

# CONSUMERS' PERCEPTION OF SUSTAINABLE PACKAGING IN THE FOOD INDUSTRY: AN ONLINE EXPERIMENT

## CONSUMERS' PERCEPTION OF SUSTAINABLE PACKAGING IN THE FOOD INDUSTRY: AN ONLINE EXPERIMENT

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**Abstract:** Consumers evaluate products and make purchasing decisions based on packaging and its sustainable aspects. This research investigated how different packages and their quality, eco-friendliness, expensiveness, and convenience affected consumers' intentions to purchase. Our sample comprised 299 French consumers of muesli cereals. We conducted an online choice experiment to analyze and measure consumers' perception of sustainable packaging, comparing three distinct experimental groups. Findings revealed that quality and environmental friendliness impact purchase intentions. Price sensitivity and environmental behavior showed to have moderation effects in the proposed research model. The reusable container is perceived as more expensive and less convenient when compared to other packaging types. We contribute to the existing literature in the food industry by providing additional insights into consumers' recognition processes in identifying sustainable packaging.

**Keywords:** Sustainable packaging, Consumer behavior, Purchase intention.

**Resumo:** Os consumidores avaliam produtos e fazem decisões de compra baseando-se nas embalagens e suas características sustentáveis. Esta pesquisa investigou como diferentes embalagens afetam a intenção de compra dos consumidores por meio da qualidade, posicionamento ecologicamente correto, custo e conveniência. Nossa amostra é composta por 299 consumidores Franceses de cereais. Conduzimos um experimento online para medir e analisar a percepção dos consumidores sobre embalagens sustentáveis, comparando três grupos experimentais. Os resultados revelaram que a qualidade e o posicionamento ecológico impactam a intenção de compra. Sensibilidade ao preço e

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comportamento ecologicamente correto mostraram efeito moderador no modelo de pesquisa proposto. Embalagens reutilizáveis são percebidas como mais caras e menos convenientes que os demais tipos de embalagens presentes neste estudo. Nós contribuimos para a literatura acadêmica da indústria de alimentos fornecendo detalhes adicionais em como os consumidores reconhecem e identificam embalagens sustentáveis.

**Palavras-chave:** Embalagens sustentáveis, Comportamento do consumidor, Intenção de compra.

## Introduction

Consumers intuitively understand packaging as a material structure that holds a product they want to purchase (Szocs et al., 2021). Packaging is the cornerstone of a company's marketing mix and can incorporate green elements without affecting its other functions (Olsson & Györei, 2002). Packaging provides protection (Robertson, 1990), information (Wyrwa & Barska, 2017) and marketing functions (Rundh, 2005) and may influence consumers' perceptions of safety (Siu & Wong, 2002), quality, and value as well as brand preference (Wang, 2013). Various studies have sought to understand which packaging elements influence consumers' perceptions, analyzing the effects of shape (Pantin-Sohier, 2009), size (Wansink, 1996), and visual and verbal claims (Magnier & Schoormans, 2015). The academic literature emphasizes the evolution of consumers' perceptions and that packaging components can be modified to overcome problems caused by traditional packaging.

The implementation of sustainable packaging is a topic still under investigated (Boz et al., 2020). Eco-friendly packaging aims to influence consumers' perceptions (Ketelsen et al., 2020) in terms of convenience (Steenis et al., 2017), price (Magnier & Crié, 2015; Scott & Vigar-Ellis, 2014), quality (Ertz et al., 2017; Magnier et al., 2016), and purchase intention (Prakash & Pathak, 2017). Therefore, consumers' responses to sustainable packaging (Boz et al., 2020) and, more precisely, to specific packaging solutions merit further investigation (Ketelsen et al., 2020). This study examined consumers' perceptions of specific (sustainable) packaging types and the consequent impacts on their purchase intentions. It contributes to the existing literature in the food industry by providing additional insights into consumers' recognition processes in identifying sustainable packaging (Popovic et al., 2019), offering a deeper understanding of the known discrepancy between consumer perceptions of packaging sustainability and the effective sustainability of such packaging (Steenis et al., 2017). It also validates Monnot et al.'s (2015) model by replicating it in another fast-moving consumer goods product category, that of muesli cereals.

From a managerial point of view, this study supports practitioners' understanding of how consumers perceive sustainable packaging and of the barriers that individuals face when switching to greener packaging. Moreover, given the strategic importance of communicating the eco-friendliness of packaging (Magnier & Crié, 2015) to inform consumers of its sustainable aspects and increase its acceptance (Ketelsen et al., 2020), this study offers insights on how

to communicate effectively with consumers. The literature demonstrates that consumers can misinterpret sustainable packaging elements (Steenis *et al.*, 2017), leading to marketing failures (Boz *et al.*, 2020). Using an experimental design with three distinct treatments and collecting complementing data through a self-administrated questionnaire, this inquiry investigated the roles of quality, eco-friendliness, expensiveness, and convenience and how they affected consumers' intentions to purchase muesli cereals.

## 2 Theoretical framing and hypotheses

Firms measure packaging's sustainability primarily through a life-cycle assessment in which consumers interpret the eco-friendliness of packaging according to the information sources accessible to them (Steenis *et al.*, 2017; Van Dam, 1996). A discrepancy exists between sustainable packaging measures and consumers' perceptions of them (Herbes *et al.*, 2020; Nguyen *et al.*, 2020). Due to informational constraints, individuals do not understand all changes in packaging or their consequences when purchasing. Researchers have identified several elements related to packaging that are considered to be associated with sustainability, creating classifications according to their characteristics (Magnier & Crié, 2015) or the life cycle of the product (Zeng & Durif, 2019). The taxonomy developed by Magnier and Crié (2015) was employed in this study, and their propositions regarding structural cues considered to conduct the experiment, which deals exclusively with packages' visual and tangible aspects.

In consumer behavior research, attribution theory (Heider, 1944) is used to explain how individuals assess and interpret information when confronted with specific stimuli. This theory has been used to explain how individuals who are confronted with changes in packaging search for information, analyze situations, and act (Monnot *et al.*, 2015; Monnot *et al.*, 2017). Individuals' perceptions of a product may be affected by information changes (Verbeke & Ward, 2006), so the experimental treatment was designed to affect individuals' judgments, reactions, and, consequently, purchase intentions.

### 2.1 Hypotheses

*Perceived quality* describes a consumer's perception of the overall quality or superiority of a product and its purpose in comparison to alternatives (Aaker, 2009). It is the result of a subjective individual analysis of the product's intrinsic and extrinsic attributes (Villarejo-Ramos & Sánchez-Franco, 2005; Zeithaml, 1988). Previous studies have shown that packaging can influence consumers' perceptions of a product's quality (Berkowitz, 1987; & Horsky, 2012; Monnot *et al.*, 2015; Schoormans & Robben, 1997; Venter *et al.*, 2010; Wang, 2013). The quality is perceived as stronger when the product is sustainable (Lee & Yun, 2015; McEachern & McClean, 2002) or presented in a sustainable format (Magnier *et al.*, 2016). Thus, we propose the following hypothesis:

**H1:** Packaging's perceived quality positively affects consumers' purchase intentions.

Packaging can influence consumer perceptions of a product's expensiveness (Inman *et al.*, 1990). Price has been identified as a key determinant in the decision to purchase sustainably

packaged products (Martinho et al., 2015), and environmentally friendly packaging is perceived as more expensive than traditional packaging (Magnier & Cri e, 2015). Given that individuals are sensitive to changes in price (Erdem et al., 2002), consumers may develop a financial risk perception if they perceive a product's price as high (Orzan et al., 2018). Therefore, the following hypothesis is proposed:

**H2:** Packaging's perceived expensiveness negatively affects consumers' purchase intentions.

Research has demonstrated a relationship between an individual's ecological awareness or environmental attitudes and the intention to buy and use sustainable alternatives (Bickart & Ruth, 2012; Kilbourne & Pickett, 2008), yet consumers have an imprecise understanding of packaging's environmental aspects (Herbes et al., 2020; Nguyen et al., 2020) given the limited sources of information available to them (Van Dam, 1996). Individuals base their environmental assessment of packaging on its visual and verbal ecological elements (Magnier & Cri e, 2015) as well as on the packaging's material (Lindh et al., 2015; Steenis et al., 2017), and previous scholarly studies have found that the choice of packaging material impacts consumers' perceptions of a product's environmental friendliness (Lindh et al., 2016; Monnot et al., 2017). Thus, we propose the following hypothesis:

**H3:** Packaging's perceived environmental friendliness positively affects consumers' purchase intentions.

*Convenience* refers to the level of effort that consumers must make to acquire a product (Scholderer & Grunert, 2005). Changes in consumption habits and lifestyles explain consumers' search for greater convenience when purchasing products (Draskovic, 2010). Convenience is a function of packaging as are transportation (Rundh, 2005) and health guarantees (Argo et al., 2006). Packaging convenience is perceived by consumers mainly through the packaging's material, size, and type of closure (Draskovic, 2010). Changes to the shape, size, or specific features of packaging can improve consumers' perceptions of packaging convenience and influence their purchase intentions (Olsen et al., 2007; Olsson & Gy orei, 2002). Regarding the specific segment of green consumption, studies have found that the convenience of packaging is an influential factor in purchase intention (Hao et al., 2019). Therefore, the following hypothesis is stated:

**H4:** Packaging's perceived convenience positively affects consumers' purchase intentions.

### 3 Methodology

This research conducted an online choice experiment to analyze and measure consumers' perception of (sustainable) packaging, comparing distinct experimental groups. The online approach was employed because it is more time efficient and reduces social biases. To reduce social desirability bias, the introduction to the choice experiment did not mention the objective of the research, i.e., understanding consumers' perceptions of (sustainable) packaging. Our sample comprised French adults who were regular consumers. Muesli was chosen because it represents an important product category in which packaging can be improved to reflect a sustainable approach.

Before answering the self-administrated questionnaire, the participants were assigned to one of three treatment groups. All the presented products indicated both the price and the quantity in grams. For the first experimental group, the product was presented in cardboard packaging with an indication that a transparent plastic bag was inside the outer box. The symbols indicating the product disposal method were enlarged for easier viewing. For the second experimental group, a reusable package was offered with information that it was a stainless-steel package and that a refundable deposit was required to purchase the product in that format. Information was also provided on how to use that type of packaging and about its waste and sustainability aspects. For the third group, stand-up packaging was presented with information that the packaging consisted of multiple plastic layers. The symbols on the packaging relating to the disposal of the product were also expanded for clearer visualization.

Regarding the measures, perceived quality was measured with three items adapted from Magnier *et al.* (2016), perceived expensiveness with two items adapted from Monnot *et al.* (2015), perceived environmental friendliness with three items adapted from Chen *et al.* (2015), perceived convenience with two items adapted from Steenis *et al.* (2018), and purchase intention with three items adapted from Steenis *et al.* (2018). As moderators, this study measured price sensitivity with three items adapted from Monnot *et al.* (2015) and environmental behavior with four items adapted from Kilbourne and Pickett (2008). Sociodemographic data were collected through multiple-choice questions. The respondents' profiles included their gender, age, nationality, level of education, employment status, annual income, household size, and household composition. The questionnaire and its items were designed in English and later translated to French and revised by a native French speaker. A pre-test was conducted with 20 respondents before the final questionnaire was distributed between November 7 and December 2, 2020.

Once the data collection had ended, the answers were examined to search for responses that were inconsistent with the aim of the research. Respondents who had never purchased or did not consume muesli cereals were not considered for data analysis. Of the initial 442 responses collected, 143 were omitted, leaving 299 valid responses for data analysis. The participants were mostly French (94.31%), female (65.22%), aged between 18 and 23 years (75.25%), and students (75.59%), and a majority had no source of income (40.80%). The respondents were randomly assigned to the treatment groups. The final sample comprised 114 responses in the cardboard box group, 98 in the reusable container group, and 87 in the stand-up packaging group. The study used Smart PLS 3.3.3 to analyze the data using structural equation modelling and conducted multi-group analysis (MGA) to differentiate consumers' perceptions of the three types of packaging assigned to the experimental groups.

## 4 Results

### 4.1 Evaluation of the Measurement Model

The measurement model analyzed relationships between constructs and the items making up those constructs, and latent variables were considered under a reflective measurement model. Therefore, the items are manifestations of the endogenous latent variables and are thus reflective

items (Hair et al., 2016). According to the literature, the outer loadings must be higher than 0.7 to be considered significant (Hair et al., 2011; Hulland, 1999). In this study, all the indicators had an internal consistency reliability higher than 0.7; therefore, no indicators were removed from the model. Both Cronbach's alpha and composite reliability may be used to measure the internal consistency reliability of a model. According to the literature, both indicators should be higher than 0.7 (Hulland, 1999), and a value below 0.6 indicates low internal consistency reliability (Hair et al., 2016). In this research, the results of both Cronbach's alpha and composite reliability were greater than 0.7 and therefore considered as reliable.

Convergent validity represents the extent to which a measurement correlates positively with alternative measures of the same construct; it is measured by the average variance extracted (AVE). In reflective models, the AVE should exceed 0.5, meaning that the construct accounts for more than half of the variance of its indicators (Hair et al., 2016). In this study, the constructs' reliability and validity requirements were fully met. Discriminant validity assessment has become generally accepted in research to analyze the dynamics and relationships between latent variables (Henseler et al., 2014). The heterotrait-monotrait ratio of correlations (HTMT), an alternative approach based on the multitrait-multimethod matrix (Campbell & Fiske, 1959), is used to detect with greater reliability the discriminant validity of the research model (Henseler et al., 2014). The literature sets the threshold value of the HTMT at the 0.85 or 0.90 level (Hair et al., 2016; Henseler et al., 2014). All our obtained results were under the threshold of 0.85, so the discriminant validity requirements were met in this research. Table 1 summarizes the main results of the measurement model.

Table 1 - Measurement model evaluation summary.

Latent Variable	Indicators	Convergent Validity		Internal Consistency Reliability	
		Loadings	AVE	Composite Reliability	Cronbach's Alpha
Perceived quality	PQ 1	0.864	0.801	0.924	0.876
	PQ 2	0.912			
	PQ 3	0.909			
Perceived environmental friendliness	PEF 1	0.905	0.787	0.917	0.865
	PEF 2	0.882			
	PEF 3	0.874			
Perceived expensiveness	PE 1	0.908	0.854	0.921	0.830
	PE 2	0.940			
Perceived convenience	PC 1	0.865	0.806	0.893	0.765
	PC 2	0.930			
Purchase intention	PI 1	0.915	0.814	0.929	0.886
	PI 2	0.916			
	PI 3	0.876			



#### 4.2 Hypotheses Testing

Initially, the model was assessed with the total sample to determine the construct's influence on purchase intention. The path relationships were assessed using p-values and t-statistic values obtained after running a bootstrap with 5,000 subsamples (with the significance level set at 5%). The corresponding critical t value in a two-tailed consideration is 1.96 (Hair et al., 2016). According to the results, H1 and H3 are supported while H2 and H4 are not. Table 2 summarizes these results.

Table 2 - Significance levels of structural paths.

	Path Coefficient	<i>t</i> -Statistics	<i>p</i> -Values	Hypothesis
H1	0.188	3.298	0.001	Accepted
H2	-0.109	1.521	0.128	Rejected
H3	0.340	5.382	0.000	Accepted
H4	0.077	1.321	0.187	Rejected

#### 4.3 Moderation Effects

This research tested for the moderation effect of price sensitivity. The scale proved reliable, with outer loadings greater than 0.7, a Cronbach's alpha and AVE higher than 0.7 and 0.5, respectively, and with satisfactory indicators of discriminant validity. Price sensitivity showed a negative moderating effect on the relationship between perceived quality and purchase intention (path coefficient = -0.106;  $p < .05$ ;  $t = 2.289$ ). The environmental behavior moderation effect is relevant in light of this experiment's research domain. The bootstrapping analysis revealed a significant structural path between perceived environmental friendliness and purchase intention (path coefficient = 0.213;  $p < .001$ ;  $t = 3.776$ ). Environmental behavior also influenced the structural path between perceived expensiveness and purchase intention (path coefficient = 0.221;  $p < .001$ ;  $t = 4.220$ ).

#### 4.4 Comparison of Packaging Formats

An MGA was used to determine whether statistical differences existed between consumers after the experimental treatment. The sample was divided into three groups: 114 participants in the cardboard box group, 98 in the reusable container group, and 87 in the stand-up packaging group. In comparing the cardboard box and reusable container groups, the results indicate that the reusable container was perceived as expensive with statistically significant difference from the cardboard packaging (path coefficient difference = 0.394;  $p < .01$ ;  $t = 2.848$ ). The reusable container was also perceived as being more expensive than the stand-up packaging (path coefficient difference = 0.514;  $p < .001$ ;  $t = 3.842$ ). The cardboard packaging was perceived as being more convenient than the reusable container (path coefficient difference = 0.434;  $p$

< .005;  $t = 3.103$ ). In the comparison of the reusable container with stand-up packaging, the stand-up packaging was perceived as more environmentally friendly (path coefficient difference = 0.272;  $p < .05$ ;  $t = 2.011$ ). No significant differences were found when comparing cardboard packaging with stand-up packaging.

#### *4.5 Gender's Influence*

A MGA was used to investigate how gender impacted the relationships between the constructs in the overall model. According to the results, individuals perceive quality significantly differently depending on their gender, with men assigning greater importance to perceived quality (path coefficient difference = 0.253;  $p < .05$ ;  $t = 2.201$ ). When the study examined environmental behavior as a moderator, it found a statistically significant difference between women and men, with women presenting stronger environmental behavior (path coefficient difference = 0.270;  $p < .05$ ;  $t = 1.979$ ).

## **5 Discussion**

This research investigated how different packages and their quality, eco-friendliness, expensiveness, and convenience affected consumers' intentions to purchase muesli cereals. A fast-moving consumer goods product was chosen because individuals evaluate those products largely through their packaging (Orth & Malkewitz 2008; Schoormans & Robben, 1997). The products' perceived quality positively influenced purchase intention, confirming the findings of previous research (Honea & Horsky, 2012; Wang, 2013). Wang (2013) has demonstrated that attitudes toward visual packaging directly impact perceived food product quality. Nonetheless, the results contradict the extant literature, which states that sustainable packaging is perceived as having higher quality than conventional packaging formats (Magnier et al., 2016). Specifically, the cardboard packaging group expressed a stronger perception of quality than the reusable container group, confirming that perceived quality results from an individual analysis (Zeithaml, 1988) and is therefore a subjective interpretation (Villarejo-Ramos & Sánchez-Franco, 2005).

The influence of gender on individuals' environmental behavior confirms previous research, suggesting that women have stronger environmental behaviors than men (Pinto et al., 2014; Laroche et al., 2001; Martinho et al., 2015). Environmental behavior exhibits a moderating effect on the relationship between perceived expensiveness and purchase intention as well as the relationship between perceived environmental friendliness and purchase intention. Individuals exhibit important concerns regarding product sustainability, including the environmental aspects of packaging. Previous research has recognized the importance of environmental attitudes and of intentions to buy products packaged with sustainable options (Bickart & Ruth, 2012; Kilbourne & Pickett, 2008). Our results support the belief that the environmental assessment of packaging relies on available visual and verbal ecological elements (Magnier & Crié, 2015) and is influenced by the choice of packaging material (Monnet al., 2017; Steenis et al., 2017). This experiment confirms the findings of previous research that packaging material can also give consumers a wrong understanding of a product's sustainability (Lindh et al., 2015; Monnot et al., 2017).



This investigation confirms that products in eco-friendly packaging are perceived as more expensive than products in conventional packaging formats (Magnier & Crié, 2015), and the reusable container's perceived price was a barrier to purchase intention in this experiment. Price is often the first criterion that consumers consider when buying reusable containers (Martinho *et al.*, 2015). Additionally, changing the packaging material can sometimes increase the product's perceived sustainability, leading to a higher price perception (Steenis *et al.*, 2017). Our results confirm that price is a crucial antecedent in consumers' decisions to purchase a sustainably packaged product (Martinho *et al.*, 2015), representing a "purely economic decision" (Orzan *et al.*, 2018, p. 3). Clearly, some consumers find it unacceptable to pay higher prices for sustainable packaging (Magnier & Crié, 2015), thus justifying the negative impact of rejecting the environmentally friendly reusable container format. Likewise, individuals' price sensitivity moderates the perception of a product's quality and the intention to purchase it. This research sample shows that individuals with no or low income are sensitive to the perceived changes in price associated with sustainable packaging. Budget restrictions are also indicated as a strong reason why consumers are not willing to pay more for sustainable packaging (Orzan *et al.*, 2018).

Packaging is a vital element of convenience when buying groceries (Kelley, 1958), specifically its material, size, and shape (Draskovic, 2010). Consumers perceive the convenience of a given product differently depending on its packaging format. Thus, changes in packaging lead individuals to make trade-offs when purchasing fast-moving consumer goods (McDaniel & Baker, 1977). Consumers are familiar with cereal packaged in cardboard, so the package does not require spending additional time or energy when purchasing this product (Kelley, 1958). This helps to explain why cardboard is perceived as convenient while reusable containers are perceived as an obstacle at the point of purchase. In a society that highly values convenience (Draskovic, 2010), the convenience of packaging is an influential factor in purchase decisions (Hao *et al.*, 2019).

## 6 Contributions

This research demonstrates the importance of employing attribution theory (Heider, 1944) to understand how individuals adapt their behavior when confronted with a stimulus. In the experiment, perceived food product quality impacted the intention to purchase, validating and reinforcing the findings of previous research on fast-moving consumer goods (Monnot *et al.*, 2015). Additionally, women exhibit stronger environmental behavior and are thus more likely to purchase products in eco-friendly packaging formats (Laroche *et al.*, 2001; Martinho *et al.*, 2015). This study deepens our understanding of the discrepancy between a package's sustainability approach and consumers' perceptions of it, thus addressing the research gaps mentioned in the literature (Boz *et al.*, 2020; Steenis *et al.*, 2017). Also, the results narrow the gaps in understanding consumers' awareness of and ability to identify sustainable packaging (Popovic *et al.*, 2019).

From a managerial perspective, understanding consumers' criteria for selecting a product and its packaging is fundamental for brands. This research sheds light on the importance accorded by clients to the quality, convenience, expensiveness, and environmentally friendly

aspects of products. Companies should consider those aspects when improving existing packages or designing new ones to address consumers' needs and expectations regarding sustainability. Moreover, consumers perceive the reusable package format as being more expensive. Business practitioners should improve their product's communication on those specific aspects to increase consumers' purchase intention and, consequently, actual buying behavior. Individuals seem reluctant to shift toward a deposit system because of considerations of convenience and expense. The food industry should thus favor communication campaigns that explain the functioning of the deposit system as well as its advantages and disadvantages. Individuals falsely perceive that products offered in reusable containers are more expensive than products in traditional packaging.

## 7 Limitations and Future Research

This research analyzed a single product with low involvement. Consumers may not search extensively for information when deciding which product to buy in this category (Kotler et al., 1998), thus, future studies should examine other product categories with higher brand involvement. In this study, a relatively known brand was used, which may have influenced the ratings of the product's perceived quality (Vranešević & Stančec, 2003), so further studies could conduct experiments presenting unbranded products. Only the French market was considered, so this experiment could be conducted in different geographical regions to determine whether nationality (and cultural factors) influence packaging perception. This study measured individuals' purchase intentions as an outcome, so the results must be considered carefully and contextualized given the intention-behavior gap noted in the literature (Schäufele & Hamm, 2018). This research analyzed three package types, but future research could assess consumers' perceptions of less common packaging formats. Participants should be able to touch and manipulate different packaging formats, which was not done in this study (Stenis et al., 2017). The self-administered questionnaire represents a further limitation of this investigation, as the respondents may have been influenced by social desirability bias.

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