Developing reusable packaging for FMCG

Consumers' perceptions of benefits and risks of refillable and returnable packaging systems

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Chapter 2
Developing Reusable Packaging for FMCG: Consumers' Perceptions of Benefits and Risks of Refillable and Returnable Packaging Systems

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2.1 Introduction

In Europe, plastic production has reached 58 million tonnes each year and 40% of plastic was used for (single-use) packaging. Only 40% of the plastic packaging was recycled in 2018, and thus most of the packaging waste is either incinerated or ends up in landfills [1]. As a consequence, the environmental impact of plastic packaging has received much societal attention in the past decades.

To counteract this environmental issue, some initiatives have been developed. For instance, the New Plastics Economy led by Ellen MacArthur Foundation has set out a vision for a global plastics system in which plastics never become waste—a circular economy for plastics. In 2018, 11 leading brands, retailers and packaging companies committed themselves to the goals of the circular economy and work towards 100% reusable, recyclable, or compostable packaging by 2025 [2].

According to the zero waste hierarchy for the circular economy, reuse is more effective than recycling in waste reduction and more value is retained. Reusable packaging can be defined as packaging or packaging components that have been designed to accomplish a minimum number of trips or rotations in a system for reuse [3]. In other words, the packaging is used multiple times by either the same or different users. Four different types of reusable packaging systems are distinguished: refillable by bulk dispenser, refillable parent packaging, returnable packaging and transit packaging [4]. Refillable by bulk dispenser allows consumers to refill their own packaging or the brand's packaging in-store or at a mobile truck. Refillable parent packaging encourages consumers to buy concentrated refills and dilute these refills in water in the parent packaging. Returnable packaging is returned by

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consumers when it is empty, cleaned and refilled for future use by suppliers. A deposit system is always involved [5]. Transit packaging is used in multiple cycles to transport goods in both B2B and B2C markets. In this research, we selected refillable by bulk dispenser and returnable packaging as our main focus areas. These two types of reusable packaging systems are interesting to investigate because the market interest for these packaging systems is growing in the Fast-Moving Consumer Goods (FMCG) industry [6]. Some recent examples are the reusable packaging systems of MIWA (https://www.miwa.eu/) and Loop (https://loopstore.com/). Furthermore, these types of reusable packaging systems require a novel and more demanding consumer interaction with an in-store infrastructure.

Even though interest in reusable packaging systems is growing, reusable packaging systems will only be successful if consumers are willing to adopt them in their daily shopping. While these systems bring several benefits, some risks could hinder their adoption. To date, the effects of different reusable packaging types on consumers' perceptions have not received much research attention.

Our research contributes to the literature by investigating consumers' attitudinal and behavioural responses towards two different reusable packaging systems (refillable packaging system and returnable packaging system) and compares these with their responses to disposable packaging. Understanding the perceived benefits and risks is useful for companies and designers developing new reusable packaging systems to further design their systems in a way that is attractive to a majority of consumers. Furthermore, policymakers can use these insights to facilitate consumers' choice for more sustainable packaging by increasing proper benefits and reducing risks.

2.2 Theoretical Background and Hypotheses

The theoretical framework of the current study is based on the widely used consumer decision-making model (EKB model). It divides the decision-making process into five steps: need recognition, information search, evaluation of alternatives, purchase and post-purchase behaviour [7].

This study focuses on consumers' evaluation of different packaging alternatives. In the evaluation phase, consumers engage in a subjective, comparative assessment of the risks and benefits provided by different alternatives [8]. Consumers balance these risks and benefits before arriving at a final purchase decision on the product alternative suitable to satisfy their needs. Our study draws upon the theory of perceived risk [9] and perceived benefits to investigate the extent to which reusable packaging systems (i.e. refillable and returnable packaging) differ from conventional disposable packaging in terms of consumers' perceived benefits and risks and purchase intention.

2.2.1 Perceived Benefits Related to the Adoption of Reusable Packaging Systems

With the growing awareness of environmental protection, consumers are changing their attitudes, behaviour and approach towards different products and consumption in general [10].

Past research has demonstrated that circular products and packaging that are designed to minimize material and energy usage, as well as solid waste, have a positive effect on consumers' perceived environmental benefits [8, 11–13]. It is estimated that reusable packaging systems (both refillable and returnable) could replace at least 20% of disposable plastic packaging and thereby significantly reduce waste [2]. It is also recognized as a more efficient option to retain the functionality of the material and packaging and achieve potentially large reductions in material use and environmental impacts [4]. Correspondingly, we expect that:

H1a: *The environmental benefits of reusable packaging systems (both refillable and returnable) will be perceived higher than the environmental benefits of disposable packaging.*

The environmental benefits of a product can also bring additional benefits for the consumer [14]. Previous research demonstrated that sustainable products can evoke a positive anticipated conscience, which is defined as consumers' expectations on how a product makes him/her feel in an ethical sense [12, 15]. Consumers often perceive acting sustainably as a moral choice. If acting more sustainably is an important personal goal, reusable packaging can make them feel good [16]. Consequently, we hypothesize that:

H1b: *People will feel more anticipated conscience for reusable packaging systems than that for disposable packaging.*

Besides making consumers ethically feel good due to their environmental benefits, reusable packaging systems have the potential to provide enjoyment to consumers through the use of novel and distinctive in-store infrastructure. Enjoyment refers to the fun and excitement gained by consumers in trying new experiences [17]. Consumers assess products and services, not just in terms of functional performance, but also in terms of the enjoyment or pleasure obtained from using the product [18]. This hedonic shopping motivation may predict consumers' green purchase behaviour [19]. Therefore, we assume that:

H1c*: People get more enjoyment from using reusable packaging systems than that from disposable packaging.*

2.2.2 Perceived Risks Related to the Adoption of Reusable Packaging Systems

According to the EKB decision-making model, consumers may also perceive risks related to the purchase of reusable packaging that may hinder their adoption.

Perceived risk is a multidimensional concept [20]. The investigation of perceived risk is one of the key research topics in the consumer behaviour domain [20].

A reusable packaging system is regarded as a product-service system; instead of simply selling a product, it also offers consumers a service. In both refillable packaging systems and returnable packaging systems, consumers are required to interact with an in-store infrastructure to obtain the product. Thus, the system performance is essential for consumers to adopt this innovative solution.

Performance risk is related to whether a product or service can perform correctly as expected and fulfil consumers' needs, as well as deliver desired benefits [21]. There is a significant relationship between operational performance and product complexity [22]. This indicates that if consumers perceive high performance and complexity risks in reusable packaging systems, they may decline to use them. In addition, using the new system may be perceived as requiring extra effort from consumers, who may be reluctant to do so [23]. As consumers are unfamiliar with the technology involved in reusable packaging systems, such as packaging identification and tracking [24], they may perceive the system as complex to operate and doubt whether it will perform as well as the solutions that they are familiar with. Furthermore, new systems will require extra interactions from consumers (e.g. scan the label, operate the digital interfaces and the bulk dispenser, use the application), which may be perceived as enhancing complexity. Therefore, we assume that:

H2a: *The reusable packaging systems (refillable and returnable) will be perceived to have higher performance risks in comparison to disposable packaging.*

H2b: *The reusable packaging systems (refillable and returnable) will be perceived as more complex to use in comparison to disposable packaging.*

Another type of risk that may be especially important for reusable packaging systems is contamination risk. The repeated usage of the packaging in a reusable packaging system may result in flaws and stains on the reusable containers. Such signs of prior usage may increase consumers' concern for hygiene or safety since these contamination cues signal that the products have been used and touched by others [25, 26]. Unlike refillable packaging which is reused by the same person, returnable packaging involves sequential reuse, in which the packaging is owned sequentially by multiple consumers who are provided with temporary access throughout the packaging lifetime [6]. Multiple contact sources will increase the level of contamination experienced by consumers [25]. Accordingly, we hypothesize that:

H2c: *The returnable packaging will be perceived as having a higher contamination risk than the refillable packaging and disposable packaging.*

2.3 Method

2.3.1 Design, Procedure and Measurements

An experimental study using a 3 (types of packaging: disposable vs. refillable vs. returnable) × 2 (product categories: shampoo vs. ketchup) between-subjects design was conducted. Each participant was randomly presented with one of the six conditions explained in an animation, and subsequently, asked to answer questions about the packaging shown in the animation in an online questionnaire. This questionnaire consisted of four sections.

First, participants were presented with a short animation of about 90 s explaining the packaging (system). Second, after watching the animation, participants rated a series of multi-item 7-point Likert scales (1 = strongly disagree, 7 = strongly agree) and 7-point semantic differential scales to assess their evaluation of the presented packaging. Specifically, we asked our participants to evaluate the following three perceived benefits: environmental benefits [13], anticipated conscience [27], and enjoyment [18]. We also asked them to rate three perceived risks including performance risk [21], contamination [25] and complexity [28]. Furthermore, we asked them to fill in their purchase intention [29].

Third, environmental concern [30] and involvement [31] were included to take into account individual differences that could potentially affect the dependent variables in our analysis. All measurement scales are included in Appendix 2.

Finally, demographic information (age, gender and education level) was collected in the last section of the questionnaire.

2.3.2 Sample

The participants were recruited from a Dutch consumer panel. The online questionnaire was sent to 810 individuals and 250 valid responses were received (53.2% male; age range: 21–91 years, $M = 59$ years). The response rate was 30.9%.

2.3.3 Stimuli and Scenarios

Shampoo and ketchup were chosen as the two stimuli products in this experiment. These product categories are relevant because food and personal care goods are two of the main categories for which reusable packaging is applied in the current FMCG sector [6]. Furthermore, the consumption of both shampoo and ketchup is relatively high in Dutch households and thus purchasing these categories would be a familiar setting for our participants. Both shampoo and ketchup are thick liquid products that are often packaged in similar plastic packaging in the market and participants utilize

both of them by squeezing. These similarities make shampoo and ketchup comparable.

The packages showcased in the animations were designed by the researcher based on the design characteristics of existing ketchup and shampoo packaging (Appendix 1). In all scenarios, a packaging design without a clear brand indication was created to prevent potential biases as a result of the brand impression or prior experiences [32, 33]. Both shampoo and ketchup packaging had the same shape, size and material, but differed in terms of liquid colour and label as a result of category differences. The same two packaging designs were used in three packaging types (i.e. disposable packaging, refillable packaging system and returnable packaging system), respectively. The solutions presented in animations illustrated the different roles of three types of packaging in a specific condition.

Each animation started with a situation where a character ran out of either shampoo or ketchup and needed to buy a new bottle at the supermarket. One of the three types of packaging solutions was then presented. In the disposable packaging scenarios, the character bought a product sold in disposable packaging, used it at home and disposed of the empty packaging in the PMD container. In the refillable packaging scenarios, the character chose empty plastic packaging and filled it with shampoo/ketchup from the bulk dispenser in the supermarket. Besides paying for the product, the character also paid a small amount for the refillable packaging. When the packaging was empty, the character washed it and refilled it again at the supermarket. In the returnable packaging scenarios, the character chose a pre-filled plastic packaging of shampoo/ketchup and paid for it with a small deposit for the packaging. When the packaging was empty, the character rinsed it, returned it at the supermarket and received the deposit refund. After a professional cleaning, the packaging was refilled and sold again.

2.4 Results

2.4.1 Evaluation of the Measurements

The reliabilities of all the scales were adequate with Cronbach's alpha and Spearman–Brown coefficient above 0.70. All measurement scales used in the questionnaire are summarized in Appendix 2.

2.4.2 Different Consumers' Responses Between Types of Packaging and Product Categories

A series of analyses of covariance (ANCOVAs) (or Kruskal–Wallis tests) were performed with types of packaging and product categories as independent variables,

and the different perceived benefits, perceived risks and purchase intention as dependent variables. We also entered involvement and environmental concerns [30] as covariates because they may influence consumers' responses to sustainable products. Table 2.1 shows all the results. In this research, we did not find any main effect for product category, suggesting that no significant differences were found between shampoo and ketchup. We did find significant main effects for the types of packaging, which we will elaborate on below. Finally, no interaction effects between product category and the types of packaging were found ($p > 0.10$).

2.4.2.1 Differences in the Evaluation of Perceived Benefits

We conducted ANCOVAs with the three perceived benefits as the dependent variables. However, for 'environmental benefits', the equality of variances could not be assumed ($p < 0.05$) and we therefore ran a Kruskal–Wallis test instead.

The results showed there was a significant difference among the three types of packaging for the perceived environmental benefits ($H(2) = 93.869$, $p < 0.001$). Specifically, both refillable packaging ($M_{\text{refillable}} = 6.08$, $p < 0.001$) and returnable packaging ($M_{\text{returnable}} = 5.98$, $p < 0.001$) were perceived as having greater environmental benefits than the disposable packaging ($M_{\text{disposable}} = 3.83$), which supported **H1a**. No significant difference was found between refillable packaging systems and returnable packaging systems ($p > 0.10$).

For anticipated conscience, both the covariates involvement ($p < 0.01$) and environmental concern ($p < 0.05$) were significant. A significant difference was found among types of packaging in terms of anticipated conscience ($F(2,245) = 44.331$, $p < 0.001$). Consumers experienced more anticipated conscience for both refillable ($M_{\text{refillable}} = 5.69$, $p < 0.001$) and returnable packaging systems ($M_{\text{returnable}} = 5.64$, $p < 0.001$) than for the disposable packaging ($M_{\text{disposable}} = 4.13$), which supported **H1b**. No significant difference was found between refillable and returnable packaging systems ($p > 0.10$).

Both involvement ($p < 0.001$) and environmental concern ($p = 0.01$) were significant covariates for the ANCOVA with the dependent variable perceived enjoyment. Consumers significantly obtained more enjoyment from both the refillable ($M_{\text{refillable}} = 4.69$, $p < 0.05$) and returnable packaging systems ($M_{\text{returnable}} = 4.84$, $p < 0.001$) than from the disposable packaging ($M_{\text{disposable}} = 4.03$) ($F(2,245) = 9.177$, $p < 0.001$), which supported **H1c**. No significant difference was found between refillable packaging systems and returnable packaging systems ($p > 0.10$).

2.4.2.2 Differences in the Evaluation of Perceived Risks

Because Levene's tests for homogeneity of variances were significant for all perceived risks, we ran three Kruskal–Wallis tests.

Table 2.1 Difference between three types of packaging

	1. Disposable	2. Refillable	3. Returnable	Statistics	Pairwise comparison	Covariates
Environmental benefits	3.83 (1.59)	6.08 (1.07)	5.98 (0.96)	$H(2) = 93.869$***	2 > 1***, 3 > 1***	
Anticipated conscience	4.13 (1.43)	5.69 (1.20)	5.64 (1.14)	$F(2,245) = 44.331$***	2 > 1***, 3 > 1***	Inv: $F = 10.501$*** EC: $F = 4.917$**
Enjoyment	4.03 (1.34)	4.69 (1.56)	4.84 (1.30)	$F(2,245) = 9.177$***	2 > 1**, 3 > 1***	Inv: $F = 13.649$*** EC: $F = 6.693$**
Contamination risk	2.11 (1.08)	2.50 (1.44)	1.80 (0.90)	$H(2) = 9.625$***	1 > 3*, 2 > 3***	
Performance risk	2.35 (1.16)	2.51 (1.38)	2.17 (1.00)	$H(2) = 1.469$		
Complexity	1.47 (0.72)	2.07 (1.06)	1.80 (0.95)	$H(2) = 24.241$***	2 > 1***, 3 > 1***, 2 > 3**	
Purchase intention	4.35 (1.55)	5.16 (173)	5.17 (1.65)	$F(2,245) = 7.618$***	2 > 1***, 3 > 1***	Inv: $F = 5.338$** EC: $F = 6.900$***

Note: The *F* statistics correspond to the results of the ANCOVAs
The *H* statistics correspond to the results of Kruskal-Wallis tests when the assumptions for parametric tests were violated (Levene tests are significant). *Inv* involvement in the product categories, *EC* environmental concern
* <0.10
** <0.05
*** <0.01

There was no significant difference between the three types of packaging for performance risk ($H(2) = 1.469$, $p > 0.10$), thereby failing to support **H2a**.

The results showed that there was a statistically significant difference between the three types of packaging in terms of complexity risk ($H(2) = 24.241$, $p < 0.001$). The complexity risk was significantly higher for both the refillable ($M_{\text{refillable}} = 2.07$, $p < 0.001$) and the returnable packaging system ($M_{\text{returnable}} = 1.80$, $p < 0.01$) than for the disposable packaging ($M_{\text{disposable}} = 1.47$), which supported **H2b**. Furthermore, the complexity risk was significantly higher for the refillable packaging system than for the returnable one ($M_{\text{refillable}} = 2.07$ vs. $M_{\text{returnable}} = 1.80$, $p < 0.05$).

For contamination risks, the results also indicated a statistically significant difference among the three types of packaging ($H(2) = 9.625$, $p < 0.008$). Specifically, refillable packaging system had a significantly higher contamination risk than returnable packaging system ($M_{\text{refillable}} = 2.50$ vs. $M_{\text{returnable}} = 1.80$, $p < 0.01$), which was opposing the direction of the effect hypothesized in **H2c**. No significant differences were found between refillable packaging systems and disposable packaging ($p > 0.05$) or returnable packaging and disposable packaging ($p > 0.05$).

2.4.2.3 Purchase Intention of Three Types of Packaging

In addition to perceived benefits and risks, we also ran an ANCOVA with types of packaging and the product category as the independent variables, and purchase intention as the dependent variable. Both involvement ($p < 0.05$) and environmental concern ($p = 0.01$) were significant covariates. The results showed that there was a statistically significant difference between the three types of packaging in terms of purchase intention ($F(2,245) = 7.618$, $p < 0.001$). Both refillable ($M_{\text{refillable}} = 5.16$, $p < 0.01$) and returnable packaging systems ($M_{\text{returnable}} = 5.17$, $p < 0.01$) triggered significantly higher purchase intentions than disposable packaging ($M_{\text{disposable}} = 4.35$). No significant difference was found between refillable packaging systems and returnable packaging systems ($p > 0.10$). This indicated that both reusable packaging systems are perceived as attractive solutions for consumers to replace single-use plastic packaging.

2.5 Discussion

This paper contributes to the literature on reusable packaging by showing that consumers' perceptions of reusable packaging systems are overall positive and consumers recognize various benefits. Both refillable and returnable packaging thus provide a promising solution to tackle the negative effects of common (plastic) packaging and thereby can contribute to the circular economy.

However, our results also showed that the perceived complexity was higher for reusable packaging systems than for disposable packaging. Future designers should thus focus on the simplification of reusing in all aspects. The reusable packaging

should be easily differentiated from the original pack. And the reusing process should be intuitive and inclusive with clear communication [34]. More information could be provided to guide on how to use the system easily and remind consumers to reuse the packaging. Moreover, we found refillable packaging systems were perceived as more complex to use than returnable packaging systems. One possible reason for this finding could be that, in the Netherlands, bottle recycling systems are common in supermarkets. Consumers are therefore already used to paying a deposit for their bottles and may have more confidence in their ability to interact with returnable packaging systems. This indicates people are more willing to engage with systems that they are already familiar with [35]. It also suggests that a familiar design may improve consumers' acceptance and adoption of new reusable packaging systems.

Our results also showed that contamination was higher for refillable packaging systems compared to returnable packaging systems, which contradicts our initial expectations. A possible explanation for this finding may be that while using the system in the supermarket, there may be a risk of spilling the product during the refilling process, resulting in an unclean and contaminated bulk dispenser. Besides, consumers might be more convinced by the professional cleaning system provided by the companies for the returnable packaging than their cleaning practice for the refillable packaging at home. More research should explore where exactly these risks emerge in the system to design new refillable packaging systems with fewer contamination risks and are easy to clean.

Although our study provides valuable implications for future designers and researchers, some limitations should be taken into consideration in future research.

First, the participants in this study are only Dutch people, who generally have high environmental awareness and concern [12]. This may positively affect the perceived environmental benefits and anticipated conscience towards different packaging options [12]. Future research could replicate this study into different cultures and contexts.

Second, we used hypothetical scenarios and tested perceptions through watching animations and filling in online questionnaires. As a result, we were able to test consumers' first impressions but not actual behaviours with reusable packaging systems. Considering that purchasing FMCG is mostly habitual and low-involvement, consumers may tend to make a choice by minimizing cognitive effort, rather than make an optimal choice [36]. Changing this habitual behaviour may require a lot of communication to inform consumers about the benefits offered by the new option. It is also essential to learn from the (failed or successful) existing reusable packaging systems, and the role of communication strategies [4]. Furthermore, the online study may lead people to give socially desirable answers and report a higher purchase intention towards reusable packaging systems in the survey than they really have in reality. It would be interesting for future research to study consumer responses when interacting with an actual system rather than watching animations to reduce the likelihood of socially desirable responses.

Third, we used plastic packaging in our study, but future research could also investigate how consumers perceive reusable packaging systems that replace other

types of packaging that may be perceived as less detrimental for the environment (e.g. carton boxes, glass jars) [37].

Fourth, although we did not find significant differences between shampoo and ketchup, future research could replicate the study for other product categories. For example, comparing responses about products that are used daily to products that are used less frequently could represent an interesting avenue for future research.

Finally, future research could investigate the effects of specific design interventions in the systems that may increase their adoption. For example, the system may provide more detailed feedback on the environmental impact of reusing packaging in order to further improve consumers' repeated purchase behaviours which are critical for actually realising the environmental benefits of reuse in the circular economy.

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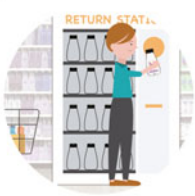
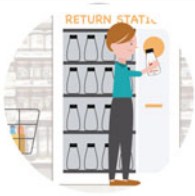
Appendix 1:Stimuli and Six Conditions Used in Questionnaire

Types of packaging	Disposable packaging	Refillable packaging system	Returnable packaging system
			
Stimuli 1: Shampoo	**Condition 1:** Disposable packaging for shampoo	**Condition 2:** Refillable packaging system for shampoo	**Condition 3:** Returnable packaging system for shampoo
			
Stimuli 2: Ketchup	**Condition 4:** Disposable packaging for ketchup	**Condition 5:** Refillable packaging system for ketchup	**Condition 6:** Returnable packaging system for ketchup

Appendix 2: Measurement Scales

Environment benefits [13] Unsing this shampoo/ketchup 1. Is bad for the environment/is good for the environment 2. Accelerates the deterioration of the environment/slows the deterioration of the environment 3. Increase pollution/reduces pollution	($\alpha = 0.95$)
Anticipated conscience [26] **(Strongly disagree/strongly agree)** 1. It would give me a good conscience to buy shampoo/ketchup in this packaging 2. I would feel good about buying shampoo/ketchup in this packaging	(α=0.95)
Contamination risk [24] **(Strongly disagree/strongly agree)** 1. I believe this shampoo/ketchup packaging is very unsanitary 2. I think this shampoo/ketchup packaging is contaminated 3. In my opinion, this shampoo/ketchup is dirty	($\alpha = 0.90$)
Performance risk [20] **(Strongly disagree/strongly agree)** 1. There is a chance that there would be something wrong with this shampoo/ketchup packaging 2. There is a chance that I would suffer some loss because this shampoo/ketchup packaging would not perform well 3. This shampoo/ketchup packaging is risky in terms of how it would perform	($\alpha = 0.89$)
Complexity risk [27] **(Not much at all/Very much) (Not many at all/A lot)** 1. How much instruction do you think you need in learning how to use this packaging? 2. How much knowledge is needed to use this packaging? 3. How much help is needed in taking this packaging into use? 4. How much effort do you think it costs to learn how to use this packaging? 5. How many people do you think will find use of this packaging complicated?	($\alpha = 0.90$)
Enjoyment [18] **(Strongly disagree/strongly agree)** 1. This shampoo/ketchup packaging is the one that I would enjoy 2. This shampoo/ketchup packaging would make me want to use it 3. This shampoo/ketchup packaging is the one that I would feel relaxed about using 4. This shampoo/ketchup packaging would make me feel good 5. This shampoo/ketchup packaging would give me pleasure	($\alpha = 0.95$)
Purchase intention [28] 1. Given the information above, I am likely to buy shampoo/ketchup in this packaging 2. Given the information above, I am willing to buy shampoo/ketchup in this packaging	($\alpha = 0.97$)
Environmental concern [29] 1. I make a special effort to buy products that are made from recycled materials 2. I have switched products for ecological reasons 3. When I have a choice between two equal products, I purchase the one less harmful to other people and the environment 4. I have avoided buying a product because it had potentially harmful environmental effects	($\alpha = 0.81$)
Involvement [30] 1. I am particularly interested in shampoo/ketchup 2. Overall, I am quite involved when I am purchasing shampoo/ketchup for my personal use	($\alpha = 0.71$)

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