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Understanding consumer disposal behaviour with food to go packaging in a move to circular, zero waste packaging solutions.

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Abstract: It is clear that a shift from the current make-use-dispose mentality of product consumption is required to move to the ideal of a Circular Economy (CE), where the world's resources are kept in use for as long as possible and their value retained. The idea of waste as a resource within a CE is not new, but the pressure to apply it to the Fast-Moving Consumer Goods (FMCG) packaging industry has been growing in momentum since 2016. Many research studies have focussed on recycling behaviours in the home, but few have looked at consumers behaviour with food to go (FTG) packaging disposed out of the home.

This research set out to assess the habit strengths of millennial consumers disposing of FTG packaging out of the home within the UK. The outcome of this research showed that millennial consumers have strong habits (upper quartile) in relation to their FTG packaging disposal routine. However, a significant percentage of participants were placing FTG packaging into incorrect recycling bins, showing there is still confusion amongst consumers about how to dispose of waste out of the home. Understanding of habit strengths at the packaging disposal stage could be one element to help in the design of interventions within packaging or waste system design, developing the responsible consumer behaviours required for a circular, zero waste society to exist.

Food to Go Packaging, Millennials and the move to a Zero-Waste Society

The UK's food to go (FTG) packaging industry is currently facing challenging times. There has been a global change in consumer eating habits, which has seen the rise of on the go eating. A rapidly growing market sector, FTG products are developing to satisfy the on the go eating needs of the time-poor Millennial UK consumer. However, the development of a range of convenient to use packaging solutions for this market sector is conflicting with the environmental concerns surrounding single-use packaging (Hamilton, Feit, Muffett, & Kelso, 2019). With growing pressure to move to a zero waste society (Cole, Osmani, Quddus, Wheatley, & Kay, 2014), designers are being challenged to develop sustainable packaging solutions to help facilitate the transition to a CE.

Food is the largest packaging end-use sector in the UK, representing 36.6% of overall sales in 2015 (Smithers Pira, 2014a, p.74). From a functional point of view packaging plays a vital

role in the protection, preservation, and promotion of FTG products in a complex UK food supply chain from food processor to store shelf to consumer use and disposal.

FTG is a growing market sector with Mintel reporting that three in five Brits ate lunch out of the home in 2018 (Mintel, 2018a). Indeed, the sector is predicted to grow by a further £2bn in the next three years, accounting for almost a quarter of eating out spending (Luttrario, 2019).

Millennials, the largest generation group in the UK population (Mintel, 2018b), are aged between 22–37 in 2018 according to Pew Research Centre (Shugerman, 2018) and split into two groups, younger and older Millennials (Macke, 2018). They have grown up in the digital age, have a good amount of disposable income, and are more open to new ways of doing things (Macke, 2018). However, a UK study completed in 2017 found that Millennials are the least likely group to recycle (Serco & Future Thinking, 2017). The Serco study found that for those aged 16-34 years old the most common reason for not recycling was confusion

over what can be recycled (Sercio & Future Thinking, 2017). The packaging of FTG products, often consumed by time-poor Millennials on the go, may be at risk of being disposed of in the most convenient method possible out of the home due to confusion and apathy (Sercio & Future Thinking, 2017).

By the year 2030, at least 70% by weight of municipal waste from households and businesses should be recycled or prepared for reuse, according to draft legislation adopted by the European Parliament (Martin, 2017). The availability of recycling and reuse facilities out of the home in England is less developed than the systems already in place in the home. This is in direct conflict with the aim of the UK Government who want to;

“move towards a ‘zero waste economy’. This doesn’t mean that no waste exists - it’s a society where resources are fully valued, financially and environmentally. It means we reduce, reuse and recycle all we can, and throw things away only as a last resort,” (GOV.UK, 2015).

The World Economic Forum and Ellen MacArthur Foundation have raised concern about the economic and environmental impact that single-use packaging is having globally (Ellen MacArthur Foundation, 2016; World Economic Forum, 2017). This has been widely publicized within UK media. A staggering 32% of plastic packaging globally escaped collection schemes, generating significant economic costs (World Economic Forum, 2016). Their solution is to move to a Circular Economy where the value of materials is kept within a closed loop economy for as long as possible.

Current approaches to CE solutions for packaging are typically focussed on transformative technological solutions (McDonough & Braungart, 2009; Gaziulusoy & Brezet, 2015; Lacy & Rutqvist, 2015; World Economic Forum, 2017; Ceschin, Fabrizio, Gaziulusoy, 2018) or legislative restrictions (McDonough & Braungart, 2009; GOV.UK, 2015; Moore, 2017; DEFRA, 2018). Academic and Industry white papers agree that sustainable design innovation is required alongside a better understanding of societal behaviour in order for CE systems to succeed (De los Rios & Charney, 2017; Lofthouse &

Prendeville, 2017; World Economic Forum, 2017).

Many research studies have focussed on sustainable packaging behaviours in the home (Rokka & Uusitalo, 2008; Williams, Wikström, Otterbring, Löfgren, & Gustafsson, 2012; Cole et al., 2014; Magnier, Schoormans, & Mugge, 2016; Wikström, Williams, & Venkatesh, 2016; Williams, Wikström, Wetter-Edman, & Kristensson, 2018), but few have looked solely at consumers behaviour with FTG packaging disposed out of the home. Therefore, there is a lack of knowledge that requires new research and insight that could support designers as they develop sustainable packaging solutions in the transition to a CE.

Understanding Consumer Behaviour

The study of consumer behaviour by social psychologists, especially within healthcare, has led to a range of models detailing different theories behind how behaviours are formed (Jackson, 2005). Triandis’ Theory of Interpersonal Behaviour (TIB), see Figure 1, is a well validated model which places habit as the priority influencing factor to behaviour, over intention and facilitating conditions (Darnton, Verplanken, White, & Whitmarsh, 2011). Verplanken and Aarts define habits as *“learned sequences of acts that have become automatic responses to specific cues and are functional in obtaining certain goals or end-states”* (Verplanken & Aarts, 1999, p.104).

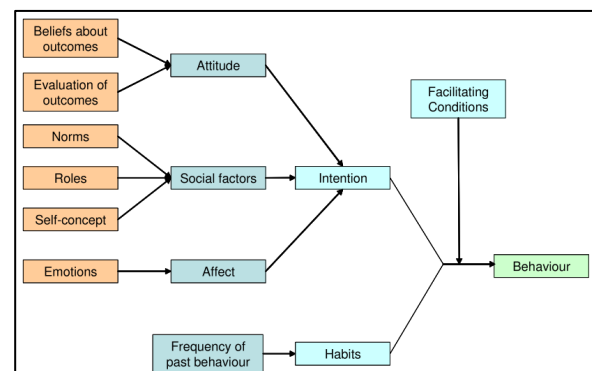


Figure 1. Triandis’ Theory of Interpersonal Behaviour (TIB), (1977) (Jackson, 2005) p.93-95

Wilson (2013), used the work of Triandis’ TIB and Verplanken’s model of Habits to develop an Augmented Model of Behaviour in relation to reducing domestic energy consumption within

UK social housing. The model includes habits, intentions (both attitudinal and societal) and facilitating conditions, such as contextual factors. Wilson’s findings illustrated the success of using the augmented design process towards the design and evaluation of a Design for Sustainable Behaviour (DfSB) strategy led intervention (Wilson, 2013; Wilson, Bhamra, & Lilley, 2016).

Verplanken and Orbell’s Self Reporting Habit Index (SRHI) is the most commonly used habit measure (Lally & Gardner, 2013). They found that the SRHI may be useful as a dependent variable, or to determine or monitor habit strength without measuring behavioural frequency, (Verplanken and Orbell, 2003, p.1313). The research by Darnton et al. confirmed that “*Measuring habit strength is important for designing in interventions, as it can help determine the type of intervention that is required,*” (Darnton et al., 2011, p.26).

Verplanken and Orbell (2003) developed a set of twelve questions which form the SRHI, six relating to automaticity of behaviour and six relating to frequency of behaviour. The twelve questions of the SRHI are exhibited in Table 1. The items are accompanied by response scales anchored by agree / disagree and preferably should contain five or more response categories. A 7 or 11-point Likert response scale is used.

Behaviour X is something I do...	
1.	I do frequently
2.	I do automatically
3.	I do without having to consciously remember
4.	That makes me feel weird if I do not do it
5.	I do without thinking
6.	That would require effort not to do it
7.	That belongs to my (daily, weekly, monthly) routine
8.	I start doing before I realise I’m doing it
9.	I would find hard not to do
10.	I have no need to think about doing
11.	That’s typically “me”
12.	I have been doing for a long time

Table 1. Twelve questions forming the SRHI (Verplanken & Orbell, 2003)

From their exploration of the research method within the healthcare sector they found that “*on the basis of features of habit; that is, a history of repetition, automaticity (lack of control and awareness, efficiency), and expressing identity, high internal and test retest reliabilities were found,*” (Verplanken and Orbell, 2003, p.1313).

This study is interested in the application of the Augmented Model of Behaviour within the packaging design process and whether better understanding of FTG packaging disposal habits out of home can aid DfSB packaging solutions in the transition to a CE. This study focusses solely on habits, the frequency of past behaviour, and automaticity, see Figure 2.

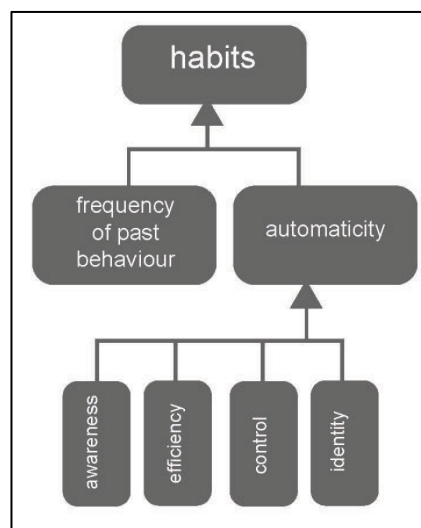


Figure 2. Diagram explaining the formation of habits (adapted from Wilson, 2013)

Darnton et al. used the work of Bargh (1994) to explain that “*through repetition, our behaviour acquires ‘automaticity’, which is defined as: lacking awareness of our action; lacking conscious intent; being difficult to control; and having efficiency*” (Darnton, Verplanken, White, & Whitmarsh, 2011, p.25). They continue to explain that to become automatic repetition must occur in a stable context (Darnton et al., 2011). This study aims to better understand the frequency and automaticity of habits by consumers disposing of FTG packaging purchased from one UK retail chain, out of the home.

Study on Consumer Disposal Habits

Method

For this study the focus is on understanding the habit strength of consumers disposing of FTG packaging out of home. A survey was developed to measure the habit strength of 100 Millennial consumers (aged 22–37) who bought FTG products for lunch from Marks & Spencer (M&S) stores (see Figure 3), to eat and dispose of out of home. M&S is a well-recognised retailer in the UK selling FTG items within their large and small retail outlets across cities, towns, train stations and motorway services.



Figure 3. A Typical M&S FTG retail display

The survey was designed to be conducted face-to-face with a participant, at lunch time, within a busy retail environment. Participants who had bought FTG items were approached instore by the research team (the authors of this paper; a design PhD student, a lecturer in Industrial Design and a senior lecture in Industrial Design) following purchase of their goods at the self-service checkout (see Figure 4). The surveys took place at one of three M&S stores located in the East Midlands, UK on nine separate occasions, between November 2018 and January 2019. Participants were provided with a Participant Information Form and Informed Consent Form before answering the questions.



Figure 4. A Typical M&S self-checkout area

The survey was split into two parts. Section A aimed to ‘warm up’ the participant into the study and enquire about the products they had purchased for their lunch, where they were going to eat the food and dispose of the packaging, and finally what kind of bin they would use to dispose of the packaging.

Section B used Verplanken’s SRHI method. Six SRHI response categories were used, in relation to the disposal behaviour identified by the participant in the previous question. Each response category was answered using a 7-point Likert scale where 1 equalled Agree and 7 equalled Disagree. Three of the SRHI questions related to automaticity of disposal behaviour and three related to frequency of disposal behaviour. Some of the questions were reworded from those in Table 1 in line with the behaviour under study (see Figure 5).

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

- B1: Is something I do frequently*
- B2: Is something I do automatically*
- B3: Is something that belongs to my daily / weekly / monthly routine*
- B4: Is something I start doing before I realise, I’m doing it*
- B5: I would find hard not to do*
- B6: I have been doing for a long time*

Figure 5. Example of SRHI questions in this study

The answers provided by the participants who completed the survey were quantitatively analysed using SPSS. Each response option was given a code to enter into the database,

allowing nominal data from Part A and ordinal from Part B to be analysed concurrently. Frequency tables and graphs were used to analyse the data output. Normality of data was tested using the Shapiro-Wilk test, the Internal consistency of answers to section B were tested using Cronbach's Alpha.

Findings

An overview of participants surveyed:

- 100 Participants aged 22–37 years on the day of the survey.
- All participants were purchasing at least one food to go item from an M&S store.
- The gender split of participants was: 57 Female, 43 Male.
- 95 participants were employed, 5 were students.

Following analysis, it was found that 75 participants were both employed and eat their lunch at work. It is this group of individuals that this study is most interested in and will be the focus of the findings in this section. Of this group 43 were female and 32 were male. The study found that all participants who ate their FTG products at work disposed of the packaging waste at work.

The frequency of FTG products purchased by participants in this study is shown in Figure 5. The most frequently purchased FTG items during this survey are listed in Table 2.

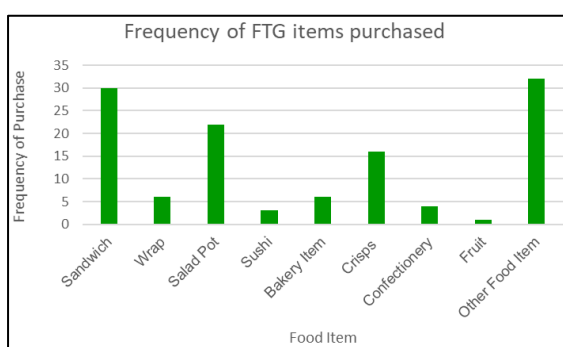


Figure 6. Frequency of FTG items purchased

Product	% who bought product	Typical Materials	Ideal disposal (WRAP, 2018)
Sandwich	40	Laminated carton board	Recycle ALL
Salad Pot	29	PET pot, flexible film lid label	Recycle SOME (PET pot)
Crisps	21	Multi-layer film	General Waste

Table 2: Top three products purchased in study.

Frequency of disposal method

Almost half of participants surveyed (49%), said that they were going to dispose of all of their packaging waste within a recycling bin at work on that day. In contrast 32% stated they would dispose of their FTG packaging within a general waste bin at work. Only 19% were intending on disposing of their FTG packaging waste within a combination of recycling and general waste bins at work.

Accuracy of chosen disposal method

As M&S current FTG packaging is produced from a range of recycled and non-recycled material formats, as illustrated in Table 2, it is unlikely that all packaging purchased by a participant would be suitable for recycling. The data was analysed further to understand if participants are placing the correct packaging into the bin at work using WRAP's Recycling Guidelines to determine the ideal disposal bin for each FTG pack type (WRAP, 2018).

This identified that thirty participants (40% of study) had selected the **correct** disposal method for the FTG products purchased that day. Forty-five participants (60% of study) selected the **incorrect** disposal method for the FTG products they purchased that day. Most participants in this study were selecting the **incorrect** disposal method for the range of FTG packaging items they purchased that day. This incorrect behaviour included recycling packaging materials which should not be recycled such as flexible films or throwing recyclable materials such as carton board and PET trays into general waste.

Comparison of Habit Strength

The habit strength of the participants who had chosen the **correct** disposal method was

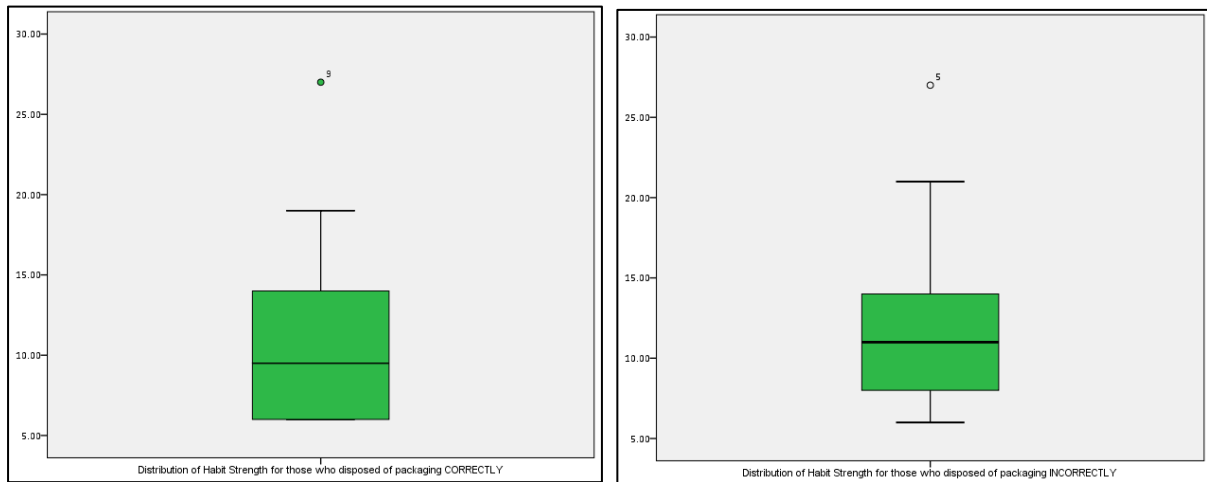


Figure 7. Box plots showing distribution of habit strength for those who disposed of packaging correctly compared to incorrectly

compared against those who had selected the **incorrect** disposal method. In this study the habit strength scale went from 6 (the strongest habit strength) to 42 (the weakest habit strength). Following the completion of a Shapiro-Wilk test for normal distribution the habit strength data for both correct and incorrect groups was found to be non-parametric. Therefore, the median and range of the two groups habit strength results were compared (Table 3).

	Correct Disposal Group	Incorrect Disposal Group
% with strong habit strength of 6	30	18
Median Habit Strength	9.50	11.00
Habit Strength Range	21.00	21.00

Table 3: Correct versus Incorrect disposal method habit strength analysis

The median score of 9.50 for **correct** disposal habit strength shows a stronger disposal habit compared to those of **incorrect** disposal where the median is 11.00. Both groups had a minimum habit strength value of 6.00 and maximum habit strength value of 27.00, therefore a range of 21.00. Figure 7 compares the distribution of habit strength for the two groups using box plots.

The **correct** disposal group have slightly strongly formed habits towards their disposal

behaviour, with a median of 9.50 compared to the **incorrect** group’s median of 11.00. With a strong habit strength they are more likely to continue this correct disposal behaviour on other occasions when disposing of packaging at work.

One third of the **incorrect** group had a habit strength score of 9.00 or lower. This shows that these individuals have strongly formed habits towards their disposal behaviour, selecting the **incorrect** disposal method for their FTG packaging on the day of the survey. With a strongly formed habit they are more likely to continue this incorrect disposal behaviour on other occasions when disposing of packaging at work.

Internal Consistency of the SRHI answers

The Cronbach Alpha test was used to measure the reliability of the SRHI data obtained in section B relating to habit strength. In order to be considered reliable the Cronbach Alpha score needs to be greater than .7 (Dancey, Christine P, Reidy, & Rowe, 2012). The Cronbach alpha score for the participants answers to section B is .595, proving that the data is not internally consistent.

There are variations in how the participants answered each of the questions in section B showing differences in automaticity and frequency of habit strength within their own answers. In order to be internally consistent we would have expected a participant with a strong habit to have answered all questions to section B with a 1 or 2, and those with weaker habit strength to have answered 6 or 7. This did not happen and we had a significant proportion of

participants answer at different points of the Likert scale.

Implications for packaging design and future research

Based on our findings a practical and scalable method has been developed which could be applied to other retail outlets, or in other countries, to better understand the automaticity of consumer packaging disposal habits.

Due to the low levels of consistency within the habit strength results the survey would be used most effectively as part of a broader study which also considers the impact of consumer intentions and contextual factors which can influence behaviour. Future studies will use the SRHI survey as part of a mixed methods triangulation approach, alongside a diary study and interview. The research will seek to better understand consumer behaviour by analysing what consumers say they do, compared to what they actually do in relation to the disposal of FTG packaging out of home.

Once packaging disposal interventions have been designed and implemented the SRHI could also be used to monitor the formation of habits amongst individuals in longitudinal studies to measure the success of behaviour change methods in a move to a CE using DfSB strategies.

Conclusions

Millennials are purchasing a range of FTG products packaged in a variety of convenient single serve formats requiring disposal in a combination of recycling and general waste bins. The time poor nature of their lifestyles is in direct conflict with the effort required during their lunch break to correctly determine and dispose of the FTG packaging in a range of bins at work. The findings from this study show that over half of participants surveyed disposed of their FTG packaging incorrectly, either placing recyclable materials into general waste or non-recyclable items into recycling. Either way this has implications for the quality, quantity, and consistency of supply of recycled packaging material within a zero-waste system, a goal of a CE.

The aim of this study was to better understand the habit strength of millennial consumers disposing FTG packaging purchased from one

UK retail chain, out of home. The findings indicate that millennial consumers have strong habits (upper quartile) in relation to their FTG packaging disposal routine whether they are correct or incorrect in their disposal behaviour. However, the study found internal inconsistencies within their responses which indicates that self-reported habits cannot be used in isolation to determine disposal behaviour. It is one part in a set of behavioural cogs which need exploring further in order to design interventions to increase sustainable packaging disposal behaviour in a transition to a CE.

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