

Front-of-Pack Nutritional Labels and Plastic Packaging: what happens in the case of healthy foods?

Abstract

This exploratory research uses a qualitative approach with interviews to address the question: *can FOPLs support consumers not only on the proper perception of foodstuffs but also on the perception of plastic packaging?*

The findings demonstrate that healthy foods, such as cereals, packed in plastic packaging featuring FOPLs are perceived as more trustworthy by consumers. FOPLs appear to enhance trust in food products, even when packaged in plastic, suggesting a positive role for these labels in improving consumers' overall perception of the product.

Keywords: Front-of-Pack Nutritional Labels (FOPL); Plastic Packaging; Healthy Foods

1. Introduction

In the current era, consumers are offered multiple alternatives for their diets, with a wide range of products available on retailers' shelves (Grandi et al., 2021) in different forms of storage. These include products once distributed as loose items (e.g., vegetables) now available in pre-packed sealed packages to ensure longer preservation periods. The interplay between the food itself and its packaging is creating evolving "food systems" that include multiple signals and are becoming progressively complex for consumers to evaluate (Hoek et al., 2017). This tends to create uncertainty for consumers with consequent concern about how to avoid unsafe food and unhealthy dietary choices while fulfilling their environmental concerns. Therefore, policymakers are acting to provide a set of reliable information that can support consumers in making healthier, more sustainable, and more informed food choices. In this perspective, Front-of-Pack Nutritional Labels (FOPLs) have been one of the main interventions to provide consumers with clear information about their food choices, as a practical tool to assist consumers in their choices (Spiro & Wood, 2021). FOPLs might include a list of information, such as fat and calories, indicators derived algorithms signaling the healthiness of standard sizes of food (Ares et al., 2022), thus ensuring that consumers can utilize useful information about the food they purchase (Priya & Alur, 2023). In addition to signaling health, producers want to signal sustainability to their consumers (Magnier et al., 2016), as packaging is frequently perceived as a source of waste that harms the environment (Brennan et al., 2021). To counter these trends, more and more companies are shifting to sustainable packaging (i.e., more environmentally friendly materials), intending to reduce the product's environmental footprint (Granato et al., 2022).

However, while FOPLs effectively provide information about the healthiness of foodstuffs, the same cannot be said about the sustainability signal that can be given by packaging, as it is not always possible to offer a sustainable alternative for packing foodstuff. Then, an interesting dilemma emerges: often healthier food choices may conflict with the perceived environmental sustainability of their packaging. In fact, for some foods, including healthy

ones, plastic is essential at the moment for longer storage periods and food preservation on the shelf (White & Lockyer, 2020). It seems, therefore, that for some healthy foods, plastic packaging is nowadays necessary, as recognized by the legislation (European Commission, 2022), for the preservation and to guarantee the integrity of the product during the transport phases, when necessary to protect very sensitive foods from impact (e.g., berries), or if it decays very quickly and is exposed to microbiological risks (e.g., salad in a bag). Consequently, considering this need for plastic packaging for various healthy food products, a crucial research question arises: *can FOPLs support consumers not only on the proper perception of foodstuffs but also on the perception of plastic packaging?* To answer this research question, we conducted qualitative research and demonstrated that healthy foods (e.g., cereals) packed in plastic packaging featuring FOPLs are perceived as more trustworthy by consumers.

2. Theoretical Background

In the domain of food labels, researchers are dedicating particular attention to FOPLs by showing their effects on consumers' understanding (Mazzù et al., 2023), food consumption and purchasing (Croker et al., 2020), and food-evoked emotions (David et al., 2023). In the last decades, multiple different FOPL systems have been developed by Governments and policy-makers. According to the European Union classification (EU Commission, 2021), FOPLs can be segmented based on their directiveness in guiding consumers' choices, with at the extreme of the classification non-directive Numerical Labels, that provide numerical information on critical nutrients (e.g., NutrInform Battery), and directive Graded Indicators, that provide a synthetic algorithmic appreciation displayed through colors and letters of the standard size of a product's overall nutritional value (e.g., Nutri-Score).

In the case of healthy foods stored in plastic envelopes, consumers are confronted with a significant asymmetry of information. On one hand, plastic packaging is sometimes associated with negative attitudes (Menzel et al., 2021), perceptions, and feelings (Fernqvist et al., 2015), which could lead customers to avoid choosing food packaged in plastic (Otto et al., 2021). On the other hand, the awareness of the impact of plastic is uneven (de Sousa, 2023), including requirements that mandate plastic packaging to store healthy foods.

As packaging can signal virtuous choices through sustainability, this is particularly expected for healthy foods (Hoek et al., 2017). However, it is not always possible to use sustainable packaging, especially for healthy foods, necessitating the use of plastic. This creates potential inconsistencies in consumers' perceptions and trade-offs about whether to purchase the proposed food system—packaging plus food—if their attitude toward the packaging outweighs the necessity of eating healthy foods. We then investigate whether FOPLs, as a signal of food healthiness, can also transfer this positive perception to packaging when unsustainable packaging is necessary. Given the abovementioned positive effects of FOPLs on food evaluations (e.g., Croker et al., 2020), we expect that FOPLs can also positively affect food packaging material.

3. Methodology

In this study, we delivered a set of four predetermined open-ended questions – with no variation between interviewees – to 178 respondents through the Qualtrics Platform. The panel consisted of a convenience sample of Master of Science university students (42.3% female; $M_{age}= 22.84$, $SD_{age}=1.20$), who were rewarded with extra points on their final grade. To ensure respondents properly understood the meaning of FOPLs, we provided a detailed explanation of their purpose in helping consumers make informed decisions toward healthier food choices. To avoid biasing responses, we included examples of three different FOPLs: NutrInform Battery, Nutri-Score, and the KeyHole. Given the qualitative nature of our study, respondents needed to comprehend the FOPLs to articulate their views.

Additionally, before answering each question, respondents were shown a transparent plastic package containing cereals. The envelope included also the “Tidyman” symbol, “a well-known and recognizable symbol [...] to encourage people to dispose of their litter responsibly” (Keep Britain Tidy, 2024). We selected cereals because they are perceived as healthier compared to other types of foods (Fenko et al., 2016). We selected a plastic package as often associated with the perception of unsustainability (Koenig-Lewis, 2022). The cereal package was displayed to participants before each question to maintain consistency in the stimulus presented. The four questions aimed at capturing individuals’ perspectives on product, package, and manufacturer, as well as the relation between those elements. Specifically, the first question: “*What do you think of these cereals in plastic packaging, in terms of healthiness, reliability, authenticity? Why?*” aimed at exploring their perception of the interplay between a package that can be perceived as unsustainable/unhealthy, with food often perceived as healthy (Plasek et al., 2020).

The second question explored the perception of the bag itself (“*What do you think of this plastic bag in terms of reliability? Why?*”). The last two questions investigated the perceived interplay of the label with the perception of the package (“*Do you think that the presence of FOPL can improve or worsen your perception of packaging? Why?*”) and when the need for a specific material is considered essential for preservation (“*There are some food products for which the use of plastic is necessary. Do you think that the presence of a FOPL could improve the perception of such plastic packaging? Why?*”).

After a careful reading of the transcripts, we organized our analysis into two streams. First, we independently coded respondents who agreed with disagreement on the four questions to validate the direction of our initial hypothesis. The coders discussed discrepancies in coding to achieve a resolution. Next, we organized the transcripts to generate relevant insights valuable for the subsequent steps of the research, while reaching “theoretical saturation” on recurring similar information.

4. Results

The analysis of the transcripts highlighted an initial strong and deep-rooted negative connotation about plastic, both in terms of environmental impact (“*Plastic is not ideal for the environment*”) and its negative effect on the product (“*The plastic bag gives me the idea*

of inconsistency vs. cereal authenticity”). Plastic is believed to be a potential cause of chemical contamination (“Plastic can contaminate food with harmful substances”), which can negatively interact with food, thereby worsening the perception of healthiness (“The plastic packaging reduces my perception of the healthiness of the product”) and reliability (54% of respondent do not consider a plastic bag as reliable). This perception decreases if the plastic is perceived as recycled (“If it were made of recycled plastic, I would not see anything wrong with it”). By contrast, certain attributes associated with plastic might generate positive implications, such as “transparency”, due to the increased ability to see inside the package (“The plastic packaging makes what’s inside transparent”), generating, in fact, a perception of product reliability, healthiness, and authenticity.

The majority of respondents (87%) highlighted that the presence of a FOPL might improve the perception of the package in general. This remains consistent (72%) even in the case of food products, such as fresh vegetables, for which the use of plastic is deemed necessary (“For products that require plastic packaging such as vegetables, FOPL adds value, making that product perceived as part of a conscious choice for a healthy lifestyle, despite the need to use plastic”). In general, FOPLs improve the perception of packaging, leading to more “holistic” considerations of how to evaluate the plastic packaging itself (“It undoubtedly improves my perception because it allows me to better understand the product, ensuring that I overlook the fact that the packaging may have a high environmental impact”; “The plastic bag, while not ideal from an environmental perspective, can be perceived as reliable for product storage due to the durability of the material. The presence of labeling provides detailed and immediate information on the nutritional composition, indicating that the manufacturer is committed to transparency and consumer education, aspects that enhance trust in the reliability of the brand”). This finding is confirmed in situations where plastic packaging is deemed necessary (“The plastic bag remains a particular choice with regards to packaging in 2024, however, some products must be placed in plastic”).

Table 1 presents the main categories identified, along with their frequencies and representative quotes from the participants.

Table 1 – Qualitative evidence organized by topic

Topic	% interviewees	Quotes
Impact of plastic packaging on Food reliability	30% with positive Food reliability perception in presence of Plastic Package	Interview #5: “In terms of reliability I would say they are reliable” Interview #8: “The free visibility of the product [<i>granted by the plastic envelope</i>] has a positive impact in terms of reliability” Interview #43: “Transparent packaging gives me confidence in what I see inside”
Impact of plastic packaging on Food healthiness	56% with a positive Food healthiness perception in the presence of Plastic Package	Interview #15: “The simple packaging gives me the idea of a natural and healthy product.” Interview #12: “The presence of a FOPL helps to positively evaluate authenticity as well as healthiness” Interview #114: “The plastic packaging, if recycled, does not create any problems for me, and the presence of the label [...] makes me think that the product is healthy.”

Impact of plastic packaging on Food authenticity	33% with positive Food Authenticity perception in the presence of Plastic Package	Interview #20: "I think that these cereals, thanks to the use of transparent packaging, give the perception of a highly genuine product." Interview #67: "Plastic may raise ecological issues, but does not affect the authenticity of the product."
Impact of FOPLs on package perception	87% highlighting an impact	Interview #13: "Reliability depends on the transparency of the label." Interview #30: "The presence of the label brings greater reliability." Interview #62: "The cereal package seems healthy to me because it shows the nutritional label on the front packaging [...]"
Impact of sustainable production practices on plastic package perception	11% with positive perception when sustainable practices in manufacturing plastic packages	Interview #46: "Cereals in transparent plastic packaging have different aspects in terms of healthiness, reliability and authenticity. The plastic for cereal packaging is generally BPA-free." Interview #49: "I think that plastic packaging does not pose particular problems in terms of healthiness unless it is made with harmful materials."
Impact on health concerns	10% highlighted potential health concerns connected to the use of a plastic package	Interview #46: "Some plastics can release harmful chemicals into food, especially when exposed to high temperatures." Interview #53: "Packaging plastic could be a potential source of chemical contamination if not adequately tested for food safety." Interview #95: "I attribute junk food (such as potato chip packaging) to plastic packaging. Plastic would also raise concerns for me about the chemicals it might release."
Impact on environmental concerns	78% highlighted potential concerns connected to the sustainability of the plastic package	Interview #49: "The plastic packaging of a product could have a negative influence on the environment and sustainability." Interview #33: "Using plastic to promote a healthy product like cereal may seem unstrategic. It is more coherent to adopt ecological materials to underline the commitment to health and sustainability."

5. Conclusions, theoretical and managerial implications

For some foods, especially healthy ones, plastic is essential for preservation and to guarantee the integrity of the product during transport (e.g., Peng et al., 2020). Consequently, consumers sometimes face a dilemma between the health benefits of the food and the unsustainability of its packaging, creating discrepancies in their choices. This trade-off between the virtuosity of food (i.e., healthy food) and the perceived not virtuosity of packaging (i.e., plastic package) raises crucial questions about how consumers evaluate and make decisions about the foods they buy. In this research, we shed light on this trade-off by analyzing the impact of FOPLs on the perception of plastic packaging material.

Specifically, through a qualitative approach, we showed that consumers attribute higher trust to plastic food packaging when a FOPL is present. Respondents indicated that FOPLs generally improve the perception of the packaging, especially in cases of healthy products or when the use of plastic is considered essential for storage and conservation purposes. In summary, FOPLs contribute to enhancing the perception of the entire food system.

From the theoretical point of view, our results add to the food label literature by identifying FOPLs, as not only useful tools for providing consumers with information about food composition and helping them make more conscious, informed, and healthy decisions but

also as external cues capable of modifying perceptions of food packaging materials. This finding is particularly relevant for foods, especially healthy ones, that rely on plastic packaging—generally negatively evaluated by consumers but essential for food storage and preservation. From the managerial point of view, we recommend incorporating FOPL for healthy foods, even when non-mandatory or when not strictly necessary given the healthy nature of the food. Their presence can improve perceived food quality and mitigate the negative connotations of unsustainable packaging. Interestingly, this positive effect is stronger for plastic packages that feature virtuous cues, as the “tidy man” and the recycling logo. Therefore, we suggest that companies should also incorporate sustainable solutions.

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