

# The impact of packaging transparency and product texture on perceived healthiness and product trust

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# **The impact of packaging transparency and product texture on perceived healthiness and product trust**

## **Abstract**

Consumers witnessed several food safety incidents over the past decades, which results in a growing demand to see the product before making a decision. The study uses a 3 (Opaque, semi transparent, and transparent packaging) x 2 (smooth vs. rough texture) experimental design on an apple sauce. The results show that there is a significant impact of transparent packaging on perceived healthiness, brand trust, the attitude toward the product and purchase intent (the impact on the pleasure is not significant). The impact of transparent packaging on purchase intent is mediated by the perceived healthiness, perceived quality and product trust. Moreover, there is a significant impact of the visual product texture on product trust. In fact, the rougher the texture of the product is, the more consumers trust it. Furthermore, when the product has completely transparent packaging, consumers trust more the product with the rough visual texture.

**Keywords:** *Transparent packaging, healthy product, product trust.*

**Track:** Product and brand management

## **1. Introduction**

The various and successive food crises over the past decade led consumers to be more health conscious and more concerned about what they eat and drink. According to a study conducted by SIAL in 2016, 66% of consumers think that food can contribute to the risk of developing some illnesses or health problems and consumer's trust in food has decreased (SIAL, 2016). In fact, it has been found that an unhealthy diet combined with physical inactivity contribute significantly to the apparition of health problems such as coronary heart disease, many cancers, hypertension, obesity and many others (James et al., 1990). Therefore, the agri-food industry is required to improve the quality of its products in order to meet the growing demand for healthy products (Fischler and Masson, 2008). This is why we notice more and more the launch of transparent packaging products in the agri-food market (Simmonds et al., 2018), which responds to a growing demand from consumers to see the product before taking a decision (Clément, 2007; Schürmann 2008). Nowadays, consumers are more likely to buy products that provide clear information about the contents and ingredients and find it important to visually control the product they are buying (Dantas et al, 2004; Parhizgar and Rostami, 2014; Mintel News, 2014; Olesen and Giacalone, 2017). Transparent packaging is a way of establishing a relationship of trust between manufacturers and consumers, which lead to a greater buying intent (Billeter et al, 2012 ; Connolly, 2014 ; Pal et al., 2018) and a better satisfaction (Kim and Lee, 2015). Although many studies have investigated the impact of transparent packaging on the perception of naturalness (Pal et al., 2018), on quality perception (Batra, Lawrence and Chandran, 2009; Nikolaidou, 2011; Connolly, 2014 ; Simmonds et al., 2018, Pal et al., 2018), on food consumption (Deng and Srinivasan, 2013), on product attractiveness (Ježovičová et al., 2016 ; Sabo et al. 2017 ; Simmonds et al., 2018), on perceived trust (Billeter et al., 2012) and on the purchase intent (Billeter et al., 2012 ; Simmonds et Spence, 2016 ; Simmonds et al., 2018, Pal et al., 2018), few studies have examined the impact of transparent packaging on health and pleasure perception. According to an exploratory study conducted by Sioutis (2011), food packaging with a clear window that allow customers to see the product has been perceived healthier than the one in opaque packaging (Sioutis, 2011). However, in another study by Riley, Da Silva and Behr (2015), transparent windows were less preferred to show healthfulness, with an image instead being the preference for all the product categories tested. (Riley, Da Silva and Behr, 2015). According to Simmonds and Spence (2018), further studies are needed to understand the impact of transparent packaging on the perception of a healthy product as the results are contradictory (Simmonds and Spence, 2016, 2018). There is therefore very little research on the perception of healthy food products in the marketing literature (Riley et al., 2015, Simmonds et Spence, 2016) even though health is recognized to be “the most significant trend and innovation driver in the global and foods drink market” (Meziane, 2007). As the results are contradictory, our study proposes to fill this gap by investigating the impact of packaging transparency on health product perception. Moreover, what differ our study from previous researches is the fact of examining 3 packaging transparency conditions (opaque, semi-transparent and transparent packaging).

## **2. Theoretical background**

### *1.1 The impact of transparent packaging*

Transparent packaging is an element of innovation and differentiation within the food industry and communicates information about the product (Batra, 2009). Transparent packaging has the power to convey attributes such as freshness, home flavor and superior quality (Nikolaidou, 2011; Connolly, 2014; Batra, Lawrence and Chandran, 2009, Pal et al., 2018). In addition, packaging transparency has the power to signal a premium offer,

innovativeness and modernity to a product (Burrows, 2013). Transparent packaging has also the ability to communicate symbolic meaning as consumers associate the notion of transparency with honesty, openness (Billeter et al, 2012), trust and understanding (Batra, Lawrence and Chandran, 2009; Simmonds et Spence, 2016). In fact, according to an experiment conducted by Billeter, Zhu, and Inman (2012), packages that had a transparent element were evaluated to be more trustworthy, received higher consumers preference scores, and greater purchase intent compared to opaque packaging. However, these effects were moderated by product attractiveness. Indeed, if the product was visually unattractive, it was judged as being less trustworthy when contained in transparent packaging (Billeter, Zhu, and Inman, 2012). Otherwise, consumers have a tendency to rely on salient visual aspects to make their judgment rather than the information provided on the product (Billeter et al, 2012). For example, the consumer judges whether a product is healthy or unhealthy not by taking into consideration its nutritional composition but on the basis of the signifiers that appear on the front of the packaging (Guichard and Muratore, 2011). Therefore, we assume that:

H1: A product using a fully transparent packaging is perceived healthier than a product using an opaque packaging.

H2: The more a product is perceived as healthy the better is consumer's attitude toward it.

H3: The more favorable the attitude toward the product is, the higher is the purchase intent. Transparent packaging promotes consumers perception of product quality as it gives products an aura of naturalness that is highly appreciated by consumers, who are increasingly concerned about their health and well-being, which in turn have a considerable impact on the purchase intent (Lunardo and Saintives, 2013; Pal et al., 2018). Therefore, we assume that:

H4: A product using a fully transparent packaging improves quality perception compared to a product using an opaque packaging.

H5: The higher the perceived quality, the more favorable the attitude toward the product is.

H6: A product using a fully transparent packaging improves the perceived credibility compared to a product using an opaque packaging.

H7: The more a product is perceived as credible the better is consumer's attitude toward it.

In addition to health aspects, sensory characteristics of food are considered to be the most important factor in consumer's food choice (Magnusson, 2001) because food pleasure is an important aspect for consumers (Mela, 2006) and they are not willing to compromise the sensory characteristics of food for potential benefits to their health (Freelet-Graves et Nitzke, 2013; Ares, Barreiro, Deliza, Giménez, & Gámbaro, 2010; Tuorila & Cardello, 2002; Verbeke, 2006). This results in the design of an attractive packaging that is tasty and appetizing because visual stimuli at a point of sale have a considerable impact on the purchase intention. According to clement (2007), consumers choose with their eyes and the old statement, "What you see is what you get" should be reformulated as: "what you see is what you choose", which clearly show the importance of sight in the decision making process (Ampuero and Vila, 2006; Crilly, Moultrie and Clarkson, 2004). Given the important role of vision in anticipating food pleasure, we question ourselves about the impact of transparent packaging on the perception of pleasure. In fact, as transparent packaging allow the view of the food and the mere sight of food increase hunger (Bossert Zaudig et al 1991, Klajner, Herman, Polivy, et Chhabra, 1981), salivation (Klajner, Herman, Polivy, et Chhabra, 1981, Hill, Magson et Blundell 1984), the desire for food (Wang et al., 2004) and the release dopamine, which is a neurotransmitter associated with feelings of pleasure and reward (Volkow et al., 2002). This leads us to formulate the following hypothesis:

H8: A product using a fully transparent packaging improves the perceived pleasure compared to a product using an opaque packaging.

In addition, transparent packaging is popular not only for the agri-food industries but also for consumers (Intel, 2014), who find the product more attractive in transparent packaging than in opaque packaging (Sabo et al., 2017). However, transparent packaging has a positive

impact only when the product is visually appealing. According to a study by Vilnai-Yavetz and Koren (2013), the introduction of transparent elements on the packaging of a ready meal was followed by a 30% decline in sales because it was perceived as less aesthetic and of lower quality than the original opaque packaging (Vilnai-Yavetz and Koren, 2013).

### *1.2 The impact of food texture*

Food texture includes several types of sensory experiences coming from visual, auditory and tactile stimuli (Chen and Rosenthal, 2015). Food texture has been defined by the international Standards Organization as “All the rheological and structure (geometrical and surface) attributes of a food product perceptible by means of mechanical, tactile, and where appropriate, visual and auditory receptors” (ISO, 2008). It can be described in the following terms: ‘hard,’ ‘soft,’ ‘liquid,’ ‘solid,’ ‘rough,’ ‘smooth,’ ‘creamy,’ ‘crumbly,’ ‘crispy,’ ‘lumpy,’ ‘gritty,’ etc (Day et Golding, 2016). Cognitive psychology distinguishes the visual perception of texture from the haptic perception, which results from touch (Lederman et Abott, 1981). In our study, we will focus on the visual perception of the product’s texture. Texture has been identified as a major trend in food product development (Sloan, 2013). It plays an important role in influencing taste, flavor (Okajima et Spence, 2011, Chen et Rosenthal, 2015) and consumer’s preference for food (Chen et Rosenthal, 2015) as it is the most important organoleptic attribute for consumers (Van Biesen et al., 2010). It also plays a secondary role in flavor release and perception. Flavor release is related to the way food breaks down in the mouth, which depends on the initial texture of the food and its modification throughout mastication (Stieger and Van de Velde, 2013; Okajima and Spence, 2011). Food texture is the most used attribute in the fresh and processed food industry to assess the quality of food and consumer acceptability (Kilcast et McKenna, 2003; Lu, 2013 ; Kadam et O’Donnel, 2015 ; Day et Golding, 2016). Consumers use also food texture to evaluate the product’s degree of processing, freshness and authenticity (Sloan, 2013). According to a study, changing the physical state of a food product has a considerable impact on the way consumers perceive the food. A food that has been mechanically processed influences consumer’s perception of healthiness and calories content (Szocs et al., 2016), perceived naturalness (Evans et al., 2010) and taste (Saint Eve, 2011; Blechert et al., 2014). In fact, the more a food is mechanically processed the more it is perceived as unhealthy and high in calories (Szocs et al., 2016). This study shows the impact of the change in the physical state of the product (solid vs. liquid) on the perception of a healthy product and emphasizes on the fact that mechanically processed food insofar as the product’s physical state changes lead consumers to perceive food as less healthy and higher in calories, a phenomenon we call “The blender effect” (Szocs et al., 2016). The authors also showed that modifying the physical state of the food pictured on the packaging has an impact on the perception of product healthiness and calories content (Szocs et al., 2016). This leads us to formulate the following hypothesis: H9: The rougher the texture of the product (vs. smooth texture), the higher is consumer’s trust. H10: When a product has a completely transparent packaging, consumers trust more the product with a rough visual texture (vs. smooth texture).

## **2. Methodology**

### *2.1 Experimental design and data collection*

Our study uses a 3 (Opaque packaging, semi transparent packaging and transparent packaging) x 2 (smooth texture vs. rough texture) experimental design on an apple sauce. To manipulate the degree of transparency of the packaging, we created 3 stimuli of applesauce: an apple sauce with a transparent packaging, one with a semi transparent packaging (with a label

partially covering the product) and one with an opaque packaging (with a label completely covering the product). These 3 stimuli were declined into two types of texture: the smooth texture and the rough texture. We did not mention any brand name on the packaging in order not to influence the respondent. Only the mention “apple sauce” has been mentioned on the packaging. We have created an online questionnaire using the Qualtrics platform. We have asked students in the library if they wanted to fill out an online questionnaire about the launch of a new product. A total of 186 students agreed to be interviewed (the sample was 65% female, average age: 21,3 ; SD = 6.02). Data collection took 5 days.

### 3. Results

#### 3.1 ANOVA Analysis

The manipulation check for perceived roughness and smoothness was effective. In fact, we have used an ANOVA and the results were satisfactory ( $M_{\text{rough}} = 2,89$  ;  $SD = 1,4$ ;  $M_{\text{smooth}} = 4,28$  ;  $SD = 1,37$  ;  $p = 0,000$ ), which lead us to conclude that the smooth texture has been perceived smoother than the rough texture. The validity and reliability of measurement scales are satisfactory. The variance inflation factor has also been checked between the 2 independent variables and the results show that the VIF is equal to 1.00, which mean that they are not correlated.

First, we have conducted an ANOVA then regression analysis as recommended by Hayes (2015). To test the impact of the level of packaging transparency on perceived healthiness, an ANOVA has been carried out and the results are conclusive as it is statistically significant ( $F=4.64$ ,  $p=0.011$ ). The analysis of mean ( $M_{\text{Transparent}} = 5,79$ ;  $M_{\text{Semi-Transparent}} = 5.75$  ;  $M_{\text{Opaque}} = 5,27$ ) and the Bonferroni post-hoc test ( $P_{\text{Transparent-Opaque}} = 0,019$ ) identifies pairwise differences between the transparent packaging and the opaque packaging ( $M_{\text{Transparent}} = 5.79$  ;  $M_{\text{Opaque}} = 5,27$ ) and between the semi-transparent packaging and the opaque packaging ( $M_{\text{Semi-Transparent}} = 5.75$  ;  $M_{\text{Opaque}} = 5,27$ ). Therefore, we can conclude that the more transparent the packaging, the healthier it is perceived. **H1 is validated.**

Concerning the impact of the level of packaging transparency on purchase intent, we have also conducted an ANOVA and the results are conclusive as it is statistically significant ( $F= 5.33$ ,  $p=0.006$ ), which lead us to conclude that the level of packaging transparency has an impact on the purchase intent. The analysis of means ( $M_{\text{Transparent}} = 4,89$ ;  $M_{\text{Semi-Transparent}} = 4.55$  ;  $M_{\text{Opaque}} = 4,07$ ) and the Bonferroni post-hoc test ( $P_{\text{Transparent-Opaque}} = 0,004$ ) lead us to conclude that the more transparent the packaging, the higher is the purchase intent. Regarding the link between the level of packaging transparency and pleasure, the results are not conclusive as it is statistically not significant ( $F=1,30$ ;  $p=0,274$ ), which does not allow us to deduce an impact of the level of packaging transparency on the pleasure. **H8 is rejected.** We have conducted an ANOVA to test the link between the texture and product trust. The results are conclusive insofar as the test is significant for each of the 3 dimensions of product trust: Credibility ( $F=4,18$ ;  $p=0,042$ ), Integrity ( $F=7,03$ ;  $p=0,009$ ) and Benevolence ( $F=4,41$ ;  $p=0,037$ ). The analysis of means for each of the 3 dimensions: credibility ( $M_{\text{Rough}} = 4,41$ ;  $M_{\text{Smooth}} = 4,03$ ) Integrity ( $M_{\text{Rough}} = 4,45$ ;  $M_{\text{Smooth}} = 3,98$ ) and Benevolence ( $M_{\text{Rough}} = 4,42$ ;  $M_{\text{Smooth}} = 4,07$ ) allow us to conclude that the rougher the texture of the product, the higher is consumer’s trust. **H9 is validated.**

#### 3.2 Mediation Analysis

We used Model 6 of Hayes Process Macro to test the following dual mediation models:

- Level of Packaging Transparency – Perceived Healthiness – Attitude – Purchase Intent The results show on one hand that the double mediation is total and on the other hand that transparent

packaging is perceived healthier, which positively influences consumer's attitude toward the product and increases purchase intent. **H1, H2 and H3 are validated.**

- Level of Packaging Transparency – Product trust (Credibility) - Attitude - Purchase Intent  
The results show that there is a double mediation and that the transparent packaging is perceived as more credible, which positively influences consumer's attitude toward the product and thus increases purchase intent. **H6, H7 and H3 are validated.**
- Level of Packaging Transparency - Quality - Attitude - Purchase Intent  
The results show on one hand that the double mediation is total and on the other hand that transparent packaging is perceived of better quality, which positively influences consumer's attitude toward the product and thus increases purchase intent. **H3, H4 and H5 are validated.**

We have conducted a two way ANOVA analysis to test the interaction between the level of packaging transparency and the product texture. The test showed a significant interaction for the 2 dimensions of product trust: credibility ( $P=0.010$ ) and integrity ( $P=0.027$ ). The diagrams show that the mean of the rough texture ( $M_{\text{Rough}}=4.88$ ) and smooth texture ( $M_{\text{Smooth}}=3.94$ ) with transparent packaging differ significantly concerning the credibility dimension of product trust. The same is true for the integrity dimension of product trust as the mean of the rough texture ( $M_{\text{Rough}}=4.94$ ) and smooth texture ( $M_{\text{Smooth}}=3.92$ ) with transparent packaging differ significantly. In other words, when the product has completely transparent packaging, consumers trust more the product with the rough visual texture. **H10 is validated.**

#### 4. Conclusion

Our findings are consistent with previous researches, which show that transparent packaging have a significant impact on purchase intention (Pal et al., 2018). This study also shows that packaging transparency has no impact on perceived pleasure, which remind us the study conducted by Vilnai-Yavetz et Koren (2013), who reported a 30% drop in sales after incorporating transparent elements on the packaging of a ready meal as it was perceived as less aesthetic and of lower quality than the original opaque packaging. Moreover, this study complements the one conducted by Szocs and Lefebvre (2016) and shows that the rougher the texture of the product is, the more consumers trust it.

As there is a growing concern for manufacturers to enhance trust in food due to the successive food crises, which has damaged public confidence, transparent packaging is a good way to reestablish trust between the manufacturer and consumers as according to the results, the more transparent the packaging is, the more the product is perceived as healthy and credible, which positively influences consumer's attitude toward the product and increases purchase intent. It is also important for managers to consider the texture when the packaging is completely transparent because consumers trust more the product with the rough visual texture than the one with smooth texture.

##### 4.1 Limits and Future Research

One of the limitations concerns the sample, which consists mainly of students (average age=21.3 years), which does not give us a comprehensive knowledge of consumer's opinion. The second limitation relates to the fact that the study has been conducted on only one product: an applesauce.

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