the reverse-vending machine. Among those returners, 81.8% were “Satisfied” with the return system, 9.1% “Neutral,” and 9.1% “Dissatisfied.” When asked when they would likely return reusable packaging in the future, 92.3% said “during a regular grocery shopping trip,” 1.9% said “on a separate trip,” and 5.8% were “Not sure yet.”

All remaining frequency distributions for these supplementary descriptive items are presented in Table 27.

Table 27. Other descriptive items in wave 1

Survey Item	Category	N	%
Ever purchased any of the shown reusable-packaged products?	No	46	88.5
	Yes	6	11.5
<i>(All respondents; N = 52)</i>			
Satisfaction with purchase experience	Neutral	1	16.7
	Satisfied	5	83.3
<i>(Only if “Yes” above; N = 6)</i>			
Plan to continue buying these products?	Yes	6	100.0
<i>(Only if “Yes” above; N = 6)</i>			
Top three products they would consider purchasing	Wok Fondant 250 g (Florette)	32	61.5
	Chips Craquante Nature BRETS 250 g	18	34.6
	Crackster Original (Carrefour Classic)	17	32.7
Multiple selections allowed; N = 52			
Ever returned reusable packaging to the store?	No	41	78.8
	Yes	11	21.2
<i>(All respondents; N = 52)</i>			
Satisfaction with the return system	Dissatisfied	1	9.1
	Neutral	1	9.1
	Satisfied	9	81.8
<i>(Only if “Yes” above; N = 11)</i>			
When would you most likely return packaging?	During regular grocery trip	48	92.3
	On a separate trip	1	1.9
	Not sure yet	3	5.8
<i>(All respondents; N = 52)</i>			
Notes in parentheses indicate the base (all vs. conditional) for that question; percentages sum to 100% within each base.			

Effects of construal level on purchase intention, return likelihood

The independent (“YOU”) group reported slightly higher average Purchase Intention ($M = 5.51$, $SD = 0.85$) than the interdependent (“WE”) group ($M = 5.43$, $SD = 1.15$), but this difference was not significant, $t(50) = -0.27$, $p = .79$, $d = -0.07$. Similarly, Return Likelihood was higher in the YOU condition ($M = 6.08$, $SD = 0.84$) than in the WE condition ($M = 5.83$, $SD = 1.16$), yet this difference also failed to reach significance, $t(50) = -0.89$, $p = .38$, $d = -0.25$ (Figure 29).

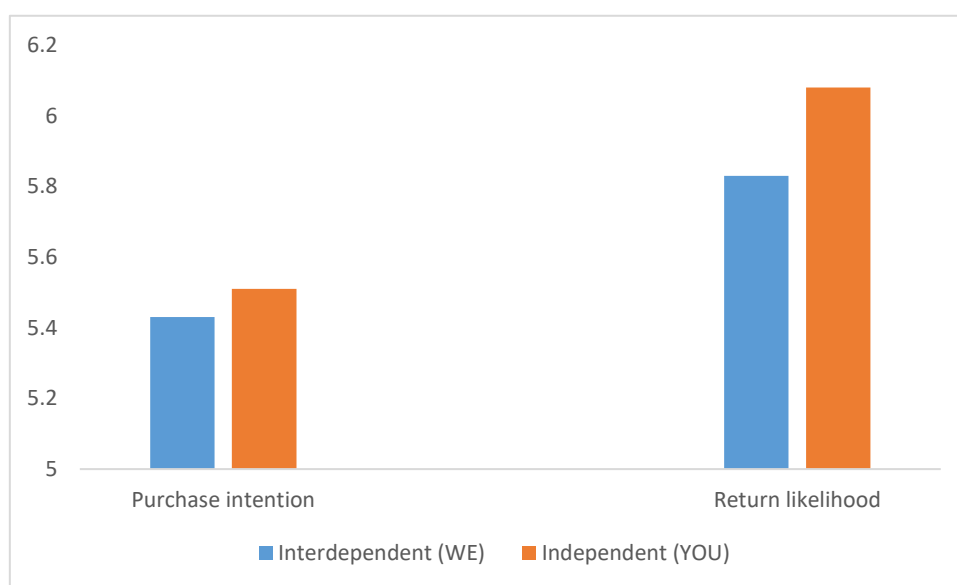


Figure 29. Effects of self- construal level on mean purchase intention and return likelihood (wave 1)

Wave 2 (follow-up 2) results

Sample background overview

Socio-demographics

A total of $N = 39$ French participants completed the second follow up survey (wave 2). Overall, 30.8% were male and 69.2% female. In the interdependent self-construal level “WE”, 31.6% were male and 58.4% were female ($N = 19$). Similarly, for the independent self-construal level “YOU”, 30% were male and 70 % were female ($N = 20$). The average age was 48.95 years, with mean age $M = 50.21$ for the self-construal level “WE” participants and $M = 47.75$ for the self-construal level “YOU” participants. Educational background spanned from middle-school diplomas (23.1 % overall) through graduate-level degrees (5.1 % overall), with similar distributions in each framing group. Most participants were married (41.0 % overall), followed by cohabiting (25.6 %) and single (20.5 %). The number of household members clustered around 2 to 3 people (total: 30.8 % and 20.5 %, respectively). Detailed breakdowns by self-construal level are presented in Table 28.

Table 28. Socio-demographic characteristics by self-construal level (wave 2, N = 39)

Socio-demographics	Total (N = 39)	Self-construal level “WE” (N = 19)	Self-construal level “YOU” (N = 20)
Gender (%)			
Male	30.8	31.6	30.0
Female	69.2	68.4	70.0
Age (mean)	48.9	50.2	47.8
Education (%)			
Middle school	23.1	31.6	15
High school	30.8	31.6	30
Technical qualification‡	12.8	10.5	15
Undergraduate	28.2	21.1	35
Graduate degree	5.1	5.3	5
Marital status (%)			
Single	20.5	21.1	20
Married	41.0	47.4	35
Cohabiting	25.6	10.5	40
Divorced/Widowed	12.8	21.1	5
Household members			
1 person	25.6	36.8	15
2 persons	30.8	31.6	30
3 persons	20.5	15.8	25
4+persons‡	23.1	15.8	30

Note: “Technical qualification” = post–high school vocational training; “4+ persons” combines 4, 5, 6+.

Means of key variables

Descriptive statistics for the primary outcomes in Follow-Up 2 (Wave 2; N = 39) are shown in Table 29. Participants reported high average purchase intention of food products in reusable packaging (M = 5.83, SD = 0.94) and even stronger return likelihood of reusable packaging (M = 6.32, SD = 0.75). Overall, in wave 2, participants remained strongly inclined both to buy food in reusable packaging and to return reusable packaging.

Table 29. Descriptive statistics for key variables (Wave 2, N = 39)

Variable	Mean	SD
Purchase intention	5.83	0.94
Return likelihood	6.32	0.75

Other descriptive Items

Reuse-related descriptive items

In Wave 2, 13 out of 39 participants (33.3%) reported having purchased at least one of the ten reusable-packaged products shown. Among those 11 purchasers (84.6%) were satisfied with their purchase experience while the rest were neutral, and all indicated they plan to continue buying food products in reusable packaging. Among the 13 purchasers, the most commonly chosen items were Fromage Frais Nature 3.5 mg 500 BIO (38.5 %), Cracky Cachuète Pinda Carrefour Classic (23.1 %), and Crackster Original Carrefour Classic (23.1 %). Only 23.1% (9 out of 13 participants who purchase food products in reusable packaging) had returned reusable packaging via the reverse-vending machine; among these nine returners, 88.9% were Satisfied and 11.1% Neutral with their return experience. Looking ahead, 94.9% said they would return reusable packaging during a regular grocery trip, while 5.1% were “Not sure yet.” All remaining reuse-related frequencies appear in Table 30.

Table 30. Reuse-related descriptive items (Wave 2, N = 39)

Survey Item	Category	N	%
Ever purchased any of the shown reusable-packaged products?	No	26	66.7
	Yes	13	33.3
<i>(All respondents; N = 39)</i>			
Satisfaction with purchase experience	Neutral	2	15.4
	Satisfied	11	84.6
<i>(Only if “Yes” above; N = 13)</i>			
Plan to continue buying these products?	Yes	13	100.0
<i>(Only if “Yes” above; N = 13)</i>			
Top three products purchased	Fromage Frais Nature 3×500 BIO	5	38.5
	Cracky Cachuète Pinda Carrefour Classic	3	23.1
	Crackster Original Carrefour Classic	3	23.1
<i>(Only if “Yes” above; N = 13)</i>			
Ever returned reusable packaging to the store?	No	4	30.8
	Yes	9	69.2
<i>(Only if “Yes” purchased; N = 13)</i>			
Satisfaction with return system	Neutral	1	11.1
	Satisfied	8	88.9
<i>(Only if “Yes” returned; N = 9)</i>			
When would you most likely return packaging?	During regular grocery trip	37	94.9
	Not sure yet	2	5.1
<i>(All respondents; N = 39)</i>			

Fiber-based packaging-related descriptive items

Overall, 61.5% of participants reported having heard of fiber-based packaging prior to the survey. Overall, the willingness to buy fiber-based packaging was relatively high ($M = 5.64$, $SD = 1.42$, $N = 39$). After being shown an example of opaque and translucent fiber-based packaging, translucent designs elicited greater interest ($M = 5.75$, $SD = 1.40$, $N = 36$) than opaque ones ($M = 4.84$, $SD = 1.60$, $N = 38$).

Consumer preferences for fiber-based packaging attributes

In Wave 2, participants most strongly identified environmental concerns (mean BW score = +1.49) as the key motivator for choosing fiber-based packaging, followed by food safety (+1.00) and cost savings (+1.21). By contrast, worries about taxes or fees on single-use packaging proved the strongest deterrent (−1.62), with social influence ranking lowest as a purchase driver (−2.13). Quality (+0.46) and functionality (−0.41) fell mid-range, indicating modest net positive and negative effects, respectively. These best–worst scores (Table 31) reveal the relative strength of each attribute’s influence on consumer preferences for fiber-based packaging.

Table 31. Best-Worst scaling results for fiber-based packaging attributes

Attribute	Best Selections	Worst Selections	Mean BW Score
1. Environmental concerns	65	7	+1.49
2. Cost savings	60	13	+1.21
3. Food safety concerns	64	25	+1.00
4. Taxes or fees on single-use packaging	11	74	−1.62
5. Quality of the packaging	41	23	+0.46
6. Functionality of the packaging	25	41	−0.41
7. Social influence	7	90	−2.13

Effects of construal level on purchase intention and return likelihood

Participants exposed to the interdependent (“WE”) framing reported a slightly higher mean Purchase Intention ($M_1 = 5.89$, $SD_1 = 0.85$) than those in the independent (“YOU”) framing ($M = 5.77$, $SD = 1.03$), but this difference was not statistically significant, $t(37) = 0.42$, $p = .67$, Cohen’s $d = 0.14$. Return Likelihood was similarly comparable across groups (WE: $M_1 = 6.30$, $SD = 0.79$; YOU: $M = 6.35$, $SD = 0.73$), $t(37) = -0.21$, $p = .83$, $d = -0.07$. In both cases, p -values exceeded .05, indicating no reliable effect of construal level on either outcome in wave 2 (Error! Reference source not found.).



Figure 30 Effects of self-construal level on mean purchase intention and return likelihood (Wave 2)

Longitudinal analysis

Section Summary

1. Across the 39 complete-case participants, purchase intentions remained stable from Wave 0 through Wave 2 with no overall change over time or difference between “WE” and “YOU” groups. Return likelihood also showed no overall time trend or framing effect, although there was a small interaction: the “WE” group started slightly higher at Wave 0 but converged with the “YOU” group by Wave 2.

Purchase intention

A 2 (Construal Level: WE vs YOU) × 3 (Time: Wave 0, 1, 2) repeated-measures ANOVA on purchase intention revealed no significant change over time, $F(2, 36) = 0.687$, $p = .506$, no overall difference between WE and YOU groups, $F(1, 37) = 0.427$, $p = .517$, and no Time × Construal interaction, $F(2, 36) = 0.051$, $p = .950$. As shown in Figure 31, average PI was stable across waves for both groups (WE: $M_0 = 5.75$, $M_1 = 5.81$, $M_2 = 5.89$; YOU: $M_0 = 5.62$, $M_1 = 5.60$, $M_2 = 5.77$), indicating that framing did not affect how participants’ buying intentions evolved over the three measurements (Figure 31).

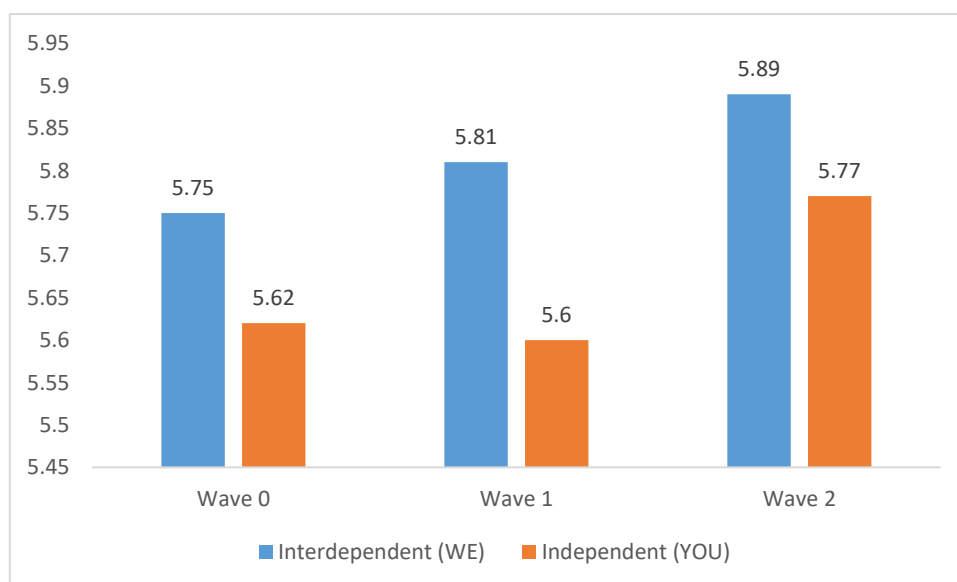


Figure 31. Mean purchase intention by self-construal level and waves 0, 1 and 2

Return likelihood

The same 2×3 ANOVA on return likelihood found no main effect of time, $F(2, 36) = 0.950$, $p = .391$, and no overall framing effect, $F(1, 37) = 0.658$, $p = .423$. However, there was a

significant Time $\times$ Construal interaction, $F(2, 36) = 3.229$, $p = .045$, reflecting different trajectories for the two groups. Post-hoc contrasts showed a marginal early advantage for WE at Wave 0 (WE: $M = 6.44$ vs. YOU: $M = 5.87$; $p = .053$), which converged by Wave 2 (WE: $M = 6.30$; YOU: $M = 6.35$). Figure 32 plots these RL trends, illustrating how the WE frame gave a small initial boost in return likelihood that the YOU frame caught up over time (Figure 32).

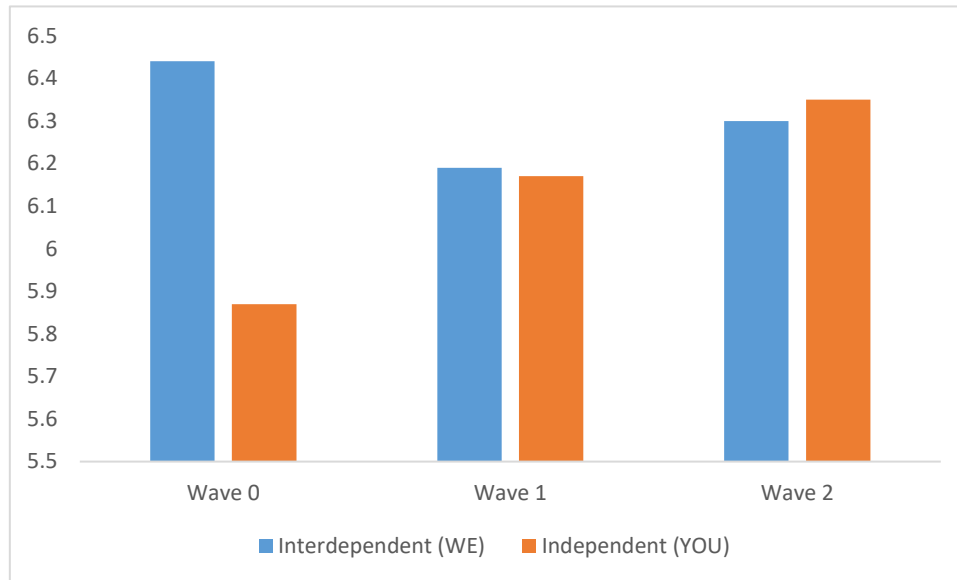


Figure 32. Mean return likelihood by self-construal level and waves 0, 1 and 2

Conclusion

The results across Tasks 2.3, 2.4, 2.5 and 2.6 collectively demonstrate that the transition toward reusable and fiber-based food packaging is driven as much by consumer behaviour as by technological, logistical or policy developments. Across countries and study types, consumers express positive attitudes toward both reuse and substitution, yet persistent gaps remain between intention and action. These gaps are shaped by everyday concerns such as hygiene, convenience, cost and habit, which frequently outweigh abstract environmental benefits. Understanding and addressing these barriers is therefore essential for designing systems that fit naturally into consumers' lived routines.

Communication can support this transition, but its impact is modest on its own. AU's experimental and field results show that gain-framed messages and individual-level ("YOU") approaches can marginally increase purchase intentions or return likelihood in controlled settings. However, these effects diminish in real-world contexts, where behavioural frictions, competing priorities, and practical constraints dominate. The intervention study reinforces this: intentions remained generally high, but message framing alone did not lead to systematic or lasting behavioural change. This highlights the need for communication strategies that go beyond messaging, integrating clear guidance, reassurance about hygiene, and user-friendly processes.

The findings from both AU and CNR converge on a crucial insight: adoption and return are two distinct behavioural steps that require different levers. CNR's work illustrates that political identity, prior experience, and practical concerns are stronger predictors of both adoption and return behaviour than traditional socio-demographic variables. Furthermore, economic incentives and social norms work as complementary—not competing—drivers. Financial rewards are effective when normative support is weak, particularly among certain population segments, while strong social norms create a durable foundation for widespread, low-cost engagement. This behavioural architecture provides a valuable roadmap for designing scalable and inclusive reuse systems.

Together, the tasks demonstrate that meaningful progress toward circular packaging requires coordinated action across three levels:

1. **Consumer-facing system design** that prioritises convenience, accessibility and hygiene transparency.
2. **Targeted communication and education**, tailored to different consumer segments and product categories, and sensitive to the distinction between reuse and fiber-based substitution.

3. **Behavioural levers**, including economic incentives and social norm cultivation, strategically deployed to support both initial uptake and consistent return behaviour.

By integrating these elements, the R3PACK project provides a comprehensive evidence base for policy makers, retailers, and industry partners striving to build packaging systems that are environmentally effective, economically viable, and socially acceptable. The transition will not be achieved through any single mechanism but through a cohesive set of behavioural, structural and communicative interventions that make sustainable choices the easy, attractive and normal option.

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Appendix

A1. Survey study: Questionnaire

Section 1: Informed consent	
CONSENT TO PROCESS PERSONAL DATA In this study, we will ask you to participate in a survey asking your preferences and perceptions about food packaging reuse schemes and fiber-based packaging. We would like to inform you that your input to this survey will remain anonymous. By agreeing to participate you give your consent to have your relevant personal data collected and processed by Aarhus University in Denmark. The research is conducted within the frames of the Horizon Europe project R3PACK (www.R3PACK.EU) and funded by the European Commission. By selecting “I Consent”, I confirm to have read and accepted the terms of the privacy statement on personal data protection on how Aarhus University ensures the confidentiality of your responses (click here to read it). Besides, I confirm that: A. My participation is voluntary, and I may withdraw my consent and discontinue participation in the project at any time as specified in point 7. My refusal to participate will not result in any penalty. B. By providing my consent, I do not waive any legal rights or release Aarhus University or its agents from liability for negligence. C. I consent to my responses are analyzed in aggregate and are collectively included in a publication in a scientific journal. • I Consent • I DO NOT consent	
Quotas	
GEN	<i>Please state your gender</i> Male Female Non-binary Prefer not to say
AGE	<i>How old are you:</i> [Open ended]
ZIP	<i>What is your postcode?</i>
RHH	<i>Are you responsible for grocery shopping in your household?</i>
REG_BE	<i>In what region of Belgium do you live?</i>
REG_FR	<i>In what region of France do you live?</i>
Section 2: Consumers’ general beliefs regarding reusable packaging	
ASS_R (Arne)	Statement/Items: <i>“Please record the first three words that come to mind when you think of ‘reusable food packaging’”</i> Thought 1: Through 2: Thought 3:
<i>Food packaging reuse refers to the practice of using food packaging multiple times, either by refilling or reusing it for its intended purpose. This helps to reduce waste and promote sustainability. For example, food packaging can include reusable plastic containers that can be filled with food items again and again, instead of being discarded after a single use.</i>	

<i>Example of reusable food packaging</i>	
AW_R (Arne)	Statement/Items: <i>"Have you ever heard of reusable food packaging before?"</i> Range: 0 = No, 1 = Yes
FAM_R (Hubbub, 2022)	Statement/Items: <i>"Have you ever used the following?"</i> Any kind of reusable packaging for food and drink Any kind of reusable packaging for NON-FOOD products (e.g., bodywash products, laundry detergents etc.) My own reusable cup for a takeaway drink My own reusable container for takeaway meal or snack Range: 1 = Yes, I often use, 2 = Yes, I've used this before but don't use this often, 3 = No, I've not used this before but would be happy to, 4 = No, I've not used this and would not be happy to,
Description of norms questions	During the survey, you will be asked to answer how you expect other people in your country would respond to certain questions (as in the following question). We ask you to be as accurate as possible. The person with the most accurate answers to these questions will win a voucher of 100 Euro value.
EXP_FAM (Bicchieri et al 2014)	Statement/Items: Previously, you've answered [...] <i>In your opinion, what would the majority of the other people in your country compiling this survey answer to the following item "Any kind of reusable packaging for food and drink"?</i> Range: 1 = Yes, I often use, 2 = Yes, I've used this before but don't use this often, 3 = No, I've not used this before but would be happy to, 4 = No, I've not used this and would not be happy to,
ATT_R_G (Ertz, M. et al., 2017)	Statement/Items: <i>"When considering food packaging reuse, do you think that it is":</i> Bad idea / Good idea Good for the environment / Bad for the environment Hygienic / Unhygienic Require low effort / Require a lot of effort Be convenient in use / Be Inconvenient in use Save no resources / Save a lot of resources Better than recycling / Worse than recycling The right thing to do / Not the right thing to do Range: Bipolar (1-7)
S_NORM_R (Ertz, M. et al., 2017)	Statement/Items: <i>"If I use reusable food packaging, most people who are important to me would..."</i> Strongly disapprove/strongly approve Not appreciate it at all/Appreciate it completely Find it very undesirable/Find it very desirable Not support it at all/Strongly support it Find it very socially inappropriate/very socially appropriate
P_NORM_R	Statement/Items:

(Bicchieri et al 2014)	<i>Concerning the use of reusable food packaging, please express your opinion:</i> I strongly disapprove/I strongly approve I do not appreciate it at all/I appreciate it completely I find it very undesirable/I find it very desirable I do not support it at all/I strongly support it
EXP_R_NORM	In your opinion, what would the majority of the other people in your country compiling this survey answer to item 1("I strongly disapprove/I strongly approve")? Please try to be as accurate as possible in your answer. We ask you to make a guess that – if accurate – allows you to earn additional money. The participant that is most accurate with its answer to this and similar questions in this survey earns an additional 100 Euro
PROD_R (Arne)	Statement/Items: <i>"How applicable do you find that reuse food packaging will be for the following food product categories?"</i> Prepared salads Bagged salads Unprocessed fruits Unprocessed vegetables Cold cuts Butter Cheese Yoghurt Savory biscuits Chips Soups Juices Milk Range: 1: Not applicable, 2: Somewhat applicable, 3: Applicable
INF_R (Adaption of Walker et al., 2021)	Statement/Items: <i>"How important are each of the following factors in influencing your decision to purchase food items in reusable packaging?"</i> Environmental harm concerns Deposit and cash returns (e.g. getting cash out when returning the reused packaging) Cost of reusable packaging Food safety concerns Availability of drop off points in local area Convenient reuse systems that require less effort from me Taxes on products in single-use packaging Quality of packaging Durability of packaging Functionality of packaging What others do or think is the right thing to do
PI_R	Statement/Items: <i>"How likely is it that you would buy food brands that allow their packages to be reused?"</i>

EXP_PI_R	Statement/Items: In your opinion, what would the majority of the other people in your country compiling this survey answer to the previous question (“How likely is it that you would buy food brands that allow their packages to be reused?”): Please try to be as accurate as possible in your answer. We ask you to make a guess that – if accurate – allows you to earn additional money. The participant that is most accurate with its answer to this and similar questions in this survey earns an additional 100 Euro.
ADOPT_R (Bashir et al., 2022)	Statement/Items: “How likely are you to adopt a food packaging reuse solution if/when it becomes available?”
EXP_ADOPT_R	Statement/Items: In your opinion, what would the majority of the other people in your country compiling this survey answer to the previous question (“How likely are you to adopt a food packaging reuse solution if/when it becomes available?”): Please try to be as accurate as possible in your answer. We ask you to make a guess that – if accurate – allows you to earn additional money. The participant that is most accurate with its answer to this and similar questions in this survey earns an additional 100 Euro.
Section 3: Consumers’ beliefs regarding different reuse schemes In real life, there are four types of food packaging reuse schemes. Refill at home: When you refill food container at your home. For example, with refills delivered through a subscription service or purchased directly. Refill on the go: You refill reusable food packaging away from home. For example, in your local store in an in-store dispensing system). Return from home: Food packaging is picked up from you home by a pick-up service. For example, by a logistics company). Return on the go: You return the food packaging at a store or drop-off point. For example, in a deposit return machine). In all cases, the packaging is supposed to be reused, thus serve more than a single role (compared to what most of food packaging serves presently). Have you read these descriptions? Yes/No	
Preference and perception of refill at home schemes NOTE: Same questions are asked for <i>refill on the go</i> and <i>return from home</i>, why we exclude them from appendix.	
Considering the refill at home scheme, please answer the following questions: Refill at home: Users refill their reusable food container at home. For example, with refills delivered through a subscription service or purchased directly	
AW_REF_H (Arne)	Statement/Items: “Have you ever heard of such scheme?” Range: 0 = No, 1 = Yes
FAM_REF_H (Arne)	Statement/Items: “Do you have any experience engaging in such scheme before?” Range: 0 = No, 1 = Yes
ATT_REF_H (Ertz, M. et al., 2017)	Statement/Items: “When considering the scheme, do you think that it is”: Bad idea / Good idea Good for the environment / Bad for the environment Hygienic / Unhygienic

	Require less effort / Require a lot of effort Be convenient in use / Be Inconvenient in use Save no resources / Save a lot of resources Better than recycling / Worse than recycling The right thing to do / Not the right thing to do
SP_REF_H (Arne)	Statement/Items: <i>"Please indicate how much you agree with each of the following statements"</i> I would feel good about engage in such scheme I would feel embarrassed if anybody saw me engaging in such scheme I would be committed to engage in such scheme if the majority was using it
SP_REF_H2 (CNR)	I would commit to participate in such a scheme if I know that (____)% of others is starting to use it
PRICE_REF_H	Statement/Items: <i>"Would you expect that a food product that adopts a reusable packaging under such a scheme to cost more or less?"</i> Range: More, The same, Less
PRICE_W_REF_H	Statement/Items: <i>"Why do you expect it to cost more / less?"</i>
EXP_PRICE_REF_H	Statement/Items: <i>What do you expect the majority of the people in your country compiling this survey would answer to the question ("would you expect that a food product that adopts a reusable packaging under such a scheme to cost more or less?"):</i> <i>Please try to be as accurate as possible in your answer. We ask you to make a guess that – if accurate – allows you to earn additional money. The participant that is most accurate with its answer to this and similar questions in this survey earns an additional 100 Euro.</i>
PRICE_PCT_REF_H	Statement/Items: <i>"How much more / less in percentages would you find suitable to pay for packaging in such scheme?"</i>
WTA_REF_H (Arne)	Statement/Items: <i>"How likely are you to engage in such a scheme?"</i>
EXP_REF_H	Statement/items: <i>"In your opinion, what would the majority of the other people in your country compiling this survey answer to the previous question ("How likely are you to engage in such a scheme?")</i> <i>Please try to be as accurate as possible in your answer. We ask you to make a guess that – if accurate – allows you to earn additional money. The participant that is most accurate with its answer to this and similar questions in this survey earns an additional 100 Euro. are you to engage in such scheme?"</i>
P_NORM_REF_H (CNR)	Statement/Items: <i>"How appropriate do you think it is to engage in such a scheme"</i>
EXP_P_NORM_REF_H	Statement/Items: <i>"In your opinion, what would the majority of the other people in your country compiling this survey answer to the previous question ("How appropriate do you think is to engage in such a scheme is"):</i> <i>Please try to be as accurate as possible in your answer. We ask you to make a guess that – if accurate – allows you to earn additional money. The participant that is most accurate with its answer to this and similar questions in this survey earns an additional 100 Euro."</i>

BAR_REF_H (Arne)	Statement/Items: <i>What would make you reluctant to use such a scheme? Mention up to 3 reasons.</i> Reason 1: Reason 2: Reason 3:
Specific questions for on-the-go schemes	
FREQ_RET_O (Arne)	Statement/Items: <i>"How often would you prefer to return the used packages?"</i> <i>Few times a week</i> <i>Once a week</i> <i>Few times a month</i> <i>Once a month</i>
LOC_RET_O (Arne)	Statement/Items: <i>"Where would you prefer to return used packages?"</i> Drop in a collection point close to home (e.g. a small local grocer) Drop in the same place where you buy (e.g., a large super-market) Drop-off point outside store.
DIST	Statement/Items: <i>"How far (in meters) is the shop you do the majority of your groceries from your home?"</i>
DEP_TYPE	Statement/Items: <i>"Which of the following refunds would motivate you the most to return the packaging"</i> Receive loyalty/credit points (e.g. from store) Cash-out Donate refund to charity
EXP_DEP_TYPE	Statement/Items: <i>In your opinion, which type of refund would the majority of the other people in your country compiling this survey prefer?"</i>
DEP_MOT (Arne)	Statement/Items: <i>Would it motivate you to return the packaging if you receive a full refund of your deposit upon return?</i>
DEP_MOT_W	Statement/Items: <i>"Why would it motivate/demotivate you?"</i>
EXP_DEP_RET_O	Statement/Items: What do you expect the majority of the people in your country compiling this survey would answer to the question ("Would it motivate you to return the packaging if you receive a full refund of your deposit upon return?"): <i>Please try to be as accurate as possible in your answer. We ask you to make a guess that – if accurate – allows you to earn additional money. The participant that is most accurate with its answer to this and similar questions in this survey earns an additional 100 Euro.</i>
DEP_MOT_PCT	Statement/Items: <i>"How much more in percentages of the packaging should the deposit be for you to return the packaging?"</i>
RATE (Arne)	Statement/Items: <i>"Overall, if you bought a returnable food packaging, how likely would it be that you returned the packaging after use?"</i> 1. No chance, almost no chances (1 chance in 100) 2. Very slight possibility (2 chances in 10) 3. Slight possibility (3 chances in 10) 4. Fair possibility (4 chances in 10) 5. Fairly good possibilities (5 chances in 10) 6. Good possibility (6 chances in 10) 7. Probable (7 chances in 10) 8. Very probable (8 chances in 10) 9. Almost sure (9 chances in 10) 10. Certain, practically certain (99 chances in 100)
EXP_RATE	<i>In your opinion how likely would the majority in your country be to return the packaging after use?</i>
Summarizing section 3	

Please consider all four schemes again and answer the following questions

Refill at home: Users refill their reusable container at home (e.g. with refills delivered through a subscription service or purchased directly)

Refill on the go: Users refill their reusable container away from home (e.g. at an in-store dispensing system)

Return from home: Packaging is picked up from home by a pick-up service (e.g. by a logistics company)

Return on the go: Users return the packaging at a store or drop-off point (e.g. in a deposit return machine or mailbox)

In all cases, the packaging is supposed to be reused, thus serve more than a single role (compared to what most of food packaging serves presently).

PREF1 (Arne)	Statement/Items: <i>"Based on the four packaging reuse schemes presented, which one do you prefer the MOST and which one the LEAST?"</i> <i>Range: I prefer THE MOST, I prefer THE LEAST</i>
PREF2 (Arne)	Statement/Items: <i>"Based on the remaining two packaging reuse schemes presented, which one do you prefer the MOST and which one the LEAST?"</i> <i>Range: I prefer THE MOST, I prefer THE LEAST</i>
Section 4: Preference and perception of fiber-based packaging	
ASS_F (Arne)	Statement/Items: <i>"Please record the first three thoughts that come to mind when you think of 'fiber-based packaging'"</i> Thought 1: Thought 2: Thought 3:
DESC_F	Fiber packaging is produced with reusable, renewable, or biodegradable materials. Such materials may include recycled content (such as newspaper and cardboard) or natural fibers such as wood pulp, bamboo, bagasse, and wheat straw. Fiber-based food packaging can be used to package a wide range of food products, including fresh and dried foods and beverages. Examples of fiber-based packaging appear below:
AW_F	<i>Have you ever heard before about fiber-based food packaging?</i> 0 = No 1 = Yes
ATT_F (Arne)	Statement/Items: <i>"Compared to other forms of food packaging, I believe that fiber-based food packaging is..."</i> More environmentally friendly // Less environmentally friendly More convenient in use // Less convenient in use More recyclable / Less recyclable Of better quality / Of worse quality Better at preserving and protecting the product // Worse at preserving and protecting the product More safe // Less safe More hygienic / Less hygienic More expensive // Less expensive

	Range: Bipolar
PROD_F (Arne)	Statement/Items: <i>"How applicable would it be to have fiber-based food packaging in the following food product categories?"</i> Prepared salads Bagged salads Unprocessed fruits Unprocessed vegetables Cold cuts Butter Cheese Yoghurt Savory biscuits Chips Soups Juices Milk Range: 1: Not applicable, 2: Somewhat applicable, 3: Applicable
PRICE_F	Statement/Items: <i>"Would you expect that a food product that adopts a reusable packaging under such a scheme to cost more or less?"</i> Range: More, The same, Less
PRICE_W_F	Statement/Items: <i>"Why do you expect it to cost more / less?"</i>
EXP_PRICE_F	Statement/Items: What do you expect the majority of the people in your country compiling this survey would answer to the question: ("Would you expect that a food product in fiber-based packaging to cost more or less?") Please try to be as accurate as possible in your answer. We ask you to make a guess that – if accurate – allows you to earn additional money. The participant that is most accurate with its answer to this and similar questions in this survey earns an additional 100 Euro
PRICE_PCT_F	Statement/Items: <i>"How much more / less in percentages would you find suitable to pay for fiber-based packaging?"</i>
PI_F (Bashir et al., 2022)	Statement/Items: <i>"How likely are you to buy products in fiber-based packaging if/when it becomes available"</i> Range: 1-7 likert scale (likelihood)
EXP_PI_F	Statement/Items <i>What do you expect the majority of the people in your country compiling this survey would answer to the question ("How likely are you to buy food products in fiber-based packaging if/when it becomes available?")</i> <i>Please try to be as accurate as possible in your answer. We ask you to make a guess that – if accurate – allows you to earn additional money. The participant that is most accurate with its answer to this and similar questions in this survey earns an additional 100 Euro.</i>
P_NORM_F (Bicchieri et al 2014)	Statement/Items: <i>As to buying products in fiber-based packaging, please express your opinion for the following items:</i>

	I strongly disapprove/I strongly approve I do not appreciate it at all/I appreciate it completely I find it very undesirable/I find it very desirable I do not support it at all/I strongly support it 1-7 (Likert scale)
EXP_P_NORM (Bicchieri et al 2014)	Statement/Items: <i>In your opinion, what would the majority of the other people in your country compiling this survey answer to item 1("I strongly disapprove/I strongly approve")?</i> <i>Please try to be as accurate as possible in your answer. We ask you to make a guess that – if accurate – allows you to earn additional money. The participant that is most accurate with its answer to this and similar questions in this survey earns an additional 100 Euro.</i>
Section 5. Background characteristics and socio-demographic	
ENV_CON (Kilbourne & Pickett, 2008)	Statement/Items: <i>"To what extent do you agree with the following statements?"</i> I am very concerned about the environment Humans are severely abusing the environment I would be willing to reduce my consumption to help protect the environment Major political change is necessary to protect the natural environment Major social changes are necessary to protect the natural environment Anti-pollution laws should be enforced more strongly
AW_CON (Adapted from Davies, Fowall & Pallister, 2022)	Statement/Items: <i>"Please indicate how much you agree with the following statements"</i> In my opinion, reusing food packaging is a major way to reduce pollution I consider that reusing food packaging creates a better environment for future generations I believe that reusing food packaging is a major way to reduce wasteful use of landfills I consider that reusing food packaging is a major way to conserve natural resources I think reusing food packaging saves money
GREEN (Haws et al., 2014)	Statement/Items: <i>"Please indicate how much you agree with the following statements"</i> It is important to me that the products I use do not harm the environment I consider the potential environmental impact of my actions when making many of my decisions My purchase habits are affected by my concern for our environment I am concerned about wasting the resources of our planet I would describe myself as environmentally responsible I am willing to be inconvenienced in order to take actions that are more environmentally friendly
MOT (Walker et al., 2021)	Statement/Items: <i>"Please indicate how much you agree with the following statements"</i> I am personally motivated to reduce the amount of single-use plastic food packaging I consider environmental impact caused by single-use plastic food packaging to be important I actively shop for sustainable packaging goods while grocery shopping
MAR	<i>What is your marital status?</i> Single Married Cohabiting

	Divorced Widowed
EDU	<i>What is the maximum level of education you have completed?</i> Primary school Post primary school Further education Undergraduate higher education Professional education Doctorate
INC	<i>What is your annual personal income?</i> Less than €10,000 €10,000 - €19,999 €20,000 - €29,999 €30,000 - €39,999 €40,000 - €49,999 €50,000 - €59,999 €60,000 - €69,999 €70,000 - €79,999 €80,000 - €89,999 €90,000 - €99,999 €100,000 - €149,999 More than €150,000
INH (Arne)	<i>How many inhabitants has the town you live in?</i> Less than 1000 1000 – 5000 5000 – 25.000 25.000 – 50.000 50.000 – 100.000 100.000 – 250.000 More than 250.000
M2 (Arne)	<i>How many m² is your apartment/house you live in?</i> Range: Self-report
HH_N (Arne)	<i>How many people live in your household?</i>
HH_KIDS	<i>Do you have kids (below 18) living in your household?</i>
Wrap up	
COM	<i>When thinking of fiber-based packaging and packaging food reuse schemes, is there anything you would like to add? Please feel free to write all your thoughts, as this can be of great help to understand the field better.</i>
Debriefing	
MAIL	Thank you for taking the time to participate in our survey! Your participation has been valuable in gaining a better understanding consumers' beliefs and perceptions regarding food packaging reuse schemes and fiber-based packaging. Additionally, we would like to invite you to join us for an online focus group interview, to be conducted in the near future. As a token of our appreciation, you will receive a voucher worth 50 EUR for participating in the focus group. If you have any questions, please don't hesitate to reach out to us via email. If you're interested in participating in the online focus group, please provide us with your email below:

Scales:

Likelihood:

- 1) Extremely unlikely, 2) Moderately unlikely, 3) Slightly likely, 4) Neither likely nor unlikely, 5) Slightly likely, 6) Moderately likely, 7) Extremely likely

Appropriateness:

1) Very inappropriate, 2) inappropriate, 3) somewhat inappropriate, 4) Neither appropriate nor inappropriate, 5) Somewhat appropriate, 6) Appropriate, 7) Very appropriate

Agreement:

1) Strongly disagree, 2) Disagree, 3) somewhat disagree, 4) Neither agree nor disagree, 5) somewhat agree, 6) Agree, 7) Strongly Agree.

A2. Focus group study: Questionnaire

Section 1: Invitation	
Would you like to contribute to research aiming to explore avenues to reduce single use food packaging and adopt food packaging reuse solutions? R3PACK is a Horizon Europe Project that seeks innovative solutions to reusable food packaging (www.R3PACK.EU). As part of the R3PACK project, researchers at Aarhus University in Denmark are recruiting participants for a focus group discussion on reusable food packaging. Your participation will be compensated with £50 through Prolific. When and where will the focus group interview take place? - WHEN: 13th of June from 5:00pm to 6:30pm Central European Time. - WHERE: Online (Microsoft Teams). A link will be shared to those who will be selected. What does it require from you? - Be available the 13th of June from 5:00pm to 6:30pm. - Be fluent in English. Would you like to participate in the online focus group interview? • Yes, I would like to participate • No, I would NOT like to participate	
Section 2: Screening	
GEN	<i>Please state your gender</i> Male Female Non-binary
AGE	<i>How old are you:</i> [Open ended]
RHH	<i>Are you responsible for grocery shopping in your household?</i>
REG_BE	<i>In what region of Belgium do you live?</i>
REG_FR	<i>In what region of France do you live?</i>
Section 3: Debriefing	
Thank you for your time and interest in the study! We will assess your responses and if we find you eligible we will contact you in the next 2 days with details about the focus group. We will do that through Prolific, thus please ensure you check your messages as we will need your confirmation. Click next to finish and receive the compensation for participating in this survey.	

A3. Focus group study: Interview guide

Introduction (5-10 min)

- Welcome, introduction of ourselves, and purpose.
- State that the session will be recorded, but only transcripts will be used. No video will be made public.
- Ask each participant to introduce him/herself (name, where you live, what you do for living).
- Ask participants to write their Prolific ID in the chat to ensure that we reward them.

Food packaging reuse (20 min)

- *What do you think about **food packaging**?*
- *What do you think about **single-use packaging** (i.e., that most food packaging we either throw to the bin or recycle)?*
- *What do you think about **food packaging reuse**?*
 - Is it a good/bad idea, and why?
 - Is such solution environmental friendly, and why?
 - Discuss the benefits, and why.
 - Discuss the barriers, and why.

Food packaging reuse schemes (5 min)

We consider the following four types of food packaging reuse schemes:

- **Refill on the go:** Users refill their reusable container outside home (e.g., at in-store dispensing systems).
- **Refill from home:** User refill their reusable container at home (e.g., with refills delivered)
- **Return on the go:** Users return the packaging at a store or drop-off point.
- **Return from home:** Packaging is picked up from home by a pick-up service (e.g., logistic service)
- *What is your impression about **these schemes**?*

Return on the go scheme (30 min)

We would like to focus on “return on the go” scheme.

- *Would such scheme be **easily implemented** in your country?*
- *Would people in your country **buy products** that would have packaging that would be reused?*
- ***Which products** would you imagine to fit for such scheme?*
- ***Would people return** packaging in drop-off points? **Why not?***
- *Imagine buying products in reused packaging. **How often** would you return the packaging? Would you store at home for long?*
- ***What would make such scheme successful?** How we could convince companies to introduce return schemes, and how we could convince people to return packaging?*

Results from the survey (10-15 min)

We did a survey and we asked about 1000 people from your country questions about food packaging reuse.

- *Do you think that products using such packaging would **cost more or less**?*
 - *We find that people think packaging would cost about 10% less. **Why?***
- *Do you think all people would return packaging in drop off points?*
 - *We find that the probability to return is 70%. **Why people this it will be less likely to return?***
- *Would you be more likely to return packaging if you live close to the drop off point?*
 - *We find that people who live far from drop off point are more likely to return packaging.*

Conclusion (5 min)

- *Any last points about food packaging reuse?*

Wrap up the discussion and thank participants for their time, and remind that we will reward them through Prolific.

A4. Pilot study 1: Questionnaire

Construct (Source)	Statement	
Informed consent		
Consent to participation	In this study, we will ask you to participate in a survey presenting you with information about reusable food packaging. Afterwards you will be asked about your buying behaviour and preferences in relation to food packaging reuse. Lastly, you will be asked about your background (e.g. age, gender etc.). We would like to inform you that your input to this survey will remain anonymous. By agreeing to participate you give your consent to have your relevant personal data collected and processed by Aarhus University in Denmark. The research is conducted within the frames of the Horizon Europe project R3PACK (www.R3PACK.EU) and funded by the European Commission.	
	By selecting “I Consent”, I give my consent to participate in the study and confirm to have read and accepted the terms of the below privacy statement on personal data protection on how Aarhus University ensures the confidentiality of your responses. Besides, I confirm that: A. My participation is voluntary, and I may withdraw my consent at any stage during the survey without stating a reason. I can withdraw my consent by closing the survey, since impartial/incomplete responses will not be registered, will be erased, and not kept for any reason. B. By providing my consent, I do not waive any legal rights or release Aarhus University or its agents from liability for negligence. C. I consent to my responses are analyzed in aggregate and are collectively included in a publication in a scientific journal. - I Consent - I DO NOT Consent	
Introduction to reuse		
Introduction to reuse	Food packaging reuse refers to the practice of using food packaging multiple times, either by refilling or reusing it for its intended purpose. It is among the strategies proposed to reduce single-use food packaging.	
	Food packaging reuse should not be confused with recycling. While recycling involves collecting and reprocessing waste materials to create new products, reuse implies that packaging will be used multiple times without being thrown away. The infographic below presents how a return on the go scheme works.	
Message framing		
Environmental frames	Statement/Items: “Imagine you walk into a store, and you see a flyer with the following message”.	Statement/Items: “Imagine you walk into a store, and you see a flyer with the following message”.
Interpersonal level	<u>Environment / Loss frame</u> Think how much we harm the environment if we do not buy food products in reused packaging! Why? Reused packaging harms less the environment compared to when we throw single-used packaging to the garbage/recycling bins. What are the threats ? By NOT participating in a packaging reuse scheme, we: Increase of single-use packaging that ends up in landfills.	<u>Environment / Gain frame</u> Think how much we protect the environment if we buy food products in reused Why? Reused packaging protects the environment when you return packaging to the shop. What are the benefits ? By participating in a packaging reuse scheme, we: Contribute to reduction of single-use packaging that ends up in landfills.

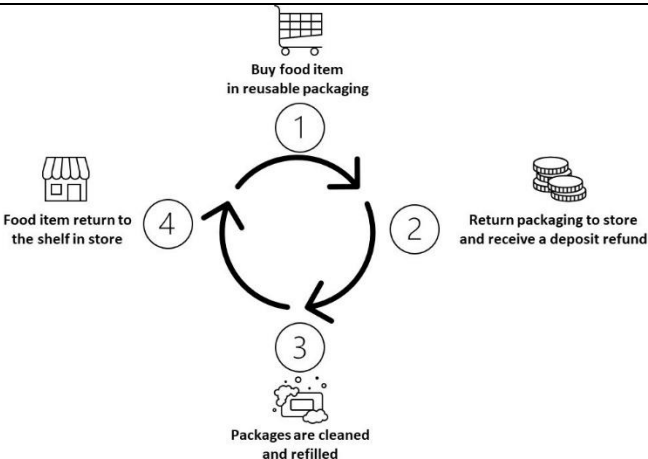
	• Hinder the transition towards circular economy.	• Accelerate the transition towards circular economy.
Economic frames Interpersonal level	Statement/Items: “Imagine you walk into a store, and you see a flyer with the following message”. <u>Economic / Loss frame</u> Think how much money we can spend if you do not buy food products in reused packaging! <i>Why?</i> Reusable packaging may cost we money by throwing valuable packaging to the garbage/recycling bin. What are the threats? By NOT participating in a packaging reuse scheme, we: • Increase of single-use packaging that ends up in landfills. • Hinder the transition towards circular economy.	Statement/Items: “Imagine we walk into a store, and you see a flyer with the following message”. <u>Economic/ Gain frame</u> Think how much money we can save if you buy food products in reused packaging! <i>Why?</i> Reusable packaging can save we money by returning valuable packaging to the shop. What are the benefits? By participating in a packaging reuse scheme, we: • Contribute to reduction of single-use packaging that ends up in landfills. • Accelerate the transition towards circular economy.
Environmental frames Individual level	Statement/Items: “Imagine you walk into a store, and you see a flyer with the following message”. <u>Environment / Loss frame</u> Think how much you harm the environment if you do not buy food products in reused packaging! <i>Why?</i> Reusable packaging harms less the environment compared to when you throw single-used packaging to the garbage/recycling bins. What are the threats? By NOT participating in a packaging reuse scheme, you: • Increase of single-use packaging that ends up in landfills. • Hinder the transition towards circular economy.	Statement/Items: “Imagine you walk into a store, and you see a flyer with the following message”. <u>Environment / Gain frame</u> Think how much you protect the environment if you buy food products in reused <i>Why?</i> Reusable packaging protects the environment when you return packaging to the shop. What are the benefits? By participating in a packaging reuse scheme, you: • Contribute to reduction of single-use packaging that ends up in landfills. • Accelerate the transition towards circular economy.
Economic frames individual level	Statement/Items: “Imagine you walk into a store, and you see a flyer with the following message”. <u>Economic / Loss frame</u> Think how much money you can spend if you do not buy food products in reused packaging! <i>Why?</i> Reusable packaging may cost you money by throwing valuable packaging to the garbage/recycling bin.	Statement/Items: “Imagine you walk into a store, and you see a flyer with the following message”. <u>Economic/ Gain frame</u> Think how much money you can save if you buy food products in reused packaging! <i>Why?</i> Reusable packaging can save you money by returning valuable packaging to the shop.

	<i>What are the threats? By NOT participating in a packaging reuse scheme, you:</i> • Increase of single-use packaging that ends up in landfills. • Hinder the transition towards circular economy.	<i>What are the benefits? By participating in a packaging reuse scheme, you:</i> • Contribute to reduction of single-use packaging that ends up in landfills. • Accelerate the transition towards circular economy.
Behavior		
Purchase intention (Bashir et al., 2020)	Statement/Items: “After having seen this message, how... • Likely are you to buy reused food packaging? • Inclined are you to buy reused food packaging? • Willing are you to buy reused food packaging? Range: 1-7 likert scale (likelihood)	
Return of packaging	Statement/Items: “After having seen this message, how... • Likely are you to return reused food packaging? • Inclined are you to return reused food packaging? • Willing are you to return reused food packaging? Range: 1-7 likert scale (likelihood)	
Engagement (adapted from Bruner II, 2009; Lee et al., 2010; Mathmann et al., 2017)	Statement/Items: Please indicate to what extent you felt the following while reading the message: • involved • motivated • interested • important • relevant Range: 1 = not at all; 7 = extremely	
Positive affect (adapted from Watson et al., 1988)	Statement/Items: To what extent do the following emotions describe how you feel after reading the message: • Bad – Good • Upset – Happy • Jittery – Comfortable • Bored – Excited Range: 7-point bipolar	
Background Questions		
Age	Statement/Items: Please state your age: [Open-ended]	
Gender	Statement/Items: Please state your gender 1. Male 2. Female 3. Non-binary/third gender 4. Prefer not to say	
Debriefing		
Awareness	Statement/Items: “Until today, had you heard the term reused food packaging before?” Range: Yes / No	
Manipulation check	Statement/Items: “To what extent did the flyer you read focus on ...	

	• ... the benefits when people participate in a food packaging reuse scheme • ... the threats when people participate in a food packaging reuse scheme • ... on protecting the environment when people participate in a food packaging reuse scheme • ... on saving money when people participate in a food packaging reuse scheme
Realism	Range: 1 (not at all) – 7 (extremely) Statement/Items: <i>“Please rate the realism of scenario with the message you read about reused food packaging”</i> 1. Very unrealistic 2. Unrealistic 3. Somewhat unrealistic 4. Neither realistic nor unrealistic 5. Somewhat realistic 6. Realistic 7. Very realistic

A5. Pilot study2: Questionnaire

Construct (Source)	Statement
Informed consent	
Consent to participation	In this study, we will ask you to participate in a survey presenting you with information about reusable food packaging. Afterwards you will be asked about your buying behaviour and preferences in relation to food packaging reuse. Lastly, you will be asked about your background (e.g. age, gender etc.). We would like to inform you that your input to this survey will remain anonymous. By agreeing to participate you give your consent to have your relevant personal data collected and processed by Aarhus University in Denmark. The research is conducted within the frames of the Horizon Europe project R3PACK (www.R3PACK.EU) and funded by the European Commission. By selecting “I Consent”, I give my consent to participate in the study and confirm to have read and accepted the terms of the below privacy statement on personal data protection on how Aarhus University ensures the confidentiality of your responses. Besides, I confirm that: A. My participation is voluntary, and I may withdraw my consent at any stage during the survey without stating a reason. I can withdraw my consent by closing the survey, since impartial/incomplete responses will not be registered, will be erased, and not kept for any reason. B. By providing my consent, I do not waive any legal rights or release Aarhus University or its agents from liability for negligence. C. I consent to my responses are analyzed in aggregate and are collectively included in a publication in a scientific journal. • I Consent • I DO NOT Consent
Introduction to reuse	
Introduction to reuse	Please read the information below <u>carefully</u> This survey is about food packaging reuse, which refers to the practice of using food packaging multiple times, either by refilling or reusing it for its intended purpose. It is among the strategies proposed to reduce single-use food packaging. Reusable food packaging is maintained in a hygienic state through rigorous cleaning processes, often involving hot water, sanitizing agents, or industrial dishwashers. Additionally, quality control measures and material selection aim to ensure that the packaging is resistant to microbial growth and safe for repeated use. Food packaging reuse should not be confused with recycling. While recycling involves collecting and reprocessing waste materials to create new products, reuse implies that packaging will be used multiple times without being thrown away. The infographic below presents how a return-on-the-go scheme works.

	
Message framing	
Loss / Gain frame Individual level	Statement/Items: "Imagine you walk into a store, and you see a flyer with the following message". Loss frame  Think how much you harm the environment and how much money you spend when you buy food products in single-use packaging!  What are the <i>threats</i> for you? When you buy food products in single-use packaging: • You harm the environment by increasing packaging waste. • You pay more by throwing out single-use packaging that has value.  What are the <i>consequences</i> for you when buying single-use packaging? • You increase the amount of single-use packaging that ends up in landfills. • You hinder the transition towards circular economy. Statement/Items: "Imagine you walk into a store, and you see a flyer with the following message". Gain frame  Think how much you protect the environment and how much money you save if you buy food products in reused packaging!  What are the <i>benefits</i> for you? When you buy food products in reusable packaging: • You protect the environment by reducing packaging waste. • You pay less by returning reusable packaging that has value.  What are the impacts for you by participating in a food packaging reuse scheme? • You contribute to the reduction of single-use packaging that ends up in landfills. • You accelerate the transition towards circular economy.
Loss / Gain frame Interpersonal level	Statement/Items: "Imagine you walk into a store, and you see a flyer with the following message". Loss frame Statement/Items: "Imagine you walk into a store, and you see a flyer with the following message". Gain frame

	 Think how much we <i>harm the environment</i> and how much money we <i>spend</i> when we buy food products in single-use packaging!  What are the <i>threats</i> for us? When we buy food products in single-use packaging: • We <i>harm the environment</i> by increasing packaging waste. • We <i>pay more</i> by throwing out single-use packaging that has value.  What are the <i>consequences</i> for us when buying single-use packaging? • We <i>increase</i> the amount of single-use packaging that ends up in landfills. • We <i>hinder</i> the transition towards circular economy.	 Think how much we <i>protect the environment</i> and how much money we <i>save</i> if we buy food products in reused packaging!  What are the <i>benefits</i> for us? When we buy food products in reusable packaging: • We <i>protect the environment</i> by reducing packaging waste. • We <i>pay less</i> by returning reusable packaging that has value.  What are the <i>impacts</i> for us by participating in a food packaging reuse scheme? • We <i>contribute to the reduction</i> of single-use packaging that ends up in landfills. • We <i>accelerate</i> the transition towards circular economy.
Behavior		
Purchase intention (Bashir et al., 2022)	Statement/Items: “After having seen this message, how [...]” • Likely are you to buy reused food packaging • Inclined are you to buy reused food packaging • Willing are you to buy reused food packaging <i>Range: 1 – 7 (likert)</i>	
Return of packaging	Statement/Items: “After having seen this message, how [...]” • Likely are you to return reused food packaging • Inclined are you to buy reused food packaging • Willing are you to buy reused food packaging <i>USE LIKELIHOOD SCALE (1 = NOT LIKELY AT ALL; 7 = VERY LIKELY)</i>	
Engagement (adapted from Bruner II, 2009; Lee et al., 2010; Mathmann et al., 2017)	Statement/Items: “Please indicate to what extent you felt the following while reading the message:” • involved • motivated • interested • important • relevant	

	Range: 1 = not at all; 7 = extremely
Positive affect (adapted from Watson et al., 1988)	Statement/Items: <i>"To what extent do the following emotions describe how you feel after reading the message:"</i> • Bad – Good • Upset – Happy • Jittery – Comfortable • Bored – Excited Range: 7-point bipolar
Covariates	
Regularity (Higgins et al. 2001)	Statement/Items: <i>"This set of questions asks you HOW FREQUENTLY specific events actually occur or have occurred in your life. Please indicate your answer to each question by circling the appropriate number below it."</i> • Compared to most people, are you typically unable to get what you want out of life? • Growing up, would you ever "cross the line" by doing things that your parents would not tolerate? • How often have you accomplished things that got you "psyched" to work even harder? • Did you get on your parents' nerves often when you were growing up? • How often did you obey rules and regulations that were established by your parents? • Growing up, did you ever act in ways that your parents thought were objectionable? • Do you often do well at different things that you try? • Not being careful enough has gotten me into trouble at times. • When it comes to achieving things that are important to me, I find that I don't perform as well as I ideally would like to do. • I feel like I have made progress toward being successful in my life. • I have found very few hobbies or activities in my life that capture my interest or motivate me to put effort into them. Range: 1-5
Values	Statement/Items: <i>"Below, you will find a list of values. Behind each value there is a short explanation concerning the meaning of the value. Please rate how important each value is for you AS A GUIDING PRINCIPLE IN YOUR LIFE."</i> • EQUALITY: equal opportunity for all. • RESPECT THE EARTH: harmony with other species. • SOCIAL POWER: control over others, dominance. • PLEASURE: joy, gratification of desires. • UNITY WITH NATURE: fitting into nature. • A WORLD AT PEACE: free of war and conflict. • WEALTH: material possessions, money. • SOCIAL JUSTICE: correcting injustice, care for the weak. • ENJOYING LIFE: enjoying food, sex, leisure, etc. • PROTECTING THE ENVIRONMENT: preserving nature • INFLUENTIAL: having an impact on people and events. • HELPFUL: working for the welfare of others. • PREVENTING POLLUTION: protecting natural resources. • SELF-INDULGENT: doing pleasant things. • AMBITIOUS: hard working, aspiring. Range: -(1) - 7 (-1 = Opposed to my value, 0 = not important, 7 = of supreme importance)
Socio-demographic	

Realism	Statement/Items: <i>"Please rate the realism of scenario with the message you read about reused food packaging"</i> 1. Very unrealistic 2. Unrealistic 3. Somewhat unrealistic 4. Neither realistic nor unrealistic 5. Somewhat realistic 6. Realistic 7. Very realistic
Age	Statement/Items: <i>Please state your age:</i> [Open-ended]
Gender	Statement/Items: <i>Please state your gender</i> 1. Male 2. Female 3. Non-binary/third gender Prefer not to say
Debriefing	
AW_R	Statement/Items: <i>Until today, had you ever heard the term reused food packaging before?</i> 1. No 2. Yes
Manipulation check	Statement/Items: <i>To what extent did the text you read focus on...</i> 1. ... the benefits when people participate in a food packaging reuse scheme. 2. ... the threats when people participate in a food packaging reuse scheme. 3. ... how you are affected by food packaging reuse. 4. ... how we are affected by food packaging reuse. Range: 1 (not at all) – 7 (Extremely

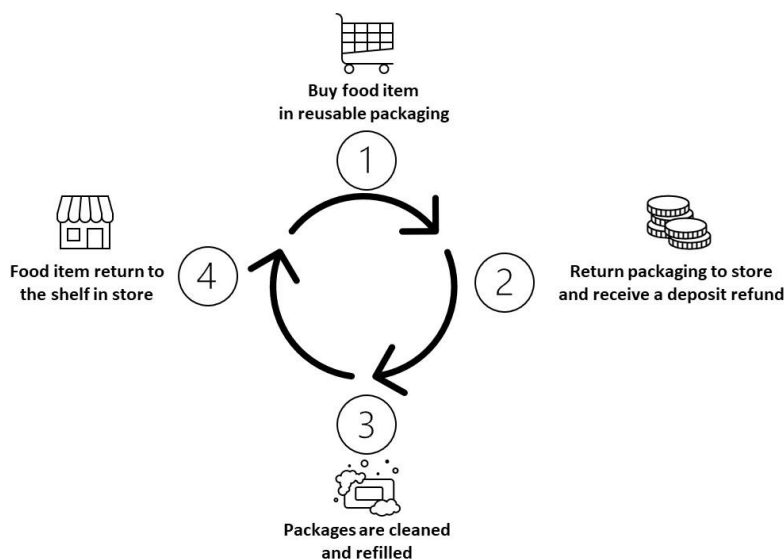
A6. Main online study: Questionnaire

Title	Statement
CONSENT	
CONS	CONSENT TO PROCESS PERSONAL DATA In this study, we will ask you to participate in a survey presenting you with information about reusable food packaging. Afterwards, you will be asked about your buying behaviour and preferences in relation to food packaging reuse. Lastly, you will be asked about your background (e.g. age, gender etc.). We would like to inform you that your input to this survey will remain anonymous. By agreeing to participate you give your consent to have your relevant personal data collected and processed by Aarhus University in Denmark. The research is conducted within the frames of the Horizon Europe project R3PACK (www.R3PACK.EU) and funded by the European Commission. By selecting “I Consent”, I confirm to have read and accepted the terms of the below privacy statement on personal data protection on how Aarhus University ensures the confidentiality of your responses (click here to read it). Besides, I confirm that: A. My participation is voluntary, and I may withdraw my consent at any stage during the survey without stating a reason. I can withdraw my consent by closing the survey, since impartial/incomplete responses will not be registered, will be erased, and not kept for any reason. B. By providing my consent, I do not waive any legal rights or release Aarhus University or its agents from liability for negligence. C. I consent to my responses are analyzed in aggregate and are collectively included in a publication in a scientific journal. • I Consent • I DO NOT Consent
Introduction to reuse	
INFO	Please read the information below <u>carefully</u> This survey is about food packaging reuse, which refers to the practice of using food packaging multiple times, either by refilling or reusing it for its intended purpose. It is among the strategies proposed to reduce single-use food packaging. Reusable food packaging is maintained in a hygienic state through rigorous cleaning processes, often involving hot water, sanitizing agents, or industrial dishwashers. Additionally, quality control measures and material selection aim to ensure that the packaging is resistant to microbial growth and safe for repeated use.

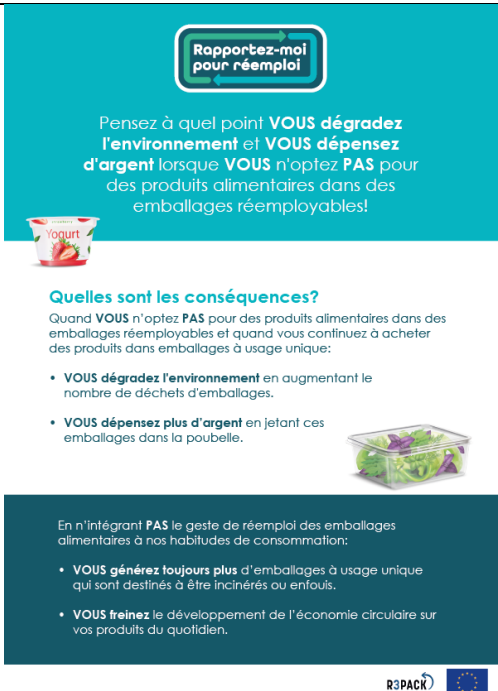
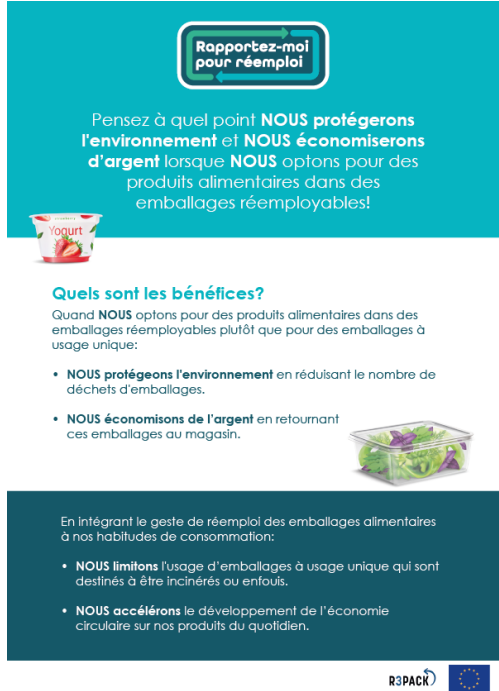
Food packaging reuse should not be confused with recycling. While recycling involves collecting and reprocessing waste materials to create new products, reuse implies that packaging will be used multiple times without being thrown away.

The infographic below presents how a return-on-the-go scheme works.

The infographic below presents how a **return-on-the-go scheme** works.



SCREEN1a	What is food packaging reuse? The practice of using food packaging multiple times The practice of using food packaging once, like single-use packaging	
SCREEN2a	Food packaging reuse is a strategy to... ...reduce single-use packaging ...increase single-use packaging	
SCREEN3a	Food packaging reuse is ensured to be safe and hygienic by... ...rigorous cleaning processes, quality control, and material selection ...ignoring cleaning processes and using any available material for packaging	
Message framing		
Loss / Gain frame	Imagine you see a flyer with the following message:	Imagine you see a flyer with the following message:
Individual level	<u>Loss frame</u>	<u>Gain frame</u>

		
Loss / Gain frame Interpersonal level	Imagine you see a flyer with the following message: <u>Loss frame</u> 	Imagine you see a flyer with the following message: <u>Gain frame</u> 
DV		
Purchase intention (Bashir et al., 2020)	We want to ask you a few questions about buying food products in reusable packaging. After having seen this flyer, how... • Likely are you to buy reusable food packaging	

	1) Highly Unlikely, 2) Unlikely, 3) Somewhat unlikely, 4) Neutral, 5) Somewhat likely, 6) Likely, 7) Highly likely - Inclined are you to buy reusable food packaging 1) Not inclined at all, 2) Not inclined, 3) Somewhat not inclined, 4) Neutral, 5) Somewhat inclined, 6) Inclined, 7) Very inclined - Willing are you to buy reusable food packaging 1) Very unwilling, 2) Unwilling, 3) Somewhat unwilling, 4) Neutral, 5) Somewhat willing, 6) Willing, 7) Very willing
RETURN	We want to ask you a few questions about returning reusable food packaging to drop off points. After having seen this flyer, how... - Likely are you to return reused food packaging 1) Highly Unlikely, 2) Unlikely, 3) Somewhat unlikely, 4) Neutral, 5) Somewhat likely, 6) Likely, 7) Highly likely - Inclined are you to return reused food packaging 1) Not inclined at all, 2) Not inclined, 3) Somewhat not inclined, 4) Neutral, 5) Somewhat inclined, 6) Inclined, 7) Very inclined - Willing are you to return reused food packaging 1) Very unwilling, 2) Unwilling, 3) Somewhat unwilling, 4) Neutral, 5) Somewhat willing, 6) Willing, 7) Very willing USE LIKELIHOOD SCALE (1 = NOT LIKELY AT ALL; 7 = VERY LIKELY)
Mediators	
ENGAGEMENT (adapted from Bruner, 2009; Lee et al., 2010; Mathmann et al., 2017)	Please indicate to what extent you felt the following while reading the flyer: - Involved - Motivated - interested - Important - Relevant Not at all, Very little, Somewhat, Moderately, Quite a bit, A lot, Extremely Range: 1 = not at all; 7 = extremely
EMOTION (adapted from Watson et al., 1988)	To what extent do the following emotions describe how you feel after reading the flyer: - Bad, Good - Upset, Happy - Jittery, Comfortable - Bored, Excited Range: 7-point bipolar
Attitude	After reading the flyer, how do you feel about food packaging reuse? - very unfavorable, very favorable - negative, positive - dis-likable, likable
RESPONSIBILITY	After reading the flyer, to what extent do you agree with the following statements?

	Individuals/ consumers are primarily responsible for reducing single-use packaging waste. Retailers are primarily responsible for reducing single-use packaging in their products. Manufacturers are primarily responsible for reducing single-use packaging by developing and promoting sustainable packaging alternatives. Strongly disagree, Disagree, Somewhat disagree, Neither agree nor disagree, Somewhat agree, Agree, Strongly agree.
Covariates	
VALUES	Below, you will find a list of values. Behind each value there is a short explanation concerning the meaning of the value. Please rate how important each value is for you AS A GUIDING PRINCIPLE IN YOUR LIFE.” • EQUALITY: equal opportunity for all. • RESPECTING THE EARTH: harmony with other species. • SOCIAL POWER: control over others, dominance. • PLEASURE: joy, gratification of desires. • UNITY WITH NATURE: fitting into nature. • A WORLD AT PEACE: free of war and conflict. • WEALTH: material possessions, money. • AUTHORITY: the right to lead or command • SOCIAL JUSTICE: correcting injustice, care for the weak. • ENJOYING LIFE: enjoying food, sex, leisure, etc. • PROTECTING THE ENVIRONMENT: preserving nature • INFLUENTIAL: having an impact on people and events. • HELPFUL: working for the welfare of others. • PREVENTING POLLUTION: protecting natural resources. • SELF-INDULGENT: doing pleasant things. • AMBITIOUS: hard working, aspiring. -1 = Opposed to my value, 0 = Not important, 1....5, 6 = Very important, 7 = Of supreme importance
REGULARITY (Higgins et al. 2001)	This set of questions asks you HOW FREQUENTLY specific events actually occur or have occurred in your life. Please indicate your answer to each question by circling the appropriate number below it. • Compared to most people, are you typically unable to get what you want out of life? • Growing up, would you ever “cross the line” by doing things that your parents would not tolerate? • How often have you accomplished things that got you “psyched” to work even harder? • Did you get on your parents’ nerves often when you were growing up? • How often did you obey rules and regulations that were established by your parents? • Growing up, did you ever act in ways that your parents thought were objectionable? • Do you often do well at different things that you try? • Not being careful enough has gotten me into trouble at times. • When it comes to achieving things that are important to me, I find that I don’t perform as well as I ideally would like to do. • I feel like I have made progress toward being successful in my life. • I have found very few hobbies or activities in my life that capture my interest or motivate me to put effort into them.

	Range: 1-5
Socio-demographic	
Age	How old are you?
Gender	What is your gender? • Male • Female • Non-binary • Prefer not to say
Debriefing	
AW_R	Until today, had you ever heard the term reusable food packaging before? 1=No 2=Yes
Manipulation check	To what extent did the flyer you read focus on... ... the benefits when people participate in a food packaging reuse scheme. ...the threats when people do not participate in a food packaging reuse scheme. ... how you are affected by single-use/ reused packaging? ...how we are affected by single-use / reused packaging? <i>Not at all, very little, somewhat, moderately, quite a bit, very much, extremely</i>
MC1	
MC2	When reading the flyer to what extent were... ... your thoughts focused on you ... your thoughts focused on your friends and family Not at all, very little, somewhat, moderately, quite a bit, very much, extremely
Realism	How realistic did you find the flyer you read about reused food packaging” 1. Very unrealistic 2. Unrealistic 3. Somewhat unrealistic 4. Neither realistic nor unrealistic 5. Somewhat realistic 6. Realistic 7. Very realistic
Thoughts	Do you have any thoughts or any suggestions about the survey and/or food packaging reuse, that you would like to share?

A7. Field experiment (T2.4) and intervention study (T2.6): Leaflets

NOUS PRÉSERVONS L'ENVIRONNEMENT
Lorsque nous choisissons le réemploi des emballages

Les bénéfices ?

Quand **NOUS** optons pour des emballages consignés, **NOUS** réduisons notre dépendance aux plastiques à usage unique, limitant ainsi notre impact sur la planète.

Ensemble, **NOUS** réduisons la pollution qui menace la biodiversité et notre santé, et **NOUS** montrons qu'un modèle de consommation durable est possible.

Un geste simple & puissant

En ramenant nos emballages à la borne de collecte, **NOUS** récupérons notre consigne selon l'option de notre choix.*

Participez à notre enquête

Répondez à notre enquête sur les emballages consignés et tentez de gagner un **BON D'ACHAT** de 150 €.



* Bon d'achat, remboursement par carte bleue ou don à une association.

R3PACK

Gain frame and interdependent self-construal level "WE"

VOUS PRÉSERVEZ L'ENVIRONNEMENT
Lorsque vous choisissez le réemploi des emballages

Les bénéfices ?

Quand **VOUS** optez pour des emballages consignés, **VOUS** réduisez votre dépendance aux plastiques à usage unique, limitant ainsi votre impact sur la planète.

Ensemble, **VOUS** réduisez la pollution qui menace la biodiversité et votre santé, et **VOUS** montrez qu'un modèle de consommation durable est possible.

Un geste simple & puissant

En ramenant vos emballages à la borne de collecte, **VOUS** récupérez votre consigne selon l'option de votre choix.*

Participez à notre enquête

Répondez à notre enquête sur les emballages consignés et tentez de gagner un **BON D'ACHAT** de 150 €.



* Bon d'achat, remboursement par carte bleue ou don à une association.

R3PACK

Gain frame and independent self-construal level "YOU"

A8. Field experiment (T2.4) and intervention study (T2.6): Banners

NOUS PRÉSERVONS L'ENVIRONNEMENT
Lorsque nous choisissons le réemploi des emballages

Les bénéfices

Moins de plastique à usage unique
En optant pour des emballages consignés, **NOUS** réalisons des économies de ressources et d'énergie, en évitant la fabrication d'un nouvel emballage.

Moins de pollution
Ensemble, **NOUS** réduisons la pollution qui menace la biodiversité et notre santé, en limitant les déchets.

Un geste simple

La consigne le retour gagnant
En ramenant nos emballages à la borne de collecte, **NOUS** récupérons notre consigne.*

Participez à notre enquête

Et tentez de remporter un bon d'achat de 150€



* Bon d'achat, remboursement par carte bleue ou don à une association.

R3PACK

Gain frame and interdependent self-construal level “WE”

VOUS PRÉSERVEZ L'ENVIRONNEMENT
Lorsque vous choisissez le réemploi des emballages

Les bénéfices

Moins de plastique à usage unique
En optant pour des emballages consignés, **VOUS** réalisez des économies de ressources et d'énergie, en évitant la fabrication d'un nouvel emballage.

Moins de pollution
Ensemble, **VOUS** réduisez la pollution qui menace la biodiversité et votre santé, en limitant les déchets.

Un geste simple

La consigne le retour gagnant
En ramenant vos emballages à la borne de collecte, **VOUS** récupérez votre consigne.*

Participez à notre enquête

Et tentez de remporter un bon d'achat de 150€

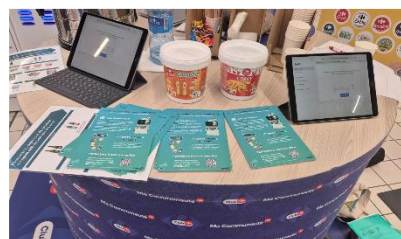


* Bon d'achat, remboursement par carte bleue ou don à une association.

R3PACK

Gain frame and independent self-construal level “YOU”

A9. Field experiment (T2.4) and intervention study (T2.6): setup photos



Field experiment and intervention study setup at Carrefour Besancon Valentin



Field experiment and intervention study setup at Carrefour Besancon Chalezeule

A10. Intervention study: Households recruitment questionnaire (wave 0)

Section 1: Informed consent	
CONSENT TO PROCESS PERSONAL DATA In this study, we will ask you to participate in a survey asking your opinion about the in-store campaign about reusable food packaging. We would like to inform you that your input to this survey will remain anonymous. By agreeing to participate you give your consent to have your relevant personal data collected and processed by Aarhus University in Denmark. The research is conducted within the frames of the Horizon Europe project R3PACK (www.R3PACK.EU) and funded by the European Commission. By selecting “I consent”, I confirm to have read and accepted the terms of the privacy statement on personal data protection on how Aarhus University ensures the confidentiality of your responses (click here to read it). Besides, I confirm that: A. My participation is voluntary, and I may withdraw my consent at any stage during the survey without stating a reason. I can withdraw my consent by closing the survey, since impartial/incomplete responses will not be registered, will be erased, and not kept for any reason. B. By providing my consent, I do not waive any legal rights or release Aarhus University or its agents from liability for negligence. C. I consent to my responses are analyzed in aggregate and are collectively included in a publication in a scientific journal. ☐ I consent ☐ I DO NOT consent	
Section 2: « Rapportez-moi pour réemploi » reuse initiative	
Awareness of reusable food packaging AW-Reuse	Statement/Items: “Have you ever heard of the term “reusable food packaging” before today” 1.No 2.Yes
Awareness of in-store reuse campaign Logo-Initiative AW-Initiative	Statement/Items: The logos below “Rapportez-moi pour réemploi” represent an in-store initiative aimed at encouraging the purchase of food products in reusable packaging. After use, you can return the packaging to the store and collect a deposit.    “Have you noticed the in-store initiative promoting reusable food packaging in the grocery store you do your groceries?”

	1.No 2.Yes
Reuse Campaign Insights Insights-Initiative	Statement/Items: If the answer to the previous question is yes (to be programmed) then answer this question... If the answer to the previous question is no, then pass to the next question... “What is your opinion of “Rapportez-moi pour réemploi”?” 1.Negative 2.Neutral 3.Positive
Products-Photo	Statement/Items: “The picture below shows some available food products in reusable packaging (or that will be soon available) in the store” 
R3PACK specific products purchase Products-Purchase	Statement/Items: “Have you purchased any of these food products that come in reusable packaging from the store?” 1.No 2.Yes
Shops	Which store(s) from the list below did you purchase food products in reusable packaging (the ones you saw in the previous image)? • Intermarché • Auchan Supermarché • Carrefour • Super U • Lidl • Aldi

	• Monoprix • SPAR • Franprix • Netto • E.Leclerc
Returning reusable packaging Products-Return	If the answer to having bought any product is yes (to be programmed) then answer this question... If the answer to having bought any product is No (to be programmed) then pass to flyer-intro Statement/Items: “Have you returned any reusable food packaging to the store?” 1.No 2.Yes
Experience with returning reusable packaging Exp-Return	Statement/Items: If the answer to the previous question is yes, then answer this question... If the answer to having bought any product is No (to be programmed) then pass to flyer-intro “How satisfied are you with your experience using the “Rapportez-moi pour réemploi” return system at the store?” 1 = Dissatisfied 2 = Neutral 3 = Satisfied
Deposit Return-Deposit	How do you find the extra amount paid as a deposit before getting your refund? 1 = Expensive 2 = Neutral 3 = Insignificant
Flyer-intro	Please take a moment to read the following flyer
Gain-WE Gain-YOU Ps: Gain-WE flyer will be shown in a different survey that Gain-YOU flyer	 

Purchase Intention (Bashir et al., 2020) PI1 PI2 PI3	We want to ask you a few questions about buying food products in reusable packaging . After seeing the flyer... How likely are you to buy reusable food packaging? 1)Highly unlikely, 2) Unlikely, 3) Somewhat unlikely, 4) Neutral, 5) Somewhat likely, 6) Likely, 7) Highly likely How inclined are you to buy reusable food packaging? 1)Not inclined at all, 2) Not inclined, 3) Somewhat not inclined, 4) Neutral, 5) Somewhat inclined, 6) Inclined, 7) Very inclined How willing are you to buy reusable food packaging? 1)Very unwilling, 2) Unwilling, 3) Somewhat unwilling, 4) Neutral, 5) Somewhat willing, 6) Willing, 7) Very willing
Return Likelihood RL1 RL2 RL3	We want to ask you a few questions about returning reusable food packaging to drop off points. After seeing the flyer... How likely are you to return reusable food packaging? 1)Highly Unlikely, 2) Unlikely, 3) Somewhat unlikely, 4) Neutral, 5) Somewhat likely, 6) Likely, 7) Highly likely How inclined are you to return reusable food packaging? 1)Not inclined at all, 2) Not inclined, 3) Somewhat not inclined, 4) Neutral, 5) Somewhat inclined, 6) Inclined, 7) Very inclined How willing are you to return reusable food packaging? 1)Very unwilling, 2) Unwilling, 3) Somewhat unwilling, 4) Neutral, 5) Somewhat willing, 6) Willing, 7) Very willing
Attitude (Ertz, M. et al., 2017) ATT	Statement/Items: “When considering food packaging reuse, do you think that it is”: • Bad idea / Good idea • Bad for the environment/Good for the environment - Unhygienic/ Hygienic - Requiring a lot of effort/ Requiring low effort - Inconvenient in use /Convenient in use - Saving no resources / Saving a lot of resources - Worse than recycling Better than recycling - Not the right thing to do / The right thing to do Range: Bipolar (1-7)
Section 3. Background characteristics and socio-demographic	
Gender Gen	Statement/Items: “What is your gender?” 1.Male 2.Female 3.Non-binary 4. Prefer not to say
AGE Age	Statement/Items: “How old are you?”

Postal code ZIPCODE	“What is the postal code of your town?”
Section4. Debriefing	
Email Email-Prize	Thank you for taking the time to participate in our survey. Your responses have provided valuable insights into our in-store reuse initiative. As a token of our appreciation, you will be entered into a draw for a chance to win a €150 voucher. If you are interested in participating, please provide your email address below: <i>Email Address:</i> _____
Section5. Participation in follow-up surveys	
Participation in follow-up surveys Info-follow-up	Before ending this survey, we would like to ask you would be interested in participating in a follow-up study. To complete this study, you will answer a few questions in two surveys (5-6 minutes long each) in a link that will be sent to your email address across two weeks. As a token of our appreciation, those who complete both surveys will receive a €10 gift card from Carrefour.
Follow-up	Would you like to participate in the two follow-up surveys? 1.No 2.Yes <i>If the answer to participating to the two follow-up surveys is No (to be programmed) then skip next question</i>
Email	If you are interested in participating in the follow-up studies, please provide your email address below: <i>Email Address:</i> _____
Thoughts	If you have any questions/thoughts or need further information, please feel free to write them below. Thank you once again for your participation!

A11. Intervention study: Follow-up 1 questionnaire (wave 1)

Section 1: Informed consent		
CONSENT TO PROCESS PERSONAL DATA In this study, we will ask you to participate in a follow-up survey asking you about your experience in purchasing food products in reusable food packaging and your opinion about fiber-based packaging as an alternative sustainable food packaging. We would like to inform you that your input to this survey will remain anonymous. By agreeing to participate you give your consent to have your relevant personal data collected and processed by Aarhus University in Denmark. The research is conducted within the frames of the Horizon Europe project R3PACK (www.R3PACK.EU) and funded by the European Commission. By selecting “I consent”, I confirm to have read and accepted the terms of the privacy statement on personal data protection on how Aarhus University ensures the confidentiality of your responses (click here to read it). Besides, I confirm that: A. My participation is voluntary, and I may withdraw my consent at any stage during the survey without stating a reason. I can withdraw my consent by closing the survey, since impartial/incomplete responses will not be registered, will be erased, and not kept for any reason. B. By providing my consent, I do not waive any legal rights or release Aarhus University or its agents from liability for negligence. C. I consent to my responses are analyzed in aggregate and are collectively included in a publication in a scientific journal. D. I am above 18 years old. ☐ I consent ☐ I DO NOT consent		
Section 2: Adoption of purchasing and returning reusable food packaging		
Gain frame/ construal level	Gain-WE	Gain-YOU
Gain-WE Gain-YOU Ps: Gain-WE flyer will be shown in a different survey that Gain-YOU flyer		

Purchase intention (Bashir et al., 2020) PI1 PI2 PI3	Statement/Items: We want to ask you a few questions about buying food products in reusable packaging. “After seeing the flyer...” How likely are you to buy reusable food packaging? 1)Highly Unlikely, 2) Unlikely, 3) Somewhat unlikely, 4) Neutral, 5) Somewhat likely, 6) Likely, 7) Highly likely “After seeing the flyer...” How inclined are you to buy reusable food packaging? 1)Not inclined at all, 2) Not inclined, 3) Somewhat not inclined, 4) Neutral, 5) Somewhat inclined, 6) Inclined, 7) Very inclined “After seeing the flyer...” How willing are you to buy reusable food packaging? 1)Very unwilling, 2) Unwilling, 3) Somewhat unwilling, 4) Neutral, 5) Somewhat willing, 6) Willing, 7) Very willing
Return Likelihood RL1 RL2 RL3	Statement/Items: We want to ask you a few questions about returning reusable food packaging to drop off points. “After seeing the flyer...” How likely are you to return reusable food packaging? 1)Highly Unlikely, 2) Unlikely, 3) Somewhat unlikely, 4) Neutral, 5) Somewhat likely, 6) Likely, 7) Highly likely “After seeing the flyer...” How inclined are you to return reusable food packaging? 1)Not inclined at all, 2) Not inclined, 3) Somewhat not inclined, 4) Neutral, 5) Somewhat inclined, 6) Inclined, 7) Very inclined “After seeing the flyer...” How willing are you to return reusable food packaging? 1)Very unwilling, 2) Unwilling, 3) Somewhat unwilling, 4) Neutral, 5) Somewhat willing, 6) Willing, 7) Very willing
	The following picture shows food products in reusable packaging that are currently <u>available</u> at Carrefour stores.

	
	Have you bought any food product in reusable packaging from the picture shown previously? 1.No 2.Yes
Purchase of food products in reusable packaging from R3PACK partners' brands	The following list shows food products that are currently <u>available</u> at Carrefour stores, could you please indicate which specific product(s) in reusable packaging, among the following list you purchased? Crackster Original Carrefour Classic Croustiz Gout Smaak Emmental-Emmentaler Carrefour Sensation Craky Cachuete Pinda Carrefour Classic Salade pasta poulet comté SODEBO 250g
PP	   
Experience with reusable packaging Exp-Purchase	Statement/Items: “Overall, how satisfied are you with your experience purchasing food products in reusable packaging?” 1 =Dissatisfied, 2 = Neutral, 3 = Satisfied
Preference of food packaging Preference	Statement/Items: “Are you planning to keep buying these products in reusable packaging in the future or will you switch to the single used packaging?” 1= No, I will switch to single-used packaging 2 = Yes, I will keep buying the products in reusable packaging
Purchase of food products in reusable packaging from R3PACK	Statement/Items: “The following list shows food products in reusable packaging that will be available at Carrefour stores in the coming weeks. Which of these products are you most likely to purchase in reusable packaging?” >> List of products:

partners' brands PP	Chips BRETTS La Craquante seau 250g Crackster Original Carrefour Classic Croustiz Gout Smaak Emmental-Emmentaler Carrefour Sensation Craky Cachuete Pinda Carrefour Classic Cidre Loic Raison Doux Fruité 75cL Cidre Loic Raison Brut Intense 75cL Les Crudettes -Salade Parisienne Jambon Emmental- 250g Wok fondant 250g Florette Wok maraîcher 250 g Florette Mayonnaise fine et douce LESIEUR 475g Huile d'olive PUGET 25cl Maison Guiot Sirop de Menthe Verte 70cl Maison Guiot Sirop de Grenadine 70cl Fromage Frais Nature 0% 500 BIO Fromage Frais Nature 3.2% 500 BIO RIANS-Fromage blanc de campagne 6,8% 2kg Salade Pasta Poulet Comté SODEBO 250g None of these products
	      

							
				None of these products			
Deposit Deposit	Statement/Items: “How do you perceive the deposit ammount each product (as shown in the image), before getting the refund back?” Scale: 1=Unfair, 2=Neutral. 3= Fair Ps: The picture in the survey are clear and the deposit is well shown.						
	 80cts	 50cts	 20cts	 50cts	 30cts	 50cts	 30cts
	 80cts						
Returning reusable packaging Return	Statement/Items: “Have you returned any reusable food packaging to the store?” 1.No 2.Yes						
Experience with returning reusable packaging	Statement/Items: If the answer to the previous question is yes, then answer this question... If the answer to the previous question is no, then answer the next question...						

Exp-Return	“How satisfied are you with your experience using the "Rapportez-moi pour réemploi" return system at the store?” 1 =Dissatisfied, 2 = Neutral, 3 = Satisfied
Frequency of returning packaging Frequency -Return	Statement/Items: “If you were to return the reusable packaging to the RVM machine, when would you most likely do it?” 1. When I go grocery shopping (as part of my regular trip) 2. On a separate trip specifically to return the packaging 3. I’m not sure yet 4. I would not return the packaging
Section 3. Background characteristics and socio-demographic	
Age Age	Statement/Items: “How old are you”
Marital status Marital	What is your marital status? 1.Single 2.Married 3.Cohabiting 4.Divorced 5.Widowed
Education Education	What is your education level? 1.Primary school 2. Middle school 3.High school 3.Technical qualification (after high school) 4.Undergraduate higher education 5.Graduate degree or posterior
Distance Distance	What is the distance between your house and the store you usually shop from in km?
Household Number-House	How many people live in your household?
Debriefing	
Second follow-up Follow-up2	Thank you for participating in our follow-up survey! As mentioned at the end of our first survey, we would like to invite you to a second follow-up survey next week. This will allow us to collect more detailed feedback about your experience with reusable packaging and your overall satisfaction. Your insights are invaluable in helping us understand and improve sustainable packaging options. We will send you a link to the second survey via email. Thank you for keeping an eye on your mailbox and taking a few moments to share your thoughts.

Thoughts	If you have any questions/thoughts or need further information, please feel free to write them below. Thank you once again for your contribution!
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A12. Intervention study: Follow-up 2 questionnaire (wave 2)

Section 1: Informed consent		
CONSENT TO PROCESS PERSONAL DATA we will ask you to participate in the second and last follow-up survey asking you about your experience in purchasing food products in reusable food products as well as the return of reusable packaging. We would like to inform you that your input to this survey will remain anonymous. By agreeing to participate you give your consent to have your relevant personal data collected and processed by Aarhus University in Denmark. The research is conducted within the frames of the Horizon Europe project R3PACK (www.R3PACK.EU) and funded by the European Commission. By selecting “I consent”, I confirm to have read and accepted the terms of the privacy statement on personal data protection on how Aarhus University ensures the confidentiality of your responses (click here to read it). Besides, I confirm that: A. My participation is voluntary, and I may withdraw my consent at any stage during the survey without stating a reason. I can withdraw my consent by closing the survey, since impartial/incomplete responses will not be registered, will be erased, and not kept for any reason. B. By providing my consent, I do not waive any legal rights or release Aarhus University or its agents from liability for negligence. C. I consent to my responses are analyzed in aggregate and are collectively included in a publication in a scientific journal. D. I am above 18 years old. ☐ I consent ☐ I DO NOT consent		
Section 2: Adoption of purchasing and retuning reusable food packaging		
Gain frame/ construal level	Gain-WE	Gain-YOU
Gain-WE Gain-YOU Ps: Gain-WE flyer will be shown in a different survey that Gain-YOU flyer		

Purchase intention (Bashir et al., 2020) PI1 PI2 PI3	Statement/Items: We want to ask you a few questions about buying food products in reusable packaging. “After seeing the flyer...” How likely are you to buy reusable food packaging? 1)Highly Unlikely, 2) Unlikely, 3) Somewhat unlikely, 4) Neutral, 5) Somewhat likely, 6) Likely, 7) Highly likely “After seeing the flyer...” How inclined are you to buy reusable food packaging? 1)Not inclined at all, 2) Not inclined, 3) Somewhat not inclined, 4) Neutral, 5) Somewhat inclined, 6) Inclined, 7) Very inclined “After seeing the flyer...” How willing are you to buy reusable food packaging? 1)Very unwilling, 2) Unwilling, 3) Somewhat unwilling, 4) Neutral, 5) Somewhat willing, 6) Willing, 7) Very willing
Return Likelihood RL1 RL2 RL3	Statement/Items: We want to ask you a few questions about returning reusable food packaging to drop off points. “After seeing the flyer...” How likely are you to return reusable food packaging? 1)Highly Unlikely, 2) Unlikely, 3) Somewhat unlikely, 4) Neutral, 5) Somewhat likely, 6) Likely, 7) Highly likely “After seeing the flyer...” How inclined are you to return reusable food packaging? 1)Not inclined at all, 2) Not inclined, 3) Somewhat not inclined, 4) Neutral, 5) Somewhat inclined, 6) Inclined, 7) Very inclined “After seeing the flyer...” How willing are you to return reusable food packaging? 1)Very unwilling, 2) Unwilling, 3) Somewhat unwilling, 4) Neutral, 5) Somewhat willing, 6) Willing, 7) Very willing
	The following picture shows food products in reusable packaging that are currently available at Carrefour stores.

	
	Have you bought any food product in <u>reusable packaging</u> from the picture shown previously? 1.No 2.Yes
Purchase of food products in reusable packaging from R3PACK partners' brands Products-Purchase	Statement/Items: “Could you please indicate which specific product(s) in <u>reusable packaging</u>, among the following list you purchased?” >> List of products: Crackster Original Carrefour Classic Croustiz Gout Smaak Emmental-Emmentaler Carrefour Sensation Craky Cachuete Pinda Carrefour Classic Salade pasta poulet comté SODEBO 250g Sirop menthe verte La Maison Guiot verre consigné 70cL Sirop grenadine La Maison Guiot verre consigné 70cL Fromage frais BIO 0% 500G Fromage frais BIO 3.2% MG 500G Wok fondant de légumes Florette Wok maraîcher Fraîcheur Florette

							
							
Experience with reusable packaging Exp-Purchase	Statement/Items: “Overall, how satisfied are you with your experience purchasing food products in reusable packaging?” 1 =Dissatisfied, 2 = Neutral, 3 = Satisfied						
Preference of food packaging Preference	Statement/Items: “Are you planning to keep buying these products in reusable packaging in the future or will you switch to the single used packaging?” 1= No, I will switch to single-used packaging 2 = Yes, I will keep buying the products in reusable packaging						
Returning reusable packaging Return	Statement/Items: “Have you returned any reusable food packaging to the store?” 1.No 2.Yes						
Experience with returning reusable packaging Exp-Return	Statement/Items: If the answer to the previous question is yes, then answer this question... If the answer to the previous question is no, then answer the next question... “How satisfied are you with your experience using the "Rapportez-moi pour réemploi" return system at the store?” 1 =Dissatisfied, 2 = Neutral, 3 = Satisfied						
Frequency of returning packaging	Statement/Items: “How often do you plan to return reusable packaging to the store?” 1.Once or more times a week 2. Few times a month						

Frequency -Return	3. Once a month or less frequently
Section 3: Acceptance of Fiber-based packaging	
Introduction	Fiber-based packaging is produced with reusable, renewable, or biodegradable materials. Such materials may include recycled content (such as newspaper and cardboard) or natural fibers such as wood pulp, bamboo, bagasse, and wheat straw. Fiber-based food packaging is used to package a wide range of food products, including fresh and dried foods and beverages.
Awareness of fiber-based packaging	Statement/Items: "Have you heard about “fiber-based packaging” before today?" 1.No 2.Yes
AW-FiberPack	
Purchase intention of fiber-based packaging	Statement/Items: “How likely are you to purchase products in Fiber-based packaging?” 1)Highly Unlikely, 2) Unlikely, 3) Somewhat unlikely, 4) Neutral, 5) Somewhat likely, 6) Likely, 7) Highly likely Range: 1-7 Likert scale (likelihood)
(Bashir et al., 2020)	
PI-Fiber	
Motivators	Best Worst Scaling
(Adaption of Walker et al., 2021)	Statement/Items: "Please list the attribute that would motivate you the MOST to buy food products in fiber-based packaging and the attribute that would motivate you the LEAST”
Best-worst1	
Best-worst2	List of attributes
Best-worst3	1.Environmental concerns (e.g. reducing waste, pollution)
Best-worst4	2.Cost savings
Best-worst5	3.Food safety concerns
Best-worst6	4.Taxes or fees on single-use packaging
Best-worst7	5.Quality of the packaging
	6.Functionality of the packaging
	7. Social influence (e.g. what others do or think is the right thing to do)
	Design is a Balanced Incomplete Block Design (7,7,3). Each question will present in a systematic order 3 of these attributes, in seven sets of questions.
	The design used is a Balanced Incomplete Block Design of seven attributes (7, 7, 3).
	Set V1 V2 V3
	1 2 4 6
	2 2 3 5

	3 1 2 7 4 1 4 5 5 3 4 7 6 1 3 6 7 5 6 7
Fiber- based packaging and transparency Fiber-transparency	Statement/Items: To date, one of the advantages of plastic is its transparency. However, for paper-based packaging, this characteristic cannot be achieved. We would like to understand whether you would be willing to buy products (e.g., prepared salad, shredded cheese) in non-transparent paper-based packaging like opaque fiber-based packaging or translucent fiber-based packaging. In the example provided in the photo we see spinach salad in opaque fiber-based packaging (left) and translucent fiber-based packaging (right):  How willing you are to buy food products in.... 1)Opaque fiber-based packaging 1) Very unwilling, 2) Unwilling, 3) Somewhat unwilling, 4) Neutral, 5) Somewhat willing, 6) Willing, 7) Very willing 2)translucent fiber-based packaging 1) Very unwilling, 2) Unwilling, 3) Somewhat unwilling, 4) Neutral, 5) Somewhat willing, 6) Willing, 7) Very willing

Section 4. Background characteristics and socio-demographic	
Age Age	Statement/Items: “How old are you”
Marital status Marital	What is your marital status? 1.Single 2.Married 3.Cohabiting 4.Divorced 5.Widowed
Education Education	What is you education level? 1.Primary school 2. Middle school 3.High school 3.Technical qualification (after high school) 4.Undergraduate higher education 5.Graduate degree or posterior
Household Number-House	How many people live in your household?
Debriefing	
End of survey	Thank you for participating in our follow-up survey! As mentioned at the end of our first survey, you are now eligible for €10 gift card from Carrefour . Details will be provided via email. Your insights are invaluable in helping us understand and improve sustainable packaging options.
Thoughts	If you have any questions/thoughts or need further information, please feel free to write them below. Thank you once again for your contribution!