A remote ethnography methodology to gain packaging behaviour insights

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Abstract
Remote ethnography requires the observation of human interaction in the natural world without the researcher being present. Well-established in industrial and user experience design remote ethnography provides insight into the user’s behaviour whilst completing a specific task in a defined environment. Designers in established fields such as Design for Sustainable Behaviour have applied this behavioural understanding to develop interventions to positively adapt unsustainable behaviours. Existing research techniques have evidenced limitations in fully understanding consumer packaging disposal behaviour, with a clear gap in behavioural insights with packaging used out of the home. A novel mixed-methods approach was developed using remote ethnography to explore consumer food-to-go packaging disposal behaviour out of the home, providing insights which could be evaluated for their application within the packaging development process. In explaining the new methodological approach, this paper (a) proposes a mixed-methods approach by which packaging developers can better understand packaging disposal behaviour out of the home, (b) explains this research method in the context of a food-to-go packaging disposal case study and (c) evaluates the value of the mixed-methods approach within the food packaging development process.

KEYWORDS
circular economy, consumer behaviour, food packaging, packaging development, remote ethnography

INTRODUCTION

The UK food packaging industry is, at present, in a complicated political and ethical situation, from concerted pressure from NGOs (enacting, e.g., the UN’s Global Sustainable Development Goals,\(^1\)) to reduce the environmental impact of single-use plastic packaging,\(^2\) through to the threat of ‘business as normal’ from the UK Government via packaging legislative measures.\(^3\)

In addition, since 2015, there has been significant global change in consumer eating habits, with an increase in the purchasing of convenience foods, evidenced by the rise of food-to-go (FTG) products. In 2019, this was found to be most prevalent in urban areas, with the sector valued at £2.9bn.\(^4\) Prior to the Covid-19 pandemic, three in five consumers in the United Kingdom regularly ate lunch out of the home (OOH), with 16- to 44-year-olds most likely to purchase lunch on-the-go products such as sandwiches, wraps, sushi and prepared salads, as they were too busy to make their own.\(^5\) Pre-packaged FTG products, often utilising single-use plastic packaging, have convenience of use, durability and unit price cited as decision-making factors during the purchasing phase.\(^6\)

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Currently, from design conception to end of life disposal, FTG packaging goes through a complex lifecycle, alongside that of the food product, involving multiple stakeholders. Important decisions must be made at each point in the lifecycle, to ensure that the pack safely and efficiently performs, minimising the waste of both packaging materials and food products. Once purchased, the packaging and product must fulfil the consumer’s functional needs allowing ease of access, handling and disposal. Once the food product has been consumed, the consumer must decide the end-of-life route for the packaging: reuse, recycle or landfill. However, there is concern that although there is rapid development of FTG-packaged products, the recycling infrastructure for these packs is lagging, limiting the responsible disposal of FTG packaging OOH. With the British Plastics Federation outlining the investment required in the United Kingdom’s recycling infrastructure to meet their vision of 1% of plastic waste going to landfill by 2030. This shifting socio-political landscape will necessitate the need for food packaging to move from linear systems of ‘take–make–dispose’ to more circular approaches, such as refill and reuse systems as outlined by the Ellen MacArthur Foundation in 2019. Ultimately, however, the packaging sector is challenged with changing society’s value perception of plastic packaging from harmful waste source to a useful resource, putting an end to the throwaway culture. Consumer behaviours, such as irresponsible disposal of plastic, the United Kingdom’s insufficient recycling infrastructure and the lack of clear policy approaches, are being attributed as fundamental barriers to success.

A further issue is the shortfall of existing academic research focussed explicitly on recycling behaviours OOH, compared to within the home. McDonald and Oke compared the recycling at home with at work within their research on UK behaviours. They conducted a questionnaire of 220 households in Scotland, asking participants to explain how they dispose of waste. They found that disposal behaviours between different contexts are not automatic or consistent. They concluded that “since an individual’s behaviour is shown to vary across materials, as well as across contexts, this challenges the very notion of the recycler.”

But disposal is a process constituted of a series of decision-making acts, including when to stop using a product and how to dispose of it. Daae et al. believed that Design for Sustainable Behaviour researchers focus more readily on the use phase of a product, which is its most functional stage and where it is viewed to have its greatest environmental impact. They raised the importance of considering the true behaviours of consumers during the disposal phase as ‘return, sort or separate’, rather than on the industrial processes normally phrased ‘refurbishment or recycling’, as these describe the consumers actual disposal behaviour and could aid the development of CE goals when considering user behaviour.

As evidenced by the findings from a packaging stakeholder workshop, conducted by the lead author Clark, the existing development process for FTG packaging is linear, with limited engagement with consumers, with the speed of project turnaround and cost to implement seen as barriers to conducting consumer behaviour studies within the existing packaging development process. There is, therefore, a significant need for a more industry-appropriate research method to improve understanding of disposal behaviour OOH as the packaging industry attempts to transition from linear to circular system solutions.

1.1 Improving behavioural research methods

The term ‘mixed methods’ is commonly used to describe research design where there is a substantial element of qualitative data collection as well as quantitative data collection in the same research project. Cresswell and Plano Clark, amongst other researchers, believe that by using a mixed-methods approach, a stronger understanding of the subject under study may be achieved by comparing different perspectives from both types of data.

This paper proposes the use of a mixed-methods approach to better understand the multiple factors affecting consumer behaviour with FTG packaging used OOH. A remote ethnographic approach was developed to collect data from consumers to better understand the facilitating conditions which influence their food packaging disposal behaviour. A semi-structured interview and Self-Reporting Habit Index (SRHI) survey were used to capture the impact of consumer’s intentional and habitual behaviours. A triangulation method of data collection and analysis was applied to create a robust methodology. A thematic analysis of the data collected led to the development of 10 insight case studies, helping to define the differences in consumer behaviour with FTG packaging disposed OOH.

2 | AIM AND OBJECTIVES OF THE STUDY

The aim of this study was to develop a mixed-methods approach which can be used to capture packaging disposal behavioural insights OOH, considering the influence of habits, attitudes and facilitating conditions on consumers behaviour.

This objectives of the study were as follows:

a. to develop a research method by which packaging developers can better understand packaging disposal behaviour OOH;

b. to trial the research method through a study of lunch time behaviours of millennials eating FTG products OOH;

c. to evaluate the value of the research method and its outcomes within the food packaging development process.

3 | DEVELOPING THE MIXED-METHODS APPROACH

In their scoping study with UK food packaging stakeholders, Clark et al. found that there is a large spectrum of solutions when transitioning the food packaging industry to the circular economy
(CE). However, in selecting the best solution decision makers must consider the supply chain constraints and the consumer’s behaviour towards new solutions.20 This established the importance of understanding consumer behaviour to aid the development of packaging in the transition to more circular solutions, and the need for practical research methods industry could deploy.

A further study conducted by Clark et al.7 with 15 UK FTG packaging development stakeholders confirmed a reliance on online surveys to gain consumer insights, with focus groups only used within innovation projects for risk management purposes. Both research approaches are limited in value as they are detached from the real-life context of using and disposing of packaging and rely on what consumers say they do. This identified a need for a new ‘fit for purpose’ research method for the UK food industry, which could be practically applied within their development process. It would need multiple research methods in its approach to capture what consumers say they do, but more importantly observe what they really do within a real-life context. In the following sections, the process of developing a mixed-methods research approach, harnessing a technology-enabled remote ethnography technique, is explained using examples from existing literature. A case study then demonstrates its application within the FTG packaging context.

3.1 Developing a remote ethnography mixed-methods approach

The following section will explain the development of a research method, utilising existing behavioural science and research methodologies as evidence for the chosen mixed-methods approach.

3.1.1 Behavioural science: Design usefulness

Existing psychology-based consumer behaviour models, such as the theory of interpersonal behaviour (TIB) from Triandis, the COM-B System from Michie et al.,21 and the augmented model of behaviour from Wilson,22 broadly consist of three main factors which combine to determine a person’s behaviour. These three factors are as follows:

- Intentional processes—including attitude, social factors and affecting factors;
- Facilitating conditions—including contextual cues and contextual factors;
- Habitual processes—including the frequency of past behaviour and automaticity of behaviour.

Jackson discussed the internal and external factors which can influence consumer behaviour with Daee and Boks23 explaining how best to investigate the impact of each factor.23 Internal factors exist within the user such as intentional and habitual processes and include attitudes, values, habits and personal norms. They are factors that users are generally conscious of and are best investigated through communicating with users. External factors exist outside the user such as facilitating conditions and include objective constraints and social norms. Operating unconsciously, consumers are usually unaware of these external factors, and they are best investigated by studying what users ‘do’. Both factors were considered when designing the mixed-methods approach for this research study.

The proposed augmented model of behaviour, illustrated in Figure 1, considers the influence of both behavioural (internal) and contextual (external) factors on the resulting consumer action and has highlighted a need for a research method that considers these when exploring consumer FTG packaging disposal behaviour OOH.

The method for this research study was planned and conducted using Clark’s24 updated version of the augmented model of behaviour as the guide to explore the impacts of habits, intentions and facilitating conditions on the FTG disposal behaviour of millennials OOH.24

3.1.2 Methods for investigating internal factors: Surveys and interviews

One highly publicised method for investigating internal factors affecting behaviour is by using a survey. There are pros and cons to using a survey to obtain behavioural data as outlined by di Sorrentino et al.25; see Table 1. These factors were considered by the investigator when developing this mixed-methods approach.

Surveys can also be used to measure factors of behaviour such as habits. One of the most used habit measurement tools is Verplanken and Orbell’s SRHI.26 Verplanken and Orbell27 found that the SRHI tool may be useful to determine or monitor habit strength without measuring behavioural frequency.27 Darnton et al.28 who applied the method in their research, confirmed that measuring habit strength is essential when designing interventions and selecting which is most suitable.28 The findings from a habitual disposal behaviour study by the lead author indicated that the SRHI tool cannot be used in isolation to determine disposal behaviour, as other factors may be influencing their actions.29 Due to the levels of inconsistency within the habit strength results, the SRHI tool would be used most effective as part of a broader study which also considers the impact of consumer intentions and contextual factors which can influence behaviour. Understanding habitual behaviour and what consumers say they do is only one part of the behavioural understanding; researchers also need to understand what they do, in context.

Interviews can be used to question participants on what they say they do, allowing the researcher to find critical moments in their behavioural routines, providing insights into the intentions and facilitating conditions which influence their behaviour. White et al.30 found from applying a diary and interview method to observe food wastage within the home that the interview made the participants more aware of their current habits allowing them to make a connection with the behaviours under enquiry.30
3.1.3 Methods for investigating external factors remotely: Diary studies

Remote ethnography requires the observation of human interaction in the natural world without the researcher being present. Possible methods include asking a participant to video their actions, using social media to observe the participant interaction or providing a diary to record their actions. Crouch and Pearce (2012) praised the application of the diary method for designers as it allows them to "observe how people engage with particular environments, artefacts, or..."
TABLE 1 Pros and cons of using a survey research method (diary studies outlined previously).

| Pros of using a survey | Cons of using a survey |
|------------------------|------------------------|
| Significant research efforts have been made towards the development of empirically validated questionnaires for specific variables of interest, such as intentions to perform a specific behaviour or attitudes towards the environment. | They often measure only intention but not the actual behaviour. This is particularly relevant in the context of sustainable behaviour where people are likely to provide socially acceptable answers, rather than the truth. |
| Researchers may access a large sample of people and question them not only about their behaviour but also about psychological variables such as their attitudes, beliefs and expectations. | Research has shown that thinking ‘green’ is often not the same as acting ‘green’. Possible reasons for this include the fact that people tend to overstate their engagement in behaviours that are socially desirable. |
| Surveys allow for a high degree of external validity, in the sense that they capture how people think ‘out there’. | The way a questionnaire is designed is important and may substantially affect the findings. |

3.1.4 Using a combination of research methods

Ultimately, a robust mixed-methods approach was required, that was easy to apply to gain rich data to establish insights based on actual data, not marketing presumptions. Daae and Boks stated that “the combination of observation and dialogue may improve the level of detail and nuances that can be investigated through the methods and thereby provide richer datasets.” White et al. found from their research using a diary and interview method to observe food wastage in the home that the interview made them more aware of their current habits allowing them to make a connection with the behaviours under enquiry. Through this deeper and more prolonged engagement, it could also be argued that rapport is built between researcher and participant, thereby reducing respondent bias and enhancing accuracy of data and cooperation and collaboration within the study. However, it should be noted that because there is a combination of data collection techniques at play in mixed-methods research, each instrument within the study needs to follow its own robust guidelines (relevant to each technique) to avoid researcher bias and improve validity of data. For example, when establishing language protocols for the diary study, the ‘friendly reminder message’ is constructed prior to the start of the data collection activity to avoid unstructured conversational language.

3.1.5 Analysing the data from a mixed-methods approach

An analysis technique suitable for examining multiple forms of data collected during a mixed-methods approach was required. This would allow packaging developers to make sense of the data and establish key insights which could be used in the development of packaging for a CE. Thematic analysis is a widely used tool for analysing qualitative data, with Braun and Clarke’s version of reflexive thematic analysis “the subjectivity of the researcher is seen as integral to the process of analysis.” This is an important consideration within this research study where industry practitioners bring prior knowledge of the packaging’s lifecycle, which may influence how they analyse the data. Braun and Clarke (2006) developed a 15-point checklist for thematic analysis which would guide the analysis stage.

The affinity diagrams method can be used for the code and theme building stages of analysis. It is a well-established industrial design analysis technique which can assist in the analysis of large volumes of data and complex information and helps to organise them into themes. It supports designers move from ‘data’ to ‘information’ by visualising links, patterns and connections between statements from different users. Terry et al. describe this stage of analysis as “a productive, iterative, reflective process of data-engagement.” The technique can be applied to manually examine each piece of evidence before assigning it a code, ultimately building themes and insights from the codes.
### 3.1.6 | Constraints

Published in Clark et al., the authors of this paper found that the main constraints to implementing consumer behaviour studies within the packaging development process are time and cost to implement, and the limited communication channels between supply chain stakeholders and consumers. Currently, it is only brands and retailers who are directly consumer facing, with access to their customers purchasing behaviour through loyalty card information and customer relationship communication channels. Prior research by the lead author had found that this is not the case for other stakeholders in the supply chain such as food manufacturers and packaging converters who are keen to “connect with the end of the supply chain (consumers)”.

There was a need for a straightforward, accessible method, which could prove the importance of gaining ethnographic insights from consumers disposing of packaging OOH. As the study was likely to be conducted with time poor participants, OOH, it was important to select methods that would be possible to apply within the limits of this context.

### 3.1.7 | The method

For a given packaging format used in a specified contextual environment, e.g., OOH, the mixed-methods approach consisted of seven stages. The aim for each stage and the chosen research method for the stage are outlined in Table 2. The outcome of conducting the research method is a series of consumer insights which could aid the development of packaging in the transition to a CE.

### TABLE 2 | The seven stages of the research methodology

| Stage | Aim of stage | Research method |
|-------|--------------|-----------------|
| Stage 1 | Identification of what users do. | Smartphone enabled diary study using WhatsApp. |
| Stage 2 | Establishing what users say they do. | Semi-structured interview. |
| Stage 3 | Compare what user does with what they say they do. | Comparison of diary storyboard output from Stage 1 with interview data from Stage 2. |
| Stage 4 | Measure the influence of habitual behaviour. | SRHI Survey. (Clark et al.) |
| Stage 5 | Analyse the qualitative data from Stages 1–3. | Thematic analysis using affinity diagramming method. |
| Stage 6 | Analyse the quantitative data from Stage 4. | Analysis using SPSS. (Clark et al.) |
| Stage 7 | Triangulate the data to form insights. | Reflective analysis approach as outlined in the case study. |

### 4 | APPLYING THE METHOD

The following case study evidences the process of applying the seven stages outlined in the previous section to gain consumer insights into FTG packaging disposal OOH. The study aimed to explore the lunchtime behaviour habits of a group of 11 millennial consumers who purchased FTG products regularly for their lunch from the UK food retailer Marks & Spencer (M&S). M&S is a well-recognised retailer in the UK selling FTG items within their large and small retail outlets across towns, cities, hospitals, train stations and motorway services. The aim of the study is to better understand the factors influencing FTG packaging disposal behaviour OOH.

Using the seven-stage approach outlined in Table 2, a WhatsApp enabled diary study was used to observe what participants did, combined with a semi-structured interview and survey to better understand why they do it. Stages 1–4 of the methodology outlined in the previous section were piloted with one participant who fell within the recruitment criteria, with minor amendments made to the study process before the main study was conducted in the United Kingdom between December 2018 and April 2019 (all data were collected prior to the Covid-19 pandemic).

#### 4.1 | Participants

When considering the ideal number of participants to conduct, the study with the work of di Sorrentino et al. and Faulkner was consulted. The former believes that “data from relatively small samples can still provide the required information to determine the characteristics of main user scenarios (e.g., average, upper or lower bound) realistically.” Faulkner concludes that when conducting usability testing using web-based collection sheets, increasing participant numbers from 5 to 10 makes a notable improvement to data confidence levels and with 20 participants increasing levels of certainty can be reached. When applying this study’s more complex mixed-methods approach, a sample size of 10–20 participants was viewed as ideal to capture most of the different factors affecting disposal behaviour.

For this case study, 11 millennial participants were recruited; all met a set of defined criteria:

1. were aged between 22 and 37 on the 1 December 2018;
2. shopped for their lunch at M&S at least twice a week;
3. ate lunch purchased from M&S OOH;
4. owned a smartphone with WhatsApp enabled; and
5. did not work for either M&S or a food packaging company.

#### 4.2 | Experimental set-up

Effort was made within the study to conceal the disposal behaviour focus of the research, reducing bias and allowing the researcher to observe normal behaviour and prevent participants adapting their behaviour for the study to ‘look good’. Participants were informed
that the study was interested in their lunchtime routine with M&S food products, including where they eat, who they eat with, what they do whilst eating and how they dispose of the packaging.

The ordering of the three parts of Main Study 1B was carefully planned so that it reduced bias for the proceeding sections. It was important that this part of the study was completed last as it focussed solely on the disposal behaviour of the consumer. If this stage had been run first, it may have skewed the results of the other two sections with the participant realising the study was focussed on their disposal and therefore altering their ‘normal’ behaviour to look more responsible.

4.3 | The process

The application of each of the seven stages within a case study example is explained in the following sections.

4.3.1 | Stage 1: Identification of what users do

This case study trialled a novel smartphone enabled diary method using WhatsApp. The method was selected as being specifically suitable for tech-savvy millennials who purchase FTG products during their lunch break from work.

Participants were asked to record their daily lunchtime diary using a WhatsApp conversation between the participant and the researcher using a series of photos, videos or text messages, some of which used emoji to convey the participants emotion. Participants had been provided with guideline information on the type of information they should capture within their lunchtime diary; this can be found in Appendix A. The study ran for 10 days, Monday to Friday over 2 weeks, with a minimum of two lunchtime diary entries required to be submitted by the participant each week. This provided the investigator with a minimum of 4 days of FTG lunchtime insights from each participant.

Each day, the investigator prompted the participant to conduct the study by sending a short, friendly reminder message. The researcher could prompt the participant for further information on a diary entry immediately when the entry was sent, preventing the participant from forgetting what had happened that day and helping to build a rapport between the participant and the investigator.

The diary messages were collated into daily ‘storyboards’, four for each participant, with each diary message being given a unique diary entry code. The storyboards, as illustrated in Figure 2, were used as evidence for the semi-structured interview stage, helping to guide the questions asked to the participant by the investigator.

4.3.2 | Stage 2: Establishing what users say they do

Within 2 weeks of completing Stage 1 of the study, participants were asked to complete Stage 2, a semi-structured interview. This was conducted either face to face or by phone depending on which was most convenient for the participant. The interview discussion was audio recorded and transcribed prior to analysis.

The semi-structured interview consisted of the following sections:

1. Background of the participant and their current work and lunch routine.
2. A review of the key insights from their lunchtime diary using the storyboard evidence.

The semi-structured interview aimed to dig deeper into the categories in Table 3 and better understand the evidence captured during the WhatsApp diary study.

4.3.3 | Stage 3: Compare what user does with what they say they do

This stage, conducted during the interview, involved the participant examining photographs of 10 M&S FTG products. These products were identified as being regularly purchased by millennial consumers in a study previously conducted by the author. Participants were asked to explain how they would dispose of each of the FTG packaging items OOH. Their responses were analysed both against their evidence from their diary entries, but also whether they matched the ‘ideal disposal’ of the packaging item identified by the investigator using either the packaging labelling or the WRAP recycling guidelines. This provided the investigator with evidence of the accuracy of their behaviour, as well as its consistency.

4.3.4 | Stage 4: Measuring the influence of habitual behaviour

The SRHI survey as published in Clark et al. and evidenced in Appendix B, was conducted directly after the interview. Each participant was asked to answer the questions in relation to the last day of their diary study; this included the FTG products they purchased, where they ate the products and where and how they disposed of them. This allowed a fair comparison between the participants and meant they were reflecting on a past behaviour instead of looking forward to how they might alter their behaviour following completion of the study.

4.3.5 | Stages 5 and 6: Data analysis

The investigator selected the most relevant data to answer the research objectives and used the affinity diagramming method to thematically analyse the data to establish key themes. It is these themes that would be used generate behavioural insights. The quantitative data from the SRHI survey was entered into SPSS for statistical analysis, using the same process as reported by Clark et al.29
Figure 3 shows one of the affinity diagrams developed during the thematic analysis of the qualitative data from Stages 1 to 3. The yellow parts are the transcription memo’s, the first layer of grouping is indicated by green post-it notes, the larger subthemes are defined by orange post-it notes, with bigger themes indicated with yellow post-it notes. The large pink post-it note defines the overall section theme. Please note the small pink post-it notes were used by the Investigator to indicate packaging material differences in the analysis stage.

### 4.3.6 Stage 7: Triangulating the data to form insights

The triangulation stage involved comparing the quantitative data from the SRHI survey in Stage 4 against the qualitative data from the diary study and semi-structured interview. This allowed the investigator to see if the level of consumer habit can be ascertained and whether there were any discrepancies between what was said in interview and survey stages against what was recorded within the WhatsApp diary stage.
Following the thematic grouping of the research outcomes, a reflective analysis process, as illustrated by Table 4, was undertaken to turn the outcomes into insights. Working across the columns from left to right, firstly, related evidence was grouped together; then it was questioned, asking ‘What does it mean?’. This was followed by the question ‘Why does it matter?’, establishing its impact on the disposal behaviour of Millennial consumers. The final stage was to conclude the insight gained by using this reflective process.

### 5 | RESULTS FROM APPLYING THE METHOD

The analysis process undertaken in Stages 5 and 6 enabled related data to be grouped, firstly into small groups, and then into larger family groups. The outcomes of this process formed multiple subgroups and three main groups: disposal knowledge, waste disposal behaviour and awareness and packaging and its context, as illustrated in Figure 4. The subgroups in Figure 4 and the insights established in Stage 7 were explored using affinity diagram mapping to determine if there were overarching themes which connected them together.
Analysis of the data captured during Stages 1 to 4 established the contextual and behavioural determinants which affect consumer disposal behaviour. Figure 4 also illustrates the colour coding of the thematic map to ascertain which determinant each of the subgroups aligned with.

The contextual determinants identified include the influence of the following:

- packaging materials, their labelling and functionality at the disposal stage;
- bins within the workplace, their accessibility, location, system consistency and associated disposal communications;
- external bodies such as work protocols or local authorities on the bin systems they provide; and
- lunchtime activities on the disposal process.

These contextual determinants were viewed as easier to resolve factors, with government legislation, workplace communications and local authority infrastructure investment each providing viable solutions.

The behavioural determinants include the influence of the following:

- consumer's recycling education;
- consumer's recycling knowledge;
- consumer's disposal behaviours of FTG packaging OOH;
- consumer's habits relating to packaging disposal OOH; and
- consumer's lifestyle at work compared to at home.

A third group of subthemes emerged which interplay between the two main themes, with Figure 5 illustrating the relationship...
Figure 5: Venn diagram exploring the main themes and the interplay between them (reproduced from Clark24).

Figure 6: An example of one of the insight sheets (reproduced from Clark24).
between the two main themes and the interplay themes that lie between them.

The interplay factors include the following:

- consumer’s deficit in recycling knowledge;
- consumer’s packaging disposal decision making process;
- the automaticity of consumer’s disposal behaviour;
- the self-awareness of consumer’s disposal behaviour and their awareness of others disposal behaviour;
- the convenience of consumer’s bins at work and the disposal areas level of hygiene;
- the packaging’s functionality aiding the disposal process; and
- how being busy at work influences consumer’s disposal behaviour.

The process of questioning each main outcome from this study and establishing what it meant and why it mattered produced 10 insights. Figure 6 illustrates one of the insight sheets developed from this stage, the full set are published in Clark.24 These insight sheets were vital when Clark et al.7 evaluated their value within the development process with packaging development stakeholders from the UK food packaging industry during an evaluative workshop.

### 5.1 Findings from using the mixed-methods approach

When conducting Stage 4 of the method as a standalone research method, Clark et al.29 found that the SRHI survey responses had
internal inconsistencies and should not be used in isolation to provide behavioural insights. The application of the survey as part of the mixed-methods approach proved that consumers’ answers to surveys and interviews, compared to their actual behaviour captured with ethnographic tools such as WhatsApp, do not always match. There were clear discrepancies found during the analysis between the evidence gained in Stage 1 of the method and the answers provided in Stages 3 and 4. This reinforced the concern of the researchers, and stakeholders in Clark et al.,7 that surveys are readily used by industry to gain quick insights, with consumers saying what researchers might want to hear, rather than displaying their natural behaviour. Adapting the work of Robson,18 a reflection of the pros and cons of using each traditional ethnographic study methods individually compared to a mixed-methods approach is presented in Table 5. By evaluating the data from each stage of the mixed-methods approach, a more holistic view of behaviour could be formed, which considers the influence of both behavioural (internal) and contextual (external) factors.

FIGURE 8  The importance of consumer behaviour understanding and supply chain collaboration, enabled by research methodologies (reproduced from Clark24)

FIGURE 9  Understanding the changes required in the FTG packaging development process (reproduced from Clark24)
During the evaluative workshop mentioned previously, Clark et al. presented the mixed-methods approach, before they questioned packaging development stakeholders about the strengths and weaknesses of using the research method in practice to gain behavioural insights. There was an even distribution of strengths and weaknesses captured, which are outlined below.

The strengths of the mixed-method approach included the following:

- Offered a good opportunity to gain consumer disposal behavioural insights, which would provide vital knowledge for the front end of the design process.
- Ability to capture unconscious consumer behaviour during the WhatsApp diary stage and then question them why during the reflective interview was seen as powerful.
- Opportunity for the method to be applied in user testing of prototype packaging formats to inform decision making within the supply chain.

The weaknesses of the mixed-method approach included the following:

- Concerns about the scalability of the method so that it could be conducted with a larger sample size to improve the representativeness of the insights for the target population.
- Investment in process time and resources form the current constraints in consumer testing, preventing the use of behavioural research studies.

6 | DISCUSSION AND CONCLUSION

6.1 | Learning from applying the method within the FTG packaging disposal case study

Academic tools used to capture consumer behaviour, although established for academic design research projects, are yet to be applied rigorously within the packaging sector. This research project has contributed a novel mixed-methods approach for understanding the disposal behaviour of consumers OOH and trialled it with FTG packaging. The case study evidences that that the research method captures not just what consumers say they do but also what they actually do. The application of the mixed-methods approach and the outcomes gained from conducting the case study investigation show clear benefits in using a mixed-methods approach to gain disposal behaviour insights, identifying the influence of internal and external factors on their behaviour. Using the academic theory based augmented model of behaviour to establish a research method has provided a robust, rigorous and repeatable research method that can become a routine and valued practitioner procedure.

The case study has proven a mixed-methods approach to be appropriate to capture rich data to better understand packaging disposal behaviour OOH. The findings have shown clear benefits in using WhatsApp as a diary tool to conduct remote ethnography. It provides multiple benefits including advancing the understanding of consumer behaviour with packaging and delivering a practical approach which can be applied within the packaging development process. The novel mixed-methods research approach gives packaging practitioners the capability to understand complex behavioural factors remotely from the consumer, overcoming the real-world constraints of observing consumers. The identified contextual, behavioural and interplay determinants provide opportunities for their application within the packaging development process to enable positive disposal behaviour change, aiding the transition to a CE.

The triangulation of mixed-methods approaches which established the data driven themes to build the consumer insight sheets was viewed positively by FTG packaging development stakeholders. It allowed packaging practitioners to thoroughly understand behaviours in real contextual environments with existing packaging formats. Barriers to applying behavioural studies were mainly viewed by practitioners as the investment both in time and money within the existing complex development process. However, these stakeholders did identify that the WhatsApp diary methodology offers a quick, accessible, cost-effective means to gather behavioural insights.

6.2 | The wider application of the mixed-methods approach

A novel and practical mixed-methods approach has proven its value in capturing and understanding what consumers do, versus what they say they do. The step-by-step method presented in Figure 7 demonstrates a robust and accessible approach to collect the quantity and quality of data to provide useful insights packaging development practitioners can use. The method is circular in its approach, with evaluated findings feeding back into the front end of the process, aiding the next stage of packaging development. When used by practitioners, it will iteratively develop, improving with each process application.

The outcomes from this research have shown the importance of consumer behaviour understanding to guide packaging development, but also need to need for a collaborative supply chain approach. As illustrated in Figure 8, the research method developed could be the enabler between these two requirements, allowing industry to gain vital packaging disposal insights, but also to engage with consumers, helping to build an avenue for knowledge transfer.
However, there is a need to adapt the current packaging development process to incorporate the mixed-methods approach, as illustrated in Figure 9. There is limited consumer engagement in the current process, although stakeholders believe it is consumer pressure which is driving change within the industry.\(^7\) Presently, user testing is often completed online, early in the process, conducted by marketing stakeholders who focus on functional and aesthetic packaging-based questions.\(^7\) To develop this two-way relationship with consumers, packaging developers need to improve their understanding of consumer behaviour with packaging, developing ways to obtain and utilise behavioural insights within the development process. These consumer insights need to initiate change within the development process, at every stage, not just the front end of the process. The shared knowledge and collaboration of multiple stakeholders must drive the continual review of consumer behaviour, influencing the iterative design of packaging. This will allow industry to quantify the sustainable value of collaborative design changes required in the transition to CE.

The findings from this research reinforce the importance of behavioural research studies focussed on packaging disposal behaviour to better understand the societal challenges facing the packaging industry. This will aid the development of packaging which consumers will responsibly and correctly dispose. Going forward, the behavioural focussed mixed-methods approach used in this research must be trialled within an actual FTG packaging development process and the insights, then applied to the development of packaging formats which encourage a positive change in disposal behaviour. These methods need to be tested to measure whether it provides the correct level of change in consumer behaviour required for a transition to a CE.

**DATA AVAILABILITY STATEMENT**

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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APPENDIX A

WhatsApp diary participant guideline document (reproduced from Clark24)

Many thanks for applying to be a participant in this Lunchtime Routine Research Study. We hope the following information will answer any questions you may have about the study, however if you have any further questions please don’t hesitate to contact the Researcher.

Project Aim
To better understand your lunchtime routine with M&S food to go products eaten out of the home.

Your Task
We would like you to complete a journal capturing your lunchtime routine with the food to go products you have bought from M&S.

The study will last from Monday to Friday for two weeks. You must purchase your lunch from M&S and record your lunchtime routine twice per week over the two week study.

The journal will consist of sending a series of messages, photos or videos about your lunchtime routine via a WhatsApp chat between yourself and the researcher (Nikki Clark). See page two for further information.

It is estimated that this task will take around 5-10 minutes each day you journal your lunchtime routine. The dates of the two-week time-frame can be agreed between yourself and the researcher.

Next stages of the research study
Following the completion of the journal study you will be asked to participate in a post study conversation and short survey either face to face or by phone with the Researcher (Nikki Clark).

It is estimated that this will last 30 minutes and will be a discussion surrounding your journal study and the evidence you captured within the WhatsApp chat. This will take place within two weeks after completion of your journal study.

Remuneration
On completion of the Journal Study, Conversation and Survey you will be given a £25 M&S gift voucher for your time and travel involved in completing the study.

How to join the project
Once you have read this instruction guide please confirm that you are happy to participate by sending an email to Nikki Clark. You will then be sent an informed consent form to complete and return.

For further information please contact the Researcher Nikki Clark
Email: n.clark@lboro.ac.uk Mobile: 07960 952975
“What kind of information should I send you about my lunchtime routine?”

1. What food products have you purchased that day? The store location and time.

2. Where and how you ate the food product? (e.g. How you open the packaging? Do you use cutlery to eat the food?)

3. Capture any tasks you are doing at the same time as eating that form part of your lunchtime routine with M&S food products.

4. Where and how you dispose of the food packaging? This could be a video, a photo or notes.

5. Anything else that you feel will help us to better understand your lunchtime routine with M&S food products.

6. The researcher may prompt you via WhatsApp if they would like further information.

This information can be given later that day if this is more convenient for you.

For further information please contact the Researcher Nikki Clark
Email: n.clark@lboro.ac.uk  Mobile: 07960 952975
APPENDIX B

SRHI survey (reproduced from Clark24)

Study 1A: In-store Consumer Survey

Please read the accompanying notes for participants before you answer the questions.

Your individual responses will be confidential and used anonymously.

Please answer the following questions about yourself:

How do you identify yourself? (please tick relevant box)

- Female
- Male
- In another way
- Prefer not to say

Which age group are you in? (please tick relevant box)

- 18 - 21
- 22 - 37
- 38 - 53
- 54 - 72
- 73 - 90
- Prefer not to say

Which of the following bests defines your occupation? (please tick relevant box)

- Employed
- Retired
- Student
- Unemployed
- Prefer not to say

Section A: Your lunchtime routine

A1. Please select the food to go items you have purchased from M&S for your lunch TODAY.
You may select as many as are relevant to you.

- Sandwich
- Wrap
- Salad pot
- Sushi
- Bakery Item
- Crisps
- Confectionery
- Fruit
- Other (please state)

A2. Where will you be eating the food to go items you have purchased TODAY?
Please select the one most relevant location for you.

- Work
- Home
- College / University
- Car
- Public Indoor Space
- Public Outdoor Space
- Public Transport
- Other (please state)

A3. Where will you dispose of your food to go packaging TODAY?
Please select one answer from the list below.

- Work
- Home
- College / University
- Car
- Public Indoor Space
- Public Outdoor Space
- Public Transport
- Other (please state)
Section A: Your lunchtime routine
A4. How will you dispose of your food to go packaging TODAY?
Please select one answer from the list below.

A. All in recycling bin AT HOME
B. All in recycling bin AT WORK
C. All in recycling bin in PUBLIC SPACE
D. In combination of general waste and recycling bins AT HOME
E. In combination of general waste and recycling bins AT WORK
F. In combination of general waste and recycling bins in PUBLIC SPACE
G. All in one general waste bin
H. Not in bin
Other (please state)

Section B: In relation to your answer to question A4.
Please answer each question using the scale 1 to 7, where 1 is you completely Agree with the statement and 7 is you completely Disagree with the statement.

“Disposing of my lunch food packaging as identified in question A4...”

B1: .....is something I do frequently

Agree 1 2 3 4 5 6 7 Disagree

B2: .....is something I do automatically

Agree 1 2 3 4 5 6 7 Disagree

B3: .....is something that belongs to my daily / weekly / monthly routine

Agree 1 2 3 4 5 6 7 Disagree

B4: .....is something I start doing before I realise I’m doing it

Agree 1 2 3 4 5 6 7 Disagree

B5: .....I would find hard not to do

Agree 1 2 3 4 5 6 7 Disagree

B6: .....I have been doing for a long time

Agree 1 2 3 4 5 6 7 Disagree

Would you be happy to be involved in future studies being run by Loughborough University and M&S?
If yes, please provide your email address so we can contact you.

Many thanks for your time today, we hope you enjoy your lunch!