HORIZON-CL6-2021-CIRCBIO-01
Innovative solutions to over-packaging and single-use plastics, and related microplastic pollution (IA)

BUDDIE-PACK

Business-driven systemic solutions for sustainable plastic packaging reuse schemes in mass market applications

Starting date of the project: 01/09/2022
Duration: 42 months

= Deliverable: D2.1 =

Consumer Interaction with Reuse Systems

Due date of deliverable: 31/08/2024
Actual submission date: 05/09/2024

Responsible Work Package: WP2: Social and Behavioural Innovation
Responsible Task Leader: The University of Sheffield (USFD)
Revision: V3.0

Dissemination level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Funded by the European Union

AUTHORS

Author	Institution	Contact (e-mail, phone)
Kristina Diprose	The University of Sheffield	k.diprose@sheffield.ac.uk
Sophie Pott	The University of Sheffield	s.l.pott@sheffield.ac.uk
Rorie Beswick-Parsons	The University of Sheffield	r.parsons@sheffield.ac.uk
Thomas Webb	The University of Sheffield	t.webb@sheffield.ac.uk
Sarah Greenwood	The University of Sheffield	sarah.greenwood@sheffield.ac.uk

DOCUMENT HISTORY

Document version	Date	Change
V1	12/07/2024	
V2	23/07/2024	Initial draft submitted for review by IPC
V3	27/08/2024	Suggestions following review by IPC addressed. Executive Summary completed and table of contents added. Sent for review by full WP2 team on 16/08/2024 and final edits made by USFD on 27/08/24.

DOCUMENT APPROVAL

Reviewers		Validation date
Work Package Leader	Thomas Webb	27/08/2024
Coordinator	Marie Ranchon	27/08/2024

DOCUMENT DATA

Keywords	Consumers, behaviour, uptake, engagement
Point of Contact	Name: Professor Thomas Webb Partner: University of Sheffield (USFD) Address: School of Psychology, ICOSS Building The University of Sheffield 219 Portobello, Broomhall Sheffield, S1 4DP E-mail: t.webb@sheffield.ac.uk
Delivery date	05/09/2024

DISCLAIMER

Funded by the European Union, with the contributions of the UK partners (University of Sheffield and Echo Brand Design) underwritten by Innovate UK via UKRI. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them

Acronym description

GA	Grant Agreement
WP	Work Package

Executive Summary

People are central to the success of reuse systems. Robust, hygienic, and functional reusable packaging such as that being developed within the Buddie-Pack project will only positively affect environmental outcomes relative to single use alternatives if consumers buy products in reusable packaging and return that packaging so that it can be used again. This deliverable therefore considers how consumers interact with current reuse systems and identifies factors that influence whether and how they reuse packaging and containers.

We approach this question by conducting a rapid review of existing evidence on factors that affect consumer interaction with reuse systems. This review identified 17 factors, which are summarised in Table 2.1. We then use the ethnographic research conducted as part of Task 2.1 and the psychological research conducted as part of Task 2.2 to complement and extend our understanding of these factors. To summarise, we identify the following key insights and recommendations, with each factor considered in turn.

Access and availability: Opportunities to purchase products in reusable containers are currently limited to trial locations and independent options, placing a significant onus on citizens to travel further to access them. This has costs, both for the environmental impact of the system and in terms of convenience to individuals. Scaling up reuse systems by increasing access, availability, and interoperability, including online delivery services, would unlock new opportunities for citizen engagement.

Awareness: Offering a reuse option in itself does not guarantee engagement, nor should it be assumed that the environmental benefits - in comparison to more long-standing packaging alternatives (e.g., recycling and repurposing) - are understood. Our research suggests awareness of the opportunity to reuse is likely important, but information on the environmental benefits of reuse systems, while nice to have, does not necessarily drive engagement.

Communication: The actions required to reuse packaging and containers (e.g., downloading an app, scanning packaging once returned) are often new to consumers and so businesses should clearly communicate what is required. Communication around the relative costs of different product delivery systems (see 4.6 Cost) means that businesses also need to clearly articulate the financial benefits of reuse and make price comparisons straightforward at refill stations.

Competencies: Systems of reuse require tasks and work on the citizens behalf, with different reuse systems requiring different competencies Whilst these actions are to some extent already familiar and intuitive in domestic settings, being required to practise these according to more formalised processes in mainstream retail settings - in the case of refill - can create barriers to engagement. When things did go wrong, staff were not always available to assist. Instead, participants would either attempt to muddle through or rely on more experienced customers by watching and/or asking them for assistance.

Convenience: In comparison to recycling, returnable packaging potentially requires less effort and worry, by removing issues of having to know how and where to recycle some materials. Furthermore, with respect to return on-the-go items, returnable packaging allowed people to continue to purchase products (e.g. food and drink) spontaneously, as they do when the products are in single-use packaging, while reducing effort when compared to refillable alternatives (e.g. remembering to bring your own container, cleaning packaging).

Cost: Financial penalties and incentives appear to promote engagement with reuse, with some evidence that higher penalties on single use are more effective than smaller penalties and that combining penalties with incentives can promote engagement with return-based reuse systems. However, further research is required as it remains unclear what times and magnitudes of penalties and incentives are effective. In the context of refill-on-

the-go based reuse systems, perceived savings may attract price-conscious consumers, but the prices of refillable versus prepackaged products are sometimes unclear, leading to confusion and potential disengagement.

Demographics: In our rapid review, we identified 6 studies that examined the demographics of people engaging with reuse systems. Some contradictions were discovered, possibly due to the findings being specific to different use cases. Those likely to engage in reuse included; women, men, older people, people under 35, those with young children, live in urban areas, have a higher income, have a high level of education, hybrid workers and those that do online shopping. Our Ethnographic research involved in-depth investigation and analysis and wastherefore conducted on a relatively small sample from which it is inappropriate to generalise. Nevertheless, such research does raise questions on how gender, cultural, religious, and other dietary requirements potentially influence engagement with reuse-based systems.

Environmental attitudes and beliefs: Citizens who engaged with reuse systems approached them through a common-sense environmentalism approach, with reuse generally being deemed better for the environment. However, customers were sceptical about prefilled returnable packaging because they wanted to know more about the environmental costs and benefits. attitudes and beliefs seem to suggest that anti-plastic rhetoric remains consistent even in the context of reuse systems.

Habit: Grocery shopping is often habitual, facilitated by stable and familiar environments (e.g., store layouts) and routines (e.g., common routes around the store, visiting specified aisles, and the writing of shopping lists or favouriting items online). This often reflects the management of everyday life, but also suggests that reuse systems may be easily overlooked. When planning store configurations, we recommend retailers disrupt the cues that trigger established habits to promote engagement. Takeaway food and drink are seen as spontaneous and exceptional purchases, making it harder to integrate returnable packaging into these habits. Simplifying checkout/return processes and offering incentives and/or penalties may help overcome the perception of inconvenience and encourage habit formation.

Hygiene: Plastic packaging is particularly prone to showing signs of wear and tear, such as stains and scratches, which can trigger concerns about contamination. In the context of shared reuse systems, providing information about how containers are cleaned may help to alleviate concerns about hygiene, but our research suggests is unlikely to make consumers more willing to use containers that appear worn or stained. We therefore suggest that reusable containers for food and drink should be made of darker coloured plastic, glass or stainless-steel containers that are less prone to showing signs of wear. We also suggest that those operating reuse systems implement strict visual quality control to ensure that containers showing signs of wear are removed from circulation to maintain consumer confidence in cleanliness and safety.

Packaging design: Consumers often stop using packaging when it shows signs of wear, becomes difficult to clean, or loses functionality. Environmental concerns, particularly the ability to recycle the packaging, also significantly influence consumer decisions. To enhance consumer engagement, it is recommended to; design durable packaging that is easy to maintain, use clear and removable labels, prioritize recyclable materials, and incorporate features that minimize contamination risks, especially in food and beverage products.

Product: Consumers are more likely to engage with reuse systems when familiar brands are available, as this familiarity reduces the perceived risk and increases comfort. However, the risk of trying a new brand (e.g.for people with skin sensitivities) and limited product variety can deter adoption. Retailers should expand the variety of familiar brands available in reusable packaging and provide clear, accessible information about product options. This approach can help integrate reuse systems into consumers' shopping habits by leveraging brand loyalty and addressing concerns about sensitivities.

Reuse type: Consumers have mixed preferences for different types of reuse systems – refill at home, refill on the go, return from home, and return on the go – depending on factors like convenience, cost and personal circumstances. While refilling and repurposing are generally favoured over returning packaging to businesses, the availability and accessibility of these systems significantly influence their usage. Retailers should expand the availability and visibility of reuse options, such as online returns and in-store refills, to accommodate diverse consumer needs and lifestyles.

Social norms: Unfamiliarity with reuse systems, except for some established practices like milk rounds and personal refillable cups, poses a significant barrier for both consumers and retail staff, leading to a default reliance on single-use packaging. To enhance engagement, retailers should prioritise staff training and support, ensuring that employees are well-informed and confident in guiding customers through reuse processes. Increasing the visibility and ease of use of these systems may help disrupt the habit of single-use consumption and encourage wider adoption.

Staff engagement: The effectiveness of reuse systems is closely tied to the knowledge and enthusiasm of staff. Inconsistent training and a lack of formal education on reuse systems can lead to inadequate customer support and a perception of these systems as niche. Retailers should invest in comprehensive staff training on reuse systems, enabling employees to act as ambassadors and educators. Prompting consumers to engage and normalising these systems within the retail environment may help to foster a supportive atmosphere for both staff and customers.

Systemic factors: The success of reuse systems depends on widespread availability, collaboration among brands, and supportive policies. Limited access to reuse options and regulatory measures can hinder consumer participation. Retailers and policymakers should work together to expand the availability of reuse systems across various locations, making them a convenient option for consumers. Implementing supportive regulations, such as incentives for using reusable packaging, can encourage adoption and help integrate these systems into everyday shopping routines.

Technology: The introduction of new technologies in reuse systems, such as self-serve stations and apps, can be a barrier for some consumers, especially when these technologies are unfamiliar or complex. Retailers should simplify technology use in reuse systems, providing clear instructions and ensuring that staff are available to assist. Offering user-friendly and low-tech options can accommodate a broader range of consumers, making it easier for them to adopt reuse habits. Streamlining processes and ensuring the reliability of technology may further support consumer engagement.

Table of Contents

List of Figures and Tables

List of Figures

List of Tables

1. Introduction

Reuse systems enable "the repeated use of a product or component for its intended purpose without significant modification" (Ellen MacArthur Foundation, 2019a), thereby reducing reliance on single-use items that are an inefficient way of using resources and increase plastic waste. For example, instead of buying laundry detergent in a bottle that is disposed of after use (hopefully recycled, but possibly ending up in landfill or - more likely - incinerated for energy recovery), the detergent might be dispensed in a bottle that can be returned when empty and refilled. The potential of reuse systems in mitigating waste and advancing a circular economy is increasingly recognised across various industries (Ellen MacArthur Foundation, 2019a; 2022; Hubbub, 2022; Zero Waste Europe, 2023). Widespread adoption of these systems holds the potential to substantially reduce single-use waste, foster more sustainable consumption patterns and minimise environmental degradation (see Cottafava et al., 2021; Greenwood et al., 2021, for information on the potential environmental impact of reusable packaging systems). Transitioning towards a more sustainable, circular economy of consumption also aligns with European sustainability goals and regulatory measures aimed at curbing the detrimental impacts of single-use plastics (e.g., Revision of the EU's Packaging and Packaging Waste Directive, April 2024). The BUDDIE-PACK project therefore aims to develop and demonstrate sustainable strategies for reusable plastic packaging in the food and cosmetics/personal care sectors.

The success of reuse systems depends on a range of design, material, technical, safety, and economic considerations; as reflected by the multidisciplinary approach and range of partners involved in the Buddie-Pack project. However, people are central to the success of reuse systems. Consumers need to be willing to buy products in reusable packaging - something that potentially involves additional complexity, such as a smartphone app - and engage in the other actions that an effective reuse system requires (e.g., return or refill the packaging, potentially multiple times, Greenwood et al., 2021; Hoseini et al., 2024). This report therefore considers how consumers interact with current reuse systems and identifies factors that influence whether and how they interact. The aim is to use this understanding of current practices to predict how people might respond to the reuse systems being developed within the Buddie-Pack project and, where possible, design them in a way that addresses potential barriers and leverages enablers. For example, if shopping practices are influenced by incentives (e.g., discounts), then these could be leveraged to promote the purchase and return of reusable options.

The report focuses on consumers because their acceptance and participation is crucial for the success of reuse systems. While businesses and other actors also play significant roles, the ultimate success of these systems depends on consumer behaviour. Consumers must be willing to change their habits, understand the benefits and actively participate in reuse practices. Without consumer buy-in, even the best designed reuse systems will fail to achieve their potential. Moreover, consumer-focused strategies can directly influence demand and drive businesses to adopt more sustainable practices. Understanding consumer behaviour and preferences allows us to tailor reuse systems that are user-friendly, convenient and appealing, thereby maximising engagement and effectiveness.

The report and the research that it describes consider a range of reuse practices, including refill. Specifically, our focus aligns with Ellen Macarthur Foundation's (2019b) classification of four main types of consumer-facing reuse models aimed at reducing waste and promoting a circular economy:

- **Refill at Home:** Consumers refill reusable containers at home, typically through subscription services delivering concentrated refills.
- **Refill on the Go:** Consumers bring their reusable containers to stores or refill stations to purchase products in bulk.

- **Return From Home:** Packaging is collected from consumers' homes by a collection service so that it can be cleaned and put back into circulation.
- **Return on the go:** Consumers return empty packaging to designated drop-off points or stores so that it can be cleaned and put back into circulation.

This report begins with a review of academic and grey literature identifying a range of factors that influence consumer interaction with reuse. Following this, we discuss each of these factors in more detail in the context of consumer-focused ethnographic and psychological research conducted as part of the BUDDIE-PACK project. We provide insights into how these factors interplay to shape consumer interaction with reuse, concluding with key findings and their implications for the success of reuse systems.

2. Factors affecting consumer interaction with reuse

Increasing interest in the circular economy is reflected in a growing number of publications on the topics of primary refillable and returnable packaging since the 2010s (Bradley & Corsini, 2023; Du Reitz & Kremel, 2023). Given the recent proliferation of research into reuse, we conducted a rapid review of academic and grey literature (e.g., industry reports and evaluations) published in the past five years, to look at the emerging evidence on factors that affect consumer interaction with reuse. Table 2.1 summarises **17 key factors** identified through this review. A version of this table cross-referenced with specific publications is provided in Annex A. For each factor, we have outlined **barriers** and **enablers** discussed in the literature to present an overview of the obstacles and opportunities for mainstreaming reuse. This includes both factors relating to the initial uptake of reusable packaging, and factors relating to repeated usage.

There is considerable overlap and agreement on factors that influence consumer interaction with reuse systems, though studies differ in their emphasis on individual motivational factors, social context, packaging properties, and reuse infrastructure. For two of the identified factors - demographics and reuse type - there are some apparent contradictions between findings. For these factors, we have referenced individual citations in footnotes. In some cases, this might be explained by studies looking at different aspects of reuse - for instance, early adopters of refillable coffee cups (Nicolau et al. 2022) and of prefilled return on-the-go systems (City to Sea 2023b) could be drawn from different demographic groups, and return on-the-go may be more of a barrier for takeaway customers (Schuermann & Woo 2022) than supermarket shoppers (IGD 2021; Kantar 2021). There is still, however, some inconsistency between studies. This could be an area for future systematic review.

Table 2.1: Summary of factors affecting consumer interaction with reuse identified by review of existing literature

Factor	Barriers	Enablers
Access and availability	Not available where people live or shop; Not designed for user needs, e.g. physical mobility, sensory or age-related access; Consumer uses public transport or cycles (harder to transport)	Availability of reuse systems & packaging; Choice of brands, locations and platforms; Shared distribution and return points; Density, location and flexibility of return points; Inclusive design, e.g. takes into account physical, sensory and age-related access; Consumer car use (easier to transport)
Awareness	Limited awareness of environmental impact; Limited awareness of reusable alternatives	Understanding of environmental benefit; Understanding of cost benefit; Awareness of reusable alternatives; Awareness that packaging is reusable; Awareness of where to return packaging; Information-seeking behaviour
Communication	Greenwashing; Lack of trust in sustainability claims; Lack of trust in influencers	Clear and consistent communication; Positive messaging; Points of sale, display devices and signage; Timely prompts to take action; Reuse nudges on packaging; Marketing campaigns and social media; Reliable messengers

Competencies	Lack of confidence; Lack of knowledge about how reuse works; Inconsistency, e.g. different skills needed for different types of reuse system	Learning how to use reuse systems through experience and being shown what to do; Feeling skilled and capable to engage in reuse
Convenience	Time-consuming; Extra effort; Inconvenient to bring packaging back; Limited home storage space; Messy (e.g. refills, leakage); Packaging that's difficult to transport, store and/or clean	Time-saving or time neutral; Easy to opt-in, use and return; Remove friction points; Saves time sorting and recycling packaging; Packaging that's easy to transport, store and/or clean;
Cost	Higher initial cost; More expensive than single use alternative; Hard to compare reusable and single use price; Too high or low deposit or penalty for non-return	Same price or cheaper than single use; Single use packaging charge; Easy to compare reusable and single use price; Opt-in incentives, e.g. promotions, reusable packaging discount, free reusable packaging; Return incentives, e.g. deposit return scheme, loyalty points, subscription models; Charge for loss or late return
Demographics		Female[1]; Male;[2] Older; higher educated[3]; Younger[4]; Urban[5]; Higher income[6]; Young children at home; online shoppers[7]; Hybrid workers[8]; White ethnicity (willingness to reuse food containers that show signs of previous use)[9]

[1] Escario et al. (2020); Baird et al. (2022)
[2] City to Sea (2023b)
[3] Escario et al. ibid., Nicolau et al. (2022)
[4] City to Sea ibid.; Schuermann & Woo (2022); WRAP (2021)
[5] City to Sea ibid.; WRAP ibid.
[6] City to Sea ibid.; Schuermann & Woo ibid.
[7] WRAP ibid.
[8] City to Sea ibid.
[9] Baird et al. ibid.

Environmental attitudes and beliefs	Scepticism of environmental benefits; Mismatch between perceived and actual sustainability of packaging materials; Belief that recycling is better than reuse; Perception of plastic as problematic; Self-image ('it's not for me'); Low perceived efficacy of own behaviour; Don't feel responsible for reducing waste	Environmental concern; Single use plastic waste concern; Identity proximity (e.g. green self-identity); Frugality and mindfulness; Consumer independence; High perceived efficacy of own behaviour; Belief that it's less waste/more sustainable; Positive emotions associated with reuse; Negative emotions associated with waste; Feel responsible for reducing waste; Personal norms; Perceived goal feasibility; Perceived control over reuse behaviour; Environmental values-based interventions
Habit	Forgetting personal or returnable reusables; Irregular consumption; Spontaneous and to-go consumption; Reticence to try something new; Single use packaging habits from childhood; Used to functionality of single use packaging; Doesn't fit in with routine	Regular consumption; Fits in with routine; Goal-setting interventions; Habit-forming interventions; Feedback on impact of actions
Hygiene	Concern about contamination; Concern about product freshness and safety; Sensitivity to food-related disgust; Type of product, e.g. food, skin contact; Absence of packaging labels and expiry dates; Seeing others touch product or packaging; Perception of food safety regulations e.g. not allowed to bring own container	Reassurance of cleanliness; Perceived freshness of unpackaged goods; Own container rather than shared container
Packaging design	Attractiveness and branding (deters return); Breakage or damage; Bulky or heavy packaging; Material: plastics, flexibles, film, foil; Not recyclable at end of life; Poor functionality, e.g. impractical, difficult to open and close, leaky, not resealable, gets too hot or lets contents go cold quickly; Wear and tear, e.g. discolouration, scratching, staining; Wrong size for preferred quantity	Attractive to use but not keep; Designed to stack, store, and transport; Durable; Lightweight; Looks: clean, like new, quality, reusable, transparent if food contents inside; Material: glass; Recyclable at end of life; Similar or improved functionality to single use, e.g. easy to open and close, thermal, heat-resistant, leakproof, resealable; Right size for preferred quantity

Product	Limited product range; Unfamiliar brands; Product type, e.g. alcohol, meat, poultry, fish; Quality concerns, e.g. freshness; Changes ready-to-eat experience, e.g. humidity, smell, looks different in reusable packaging, can't slice in box	Product variety; Familiar brands; Custom quantity or portion size; Quality control, e.g. can see and choose; Product attributes, e.g. organic, local; Improves ready-to-eat experience, e.g. food better presented or protected
Reuse type	Shared reusable packaging[10]; Refill at home[11]; Refill on-the-go[12]; Return from home[13]; Return on-the-go[14]	Personal reusables; Refill at home; Refill on-the-go; Return from home; Return on-the-go
Social norms	Unfamiliar reuse system or packaging type; Unsure what to do; Embarrassed if things go wrong; Norm conflict (other people aren't doing it); Fear of judgement from social environment; Lack of examples/support from others; Eating outdoors, on-the-go or in large groups	Familiar reuse system or packaging type; Reusable packaging as the default; Single use packaging removed from view; Prominent placement of reuse system; Reuse system look busy and well-used; Feedback about the prevalence of reuse; Trendiness; Peer influence
Staff engagement	Busyness with other tasks; Not available to assist customers; Shared reusables: less willing to serve customers in containers that look used	Ambassadors for reuse; Available to assist customers; Buy-in from delivery staff; Incentives to recruit new users; Training; Personal reusables: willing to serve customers in containers that look used
Systemic factors	Open loop systems, e.g. city-wide	Closed loop systems, e.g. workplace, festival; Collaboration across brands; Upscaling; Remove the choice of single use packaging; Policies, regulations and bans

[10] Baird et al. (2023); Miao et al. (2023)

[11] **Refill at home** a barrier: Kantar Public (2021). Refill at home an enabler: IGD (2021); Greenwood et al. (2021)

[12] **Refill OTG** a barrier: IGD (ibid.); City to Sea (2023b); Refill OTG an enabler: Greenwood et al. (ibid.)

[13] **Return from home** a barrier: Greenwood et al. (ibid.); Return from home an enabler: IGD - for online shoppers (ibid.); Kantar Public (ibid.); Schuermann & Woo (2022)

[14] **Return OTG** a barrier: Greenwood et al. (ibid.); Schuermann & Woo (ibid.); Return OTG an enabler: City to Sea (ibid.); IGD (ibid.); Kantar Public (ibid.)

Technology	Complicated app or QR code process; Digital access, e.g. age or income-related; Digital and mechanical malfunctions	Simple signup and return process; Timely maintenance and repair; Return reminders via email and app alerts.

3. Our research

Our research for BUDDIE-PACK Work Package 2 focussed on consumer interaction with reuse systems through two complementary strands of enquiry:

1. Social research on how consumers interact with existing reuse systems in real life contexts, and
2. Psychological studies that examine factors that influence reuse, such as contamination concerns.

This section gives a brief overview of the research activities in each of these strands and the characteristics of the people and organisations who took part.

3.1 Social research and ethnography

Social research on existing reuse systems included work with consumers who engage in different types of reuse, and with businesses that offer customers the option to use refillable or returnable packaging. We were particularly interested in observing reuse in mainstream retail and hospitality contexts, as specialist zero waste stores have been the subject of previous studies (e.g. Beitzen-Heineke et al,. 2017; Fuentes et al., 2019; Rapp et al., 2017). In practice, however, we found that consumers tended to use a combination of mainstream and specialist retailers. We recruited 15 consumers[15] and 11 outlets to take part in research between May 2023 and February 2024, and we used an ethnographic approach to look at the social contexts in which reuse takes place. Ethnography is widely used in the social and behavioural sciences, and foregrounds the study of people in naturally occurring settings as a way of exploring ordinary activities and their social meanings (Brewer 2003). It typically involves observational research alongside complementary data sources such as interviews and diaries.

Reuse schemes

To observe real life reuse schemes, we identified and made contact with a number of UK businesses that are trialling refillable and/or returnable packaging systems. This resulted in 11 observational visits to different sites, each visit lasting between three and six hours. Access was initially negotiated via reuse scheme coordinators, and each visit was then prearranged with the manager on-site. As **Table 2.1** below illustrates, observations focused on four supermarkets and seven quick service convenience food outlets. Fieldwork involved the researcher as an onlooker, hanging out near a supermarket reuse zone or having coffee near a service counter, to observe what is happening and engage in "ethnographic chats" with staff and customers (Fuentes et al., 2019). These observations and conversations were jotted down in field notes and typed up soon afterwards. Photographs of venue configuration, packaging placement and displays were also taken as an aide-mémoire.

Table 3.1 Overview of observational visits

Business	Reuse system	Sites visited
Supermarket A	Refill on-the-go for dry food goods. Refill at home for household goods. Return on-the-go for household goods and personal care products.	2 large supermarket stores

[15] These individuals are referred to by pseudonyms throughout.

Supermarket B	Refill on-the-go for dry food goods. Return on-the-go for household goods.	2 large supermarket stores
Sustainability pilot scheme	Return on-the-go cup scheme. Return on-the-go or from home takeaway food packaging scheme.	2 independent cafes (cups) 1 kiosk in transport interchange (cups) 1 curry house (takeaway food boxes)
University	Return on-the-go cup and takeaway food packaging scheme.	3 university campus cafes

■ Consumers

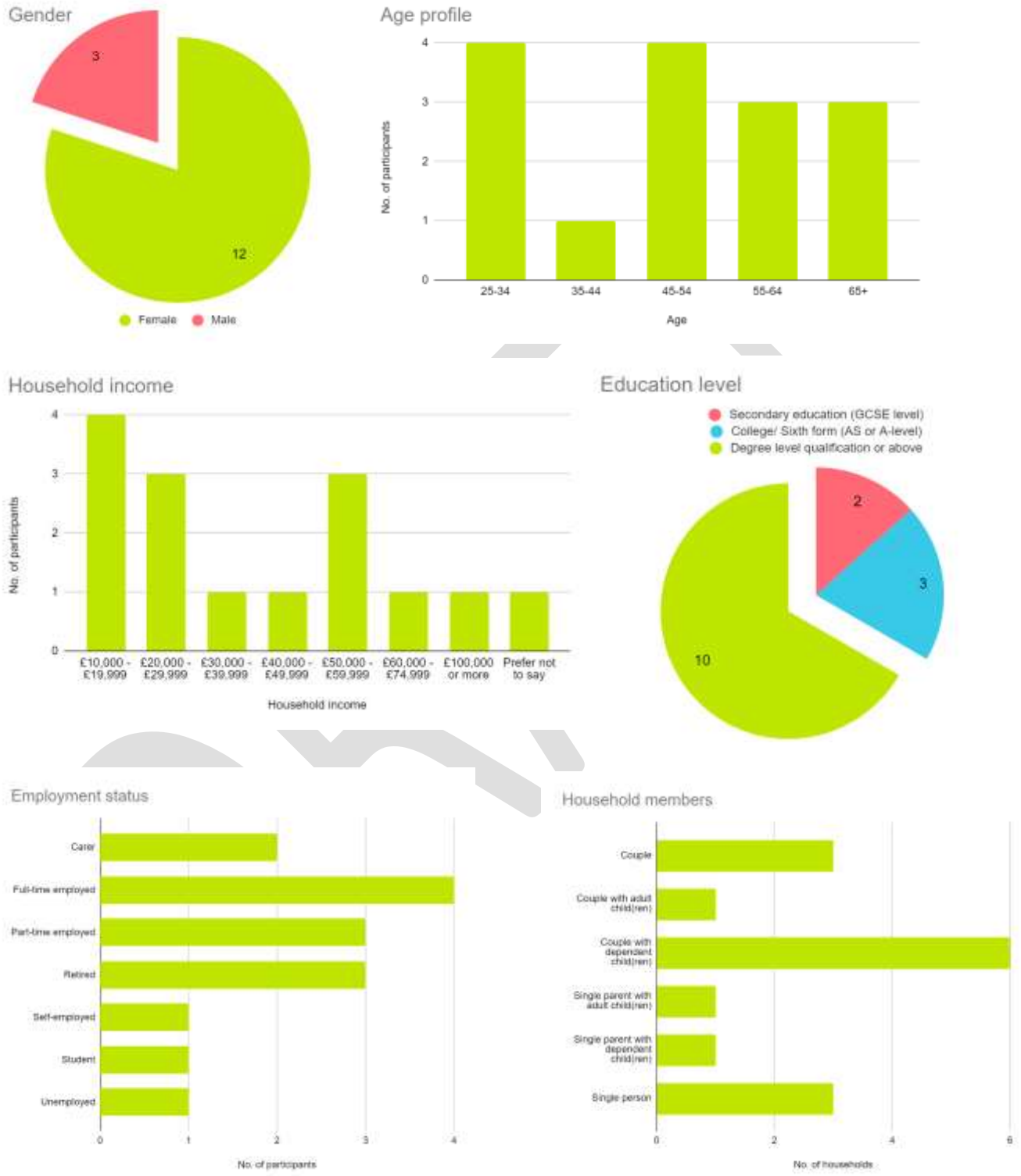
To get a more in-depth picture of how reusable packaging fits in with consumers' everyday lives and routines, we recruited 15 individuals to take part in a four-stage research process, which included:

1. an initial interview about household shopping and packaging use
2. an accompanied shopping trip or unpacking task, if they shopped online
3. keeping a packaging diary for a week over WhatsApp or email, with a minimum of five entries per day
4. a wrap-up interview to discuss their packaging diary

Participants were recruited via leafleting and conversations during site observations (n=2), local Facebook groups for neighbourhoods adjacent to supermarket reuse pilots (n=3), the University of Sheffield's social media (n=3), and the newsletters of two online grocery companies that offer return from home packaging (n=7). Although participants were initially identified as customers of particular schemes, they tended to have experience of a range of reuse practices and packaging types. They were paid a £50 voucher on completion of the research tasks.

Figure 3.1 gives an overview of the people who took part in this research.

Figure 3.1 Overview of the characteristics of participants and households who took part in the social research



3.2 Psychological research

Our psychological studies for BUDDIE-PACK that examine factors influencing consumer interaction with reuse have focused specifically on potential concerns about contamination and understanding the effects of penalties and incentives on engagement.

Approach to investigating the effect of providing information about cleaning on willingness to use reusable containers

Given evidence that people are less willing to use containers that show signs of previous use (e.g. Baird et al., 2022; Collis et al., 2023; Hoseini et al., 2024), we designed an online experimental study to test whether providing information about the cleanliness of containers would increase people's willingness to use them. The study was pre-registered (https://osf.io/64e57) and is reported in the journal *Sustainability* (Pott et al., 2024). Participants were recruited online via the research platform Prolific and received £3 for taking part. Of the 692 participants who provided complete data, n = 349 (50%) were male, n = 328 (47%) were female, n = 13 were non-binary and n = 4 did not report their gender. Participants were aged from 18 to 78 years old (M = 25.61, SD = 8.48). Participants were asked to complete the following tasks:

1. After providing informed consent and passing attention check questions, participants were randomly allocated to either receive one of two posters (on a computer screen, see **Figure 3.2**) providing information about cleaning or no intervention at all.

2. Half of the participants then viewed three bowls with different levels of staining (clean, mildly stained, heavily stained) and were asked to rate their willingness to use the bowls in a cafeteria setting.

3. All participants completed a Lexical Decision Task designed to measure the accessibility of contamination concerns. In this task, participants were randomly presented with 80 words (16 of which were related to contamination) and 80 non-words and asked to identify as quickly and accurately as possible which were words. The rationale for this task is that if participants have underlying concerns about contamination they will respond more quickly to words reflecting contamination than to other words or non-words.

4. Participants who were originally allocated to one of the cleaning interventions then viewed their respective poster again.

All participants completed questions to assess their self-reported concerns about contamination in three areas: hygienic, utility and territorial (Baxter et al., 2016). This task was designed to measure participants' explicit concerns about contamination.

Figure 3.2 Posters providing information about cleaning

■ Approach to investigating the effects of penalties and incentives on consumer engagement with reuse systems

Penalties and incentives (e.g. financial penalties for using single-use packaging, discounts on reusable alternatives, or loyalty points) appear to be a common feature in reuse systems and are presumably designed to promote consumer engagement. However, little is known about the nature of penalties and incentives used across different contexts or which approach is optimal for promoting consumer participation. To address this gap, we are conducting a systematic review of academic studies, commercial schemes and trials with the following objectives:

1. Describe the nature of penalties and incentives designed to promote reuse across different product types, with reference to established behaviour change technique frameworks (e.g. the BCIO, Marques et al., 2023).

2. Estimate the effect of penalties and/or incentives on consumer engagement with reuse systems (i.e. uptake and return rates).

3. Identify factors that influence the effect of penalties and/or incentives on consumer engagement with reuse systems, including the nature of the penalty and/or incentives, type of product, country in which the reuse system operates and the nature of the reuse system (e.g. reuse vs. refill, at home vs. on the go).

The review involves searches of academic databases to compile peer-reviewed evidence of studies on the effects of penalties and/or incentives in the context of food and drink, personal care and household products. Additionally, we are identifying unpublished data and commercial systems, schemes and trials that have applied penalties or incentives in these contexts through websites, networking and the research team's personal contacts. Commercial schemes and trials are being approached by the research team via online adverts and e-mail to request access to unpublished consumer engagement data.

A protocol for the review has been pre-registered on the Open Science Framework: https://doi.org/10.17605/OSF.IO/CXFV9

4. Discussion of factors

In the following sections, we discuss findings from our research to date that complement or extend our understanding of factors that influence consumer interaction with reuse identified through literature review.

4.1 Access and availability

The availability of reuse systems can be a barrier to consumer engagement, with some people not having access to them, or having to go out of their way to use them (Coehlo et al. 2020; Herweyers et al. 2024). In observations of businesses piloting reusable packaging, many customers commented that they had not seen similar systems elsewhere. Some research participants had limited engagement with reuse beyond personal reuse of containers and buying one or two products in reusable packaging. For example, Hannah said that she had only been able to find returnable packaging for home delivery: "*I buy from* [online grocery company] *partly because of the packaging that they use, and the milkman partly because of the packaging he uses. But I don't think there's an awful lot of choice the rest of the time."* Jill refilled shower gel at an out-of-town shopping centre a couple of times a year, but didn't use refill on-the-go otherwise because: "*There is at the moment no refill station near me… it's the ease of how you could get to – if it was at* [local shopping centre] *or my local supermarket, yes. Then I definitely would."* Conversely, Natalie started buying refillable products more regularly when a refill store opened locally:

> *Six or so years ago, there was one that opened over in* [a neighbouring area]*, which I used to – I had a friend there, so when I went to see her, I would pop in there and fill things up. But obviously that's a 15-minute drive from here, so I wouldn't just go for that. And then, as I say, when this one opened in the village, it became something that was much easier to top up or – regularly, in smaller amounts and so on.*

Consumers considered their distance from reuse systems in relation to environmental costs and benefits, as well as convenience. Sarah, who used a combination of supermarket refill on-the-go a half-hour drive away and a refill stall at her local market, said: "*...you're kind of defeating the object by travelling so far to refill something, you know, so I'm interested in it as a principle but only if it works on a practical basis for you*."

Two participants reflected on the impact of moving to a new area. For example, when Craig moved, the online grocery company he used did not cover his new postcode. It took him a while to find an alternative one that offered returnable packaging and delivered to his new home. Tara used the same online retailer as Craig, and had recently started to use a local refill store for some household products as well. She explained: "*I guess using refill shops has only started since we moved*". There was not one within walking distance where she and her family used to live, which meant: "*...walking into town, filling up there and then carrying it back, so we didn't really do that. But here, with it nearer, I imagine we might do it more, living here, and it is a nicer walk*." This illustrates that moving house can disrupt shopping routines, presenting an opportunity to instil new reuse habits if the infrastructure is available.

Craig and Tara did not drive, instead relying on online shopping and what was available in their neighbourhood. Tara had been aware of refill on-the-go options in the city centre before she moved, but her reluctance to use them was "*partly to do with not having a car*." Craig gave up driving when he retired, but still liked to buy in bulk to save money. He now preferred online delivery and return from home, because in-store *"I would be limited by what I bought by what I could carry back"*. Graham, another research participant, lived a 10-minute walk from his local refill store. In the course of our research, this store closed and he reverted to using one further away, which he travelled to by bike on his commute. He switched from reusable containers to flexible plastics, as it was no longer practical to carry bulky items: *"When we'd got the refill up in* [his local area] *then I could take boxes… because now I'm having to go up to* [another neighbourhood] *– is everything boxed? Everything apart from the coffee is in plastic bags."* These examples show that transport mode is an important consideration that shapes both the choice of reuse system and packaging, in particular for refill on-the-go (Wrap 2022). The limited

availability of reuse systems places the onus on consumers to travel further to access them, and to hunt for alternatives when circumstances change.

4.2 Awareness

Existing literature highlights both limited awareness of reuse systems and how they work (Greenwood et al. 2021; Du Rietz & Kremel 2023), and limited awareness of their environmental benefits (Ellen MacArthur Foundation 2019b; Bradley & Corsini 2023; Starbucks & Hubbub 2024) posing a potential barrier to reuse. Our research confirms that lack of awareness is a challenge for engaging both consumers and delivery staff (see **4.15 Staff engagement**), and shapes consumers' perceptions of the benefits of reuse systems.

When asked what kind of questions or feedback they get from customers, supermarket staff who look after refill zones said: "*What do I do?*" or "*Most of it is to do with how do I do this? Or they are just curious in general as to why would I do this?*" In supermarkets, customers hovered around refill and return systems looking interested but hesitant. We also spoke with regular customers who had only recently noticed and tried the refill range and/or returnable packaging, or who had not seen it, despite it being available in store for several months. A customer shopping on her own, who removed her headphones to talk with our researcher, explained: "*To be honest, I'm usually here with the kids and just trying to get the shop done as fast as possible.*" Shoppers on 'autopilot' could easily miss reuse alternatives (see **4.9 Habit**), and did not intuitively know what to do when they did encounter them.

In quick service venues, few customers opted for returnable food and drink packaging. When we spoke with customers as they waited for takeaway, many said that they, either had not noticed the option, or they had ignored it because they had not understood what it was. They asked our researcher clarification questions about how return schemes work, such as "*Do you mean bringing your own cup?*" and "*Can I still take it away?*" The idea of their own refillable cup was more familiar and many customers assumed this was what was on offer, comparing returnable cups to ones they'd seen for sale in high street coffee chains. Other customers were surprised to learn that they could take returnable packaging off the premises. In one instance, a regular user of a cup deposit-return scheme said she had not initially realised the packaging was returnable. She had used a cup as a personal refillable for several weeks before a barista nudged her to return it.

In WhatsApp diaries, participants often focused on the benefits of recycling and repurposing packaging, rather than packaging that is designed to be reusable. This was in part due to limited opportunities to engage with reuse systems (see **4.1 Access and availability**), but it also reflected a false equivalence between reuse and recycling, and limited awareness of the additional environmental benefits of keeping packaging in circulation (Miao et al. 2023). Gaia, for instance, commented that the packaging she had used that day was "*all recyclable which is great*". Sarah, when asked to reflect on recycling-focused diary entries, said:

> *Like I don't mind buying a single-use plastic bottle, 'cause I would just bring it home and put it in the recycling, I don't mind doing that, whereas a lot of people would say we shouldn't be doing just single-use plastic, so I think it just depends on - it's whether you trust the government and the manufacturers to be doing that recycling, and reuse as well of the plastics.*

Limited information about the environmental impact of return-reuse systems meant that some consumers - who were otherwise open to reuse and repurposing - were sceptical of them. Laura's local supermarket switched systems from a refillable laundry detergent bottle that the customer keeps, to a returnable prefilled bottle. She explained that she had not used the new system because she did not understand the environmental benefits of it:

> *I just can't get my head around that, I just don't like how that's reused… I just think why can't I use my bottle? I'm washing it and reusing it, why can't I do that? Why do I have to return the bottle and get a new bottle? Or - 'cause all the bottles look brand new every time*.

She was also sceptical of return from home systems such as milk delivery ("*I just think if someone's coming to my house unnecessarily, erm, is that worth it? Somebody travelling here…"*), questioning the logistics, cleaning practices, and overall resource use compared with reusing her own containers. This illustrates that consumer awareness of how reuse makes a difference and the costs and benefits of different systems might be important.

Having said this, we suspect that there may be an important distinction between information that consumers would like and that which actually drives engagement with systems. For example, we (Tonikidou & Webb, 2024) used an online scenario to investigate the effect of providing consumers with information on the environmental impact of their reuse behaviour - in this case, reusing bottles for laundry detergent. The findings suggested that the information increased consumers' awareness of the environmental impact of reuse systems but did not increase their willingness to use such systems.

4.3 Communication

Previous studies highlight the importance of clear, consistent, direct, positive and timely messaging about reuse (City to Sea 2023a; Gavins et al. 2023). Our ethnographic research explored the kinds of reuse messages that retailers were communicating, what communication methods they used, and how consumers responded.

In the quick service venues we visited, returnable packaging was advertised via freestanding points of sale, window stickers, posters, countertop signage, and additions to existing digital displays. Instructions and scannable QR codes were positioned to take into account customer flow when queuing and ordering at the counter. A curry house also advertised its returnable takeaway box scheme in its print and online takeaway menu. However, as discussed in **4.2 Awareness**, most customers buying takeaway food did not notice or ignore this advertising. In contrast, users of returnable packaging said they had seen advertising on multiple occasions before trying it, and highlighted turning points such as being prompted by an email or social media post, a time-limited special offer, or being stuck in an especially long queue, which gave them the time to study it.

In the two supermarket chains we visited, refillable products were situated in a dedicated 'refill zone' with its own signage on and above self-serve dispensers and weighing scales. One supermarket chain also had freestanding points of sale with example loose goods weighed out in refillable containers, and signage around the store (e.g. in the cereal aisle) signposting customers to equivalent products in the refill zone. Similarly, prefilled returnable metal bottles for home care products were displayed in a dedicated section next to deposit-return reverse vending machines. Refill at home products, where available, were displayed with signage and/or videos provided by particular brands, such as Cif, Ocean Saver, and Soda Stream.

In both supermarkets and quick service venues, reuse displays and signage focused on three key messages:

1. How reusable packaging schemes work and what steps customers need to take to use them.
2. Environmental credentials of reuse in reducing plastic packaging waste.
3. Economic benefits of reuse in saving the customers' money.

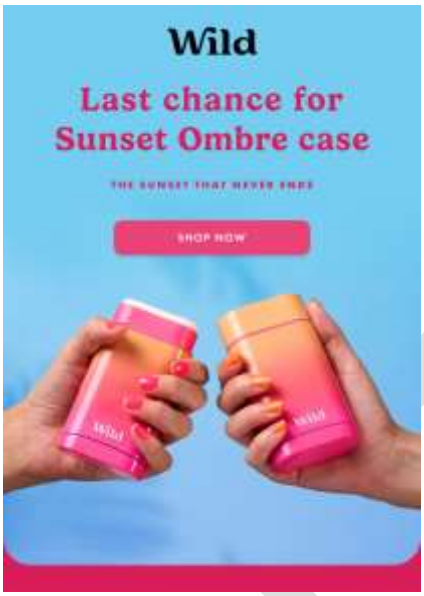
'How to' signs typically gave customers numbered self-service steps to follow, e.g. to fill and weigh a container, return a bottle, or download and use a returnable packaging app. One supermarket chain had an in-store video that demonstrated how to use the refill zone. The other provided a QR code that customers could scan to watch a demonstration video online. However, in practice, customers tended to ask someone what to do if they were unsure (see **4.4 Competencies**).

The environmental credentials of reuse schemes were signalled with green colour schemes, displays made from natural or recycled materials, and visuals such as marine wildlife, a circular economy heart symbol, and a green or smiling planet Earth. Text carried feel-good messages such as "*Great for the planet. Great for you*" and "*Happy Packaging. Happy Planet*". Refill at home displays emphasised a percentage plastic reduction compared to equivalent single-use products, while returnable food and drink packaging signage simply emphasised the opportunity to reduce plastic waste. This is consistent with the idea that environmental concern and worry about single-use packaging are key motivators for engaging in reuse (Baird et al. 2022; Bocken et al. 2022; Herweyers et al. 2024). However, slogans like "*Pollocks to plastic!*" were somewhat counterintuitive on displays selling reusable plastic bottles for cleaning sprays.

Money-saving incentives featured prominently in signage about the benefits of reuse in supermarkets, and in one returnable packaging takeaway pilot scheme. As well as a smiling planet Earth, the takeaway packaging scheme featured smiling wallet and gift characters in its branding, emphasising discounts and rewards for regular use. Supermarket signage made claims such as "*Same product always cheaper*" and "*At least 10% cheaper without the packaging*" in relation to returnable and refillable product ranges, both in the reuse zone and in one supermarket chain, in signposting from pre-packaged produce aisles. The extent to which such claims influenced consumers is discussed in **4.6 Cost**.

In diaries, wrap up interviews, and conversations in supermarkets, consumers discussed the influence of social media and word of mouth on their packaging use (see examples in **Figure 4.3.1**). This appeared to have been particularly effective in marketing online delivery companies specialising in reusable product niches. For instance, Laura sent a screenshot of a targeted ad for smol, who specialise in refillable home cleaning products, and said "*I've been looking into starting this, seeing how it works*". Supermarket shoppers mentioned targeted online ads as having encouraged them to try products from smol and rival brand Splosh. Natalie shared a photo of two different brands of refillable deodorant that she and her husband use. Discussing how this came about, she said: "*I think it came on my Facebook feed, or certainly that's where I've seen subsequent adverts… and I think probably my husband was the same*." Similarly, Jill started using Wild refillable deodorant after a friend told her about an introductory offer: "*quite a few of us tried it… obviously they'd had a huge – and I'd missed it – advertising campaign on Facebook or something*." Craig belonged to an online forum where members discuss subscription-based shopping and new apps, and had been introduced to reusable packaging brands that way. Julie, on the other hand, shared a social media post about single-use plastic waste with the comment "*horrified by how much will end up in landfill*" This illustrates the importance of social media in consumers encountering and sharing information about packaging and reusable alternatives.

Figure 4.3.1 Screenshots from social media included in packaging diaries



4.4 Competencies

Competencies or know-how are an important factor in consumer engagement with reusable packaging systems: in order to use them effectively, people need to know how reuse works and what to do, and to feel confident that they can do it. As discussed in **4.2 Awareness**, we found that when consumers encounter reuse systems in mainstream retail and hospitality businesses, they have questions about how they work and what to do.

To explore this further, we draw on the concept of 'consumption work', which is defined as "'all work necessary for the purchase, use, re-use and disposal of consumption goods and services'" (Wheeler and Glucksmann 2015, p.37). It is useful to note that research on household recycling considers how it requires additional work for consumers, including sorting, cleaning, storing, distributing, and transporting packaging waste, to successfully facilitate circular economy systems. Applying this to reusable packaging systems, we found that some reuse activities are actions that people already do and find intuitive. For example, tasks like managing online orders and subscriptions, decanting products for home storage, and recognising when packaging is no longer suitable for reuse due to wear and tear, are things that our participants did regularly as part of household shopping and repurposing routines. Similarly, rinsing or cleaning packaging after use and making decisions about what to do with it was ingrained in more general household recycling routines.

Different reuse systems require different kinds of know-how, and some are more familiar to consumers than others (Greenwood et al. 2021). Hannah reflected on returnable milk bottles, for example, as an established practice that's "*very easy, and I think people feel very confident*" because the majority of consumers have encountered this system before. In **Table 4.4.1**, we have provided an overview of different skills and competencies that we observed, and that participants discussed, in relation to refillable and returnable packaging systems.

Table 4.4.1 Competencies for engaging with refillable and returnable packaging

Refill competencies	Return competencies	Refill and Return competencies
Diluting and mixing refill from concentrate products	Scanning a QR code to borrow and/or return packaging	Managing online orders and subscriptions
Using self-serve dispensers, weighing scales, and scanners	Downloading and using an app to borrow and/or return packaging	Decanting products into parent containers
Estimating the weight and cost of products	Using deposit-return reverse vending machines and scanners	Rinsing or cleaning packaging for reuse
Printing or transferring packaging labels	Knowing how, where and when to return packaging, e.g. doorstep collection, post, reverse vending machine, or collection point	Recognising when packaging is no longer reusable

Diluting and mixing refill from concentrate products was a familiar skill, and users of these products highlighted instructions on packaging that made it easy for them to do this. Some, like Craig, used refill products with specifically designed parent packaging, where both refills and containers came with instructions about diluting and mixing. Others, like Sarah, used refill products with repurposed single-use packaging, but similarly followed 'recipes' printed on refills (See examples in **Figure 4.4.1**). They described some trial and error to get the right consistency - Craig said some products are thicker and need more mixing, and Sarah said of her conditioner bar that "*you just have to keep stirring it, because if you don't stir it, it melts in lumps*". However, these were minor issues that they had figured out themselves. Holly bought a refill from concentrate multi-purpose cleaner for the first time, without its branded parent packaging. Contemplating whether she should buy the bottle as well, she said it looked easy to use either way: "*I'm just wondering whether I could actually use my own bottle 'cause it tells you how many mls, and all you do is put the product in and add the water.*"

Figure 4.4.1 Following instructions for refill at home products

Consumers struggled with more complex or unfamiliar reuse tasks and technology use (see **4.17 Technology**), such as self-serve refill systems in supermarkets and apps and QR codes for tracking returnable packaging. Previous studies have found that lack of confidence when things go wrong is a barrier refill on-the-go, for example in relation to spillage and mechanical failures when dispensing and weighing products (Miao et al., 2023; Wrap, 2022). We witnessed several instances in supermarkets where customers gave up on buying refill products after

accidentally getting more than they wanted, or struggling to print a label. Some customers assumed they would get a specific amount from dispensers, corresponding to the weight on the label. Others weren't used to judging weight by eye - an issue that one supermarket tried to address with a display of what 100g of various products look like in refillable containers. Customers had the option to bring their own refillable container or use a paper or plastic bag, and systems differed in their requirement for these to be pre-weighed or not. This led to confusion about which instructions were relevant. When things went wrong, customers tended to look around for assistance - staff were not always available, and those they asked were not always able to help (see **4.15 Staff engagement**). While on an accompanied shop with Sarah, another customer approached her because she had seen her using the refill zone: "*I've never used this before. I thought I were* [sic] *doing it right, but it won't print anything off for me*." Other participants shared similar experiences of "*muddling through*" by watching or asking others. This suggests that in this retail environment, these reuse systems are not yet familiar enough for retailers to rely on first time users being able to self-serve. While consumers might, for example, weigh out ingredients when cooking at home, refill systems introduce more formalised processes and rules for accomplishing this task, so the context is new.

4.5 Convenience

Time and effort are major factors to consider in the design of circular economy systems (Coehlo et al., 2020; Herweyers et al., 2024; Hubbub, 2022; etc.). The ease with which everyday tasks like shopping and eating can be accomplished with reusable packaging was a key theme in our discussions, both with consumers who found it convenient and with those who were sceptical. A supermarket shopper hovered near the refill zone and said she was interested in trying it "*as long as it's obvious what you need to do and it's not a faff*". Responding to the idea of returnable packaging for takeaway food and drink, some customers similarly used words like "*faff*" and "*hassle*" to express the view that they would not want to make additional effort to engage in reuse.

The convenience of home delivery was mentioned by several interviewees, with around two-thirds of the households in our study regularly ordering products in refillable, returnable and/or bulk packaging online. In her packaging diary, Tara documented choosing to buy a bulk-size laundry liquid refill online, rather than get this product from her local refill store. When asked to reflect on why she chose a bulk refill pack for home delivery in this instance, she said: "*It might have been convenience around work to be honest, it's like what's easier to do - click a button or go to the shop*." Hannah said she liked getting milk delivered in returnable glass bottles and groceries delivered in returnable boxes, because: *"I don't have to go anywhere. I can literally put out every bit of stuff that they have provided and they'll take it away… So I think it's about it being easy to do."* In packaging diaries, participants shared photographs of getting groceries delivered in returnable packaging and leaving this packaging on the doorstep for collection (**Figure 4.5.1**), emphasising the ease of this return method. They also documented their efforts to sort and recycle packaging, with lots of entries reflecting on issues such as cleaning and separating packaging, not knowing what to do with mixed packaging, how and where to recycle some materials, or taking packaging to specific recycling points. In contrast, the packaging that they returned from home, knowing the business would reuse it, required less effort and worry.

During interviews at home, participants reflected on their storage space as a factor in how they engage in reuse. Gemma complained of an irregular local recycling service that did not accept some packaging types, which led to her storing packaging waste in her small kitchen and feeling overwhelmed by it. She preferred returnable packaging that she could immediately decant into her own containers and put back in a delivery box for doorstep collection, where this was available as part of her weekly online shop. She explained:

> *I'll be honest, I like to think it's being more altruistic but it's also that immediate impact on us, that local impact. So if I get something from* [the returnable packaging range]*, I don't have a packet to throw away. I get a box that I can return so it has that immediate impact for us as a family.*

Figure 4.5.1 Packaging for doorstep delivery and collection

In this example, returnable packaging freed space that would have otherwise been needed to store recycling, and saved Gemma the job of having to take packaging elsewhere. Mike and his girlfriend got fresh fruit and vegetables delivered in returnable crates, which they found convenient as they could store these in their basement: "*we've got the space where sometimes we'll have a few weeks' worth because we might not be in, so they're happy to take a few of them at a time."* Similarly, Mandy and her husband used their garage to store returnable packaging between deliveries. Mike contrasted his experience of storing crates in the cellar with trying home-delivery store cupboard goods in returnable plastic pots. He had a small galley kitchen, used specific containers to maximise storage space, and hadn't found the process of decanting from one small container to another convenient. Anjali lived in a studio apartment with extremely limited storage. She carefully chose which containers she repurposed to store products in, based on them taking up as little space as possible. This meant that she bought smaller quantities of products in single-use packaging more regularly, rather than larger refills or bulk buys - she gave the example of buying 100g of coffee for her small jar, rather than a 1kg bag.

Figure 4.5.2 Leakage from transporting a returnable coffee cup

In our research on returnable packaging for takeaway food and drink, the inconvenience of transporting packaging was a concern among consumers who had not used it or who were trying it for the first time. People said they did not have a suitable bag, or worried about spillage from residual contents being "*smelly*" or "*minging*". A first time returnable cup user wondered if he should "*just give it a rinse*" before catching his bus. He emailed our researcher a photo later the same day of how cappuccino foam had leaked and stained his cotton bag (Figure 4.5.2). Some people compared the schemes unfavourably with personal reusables, where they could choose packaging with features such as being leak-proof or collapsible, that made it easier to transport.

Non-users were also worried that they would forget to return packaging, based on prior experience of reuse. A customer at a city centre cafe gave the example of struggling to remember reusable shopping bags, and remarked: "*It's just another thing to carry and remember, and as a parent the last thing you want is more things to remember!*" At a campus cafe, a customer worried he would end up with a stack of returnable cups by the end of the week. Many customers said they *"usually forget*" their own cup, and argued that they were no more likely to remember a borrowed one. Conversely, consumers who used returnable takeaway packaging remarked on its convenience, particularly in reference to their experience of using personal refillable cups. Some used return schemes when they forgot or did not have time to bring their own cup. Others now preferred returnables, as they did not have to carry them all day, take them home, or thoroughly clean them. Some highlighted how returnable packaging is "*so much more convenient*" and requires less effort than looking after your own: "*...not having to bring something in and remember to bring in my coffee cup. It just means 'Oh, I fancy a coffee', but I haven't got the guilt of the non-recyclable packaging issue*." Where bringing their own reusables meant forward planning (Fuentes et al., 2019), borrowing returnable packaging enabled spontaneous consumption (see **4.9 Habit**).

○ 4.6 Cost

Financial penalties and incentives are widely used to promote consumer engagement with reuse systems, with many systems using a combination of incentives (e.g. discounts on reusable packaging) and penalties (e.g. increased price for single-use options, penalty fee for non-return of reusable packaging). However, it is currently unclear whether penalties or incentives are more effective for promoting engagement, or what specific amounts should be charged or offered to enhance and maintain engagement in different contexts. This is the focus of our ongoing systematic review of incentives and penalties, as described in the overview of our research methods.

Data from one site offering takeaway food and drink (Scheme A in Table 4.6.1 below) shows an uplift in engagement after the single-use charge was increased from 20p to 30p in the same period that a time-limited incentive where customers could purchase any hot drink in a returnable cup for £1 was introduced. As the two interventions occurred simultaneously it is not possible to know for sure the contribution of either to the increase in usage, but it does suggest that higher penalties may be more effective than lower penalties and that engagement may be further enhanced by combining a penalty with an incentive, the latter of which has been demonstrated in previous research in this context (Poortinga & Whitaker, 2018). Our (ongoing) systematic review (pre-registered here: https://doi.org/10.17605/OSF.IO/CXFV9) aims to clarify the optimal levels of penalties and incentives to maximise consumer participation across various settings.

In ethnographic research, we found that supermarket shoppers were interested in saving money on products through reuse - particularly, though not exclusively, at the lower-priced supermarket chain. This supermarket promised the "*same product always cheaper*" from its refill zone, and used dynamic pricing on dispensers to guarantee this, even when equivalent pre-packaged products were on special offer. We observed customers commenting about the price difference on familiar brands and how much they would save, and we also spoke with customers who said the refill zone being "*much cheaper*" is what prompted them to try it. At one store, the staff member responsible for refill said she had had customers check price claims against pre-packaged products on nearby aisles, then come back and say "*You're right, it is cheaper*". Even at the more expensive supermarket chain, a staff member said that customers regularly ask if it's cheaper. Some consumers commented favourably on the cost compared to "*fancy refill stores*", or their general impression that refill products "*tend to be more expensive"* elsewhere. This suggests that businesses may be working to counter the perception that reuse systems are niche and therefore pricey.

Not all customers were able to compare the prices of refillable and pre-packaged products easily, because they were not used to buying loose products by weight (see **4.4 Competencies**). For example, when we asked one customer why she had hovered by the refill zone for a while, she said "*I wanted to know if it was cheaper*" but she had not been able to work it out. In this instance, refill products were priced per 100g, where she would usually

buy the equivalent pre-packaged products in 250g or 500g units. One store displayed a price comparison for some refill and pre-packaged products by weight, which showed significant savings, but some customers were still unsure. For example, a customer commented that when he saw '41p' on a cereal dispenser, he thought of a box of cereal and wanted a direct price comparison with the product he usually buys. We observed customers who wrongly guesstimated the weight of products and ended up with more than they were willing or able to pay for, which led to food wastage - staff said this happened quite frequently.

Price-consciousness was also a factor in the types of reuse that consumers engaged in. Mike, who had tried a few different types of reuse and occasionally used a local refill store, said he was:

> *…not willing to pay massively above the odds to have all these bespoke things that can be delivered to you in reusable containers, or go and buy everything from a reusable shop. I kind of feel like it should be easier to go to the cheap supermarkets and have options available to you.*

Figure 4.6.1 Return on-the-go milk bottle advertising

Anjali repurposed packaging rather than buying returnable or refillable products, because they were too expensive for her budget. Her diary included a photo of milk in a returnable glass bottle in a store she regularly shops at (**Figure 4.6.1**). She commented: "*Great initiative, but I could not buy it as it's very expensive. I buy 2 litres of milk for £1.45, this was almost for £2.49 or higher*." Holly and Laura used supermarket refill on-the-go where they could save money, but thought the store's returnable prefilled offer was expensive. While shopping, Holly commented on the laundry liquid "*that still works out at £6.50 for 45 washes, and I don't think that's good value*." Laura said of the same product, including the deposit-returnable price of the bottle: "*I'm sure it didn't used to be £8 for 45* [washes]*, but it's cheaper to just buy, erm, the other* [pre-packaged] *- I think it's like £5-something for 35 washes, so for £3 more it's not worth it for 10 washes*." As with refill, this illustrates that consumers want a simple price comparison with pre-packaged products and avoid more expensive options (City to Sea 2023b).

Participants were sensitive to marginal differences in the price of everyday products that get a lot of regular use, and balanced their interest in reuse with what they felt was the most cost-effective option - though they had different approaches to household budgeting. Some bought bulk-size refills to save packaging and money, often doing this in combination with repurposing and informally refilling containers at home. Jill said "*I do like to buy in bulk. Because that works out cheaper, and especially when there were five of us living here*". She had been bulk-buying products like handwash for "*literally years*". Julie clubbed together with neighbours to buy in wholesale quantities from an organic food cooperative every few months. She said this works out "*about half price*" compared with the online grocery company she uses. Gaia switched to bulk-buying laundry detergent refills when her son was born and she started using washable nappies: "*we were getting through that relatively quickly and that was getting more expensive, and so this kind of worked out as the cheaper option".* Tara similarly said that laundry detergent in a five-litre concentrate tub "*feels more cost effective".* Sarah, on the other hand, used to buy in bulk, but switched to getting more regular refills from a local market stall while she was between jobs: *"I am buying them in smaller amounts so it's not as much money all at once… 'cause the big boxes of laundry detergent in particular are really quite expensive, even though we do use a lot of it.*"

Some participants highlighted special offers as a factor in them trying new refillable and returnable products. Holly bought a new refill from concentrate multi-purpose cleaner when it was on offer significantly reduced, making it much cheaper than pre-packaged:"*'cause they're over £2 each* [pre-packaged] *and they were 75 pence, so I thought yeah*." Laura liked a targeted ad she had seen for a refillable cleaning spray (see **4.3 Communication**):

…because they're giving you a free bottle and a free trial as well so I just thought, they wouldn't risk you just having a free bottle if they didn't think you were going to come and keep using it would they?... I thought that was a good incentive, because a lot of it were free free free.

Generous discounts and low prices seemed to work well for recruiting new customers. However, for this to be cost-effective and environmentally impactful in the long-term, this packaging needs to be reused. In some instances, such as for brands offering deodorant and shower gel refills by post, we saw evidence that participants kept packaging in circulation as intended. In other instances, financial incentives did not result in regular uptake.

Table 4.6.1 outlines how two returnable takeaway packaging schemes where we conducted ethnographic research applied different kinds of discounts, penalties, deposits, late fines, and return incentives. Scheme A was an app-based system used in venues that charged a 30p single-use packaging penalty and ran time-limited special offers to incentivise customers to opt in, with a late charge for packaging not returned within two weeks. We are currently analysing data from these and other venues to estimate effect sizes, as part of the review of the effects of incentives and penalties on engagement described above. From our ethnographic research, we know that both staff and customers attributed this scheme's packaging return rate of 99% to its charge for late returns. In Scheme B, independent cafes trialling returnable coffee cups for a £1 deposit had issues with non-return of cups which customers felt were "*good quality*" and cheap. This illustrates the importance to return-reuse schemes of balancing affordable upfront costs with an incentive to bring packaging back (Bradley & Corsini 2023; Starbucks & Hubbub 2024).

The application of financial incentives and penalties was sometimes confusing or untimely. One supermarket advertised a claim that refill products are "*at least 10% cheaper*" than pre-packaged, but a quick check indicated that this was not always the case. We found a particular cereal priced at 20p per 100g in the refill zone, whilst a pre-packaged alternative was 15p per 100g. When we asked a staff member about this, they said they had previously queried it with head office and clarified that the advertised 10% saving related to an average across the product range. In Scheme A, serving staff said customers tended to notice the 30p single-use penalty after placing their order - for example, querying why they have been charged £5.25 for a £4.95 meal deal. A server explained: "*So then we say, 'If you bring your own cup you don't get charged'. But we don't say - to be fair sometimes we do say - about the* [reuse scheme]" At this point in the transaction, it is too late for customers to change their packaging choice - though they might remember the penalty next time they order. In Scheme B, a 50p or £1 packaging deposit negated any immediate savings from promotional discounts unless the packaging was returned.

Table 4.6.1 Incentives and penalties on two returnable takeaway packaging schemes

	Scheme A	**Scheme B**
Single-use penalty	30p charge	None
Deposit	None	£1 per cup, 50p per food container
Reuse incentive	Occasional time-limited offers, e.g. £1 drinks promotion week	10p discount for drinks in returnable cups, 5% discount on meals in returnable containers
Return incentive	None	Reward points for return can be used towards a free drink or dessert and for a monthly prize draw
Time limit for returns	Two weeks	None

Return late fine	£4 per cup, £10 per food container	N/A

4.7 Demographics

Research that explores demographic differences in consumer engagement with reuse tends to be quantitative, based on statistical analysis of differences in survey responses as a function of different demographic characteristics. Our rapid evidence review identified six recent studies that discuss demographic differences, each focussing on different aspects of reuse:

- Escario et al. (2020) found that men are less involved than women in buying products with reusable packaging, that older people are generally more involved in reducing, reusing and recycling, and that these behaviours also increase with education level.
- In a study of the effect of financial incentives on consumer willingness to bring their own reusable coffee cup, Nicolau et al. (2022) also found that age and education level were significant, with older people and those with a higher level of education being willing to do this for a smaller discount.
- A consumer survey by WRAP focused on purchasing in-store refillable products, refill at home packs and loose fresh produce, and returning packaging to stores for recycling. This study found that early adopters of these behaviours are more likely to be under 35, have younger children at home, live in a large city or town, and do at least half of their shopping online.
- A consumer survey by City to Sea (2023b) focused on prefilled returnable packaging. This study also found that early adopters are more likely to be under 35 and live in an urban area. This survey also suggested that more affluent consumers, males, and those who have adopted hybrid working are more likely to engage in this reuse practice.
- In a survey of willingness to pay for reusable takeaway containers, Schuermann & Woo (2022) found that people with higher incomes were generally more willing to pay, and that younger consumers were more willing to pay to have food containers collected by a delivery driver.
- Baird et al. (2022) found that gender and cultural differences may be associated with willingness to reuse food containers in shared reuse systems, such that females and people who identified as white were willing to eat from containers that looked 'dirtier' from prior use and staining.

The problem with identifying differences in reuse behaviour as a function of demographic characteristics, is that it provides little insight into *why* one demographic is more or less likely to engage than another. Ideally, such research would also measure more proximal determinants of behaviour (e.g., environmental attitudes) that might explain differences between demographics. Ethnographic research can also help to understand how particular demographics think about and interact with reuse systems; however, small samples mean that it would be inappropriate to generalise. We did, however, note that some female participants reflected on reusable period products in packaging diaries alongside entries on reuse for food, home care and other personal care products. These participants highlighted considerations such as comfort, discreteness, using public bathrooms, and not knowing when you will get your period (for instance, in perimenopause) as reuse challenges in this context. This illustrates that people who engage in reuse are open to exploring it in a range of different contexts, and some of these contexts are specific and gendered.

The manager of a curry house where we did an observational visit highlighted a cultural reuse challenge that arose in pre-pilot research with their customers. In the early stages of pilot development, it was unclear whether the curry house would be the only business piloting takeaway food containers, or whether these containers would be reused across other local businesses in the same scheme. The curry house served a neighbourhood with a sizeable

Muslim population, and customers did not like the idea of reusing containers shared with non-halal kitchens. The manager was Muslim himself and shared this view: "*I wouldn't personally feel comfortable about a reusable container if it came from a place that served non-halal food*." In the end, they piloted takeaway containers in-house rather than across a network of businesses, and so were able to reassure customers. The influence of religious, cultural, and other dietary influences on reuse would be interesting to explore in future studies of takeaway food pilots that are implemented across a neighbourhood or city scale.

4.8 Environmental attitudes and beliefs

As reported in section **4.3 Communication**, reusable packaging is often marketed as environmentally-friendly and a way to reduce single-use plastic. In conversations in supermarkets and in packaging diaries, consumers reflected on their dislike of single-use packaging and how it accumulates. For example, a supermarket shopper said that after unpacking his weekly food shop, he is sometimes left with two shopping bags full of plastic waste. Mike said he and his girlfriend were motivated to try refillable and returnable packaging during the Covid-19 lockdown, after reflecting on how much waste they were producing:

> *…we were just becoming more conscious I think, spending a lot more time at home around waste and being around it. I think it was just a lot clearer when you do all your consumption in the house, which is piling up. Like I say it was particularly things like you can't recycle tetra packs around here. We were storing them to take them to the skip but then the skip would be closed because of Covid or we just couldn't get out there. So there was literally about 50 tetra packs in the cellar. So those things are a reminder of, 'Oh there must be a better way to do this'.*

For the most part, consumers viewed reuse through the lens of common-sense environmentalism, commenting that it seemed "*better for the environment*". A floor manager at a higher-priced supermarket chain said that refill zone customers "*tend to be more eco-conscious*", and indeed most of the customers that we spoke with in this store mentioned the environment or packaging waste. Where customers were sceptical about prefilled returnable packaging (see **4.2 Awareness**), this was because they wanted to know more about the environmental costs and benefits. Even people who were not particularly interested in sustainability supported the idea of reducing packaging waste. An older supermarket refill customer told us: "*I'm not big into the environment, saving the whales and all that, but I just think packaging is ridiculous*."

Of particular interest, given the BUDDIE-PACK project's focus on reusable plastic packaging, is how a commonly held view of single-use plastic as 'troublesome' or 'problematic' (Evans et al., 2020; Hawkins, 2020) influenced consumer perceptions of plastic as bad for the environment in any context. One supermarket chain provided single-use paper bags at its refill zone, as an alternative to consumers bringing their own containers. Refill customers tended to use this packaging and said they liked that it was not plastic, that paper packaging is better for the environment than plastic tubs, and that paper is recyclable. When chatting with a customer about this supermarket's cleaning product range in returnable metal bottles, he compared it favourably with the refillable plastic spray bottle that he used at home, saying that the problem with his bottle is "*you're still reusing single-use plastic*". This contradictory phrasing suggests a perception that plastic has an essential quality of being disposable and non-recyclable - which is not necessarily the case. During an observation at a university campus cafe, we spoke with a customer who was surprised at having been given a plastic reusable cup as part of a sustainability initiative. He expected his employer to be "*anti-plastic*", and questioned whether this was an oversight. This illustrates an instinctive adverse reaction to plastic as a suitable material for achieving environmental goals, and a potential mismatch between the perceived and actual sustainability of packaging materials (Otto et al., 2021).

Health-related concerns relating to plastic reuse came up quite frequently. Comparing reusable plastic takeaway containers with her preference for tiffin tins, Anjali said "*at home we actually don't use a lot of plastic, it's not supposed to be good for health*". Julie said she does not trust plastic, emphasising a gut response to it despite reassurances on packaging labels: "*I'm never really quite – these days it's a lot better because a lot of the*

packaging will say 'BPA free'. But I still have this feeling that surely things can leach out of plastics." In her packaging diary, Tara shared an entry about getting returnable paper-based packaging for fruit and vegetables in her grocery box, which she said, "*feels more natural to have this touch my food in health terms*". Later, reflecting on why she feels more comfortable with paper and plant-based packaging, she said: "*I think probably it's that amateur hearing of different things, plastics and how it affects health in ways that we maybe don't know.*" This shows a suspicion of plastic as a suitable material for reuse, related to its reputation as a troublesome, unnatural actor in the environment.

Among our household participants, three self-identified as especially environmentally conscious. They were more willing to make extra effort to engage in reuse, as a reflection of their personal norms and values. Gaia did the food shopping for her household and said "*part of the reason I do it is because I don't mind doing these different things because I just prefer the difference it makes*." She said that zero waste shopping "*takes a bit more time*" and when asked why she did it, she reflected:

> *I think there's definitely the eco aspect of it is reducing the packaging. That is important to me. I like to not have just so much plastic and be getting rid of so much plastic. Like we don't have to put our blue plastic* [bin and] *metal recycling bin out every other week when it's collected. We don't have to because we just don't have that amount of packaging which is really nice.*

This example illustrates that people can get a positive buzz from reuse, when they see the household-level impact of their efforts. As well as buying products wholesale and in returnable packaging, Julie belonged to a local plastic-free group. In her packaging diary, she documented daily efforts to repurpose and reuse packaging rather than throw it away - her recycling bin only went out "*about every six months*". Graham bought the bulk of his household's weekly shop unpackaged from independent refill stores and a local greengrocer. He admitted: "*it's not as convenient as just getting everything in one shop from the supermarket, there's no getting away from that, but I've decided that's a price worth paying from an environmental sustainability point of view."* In his packaging diary, he said that for him, trying to reduce packaging waste through reuse is one aspect of "*a wider approach to 'treading lightly on the Earth'":*

> *I suppose I somehow feel accountable to everyone and everything I might affect, both through what I consume (food, clothes, transport), and also through how I use my time (hence my involvement in various bits of activism and community work).*

In these examples, people with a green self-identity were motivated to engage in reuse as part of a wider ethic of frugality, mindful consumption and collective responsibility.

4.9 Habit

Some kinds of consumption that people do regularly, such as getting groceries, become routine and habitual (i.e., relatively automatic tasks underpinned by strong associations between contexts and responses, Wood & Runger, 2016). In these contexts, consumers tend to do what they are used to, often without conscious thought. For instance, during accompanied supermarket shops, people talked us through how they navigate the store. Some participants used strategies such as sticking to a shopping list and only visiting specific aisles. In her local supermarket, Anjali explained "*Because now I'm used to, I know everywhere where what is kept so it's just easy for me. I just know which section to go to.*" Jill described how she prepares for a big weekly shop by organising her shopping list around the areas of the store she will need to visit: "*I try to do my list as in the blocks it would come in… You know, the dairy stuff in one, the fruit and veg in another*." This focus was important to participants who were trying to stick to tight household budgets. Laura, who also shopped in this way, said this could have led her to miss new refillable and returnable options, if a big refurbishment had not caught her attention:

> *I only go where I need to go, I do not go throughout the full shop… it's* [the refill zone] *all the way over there, but if you don't need anything from over there to walk there, then you wouldn't see it… It was just because of when they closed it all off for the refurb. That is why I went there.*

In three of the four supermarkets we visited, refillable and/or returnable products were located in their own section towards the back of the store. As Laura suggested, in her local supermarket, we observed many shoppers who came nowhere near this area of the store as it was not near the grocery aisles, and others who walked by without noticing these products (see **4.2 Awareness**).

Similarly, participants who shopped online liked time-saving shortcuts such as suggested favourites and the search functionality to navigate straight to the products they wanted. Some participants regularly shopped with an online retailer with a returnable plastic packaging range, but were not particularly aware of this range as their usual shop consisted of items such as organic fruit and vegetable boxes. These customers were already in the habit of returning secondary packaging (e.g. delivery boxes) for reuse and flexible plastic for recycling to this retailer via weekly doorstep collection. This example suggests that returning packaging can be convenient and fit with existing routines, but that retailers also need to offer some encouragement or incentive for consumers to try reusable products that aren't part of their regular order. Gemma was a long-time customer of this company, but had only recently started ordering from the returnable packaging range because "*it used to be you had to buy a membership… so I didn't do that because I wasn't sure how much I'd use it.*" If people are not yet habitually using a product, signing up to a membership or subscription is a big first step that could be a barrier.

Some in-store shoppers looked out for multibuys, special offers and "*little yellow stickers*" for reduced products. Doing a basket shop on his lunch break, Mike said: "*I think when you do these chaotic shops, you almost just want to look around and see what catches your eye.*" Some participants contrasted this way of shopping with doing it online, where they would be more likely to stick to a list. Like Mike, Holly did a basket shop several times a week: "*I'll have a browse. 'Cause things like this* [stopping at the end of an aisle near special offers]*, the different deals that you can have, you don't get that online.*" Sarah did a weekly trolley shop for a mixture of things on her list and things she noticed browsing the store. She explained that this was a relatively new routine for her and an activity that she enjoys:

> *I'm not working at the moment, so I've got more time to come and shop, but I've quite enjoyed actually coming and looking in the store because you see different things… When you do your online shopping it's just completely automated isn't it? I literally would just get the same things week in, week out.*

In this instance, spending time in store meant she had started buying refillable products that were not available to online customers. Having extra time between jobs had disrupted old shopping habits, replacing a quick online order with browsing and refilling. Sarah's new way of shopping combined elements of spontaneity, in the purchase of pre-packaged products on special offer, with planning ahead to bring containers for the refill zone.

Our ethnographic work on returnable packaging in quick service venues offered an interesting contrast to grocery shopping, as takeaway customers were reluctant to frame this type of consumption as habitual. Consumers spoke of getting a takeaway because they did not have time to prepare their own that day, for a treat, or as a momentary decision (Hirth et al. 2021). In this context, they argued, it would be difficult or unnecessary to get into the habit of using returnable packaging. For example, a customer queuing at a city centre cafe commented: "*I mean it would be so rare that I get a takeaway that I feel like it wouldn't be worth the effort*." Later that day, one of the managers there said he felt the returnable cup scheme was unpopular because takeaway is "*a spur of the moment thing*". This suggests that the way convenience food and drink is framed as an 'exceptional occasion' (Pfeiffer et al. 2017) - something people do spontaneously, to treat themselves or save time - is a barrier to the uptake of returnable

packaging. This finding also links with consumers' concerns about the inconvenience of remembering to return packaging (see **4.5 Convenience**).

○ 4.10 Hygiene

Concerns about hygiene can significantly impact consumer interaction with reusable packaging systems (e.g.., Baird et al., 2022; Collis et al., 2023; Hoseini et al., 2024). In ethnographic research, staff members were conscious of their responsibilities, particularly relating to food hygiene, and the reputational implications for their business if they didn't maintain high standards of cleanliness in reuse systems. A curry house manager said his business prides itself on never having had less than a 5-star food hygiene rating. When marketing their reuse pilot, he wanted to reassure customers that reusable takeaway containers were being commercially cleaned in a dishwasher. Staff members responsible for restocking supermarket refill zones demonstrated the strict processes that they follow for labelling and cleaning dispensers to avoid cross-contamination, but in contrast to the takeaway food example, this effort behind the scenes was not advertised to customers.

As a follow on from the previous section's discussion of habits, consumers contrasted being "*quite conscientious*" about sorting waste at home for recycling, with getting a takeaway on-the-go: "*…if you're out and about… you're more likely to just put it in general waste*." Consequently, some users of returnable packaging schemes said they preferred this packaging to their own reusables, because they did not have to clean it:

> *...you don't have to remember to then wash something up and then bring it in the next day, clean, or anything like that. Because I'm terrible at remembering to wash things… it's good that you can take it, have it for the day, put it back, and not feel guilty about throwing something away.*

At a campus-based reuse scheme, staff complained about customers dropping off returnable packaging without rinsing it. Failure to clean packaging was about context rather than know-how - consumers unused to making time for this task outside of the home simply transferred single-use packaging disposal habits. A team leader said they had found "*really really mouldy*" cups and smelly containers with leftover food in return bins, which they had had to soak overnight. She worried: "*If you think somebody else is having that… that's not nice is it?*" This could have an adverse impact on reuse, as packaging that staff perceive to be unhygienic or difficult to clean may be taken out of circulation (Baird et al. 2022). This example also illustrates a negotiation of responsibility between consumers and retailers (Wheeler & Glucksmann, 2015).

Consumers reusing and cleaning containers for personal and household use tended to be more relaxed about hygiene. For instance, they were not worried about repurposing plastic takeaway containers with staining from prior use, as this quote from Mandy illustrates:

> *Some of the – so those plastic containers, after a while, particularly if you've got a tomato-based product in them, have got a red stain round it. But in-house, I'm not particularly bothered about that. Because I know I've washed it and I know it's just the fact that tomato soup or beans or whatever does stain plastic.*

Some participants even reused plastic packaging for freezing raw meat and fish products, as long as they were satisfied that they'd cleaned it between uses. Product type had some bearing on hygiene concerns - for instance, participants reused plastic shower gel or laundry bottles with visible product residue (e.g. around bottle necks or closures - see **4.11 Packaging design**), whilst not accepting this level of dirt on a reusable water bottle.

Hygiene concerns were most prominent in relation to returnable packaging for takeaway food and drink, where cups and containers were shared with others and products were consumed directly from this packaging. An occasional user of one such return scheme said:

> *I think there's a small worry for me about hygiene, like if it is being washed up by people and then returned, is it then being washed again in the café? …I want to make sure that what I'm eating out of is cleaned in a dishwasher, or – at whatever temperature to just sterilise it. So maybe it would be nice to know that it's clean.*

We spoke with a group of takeaway customers who had opted for single-use packaging, who said returnable packaging "*doesn't sound convenient or appetising*". When prompted to explain why, one said it was the idea of "*someone else using it*". His friend agreed: *"…Tupperware does tend to get a bit gross over time… if it's been shared with like 50 other people… 'cause a plate is like, if you clean it or whatever it's fine, but plastic seems to get a bit dirtier and stained I think."* This suggests that perceptions of hygiene are related to packaging materials, as plastic shows wear and tear after reuse more readily than crockery or glass (see **4.11 Packaging design**). More generally, for takeaway food and drink, single-use packaging has a longstanding association with cleanliness. A team leader at a campus cafe said "*quite a few*" customers ask for single-use packaging rather than crockery when eating in, and while this is partly for convenience, she also got the impression that "*it's more a hygiene thing… I want a clean one*." This assumption is somewhat validated after speaking to a customer at the same venue, who commented that he prefers single-use packaging because he knows no one else has used it.

Our psychological research supports these findings - showing that participants were generally unwilling to use takeaway food containers that were visibly stained. This is consistent with previous research (Baird et al., 2022) and is likely explained by participants viewing signs of wear and tear (e.g. stains or scratches) as potential sources of contamination that could make them sick (Schmidt, 2008). Providing reassurance that reusable containers had been thoroughly cleaned was found to reduce self-reported concerns about hygienic contamination (i.e. perceived health threats from pathogens; Baxter et al., 2016). However, contrary to expectations, this did not translate to an increased willingness to use containers that were visibly stained. This may be explained by dual processing theory, which posits that automatic, intuitive responses often override more deliberate, thoughtful processing (Kahneman, 2003). This may be particularly relevant when strong emotions, such as disgust, are involved (Curtis et al., 2011). These findings are reported in the journal *Sustainability* (Pott et al., 2024) and suggest that, despite interventions to promote acceptance, visible signs of wear and tear on reusable containers may trigger concerns about contamination and hinder consumer interaction with reuse systems even when consumers are reassured that the containers are appropriately cleaned.

4.11 Packaging design

Reuse literature highlights a range of qualities and design considerations that affect if and how consumers reuse, and repurpose packaging - factors such as attractiveness, sturdiness, shape and size, weight, closures, thermal properties, functionality, stackability, material, and recyclability (for a thorough review, see Recoup, 2023). BUDDIE-PACK Deliverable 2.2, *Guidelines for the Design of Reusable Plastic Packaging (RPP) to Minimise Concerns about Contamination* also provides guidance on how to design reusable packaging so as to minimise concerns about contamination (e.g., use dark colours that do not show staining and materials that resist scratching).

In conversations in supermarkets and quick service venues and with consumers in their homes, we asked what makes packaging suitable for reuse and how consumers know when packaging is no longer reusable. Consumers shared their thoughts both on packaging that they specifically purchase for reuse, and on packaging that they choose to repurpose. Of the identified factors, functionality and appearance were major influences on how they used it and when they stopped reusing it. For example, reflecting on reusing plastic water bottles and resealable plastic bags, Sarah said:

> *I'm just not very scientific about it, it's just kind of what it looks like and how it's functioning I guess. The boys would just carry on using those bottles forever and a day, and eventually I just take them off them because they start to go like cloudy - and they take all the labels off them and things, 'cause they don't like having all the branded labels on, so you can see right through them and yeah, they*

> *start to look like you can't really, properly clean them. But it's not anything scientific, it's just based on what it looks like. And for the bags, like I was saying, none of them have actually got damaged yet so I haven't chucked any of them away, but it would be if they're not sealing properly and things that I would throw them, because I think the reclosable seams, eventually they just stop working don't they? If they get damaged. So I wouldn't be freezing anything if I couldn't make sure it was sealed properly.*

In this example, Sarah is saying that she is comfortable with packaging reuse as long as it still works and shows no signs of breaking down. Others, when asked what would make them stop reusing packaging, cited factors such as brittleness and breakage, cracks and chips, lids that no longer seal, and pump action mechanisms that no longer work. Some participants showed us examples of packaging and containers that they had reused for decades, such as glass jars and plastic cereal tubs.

Recyclability at the end of life was an important factor in consumers' perceptions of what makes packaging suitable for reuse. Gemma preferred glass containers for home storage and returnable plastic packaging, as she was not able to dispose of plastics through household recycling where she lived. She explained how she collects glass jars because "*if I don't need them they are equally easy to recycle… When I declutter then I just recycle what's not been used/useful."* In the supermarket, Mandy hesitated in the coffee aisle, unsure whether to buy a non-recyclable refill pouch of coffee or a new glass jar:

> *I know my coffee jar is getting down. But I always have this debate with myself as to whether – to the recyclable or reusable… which is actually better? Almost better for the environment if – yes, that's 97 per cent less packaging, but I can't recycle that. Yes, I know there's a cost to recycling glass, but it is something that can be recycled.*

For environmentally-conscious consumers, the importance of recycling is ingrained to the extent that they are less likely to accept reusable packaging that can't ultimately be recycled. This illustrates the interrelationship between reuse and recycling infrastructure as a factor to consider in the design of reuse systems.

In addition to materials, we were also interested in the features of the design of reusable packaging that consumers liked or disliked. Participants who repurposed packaging or transferred products (e.g. from returnable packaging or a refill pack to their own container) liked it when they could remove and reuse labels without leaving a sticky residue. For example, Craig said he had noticed that the labels on the returnable plastic packaging he used had recently changed, and were now more easily peelable for reuse on his own containers. Similarly, the straightforward transfer of labels from refill packs meant that consumers could keep track of the contents of repurposed packaging. Transferring labels also enabled consumers to refer back to useful information such as expiry dates and usage instructions. See **Figure 4.11.1** for two examples, and section **4.13 Reuse type** for further examples of labels on refilled-repurposed packaging. Where participants were using parent packaging specifically designed for refill-reuse, they found packaging and label features such as refill instructions and indicator lines for mixing concentrate products useful (see **4.4 Competencies** for examples).

Figure 4.11.1 Label transfer

Figure 4.11.2 Packaging that's difficult to clean

Another important design consideration is how easy packaging is to clean. Some design features such as plastic nozzles, pumps, sprays and other closures collect residue where product builds up over time. Figure 4.11.2 shows an example of this in a reusable plastic shampoo bottle. Craig, whose bottle this was, said: "*I'm having to force hot water through it, put it under the tap, use a little scrubbing brush and if necessary blow hot water through it*." Despite these efforts, he was not able to satisfactorily clean it and found its appearance off-putting. Gemma described a similar issue with a reusable water bottle that belonged to her son:

> *I was cleaning it and I noticed it was difficult to get underneath the bridge around the rim, on the inside of the bottle, and it was just getting bits of water mould caught in odd corners. So, I just chucked it. If I have to keep double and triple checking something to make sure I've got every little weird corner completely clear, it's not convenient to use*.

Where packaging was used for food and drink rather than home or personal care products, any difficulties with cleaning tended to result in packaging replacement, as contamination concerns are more easily triggered in this context (see 4.10 Hygiene).

○ 4.12 Product

In both supermarket chains where we did ethnographic research, refillable and returnable product ranges were typically by familiar brands and these products were also available in single-use packaging in store. One supermarket chain sold mostly own-brand products in single-use packaging and in its reusable ranges; the other sold well-known brands alongside own-brand products. For some customers, familiarity with brands and products was an incentive to try reuse systems. Customers liked being able to get a well-known brand at a cheaper price in the refill zone and had favourite products, such as tea bags, coffee, cereal, and sweets that introduced them to this way of shopping. Some bought only one or two products in their weekly shop this way; others went on to try a wider range of products once they'd got the hang of refill shopping. We also spoke with customers who opted to try reusable packaging when their favourite cleaning product or scent was out of stock in single-use packaging, but was available in a returnable prefilled bottle.

Brand and product loyalty were mentioned by participants as both as an enabler of reuse and a barrier to trying new products, particularly in relation to skincare, laundry detergent and cleaning products. Jill gave the example of buying refill on-the-go shower gel "*because it's – like Body Shop as I said – a specific product that you'd be buying anyway, and they do the refill, you will do it because you like or want that product."* She already knew that this product suited her, so the spend on a refillable bottle and buying, in this instance, a larger quantity of product,

did not feel like a risk. Tara, on the other hand, said that reacting badly to a change in laundry detergent meant she was reluctant to trial other reuse brands, despite generous new customer offers and starter packages:

> *You need to know you want to use that product… otherwise you're just wasting the starter kit I guess. But then you carry on with it. But something like smol I reacted to, my skin was just too sensitive for their washing powder.*

Other participants similarly mentioned sensitivities, either of themselves or a member of their household, as a reason why trying a new product in reusable packaging can be risky. For example, Laura described an allergy that made her "*fussy*" about cleaning products, and weighed this up against trialling a refillable kitchen spray that had caught her eye: "*I just think is it going to be worth it 'cause then you've got to buy the bottle, buy the product, pay for the delivery, and then you sign up for however many, I don't know, 6 weeks*." Participants expected these products to last for a certain number of washes or weeks, and were conscious of the potential for waste.

Shoppers purchasing food from refill on-the-go dispensers emphasised portion size and freshness as reasons they like shopping this way. One supermarket chain sold refillable containers with 'freshness seals' for use with unpackaged products, while the other marketed unpackaged coffee beans as 'grind your own', with an emphasis on the freshness and quality of products rather than reducing packaging. Customers said they prefer that "*you can just buy what you need*" or get a smaller amount if you want to sample something new, and explained how this suited their household consumption. For instance, a supermarket refill customer said she "*can't be doing with large boxes*" for storing groceries at home, so instead buys a smaller quantity of product that will typically get used straight away. During an accompanied shop, Laura explained that she avoids food waste and saves money by refilling a small plastic container with cereal every week:

> *…that is better for* [my children]*, 'cause they wouldn't use the full box, and then they wouldn't eat it 'cause it's been open too long, like my middle child, she's really fussy - she's like 'It's been open a week, I'm not eating that', even if it's still fresh she won't eat it.*

Similarly, Holly said that being able to get cereal in smaller quantities is useful for managing her two children's preferences on a budget. In her packaging diary, she shared an example of using small refillable tubs for cereal to take on holiday, and later reflected: "*I can use whatever tub I want, it is just so easy. You can have whatever size, you can have big, little, whatever and it didn't cost much.*" A staff member responsible for a supermarket refill zone said it is popular with older customers who want smaller portions.

Product variety and availability has been highlighted in previous studies as key factors in engaging consumers in reuse (City to Sea, 2023b; WRAP, 2022). Refill zone staff described how they address stock issues by duplicating or triplicating dispensers for popular products so they do not run out. At the retail outlets we visited, refill dispensers were designed to hold additional loose product in a window at the front. These strategies ensured that refill displays looked mostly full and appealing, even when there were stock shortages. Retail staff and customers had noticed changes to reusable product ranges over time, which they assumed were due to demand and head office trying things out. Some customers had positive feedback about a wider range of products becoming available, while others had seen favourite products disappear. In her kitchen at home, Holly pulled out her reusable storecupboard container for pasta and said:

> *…the pasta there* [in the supermarket refill zone] *has got so expensive! They've changed it, it used to be the* [own-brand] *one and now it's the most expensive one… so to be honest, I buy* [pre-packaged] *pasta and put it in there now.*

Some participants said they would like to use more reusable packaging, but are put off by a limited range of products. Mike said he and his girlfriend tried an online grocery store with returnable plastic packaging "*out of*

interest", but decided it was not worth shopping there regularly because there wasn't enough choice: "*the issue with that was it was just not a very good range of products. It was a nice idea but there's only so many times you can buy like unpackaged oats or something.*"

4.13 Reuse type

Research to date has suggested that all four types of reuse identified by the Ellen McArthur Foundation (2019b) - refill at home, refill on-the-go, return from home, and return on-the-go - can either be preferred or disliked by consumers in different contexts:

- A survey by Greenwood et al. (2021) found that among consumers who were willing to reuse packaging, refilling or repurposing it were preferred options compared to returning it to a business.
- In a study of consumer willingness to pay for returnable takeaway food containers, Schuermann and Woo (2022) found that consumers were more willing to pay for a returnable container that is collected from their home than one they have to drop off at a collection point.
- In a survey conducted by Kantar Public (2021), consumers were asked to rate each system from 'very good' to 'very annoying' if it was hypothetically the only option available in the supermarket and there was no disposable packaging. 65-69% of consumers rated refill on-the-go, return from home and return on-the-go positively, but only 48% of consumers rated refill at home positively.
- A study by IGD (2021) found that consumers were generally open to trying all four reuse types, with this ranging from 73% of consumers for return from home to 83% of consumers for refill at home. However, survey reaction times were slower for refill on-the-go. Focus groups highlighted that consumers perceived this system as more effort and were concerned about hygiene. This study also found that consumers who shop online are more open to return from home than those who shop in store.
- A study of prefilled return on-the-go packaging systems by City to Sea (2023b) suggests that they can be more convenient for consumers than refill on-the-go, by removing barriers such as having to dispense their own products before purchase.

As well as differentiating between refill and return, packaging ownership is a key factor in the design of reuse systems (DuRietz & Kremel, 2023; Greenwood et al., 2021). In a qualitative study which simulated a supermarket refill on-the-go system, Miao et al. (2023) found that consumers preferred to use their own container rather than to share packaging with unfamiliar users, citing concerns about hygiene and seeing others touch packaging. The findings of our ethnographic work and consumer psychology relating to returnable takeaway food packaging echo this (see **4.10 Hygiene**).

We recruited participants for ethnographic research by targeting users of different reuse systems (supermarket refill on-the-go, home delivery of groceries or milk in returnable packaging, local refill on-the-go, return on-the-go for takeaway food and drink). However, in practice, people interested in reuse tended to do it in a range of contexts. **Table 4.13.1** gives an overview of where and how each of our participants engaged with reuse systems, based on the activities they discussed in interviews, accompanied shops and packaging diaries. The majority of them engaged with both refill and return, with only two who had never tried returnable packaging.

Table 4.13.1 Where and how participants engaged with refill and return reuse systems

	Refill		Return	
	at home	on-the-go	from home	on-the-go

Participant	Bulk buy	Local refill store	Online refill brand	Super-market	The Body Shop	Local refill store	Super-market	Take-away outlet	Online grocer	Milk round	Super-market	Take-away outlet
Sarah												
Craig												
Laura												
Holly												
Tara												
Graham												
Mike												
Anjali												
Jill												
Julie												
Mandy												
Gaia												
Hannah												
Gemma												
Natalie												

Key

Uses regularly | Tried once or twice | Used to use | Chooses not to use

Table 4.13.1 uses the Ellen McArthur Foundation's (2019) typology of reuse, but, in practice, we observed some blurred distinctions between these categories. For example, Anjali regularly used a takeaway business in her local market and always took their containers back, either to get a refill of the same meal, or for reuse by the stall holder. Gaia shopped with an online retailer that delivered products in canvas bags, which she used to refill her own containers at home. Having accomplished this, she returned the bags - thus this system included elements of both refill at home and return from home. Craig and Gemma similarly decanted plastic returnable pots from an online retailer to refill their own glass jars. Some of the refill at home brands that participants used encouraged packaging return through the provision of prepaid postage - though this was for recycling.

Return on-the-go was the least used of the four reuse types, though we suggest this was in part attributable to its availability compared with refill and return from home options - several participants said they hadn't come across return on-the-go when asked. In addition to Anjali's informal arrangement to return takeaway food containers, some participants had tried returnable takeaway cups once or twice in different contexts (see **4.16 Systemic factors**). Others had the option to buy laundry detergent in returnable packaging at the supermarket they used regularly, but none of them did. Sarah got this product from a local refill stall, while Laura and Holly thought it was too expensive, and Laura also questioned its environmental benefits (see **4.2 Awareness**).

Where participants had switched from one type of reuse to another, this was usually because of a change of circumstances rather than a fixed preference for a particular system. For instance, three individuals - Julie, Gaia and Gemma - used to shop in person at refill stores. At the time of our research, Julie was more reliant on home delivery as she had limited mobility while waiting for surgery, though she hoped that in-person refill shopping was something she would do again in the future. In the meantime, she reduced packaging waste through bulk buying with her neighbours through an organic food cooperative, and using an online grocery retailer that gave her the option to return packaging. Gemma explained how her switch from refill on-the-go to return from home was due to becoming a stay at home mum and full-time carer:

> *Those are the sorts of things I used to do when I used to work in* [city centre]*. So I always had my own coffee cup that I used to take everywhere and get that filled up. And there was a shop I used to go to that was just opposite work and they did a refill scheme. So the same things I get through* [online returnable packaging retailer] *now, so pasta, lentils, things like that I'd use from there. But now because I'm not out and about, I don't do it.*

Similarly, Gaia started doing more refill and return shopping online during the Covid-19 lockdown, which coincided with a house move and the birth of her child: "*We moved here and then I was pregnant and then I just couldn't be bothered to be doing shopping*." These examples illustrate that different systems of reuse may be more or less convenient as consumers' household routines and shopping needs change over time.

In addition to using packaging intended for reuse, participants often repurposed single-use packaging. For example, to store leftovers, for store cupboard goods, and for reuse with bulk buys and refill systems. **Figure 4.13.1** shows some examples of repurposed packaging for refill from participants' WhatsApp diaries. The first photo was taken by Natalie, who said "*Our cleaning products are a mixture of refillable items bought from the supermarket (left), items from the refill shop (centre), and single-use items from the supermarket (right)"*. She mixed and matched the kinds of packaging she used based on factors like availability, convenience, and product preference. In these examples, repurposed packaging has labels stuck over it to indicate what is inside (see **4.11 Packaging design**). This practice was encouraged by some local refill stores, who kept a stock of spare packaging in case customers forgot to bring their own. When asked why she used a Ribena bottle to buy refill shampoo, for example, Sarah said that she was given it in store and it is handy for topping up smaller bottles at home.

Figure 4.13.1 Packaging repurposed for use with refill at home and refill on-the-go systems

○ 4.14 Social norms

We found that - with the exception of some reuse practices such as milk rounds, refill packs, and personal refillable cups - unfamiliarity with reuse systems was a barrier for both consumers and the retail staff who serve them (see **4.2 Awareness** and **4.15 Staff engagement**). In both quick service venues and supermarkets, this led to a lack of

confidence in trying reuse systems and a culture of single-use packaging being the default. In other words, the dominant social norm is *not* to reuse things.

In spite of prominent advertising in quick service venues, we observed very few customers opting for returnable packaging. Takeaway customers recalled instances where asking to use a returnable packaging app had disrupted the checkout process, where serving staff hesitated and they subsequently felt self-conscious. A first-time user said it was "*...a little bit of a rush, like, you know, 'How do I do this? Oh gosh, she's staring at me'*". Another recalled: "*I said 'Oh, sorry, could you just be patient?' And she was like, 'Yes, I don't know what's going on'*". A regular user of the app said that if he had not had "*got quite lucky*" with a server who explained it clearly the first time he used it, "*then I would've just gone, 'OK, bye, I'll never ask again*.'" The social context of a hurried quick service environment where consumers queue for the checkout meant that neither they nor serving staff wanted complicated transactions. This sense of time-pressure and embarrassment led some potential users to abandon their first attempts to use returnable packaging.

We observed similar challenges in supermarkets, where consumers unfamiliar with the self-serve refill on-the-go process abandoned it midway through, if they ran into difficulty with dispensing and weighing the products that they wanted (see **4.4 Competencies** and **4.17 Technology**). Those who were using supermarket refill and return on-the-go systems commented on their newness, and the fact that they had not seen them in other stores. While this meant that the systems had a certain novelty appeal and new users wanted to support them, these shoppers also described a feeling of doing something out of the ordinary. For example, Laura, who lived near a flagship sustainability store and used their refill on-the-go range, said: "*This were like one of the first stores and I thought that's quite a big thing for this area, so I thought that was really good, and I thought the more people that use it - but literally, I don't see that many people using it."*

A refill shopper at another store expressed a similar feeling. She said that there used to be a bigger range of refill products and there had been a "*fanfare*" when the system was first introduced, but over time, she had noticed products disappearing. She believed that the range must have been reduced due to a lack of demand: "*Often I'm the only person here, or I maybe see someone with their kids buying sweets because they like the machines*." In all but one supermarket, we observed a fairly steady stream of shoppers engaging with refill and return systems, but rarely more than one at a time, so it's easy to see how consumers felt as if they were on their own.

In the absence of seeing other consumers engaging in reuse, those who did do it had to be fairly comfortable with going against social norms. Anjali, for example, described how she negotiated with a local takeaway business that she uses regularly, to buy meals in reusable plastic containers. This takeaway used disposable aluminium foil containers by default, which Anjali was not able to recycle. She recalled an ongoing process of taking a repurposed container and asking to use it instead:

> *The first time it was difficult because, you know, but then I think I kept insisting after which we've come to an understanding… I mean they get a little hesitant for a while… it surprises them basically… they started to recognise me now, so it's all right. But of course when I went earlier and there would not be the same person all the time, they would just be a little - but then they would be like, "OK, if you say so," or something like that.*

Julie said she had been refilling and reusing her own containers for years, for example when shopping in the market or to take leftovers home from a meal. She described a similar feeling of awkwardness based on reactions from staff and even her friends: "*It used to be odd. People used to sort of look at me as if I am a weird woman… It was like owning up to being a vegan or something. It was, 'Oh, she's one of those weirdos.'*". More recently, she had noticed it excited more curiosity in people ("*they often want to know a little bit more about it"*) and felt optimistic that this signalled a growing interest in reuse.

These two examples illustrate consumers sticking to their principles while being made to feel conscious of doing something that other people do not do. Escario et al. (2020) highlight that situations of norm conflict can be challenging, and that people who do reuse in this context tend to be motivated by a belief that their actions make a difference, however small. For others, reassurance that reuse is do-able, normal, and that other people are doing it can encourage engagement (DuRietz & Kremel, 2023). Reflecting on when she started using refillable drink containers, for example, Mandy recalled an all-staff meeting in the large company she used to work for, where she and her colleagues were given them: "*I think the fact that work went down the route of giving everybody a water bottle and a mug made you think, 'Well actually, do you know what? This is probably the best thing – the right way of doing it.'*"

○ 4.15 Staff engagement

Whilst this report focuses on consumer engagement with reuse, the role of the staff who operate reuse systems in supporting consumers is an important factor to consider - for example, whether staff can explain how systems work, be available to help, and act as ambassadors for reuse (City to Sea, 2023a; Starbucks & Hubbub, 2024; Wrap, 2022). In our ethnographic research, we found that there was limited staff awareness of and training in reuse schemes. A supervisor at a cafe that offered returnable packaging explained how staff pick up shifts across different outlets and have varying knowledge of the scheme: "*I have a different team five days a week… So for me also to have the time to be able to explain every day what* [the scheme] *is… not all our venues use it… it is quite time consuming."* Consequently, only some servers knew how to log returnable packaging in the till system and others had to ask colleagues for help - we also observed this in other venues. Likewise, in supermarkets, staff could pick up shifts across different stores and reuse systems were relatively uncommon, available in a small number of pilot stores only. A manager explained they have days when there are no staff on shift who are trained in their reuse systems and it's "*not as seamless as it could be*". Both hospitality and supermarket staff said they had not had any specific, formal training in the reuse systems they used - it was something they learned on the job. Some staff operating refill on-the-go systems cited more general training in UK food safety legislation such as Natasha's Law for informing how they work. Explaining how the refill on-the-go system was introduced as part of a new store opening, a member of staff at a supermarket said: "*When I came here to do this, nobody knew anything. We've had to discover* [what to do]"

In each supermarket, one store colleague was responsible for refill on-the-go, with an additional colleague covering their days off, whilst return on-the-go was restocked and maintained by a visiting colleague. This meant that these areas of the shop floor were often unattended when these staff members were not on shift, and when they were, it was possible that they were in the stockroom rotating and quality controlling products and cleaning dispensers (see **4.10 Hygiene**). Other store colleagues had limited engagement with reuse systems and struggled to assist customers - something we observed firsthand, and that customers described as a frustration. For example, Laura had an issue with a faulty refill on-the-go dispenser for laundry detergent, where she had asked for assistance to refill her bottle on several occasions, and ended up buying single-use products instead: "*…when I came before they were like, find another member of staff. No one wanted to do it*" We observed an elderly couple who asked a member of staff for help with self-serve weighing scales for refill on-the-go. She replied *"I'm from a different store and we don't have this, sorry."* In this instance, a floor manager showed the customers what to do, then talked the staff member through it in more detail. On other occasions, however, we saw customers give up on using refill on-the-go after looking around for help, and some resorted to asking other customers for assistance (see **4.4 Competencies**).

The members of staff in the supermarkets responsible for refill on-the-go said that they try to champion it among customers and colleagues. They talked enthusiastically about benefits such as freshness and cost savings, and the importance of being outgoing and chatting with customers about reuse. They were easily able to answer our questions about customer engagement. However, we noticed some scepticism about refillable and returnable packaging ranges from other staff. For example, they described problems with faulty deposit-return machines (see **4.17 Technology**) and stock issues for refill on-the-go. One floor manager said that the refill zone took up too

much space and should be half the size. When asked about the range of returnable packaging, he said that he does not really know how this works and doesn't think many customers use it. He personally used an online refill at home brand for cleaning products, and thought this was a better system than return on-the-go. While cleaning dispensers, one refill staff member told us that some of her colleagues want nothing to do with refill as they think it is too complicated. Later that day, on the shop floor by the refill zone, a colleague said that she had heard a rumour that they were getting rid of it. The staff member associated with the refill zone said this was not true and explained that the section was getting a restock. Her colleague replied: "*Are they going to start stocking products that people actually want?*" Afterwards, the staff member associated with the refill zone turned to our researcher and said: "*See? Most people don't want to work on this section but I think it needs more promotion, more of a chance*." This illustrates that reusable packaging ranges are sometimes perceived by staff as niche experiments rather than core business.

In quick service venues, some serving staff as well as customers asked our researcher questions about the schemes that we had come to observe - for example, why customers had been fined for returning packaging late, or the best thing to say to customers to encourage them to try returnable packaging. In one scheme, servers gave incorrect information about its associated app (see **4.17 Technology**) and late return fine. In another deposit-return scheme, servers used the phrase "*...if you bring it back*" when explaining it to customers, making return sound optional. A cafe manager referred to the number of returnable cups they had "*sold*". When promoting the scheme to regular customers, a kiosk server offered to write their name on a cup and keep it behind the counter. These examples illustrate that a lack of familiarity with return-reuse schemes (see **4.2 Awareness**) is an issue for delivery staff. This had a knock-on impact on consumer engagement, as customers picked up on staff cues (e.g. to use packaging as their own) and hesitance. Generally, schemes relied on customers to ask for returnable packaging, and staff gave customers single-use packaging by default. A user of a returnable cup scheme said that she noticed the scheme and downloaded the app "*a couple of years ago*", but "*was just so confused on how to use it. And they never ask you, so I just didn't use it until this year.*" When she eventually first tried to use it, her server "*also looked confused. I was like, 'Well actually don't worry, don't worry'*."

These observations in supermarkets and quick service venues contrasted with the experiences of participants who shopped at local refill stores, where they got a more personalised service from business owners with specialist knowledge of reuse. For example, during an accompanied shop at his local refill store, Graham had lots of back and forth conversations with the owner, and asked her for suggestions when he couldn't find the exact products he wanted. Shortly before this trip, he found out that this store was due to close permanently. He had been coming twice a week, and while shopping he spoke about how he would miss these interactions: "*…that's all part of the fun of shopping at the same old shops generally, you get to know the folk who run the place. And the conversation is a really big part of what you do while you're there."* This store used a self-serve system so it was not necessarily that Graham wanted lots of practical assistance, more that he valued the social aspect of independent refill shopping. It also meant that when he had been getting used to this way of shopping, he had had someone on hand to ask and guide him through the process.

4.16 Systemic factors

Some of the factors identified as critical to the success of reuse systems are systemic, such as making reuse widely available through a critical mass of companies and brands working together at scale, to create a convenient user experience (Ellen MacArthur Foundation, 2023; Hubbub, 2022). This would, for example, offer consumers more options for where they could refill or return packaging (Bocken et al, 2022; Ellen MacArthur Foundation, 2019b) and the flexibility to engage in reuse at multiple locations (IGD, 2021). We heard from consumers that reuse systems are not widely available, and that they would like more opportunities to engage with reuse through their everyday shopping routines (see **4.1 Access and availability**). In one supermarket chain, we also saw how being able to offer refill on-the-go products from a range of well-known brands incentivized reuse (see **4.12 Product**).

The literature also highlights the role that policies, regulations and bans could play in supporting reuse (Greenwood et al., 2021; Herweyers et al., 2024). We spoke with customers purchasing takeaway food and drink, for example, who argued that tougher legislation is needed to change things, and that consumer-focused projects cannot succeed on their own. The influence of policy change, however, is outside the scope of our ethnographic research, which focused on voluntary, business-driven reuse systems in the absence of regulatory measures in the UK. We note that some other European countries (e.g. France, Germany and the Netherlands) have introduced stronger legislative drivers of reuse, such as charging customers for single-use takeaway packaging, and a requirement for customers eating on takeaway premises to be served in reusable packaging.

One systemic factor that did come up in the course of our research is the difference between open and closed returnable packaging systems. Open reuse systems are implemented at a macro level, for example across multiple venues at a neighbourhood or city level (Šuškevičė & Kruopienė, 2020). Our ethnographic research on quick service takeaway venues focused on returnable packaging systems where customers had a choice of which packaging to use (e.g. single-use or returnable), could take packaging off site, and could return it at other venues participating in the same scheme. When speaking with customers at these venues, the perceived inconvenience of transporting and forgetting packaging was a barrier to reuse (see **4.9 Habit**). For example, a customer out shopping said that she did not know where she'd end up, and would want to get rid of packaging as soon as she's done with it. She suggested a network of return bins with scannable QR codes, then reconsidered: "*...but then again, this isn't practical because you'd need a lot of them*." Craig and Mike had each tried return on-the-go in this context and didn't think they would use this type of system again. Mike reflected: "*I think basically it didn't quite make sense in terms of – I'd rather have just eaten it in the café and then not have the faff of taking stuff back and forth.*"

Closed systems are reuse loops implemented at the micro-level, such as a staff canteen or event where packaging is intended for use on site. In such systems, Šuškevičė and Kruopienė (2020, p.3) argue that "material inputs and outputs can be measured and easily controlled", especially when twinned with deposit-refund initiatives to support resource recovery. Two of our participants had used returnable cups in this context. When asked whether she had come across any examples of return on-the-go, Mandy recalled using and swapping returnable plastic pint cups at a sports stadium:

> *You bought a beer and you got – you paid £1 extra. And if you went back for another beer, you'd get your £1 back if you took it back. Or if you took it back and wanted another one, your next one would be £1 cheaper. But we kept these because we thought they were quite useful for barbecues and things like that.*

Figure 4.16.1 Returnable cup

In her WhatsApp diary, Natalie shared a photo (see **Figure 4.16.1**) of a returnable coffee cup that she was given on a day out with her family at a National Trust property. In a later interview, she said that it was the first time she had come across this system, but she knew to give the cup back because of the prompts on the packaging and signage at the venue. "*I don't remember seeing any particular facility, so we then took it back inside and handed it in to the counter. But there were signs round saying please return your cups."* In both of these examples, Mandy and Natalie were given returnable cups by default and found them easy to use, return, or swap. This illustrates the convenience of closed reuse systems where consumers are staying on site. However, Mandy's quote also shows that resource recovery cannot be taken for granted. Schemes should consider how best to incentivize or nudge consumers to ensure packaging is returned, where this is the goal of the system.

4.17 Technology

In supermarkets and quick service venues, the introduction of reuse systems necessitated both customers and staff using new technology and devices. Many reuse systems use technology to facilitate aspects of the system, such as tracking packaging and containers (for a review, see the Appendix of RECOUP's report on 'Reusability by design', 2023). **Table 4.17.1** provides an overview of what technologies were used and how in the venues where we conducted ethnographic research. Both supermarket chains used similar systems for refill on-the-go for store cupboard goods, and for return on-the-go for home and personal care products, so these columns are organised by the type of system rather than specific supermarkets. Table 4.17.1 shows that the work required of consumers to self-serve through technology use (Wheeler & Glucksmann, 2015) varies for each system and comes at different points in the shopping process, from pre-purchase tasks such as downloading apps or dispensing and weighing products, to scanning QR codes to check out and/or return packaging. We have excluded other systems used by the fifteen participants who took part in in-depth interviews, but note that there was a subset of these users for whom web and app-based online shopping went hand-in-hand with refill and return from home systems as a convenient way to shop (IGD, 2021). Craig, for example, said that being a "*tech guy*" with an interest in "*new apps*" led him to try online refill and return brands that he now uses regularly.

Of the systems that we observed, the deposit-return system for takeaway food / drink packaging was the only one where using technology was optional. Customers simply asked to use this packaging at checkout and the deposit was added to their bill. They could claim their deposit back by returning the packaging to a server in any participating venue. The lead organisation for this scheme explained that they did not want technology to be a barrier to people trying the system. In this system, consumers could claim loyalty points by using their phone to scan QR codes when checking out and returning packaging, but, in practice, we didn't see anyone do this. While this low-tech process has advantages from a useability perspective, this scheme had issues with non-returns of packaging that was not traceable.

In contrast, the other system for reusing takeaway food / drink packaging that we observed relied on a third party app which users had to download to their phones and register their payment details with, so they could scan a packaging QR code at checkout. This was a friction point, especially at first use (City to Sea, 2023a; Tesco 2022). Users said that they had registered with the app when stuck in a long queue, or "*had a little bit more prep*" by downloading it in advance, rather than spontaneously opting in. Some first-time users reported issues with servers being unable to assist them when they had asked for help with using the app (see **4.15 Staff engagement**). Other customers were receptive to the idea of reusable packaging, but said that an app linked to their payment details was "*too much hassle*" or "*too complicated*." Here, using technology during pre-purchase and at checkout meant more work for consumers. However, those who did go on to use the app found automated reminders useful for remembering to return packaging, and this system had a return rate of 99%.

Rather than requiring customers to self-scan takeaway packaging to check it in on the app when they returned it, this system had return bins for customers to drop off used packaging (see **4.10 Hygiene**). This created additional

work for staff to empty these bins and scan returned packaging, which they did at the end of the working day or "*when we get 5 minutes*". Venues had had complaints from customers about fines for time-sensitive returns, where the apparent flexibility of this system was not compatible with midweek-only opening hours. A team leader explained "*...if their two weeks ran out on Sunday, and they popped that in the bin on Friday at 5 o'clock, we're not here, so they've gone over*." At one venue, staff encouraged customers to return packaging at the counter, after similar issues. Some staff thought that customers could self-scan returns and argued that "*the onus should be more on them*". The app did have this functionality; however, only if the venue displayed a return QR code, which none of these venues did. Tracking packaging as an asset within a reuse system is an additional task, and in this example responsibility for using tracking technology was both unclear and contested.

Table 4.17.1 Customer and staff technology use in takeaway and supermarket reuse systems

	App-based system for returnable packaging for takeaway food / drink	Deposit-return system for reusing packaging for takeaway food / drink	Supermarket refill system	Supermarket deposit-return system
Pre-purchase	Customer uses their smartphone to scan a venue QR code, download the app and register their details.		Customer uses a self-serve system to pre-weigh their own container (if using) and print a barcode. Customer dispenses product into their own container or a bag. Customer scans the pre-weighed barcode (if using), selects their product on the self-serve system, then weighs it and prints a label.	
Checkout	Customer uses their smartphone to open the app, chooses 'Borrow' and scans a packaging QR code. Staff log customer packaging choice on the till.	Staff log customer packaging choice on the till. Customers have the option of using their smartphone to scan a packaging QR code to claim reward points.	Customer sticks the second label to their product for scanning at checkout. Staff scan the product through checkout in the usual way.	Staff scan the product through checkout in the usual way - price includes the packaging deposit.
Return	Staff empty return bins and use the app on a venue tablet or smartphone to scan packaging QR codes and log returns.	Staff log packaging checkouts, returns and swaps on the till. Customers have the option of using their smartphone to scan a venue or delivery driver QR code to claim reward points.		Customer uses an in-store deposit return machine to scan the empty bottle they're returning and print a voucher for the value of their deposit.

In supermarkets, reuse systems for prefilled aluminium bottles for laundry detergent, hair care and household cleaning products involved no extra work for consumers at checkout, but they had to self-serve using an in-store deposit-return machine when bringing bottles back. This process involved scanning a label on the packaging and dropping it into the machine, which would then print a voucher for the value of the customer's deposit. We spoke to one user of this system who said he found it *"very easy"* and another who said it can be "*a bit tricky*" to scan the bottle, but otherwise easy. Staff, however, described issues with these machines meaning that they were sometimes unavailable for customers to use. In one store, a staff member said that the machine had recently

been replaced and now worked better, as the previous one only had capacity for a small number of bottles, and wouldn't work once it was full. In another supermarket, a staff member described the deposit-return machine as "*temperamental*" and said that when it would not scan bottles or print barcodes, he and his colleagues were not able to fix it as they did not have much to do with it (see **4.15 Staff engagement**). He reflected: *"When it works it's seamless, but if it's out of order for a while then the customer's not going to come back*." Laura described a similar situation in her local supermarket, where a laundry detergent deposit-return machine replaced a refill machine that - according to her - almost never worked after she bought her first bottle:

> *…every time I'd come it just wouldn't be working and then I'd go find someone to help… and they'd be like 'just go ask someone else', or 'oh we can't do it'… it never worked, so they've changed it… I haven't used it for ages because then I have to buy the* [prepackaged] *tubs anyway, so then by the time I come back and it doesn't work - honestly it were like months and months. I thought I can't - there's no point using it.*

Laura kept her refillable bottle in the boot of her car with her reusable shopping bags, hoping to use it when the machine was working again. She got fed up with taking it into the shop with her, as every time that she tried the machine was out of order. She explained that with three children at home, she used laundry detergent very regularly and needed to replenish it quickly - so when it ran out and the machine was broken, she reverted to buying the single-use alternative. When the machine was eventually replaced with a prefilled deposit-return system, she felt doubly frustrated as she had wasted money on a refillable bottle that she could no longer use at that store. In this example, both system malfunction and system replacement were barriers to reuse, where niche technologies were only compatible with specific reusable packaging.

Of the four systems, refill on-the-go in supermarkets involved the most self-service by consumers to pre-weigh containers, print labels, dispense products, and find their product selection on the self-serve weighing system. We have already described -in **4.4 Competencies** - how people struggled with this. Though there were instructions available in store via signage and videos, the sequencing of tasks confused customers. For instance, we observed people:

- Dispensing products without weighing or labelling them, then heading to the checkout (where presumably they were unable to complete their purchase).
- Trying to scan product labels on dispensers with handheld barcode scanners, when these scanners were intended for use with self-printed labels on pre-weighed containers.
- Trying to pre-weigh paper bags that were too light for the scales to recognise.
- Filling reusable plastic bags without scanning them first, then getting stuck at the next step, as the system wouldn't let them progress to weighing the product.
- Navigating to the wrong product categories on the self-serve screen, e.g. a customer buying chocolate cashews could not find them under nuts, and eventually located them under 'chocolate-covered snacks'.

We also visited an independent refill store - with Graham, during an accompanied shop - that used a similar self-serve system, which the owner said was "*something that a lot of people who have started, who shopped from us especially at the beginning, had to get used to*". Graham agreed:

> *That was a real learning curve. I was crashing my way around when I first came here going oh I know how refill shops work, I know what to do. Oh, maybe I don't, I just need to take a step back… The process I suppose, the kind of pre-weighing and the printing out of a sticker which you then scanned when it came to the actual weighing process itself.*

In contrast to the supermarkets, in this context a staff member was always available to advise and assist customers who had any difficulty. Sarah used a combination of supermarket refill on-the-go and a local market stall, and reflected: "*It's significantly easier to just buy it from the chap in the market 'cause he does it for you, so you don't get any of the labelling thing that you would get at* [the supermarket]." Self-serve technologies introduce additional complexity to reuse systems, and tasks that consumers are not familiar with in this context. While we did encounter shoppers who "*muddled through*" and had got used to self-serve refill on-the-go, we suggest that until this technology is more commonplace, new users will need staff support to understand and use the systems.

5. Conclusions

The main message of the report is that consumer behaviour is complex and shaped by a wide range of factors, including aspects of the system (e.g., access, availability, convenience, cost, and the nature of the product, packaging, and system), aspects of the person using the system (e.g., their demographics, habits, environmental attitudes and beliefs), as well as broader factors such as social norms. The report describes each of these issues and so provides a guide to those designing and implementing systems that enables them to design systems that work with, rather than against consumers. As Hubbub (2022) say, reuse systems should be designed to "minimise the friction points and fit into people's existing patterns of behaviour". Our hope is that the present report identifies potential friction points (e.g., increased cost, the need to use technology, concerns about contamination, challenges of returning used packaging and containers) and people's existing patterns of behaviour (e.g., existing reuse habits, social norms) and so provides the understanding needed to maximise the potential of reuse.

6. References

Baird, H.M. Meade, K., Webb, T.L. (2022). This has already been used! A paradigm to measure the point at which people become unwilling to use reusable containers. Journal of Cleaner Production, 363, 132321. https://doi.org/10.1016/j.jclepro.2022.132321.

Baxter, W. L., Aurisicchio, M., & Childs, P. R. (2016). Materials, use and contaminated interaction. Materials & Design, 90, 1218-1227. https://doi.org/10.1016/j.matdes.2015.04.019

Beitzen-Heineke, E.F., Balta-Ozkan, N., Reefke, H. (2017). The prospects of zero-packaging grocery stores to improve the social and environmental impacts of the food supply chain. Journal of Cleaner Production, 140 (3), 1528-1541. https://doi.org/10.1016/j.jclepro.2016.09.227

Bocken, N.M.P., Harsch, A., Weissbrod, I. (2022). Circular business models for the fastmoving consumer goods industry: Desirability, feasibility, and viability. Sustainable Production and Consumption, 30, 799-814. https://doi.org/10.1016/j.spc.2022.01.012.

Bradley, C.G., Corsini, L. (2023). A literature review and analytical framework of the sustainability of reusable packaging. Sustainable Production and Consumption, 37, 126-141. https://doi.org/10.1016/j.spc.2023.02.009.

Brewer, J. 2003. Ethnography. In Miller, R., Brewer, J. eds. The A–Z of Social Research, London: Sage, 99-102.

City to Sea (2023a). The Future is Returnable: A blueprint for setting up and running a successful returnable cup scheme for hot drinks. Available online: https://www.citytosea.org.uk/the-future-is-returnable-a-circular-approach-to-hot-drinks

City to Sea (2024b). Ready to Prefill? Market innovation to unlock growth in the reuse market. Available online: https://www.citytosea.org.uk/ready-to-prefill-report/

Coelho, P.M., Corona, B., ten Klooster, R., Worrell, E. (2020) Sustainability of reusable packaging – Current situation and trends. Resources, Conservation and Recycling. X, 6, 100037. https://doi.org/10.1016/j.rcrx.2020.100037.

Collis, B., Baxter, W., Baird, H. M., Meade, K., & Webb, T. L. (2023). Signs of use present a barrier to reusable packaging systems for takeaway food. Sustainability, 15(11), 8857.https://doi.org/10.3390/su15118857

Cottafava, D.; Costamagna, M.; Baricco, M.; Corazza, L.; Miceli, D.; Riccardo, L.E. (2021). Assessment of the environmental break-even point for deposit return systems through an LCA analysis of single-use and reusable cups. Sustainable Production and Consumption, 27, 228–241. https://doi.org/10.1016/j.spc.2020.11.002

Curtis, V., De Barra, M., & Aunger, R. (2011). Disgust as an adaptive system for disease avoidance behaviour. Philosophical Transactions of the Royal Society B: Biological Sciences, 366(1563), 389-401. https://doi.org/10.1098/rstb.2010.0117

Du Rietz, S., Kremel, A. Consumer Behavior as a Challenge and Opportunity for Circular Food Packaging - a Systematic Literature Review. Circular Economy and Sustainability, 4, 413–438. https://doi.org/10.1007/s43615-023-00290-1

Ellen MacArthur Foundation (2019a). Completing the Picture: How the Circular Economy Tackles Climate Change. Available online:

https://www.hoop-hub.eu/virtual_images/134-6254016ea43c113bc152bb9f06f1ec02.pdf

Ellen MacArthur Foundation (2019b). Reuse - Rethinking Packaging. Available online: https://www.ellenmacarthurfoundation.org/reuse-rethinking-packaging

Ellen MacArthur Foundation (2022). Global Commitment Progress Report 2022. Available online: https://www.ellenmacarthurfoundation.org/global-commitment-2022/overview

Ellen MacArthur Foundation (2023). Global Commitment Five Years In: Learnings to Accelerate Towards a Future Without Plastic Waste or Pollution. Available online: https://emf.thirdlight.com/link/squ1fmbhnevb-50gsgv/@/preview/

Escario, J.J., Rodriguez-Sanchez, C., Casaló, L.V. The influence of environmental attitudes and perceived effectiveness on recycling, reducing, and reusing packaging materials in Spain. Waste Management, 113, 251-260. https://doi.org/10.1016/j.wasman.2020.05.043.

Fuentes, C., Enarsson, P., Kristoffersson, L. (2019). Unpacking package free shopping: Alternative retailing and the reinvention of the practice of shopping. Journal of Retailing and Consumer Services, 50, 258-265. https://doi.org/10.1016/j.jretconser.2019.05.016

Gavins, J., et al. (2023) How to Talk About Plastics. Available online: https://grantham.sheffield.ac.uk/how-to-talk-about-plastics/

Greenwood, S.C.;Walker, S.; Baird, H.M.; Parsons, R.; Mehl, S.;Webb, T.L.; Slark, A. T.; Ryan, A. J.; Rothman, R.H. (2021). Many Happy Returns: Combining insights from the environmental and behavioural sciences to understand what is required to make reusable packaging mainstream. Sustainable Production and Consumption, 27, 27, 1688–1702. https://doi.org/10.1016/j.spc.2021.03.022

Herweyers, L., Du Bois, E., Moons, I. (2024). Use - clean - repeat: Understanding user, product, and context to design for long-term reuse. Resources, Conservation and Recycling, 204, 107511. https://doi.org/10.1016/j.resconrec.2024.107511.

Hoseini, M., Greenwood, S. C., Eman, S., Mattinson, P., Baird, H. M., Beswick-Parsons, R., Fairclough, J. P.A., Webb, T. L., Ryan, A. J., & Rothman, R. H. (2024). Integrating behavioural, material and environmental science to inform the design and evaluation of a reuse system for takeaway food. Resources, Recycling, and Conservation. 10.1016/j.resconrec.2024.107815

Hubbub (2022). Reuse Systems Unpacked. Available online: https://hubbub.org.uk/reuse-systems-unpacked

IGD (2021). How to help consumers adopt reusable packaging. Available online: https://www.igd.com/Social-Impact/Sustainability/Reports/How-to-help-consumers-adopt-reusable-packaging/35716

Jiang, X., Dong, M., He, Y., Shen, J., Jing, W., Yang, N., Guo, X. (2020) Research on the Design of and Preference for Collection Modes of Reusable Takeaway Containers to Promote Sustainable Consumption. International Journal of Environmental Research and Public Health. 17 (13), 4764. https://doi.org/10.3390/ijerph17134764.

Kahneman, D. (2003). A perspective on judgement and choice. American Psychologist, 58, 697-720. https://doi.org/10.1037/0003-066x.58.9.697

Kantar Public (2021). Our Planet issue: Accelerating behaviour change for a sustainable future. Available online: https://www.kantar.com/inspiration/society/2021-are-citizens-ready-to-change-their-lifestyle-to-address-the-climate-crisis

Kazançoğlu, I., Köse, S.G., Arslan, A. (2024). Drivers and Barriers Influencing Consumers' Intention to Purchase Cosmetics With Refillable Packaging. Packaging and Science. 37 (6), 551-569. https://doi.org/10.1002/pts.2808

Keller, E., Köhler, J.K., Eisen, C., Kleihauer, S., Hanss, D. (2021) Why consumers shift from single-use to reusable drink cups: An empirical application of the stage model of self-regulated behavioural change. Sustainable Production and Consumption, 27, 1672-1687. https://doi.org/10.1016/j.spc.2021.04.001.

Klug, K., Niemand, T. (2021) The lifestyle of sustainability: Testing a behavioral measure of precycling. Journal of Cleaner Production, 297, 126699. https://doi.org/10.1016/j.jclepro.2021.126699.

Kunamaneni, S., Jassi, S., Hoang, D. (2019) Promoting reuse behaviour: Challenges and strategies for repeat purchase, low-involvement products. Sustainable Production and Consumption, 20, 253-272. https://doi.org/10.1016/j.spc.2019.07.001.

Louis, D., Lombart, C., Durif, F. (2021). Packaging-free products: A lever of proximity and loyalty between consumers and grocery stores. Journal of Retailing and Consumer Services, 60, 102499. https://doi.org/10.1016/j.jretconser.2021.102499.

Marques, M. M., Wright, A. J., Corker, E., Johnston, M., West, R., Hastings, J., Zhang, L. & Michie, S. (2023). The behaviour change technique ontology: transforming the behaviour change technique taxonomy v1. Wellcome Open Research, 8, 308. https://doi.org/10.12688/wellcomeopenres.19363.1.

Miao, X., Magnier, L., Mugge, R. (2023). Switching to reuse? An exploration of consumers' perceptions and behaviour towards reusable packaging systems. Resources, Conservation and Recycling, 193, 106972. https://doi.org/10.1016/j.resconrec.2023.106972.

Nicolau, J.L., Stadlthanner, K.A., Andreu, L., Font, X. (2022). Explaining the willingness of consumers to bring their own reusable coffee cups under the condition of monetary incentives. Journal of Retailing and Consumer Services, 66, 102908. https://doi.org/10.1016/j.jretconser.2022.102908.

Novoradovskaya, E., Mullan, B., Hasking, P., Uren, H.V. (2021) My cup of tea: Behaviour change intervention to promote use of reusable hot drink cups. Journal of Cleaner Production, 284, 124675. https://doi.org/10.1016/j.jclepro.2020.124675.

Novoradovskaya, E., Mullan, B., Hasking, P., (2023) Acceptability of a behaviour change intervention aimed at increasing the use of a reusable hot drink cup. Evaluation and Program Planning, 97, 102203. https://doi.org/10.1016/j.evalprogplan.2022.102203.

Otto, S., Strenger, M., Maier-Nöth, A., Schmid, M. (2021) Food packaging and sustainability – Consumer perception vs. correlated scientific facts: A review. Journal of Cleaner Production, 298, 126733. https://doi.org/10.1016/j.jclepro.2021.126733.

Pfeiffer, C., Speck, M., Strassner, C. (2017). What Leads to Lunch - How Social Practices Impact (Non-)Sustainable Food Consumption/Eating Habits. Sustainability. 9 (8), 1437. https://doi.org/10.3390/su9081437

Poortinga, W., & Whitaker, L. (2018). Promoting the use of reusable coffee cups through environmental messaging, the provision of alternatives and financial incentives. Sustainability, 10(3), 873. https://doi.org/10.3390/su10030873

Pott, S. L., Baird, H. M., Eman, S., Ciocirlan, A-B., Foster, K., Green, G., Grobien, M., & Webb, T. L. (2024). Does providing information about cleaning increase people's willingness to (re)use bowls that show signs of previous use? Sustainability, 16, 1322. https://doi.org/10.3390/su16031322

Rapp, A., Marino, A., Simeoni, R., Cena, F. 2017. An ethnographic study of packaging-free purchasing: designing an interactive system to support sustainable social practices. Behaviour & Information Technology, 36 (11), 1193–1217. https://doi.org/10.1080/0144929X.2017.1365170

Recoup (2023). Reusability by Design: Reusable plastic packaging design guidance for the value chain. Available online: https://www.recoup.org/research-and-reports/reusability-by-design-2023/

Schuermann, H., Woo, J.R. (2022) Estimating consumers' willingness to pay for reusable food containers when ordering delivery food: A contingent valuation approach. Journal of Cleaner Production, 366, 133012. https://doi.org/10.1016/j.jclepro.2022.133012.

Shah, P., Yang, J.Z. (2024) It Takes Two to Tango: How Ability and Morality Shape Consumers' Willingness to Refill and Reuse. Environmental Management, 73, 311–322. https://doi.org/10.1007/s00267-023-01828-7.

Starbucks & Hubbub (2024). The Bring it Back Fund - Impact and Learning. Available online: https://issuu.com/hubbubuk/docs/2023.01.22_bring_it_back_fund_impact_report_bb_fin

Šuškevičė, V., Kruopienė, J. 2021. Improvement of Packaging Circularity through the Application of Reusable Beverage Cup Reuse Models at Outdoor Festivals and Events. Sustainability 13 (1), 247. https://doi.org/10.3390/su13010247

Tenhunen-Lunkka, A., Balatsas-Lekkas, A., Mouazan, E., Palola, S., Ngo, T., Salo, M., Hylkilä, E., Sundqvist, H., Luomala, H., Pennanen, K., Sorvari, K., Petänen, P., Lahtinen, J.H. (2024) Implementing a circular business model for reusable packaging: Multidisciplinary learnings from reusable pizza packaging. Sustainable Production and Consumption, 48, 62-83. https://doi.org/10.1016/j.spc.2024.05.006.

Tesco (2022). Use. Reuse. Repeat. Sharing Learnings on Reusable Packaging. Available online: https://www.tescoplc.com/media/759307/tesco-reuse-report.pdf

Testa, F., Iovino, R., Iraldo, F. (2020) The circular economy and consumer behaviour: The mediating role of information seeking in buying circular packaging. Business Strategy and the Environment, 29 (8), 3435-3448. https://doi.org/10.1002/bse.2587

Tonikidou, A., & Webb, T. L. (2024). Does providing information about the environmental benefits of reusable packaging systems for consumer products increase consumers' willingness to use them? Sustainability, 16, 6599. https://doi.org/10.3390/su16156599

Unpackaged (2022). A Just Transition to Reusable Packaging. Available online: https://rethinkplasticalliance.eu/ressource/a-just-transition-to-reusable-packaging/

Wheeler, K., Glucksmann, M. (2015). It's Kind of Saving them a Job isn't it?' The Consumption Work of Household Recycling. The Sociological Review, 63 (3), 551-569. https://doi.org/10.1111/1467-954X.12199

Wiefek, J., Steinhorst, J., Beyerl, K. (2021) Personal and structural factors that influence individual plastic packaging consumption—Results from focus group discussions with German consumers. Cleaner and Responsible Consumption, 3, 100022. https://doi.org/10.1016/j.clrc.2021.100022.

Wood, W., Rünger, D. (2016). Psychology of Habit. Annual Review of Psychology, 67, 289-314. https://doi.org/10.1146/annurev-psych-122414-033417

WRAP (2021). Plastic Tracking Survey 2021: Behaviours, attitudes and awareness around plastic waste. Available online: https://plasticspolicy.port.ac.uk/resource/plastics-tracker-report-2021/

WRAP (2022). Behaviour Change Interventions to Increase Citizen Participation in Reuse and Refill Systems. Available online: https://www.wrap.ngo/resources/report/increasing-citizen-participation-reuse-and-refill-systems

Zero Waste Europe (2023). The economics of reuse systems. Available online: https://zerowasteeurope.eu/library/the-economics-of-reuse-systems/

7. Annexes

Annex A: Overview of literature that identifies factors associated with consumer interaction with reuse systems

	Access and Availability	Awareness	Communication	Competencies	Convenience	Cost	Demographics	Environmental attitudes and beliefs	Habit
Bring It Back Fund 2024		■	■		■	■		■	■
City to sea 2023a	■		■		■	■		■	
City to Sea 2023b	■	■	■	■	■	■	■	■	■
EMF 2019	■	■	■		■	■			
EMF 2023									
Hubbub 2022	■		■		■	■		■	■
IGD 2021	■	■	■		■	■		■	
Kantar public 2021		■	■		■			■	
Recoup 2023	■		■		■	■		■	
Tesco 2022	■		■		■	■		■	
Unpackaged 2022	■		■		■	■			
Wrap 2021	■		■		■	■	■	■	
Wrap 2022	■		■	■	■	■		■	
Baird et al. 2022							■	■	
Bocken et al. 2022	■	■			■	■		■	
Bradley & Corsini 2023		■	■		■	■		■	

Coehlo et al. 2020	■		■		■	■			
	Access and Availability	Awareness	Communication	Competencies	Convenience	Cost	Demographics	Environmental attitudes and beliefs	Habit
Du Rietz & Kremel 2023		■							
Escario et al. 2020							■	■	
Fuentes et al. 2019			■	■	■				■
Greenwood et al. 2021	■				■	■		■	
Herweyers et al. 2024	■	■	■	■	■	■		■	■
Jiang et al. 2020	■				■	■			
Kazançoğlu et al. 2024	■	■	■		■			■	
Keller et al. 2021		■						■	■
Klug & Niemand 2021								■	
Kunameneni et al. 2019		■			■	■		■	■
Louis et al. 2020	■			■	■			■	■
Miao et al. 2023				■	■	■		■	■
Nicolau et al. 2022		■			■	■	■	■	
Novoradovskaya et al. 2021			■			■			■
Schuermann & Woo 2022					■	■	■	■	
Shah & Yang 2023								■	
Šuškevičė & Kruopienė 2020	■		■			■			
Tenhunen-Lunkka et al 2024	■				■	■		■	■

Testa et al. 2020									
Wiefek et al. 2021									

	Hygiene	Packaging design	Product	Reuse type	Social norms	Staff engagement	Systemic factors	Technology
Bring It Back Fund 2024								
City to sea 2023a								
City to Sea 2023b								
EMF 2019								
EMF 2023								
Hubbub 2022								
IGD 2021								
Kantar public 2021								
Recoup 2023								
Tesco 2022								
Unpackaged 2022								
Wrap 2021								
Wrap 2022								
Baird et al. 2022								
Bocken et al. 2022								

	Hygiene	Packaging design	Product	Reuse type	Social norms	Staff engagement	Systemic factors	Technology
Bradley & Corsini 2023		■			■			
Coehlo et al. 2020								
Du Rietz & Kremel 2023		■		■	■			
Escario et al. 2020					■			
Fuentes et al. 2019					■			
Greenwood et al. 2021		■		■	■			
Herweyers et al. 2024	■	■			■		■	
Jiang et al. 2020	■				■			
Kazançoğlu et al. 2024	■		■		■			
Keller et al. 2021					■			
Klug & Niemand 2021								
Kunameneni et al. 2019		■	■				■	
Louis et al. 2020								
Miao et al. 2023	■	■	■	■	■			■
Nicolau et al. 2022								
Novoradovskaya et al. 2021								
Schuermann & Woo 2022	■			■				
Shah & Yang 2023								
Šuškevičė & Kruopienė 2020		■			■		■	

Tenhunen-Lunkka et al 2024								
Testa et al. 2020								
Wiefek et al. 2021								