

# The impact of the health star rating front-of-packaging label on preferences for food products

Muhammad Junaid Shahid Hasni, Luigi Mittone and Lucia Savadori  
*Department of Economics and Management, University of Trento, Trento, Italy*

## Abstract

**Purpose** – The Health Star Rating (HSR) is a front-of-pack labeling system that helps consumers understand the nutritional values of foods. In this study, we examined the effects of the presence (vs. absence) of an HSR label on consumer choice behavior and perception of healthiness.

**Design/methodology/approach** – In an experimental study, we tested if the presence (vs. absence) of an HSR label provides a competitive advantage over a rival product that lacks the label, influencing purchase intentions. Participants were asked to choose among two competing products, with and without the labels, in a full factorial design.

**Findings** – Results showed that products with an HSR label had a competitive advantage over the rival products that did not have the label. Moreover, this effect emerged more strongly for some products than others. Thus, while front-of-pack (FOP) labels can enhance sales, their impact may vary based on the specific product or brand.

**Originality/value** – This paper offers novel insights into the implications of HSR labels for consumer behavior and marketing strategies, particularly in the context of their potential use as a marketing tool by companies to boost sales in the food industry.

**Keywords** Health star rating, Front-of-packaging label, Consumer preference, Consumer decision-making, Food products

**Paper type** Research paper

## 1. Introduction

Growing health awareness and concern for nutrition has led to increased interest in healthy food products (e.g. [Lichtenstein et al., 2021](#)). Traditional food labeling (nutrition tables and ingredient lists) provides important information for consumers to choose healthier options ([Miller and Cassidy, 2015](#)). However, such labeling is often complex to understand and difficult to see, as it is placed at the back of the packaging, hindering its use in purchase decisions ([van Herpen and Trijp, 2011](#); [Cheikh Ismail et al., 2024](#)). Simplified labels like the Health Star Rating (HSR) ([Commonwealth of Australia, 2014](#)), present concise, prominent information on the packaging front, facilitating its use in purchase decisions (e.g. [Jones et al., 2019](#)).

Whereas previous literature on front-of-pack (FOP) labels have primarily advocated them for health-related reasons ([Seenivasan et al., 2024](#); [Shrestha et al., 2023](#)), here we posit that

---

© Muhammad Junaid Shahid Hasni, Luigi Mittone and Lucia Savadori. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) license. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this license may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

*Ethical statement:* All participants provided written, electronic and online informed consent before enrolment in the study by clicking on the “I consent” option on the screen. The study was conducted according to the principles expressed in the Declaration of Helsinki.

*Data availability statement:* The data supporting this study’s findings are available from the corresponding author upon request.



they could also serve as marketing tools to boost sales. However, few studies have addressed this issue, often providing conflicting results (Anderson and O'Connor, 2019; Thomas *et al.*, 2021). Therefore, it remains unclear whether the mere presence of an HSR label on a product's packaging gives a competitive advantage to the product over another unlabeled product. To add to the extant literature, this study investigates by means of a laboratory experimental investigation, whether HSR labels may make a product more appealing to consumers and perform better in the market.

## 2. Conceptual background and research hypotheses

### 2.1 Packaging and product choice

A considerable body of literature shows that food product choice can be influenced by packaging (Clement *et al.*, 2013). A product's packaging can play a role in attracting consumers and persuading them to buy the food product. For example, Reutskaja *et al.* (2011) found that consumers rely on one or two visual features to quickly locate a product. Product packaging can serve as a vehicle for product communication, enhancing the appeal and attractiveness of a product and making the selection process easier for consumers (Srivastava *et al.*, 2022). Research shows that packaging details of competing products can capture consumers' attention even if they have already decided to purchase a specific product, potentially influencing their ultimate decision (Silayoi and Speece, 2004).

Front-of-packaging (FOP) food labels are one of the packaging features that have gained increasing attention in recent years due to their potential to influence consumer food choices. FOP food labels provide nutrition and health information about food products (Wandel, 1997), and they can also include logos and other symbols meant to convey certain health benefits (Hawley *et al.*, 2013). The likelihood of consumers purchasing a product increases when the product displays a more favorable nutritional FOP label (Bui *et al.*, 2013). For example, FOP labels have been found to increase the choice of the healthiest product (a cereal) from 14% when the product did not carry the label to 34% when the product carried the label (van den Akker *et al.*, 2022). FOP labels can also effectively signal sugar levels on food products, such as yogurt, thereby influencing consumers' healthy choices. This effect has been attributed to the simplicity of FOP labels, guiding consumers toward healthier products (Mauri *et al.*, 2021; Junkkari *et al.*, 2023).

However, some research has questioned the actual impact of FOP labels on consumers' real purchasing decisions. For example, a randomized experimental study comparing the effectiveness of five different front-of-pack food label formats in helping consumers make informed food choices found that the multiple traffic light label format was most effective in helping German adults correctly identify healthier food items, while the other label formats did not perform as well. However, the study also found that changes in perceived healthiness did not significantly influence food choice or consumption (Borgmeier and Westenhoefer, 2009). Despite FOP labels have strong positive effects on the perception of healthiness, this does not always translate into healthier decisions (Ikonen *et al.*, 2020). Sometimes FOP labels can also have unwanted effects because health claims increase consumers' tendency to purchase the product carrying that claim, regardless of the healthiness of the product (Ikonen *et al.*, 2020). This suggests that packaging design is important not only in changing product perception but also in attracting consumers to a particular product and changing its overall appeal.

### 2.2 Effect of HSR label as a marketing tool

The Health Star Rating (HSR) is a voluntary labeling scheme displayed on the front of packaged foods that was established by the governments of Australia and New Zealand to

aid consumers in making informed choices about the nutritional value of such products (Commonwealth of Australia, 2014). The HSR assesses a product's overall nutritional value and rates it with a star rating between 0.5 (least healthy) and 5 (most healthy) stars. Previous research suggests that the HSR label impacts product choice by influencing consumers to choose products with higher star ratings over those with lower ratings (Seenivasan *et al.*, 2024). For example, in a study on adults and children aged 10+ years, the HSR label produced the largest differences in choices compared to similar FOP labels, increasing the selection of healthier products over less healthy ones, as well as a significantly greater willingness to pay (Talati *et al.*, 2017).

While in previous studies, the HSR system has been recognized as a means to improve consumer understanding of the nutritional value of foods, its impact as a marketing tool on product selection has not been widely investigated. Existing research does not clearly establish whether the mere presence of an HSR label on a product's packaging produces a competitive advantage that influences a consumer's decision to choose that particular product over another. Here, we posit that the mere presence of an HSR label could serve as a marketing tool that increases preferences for the product with the label compared to the unlabeled product.

Based on the heuristic-systematic model, consumers should be facilitated in their choice when an HSR label is present, compared to when it is absent (Chaiken *et al.*, 1989; Kahneman, 2011). The FOP label should help consumers process information quickly during shopping because this is a routine task (van Herpen and Trijp, 2011). In this regard, some researchers have suggested that products with a FOP label might be viewed as healthier than products without it, regardless of the true nutritional content (Hamlin and McNeill, 2016). The mere presence of an HSR label could signal greater product healthiness, and due to the fast heuristic process, more consumers could prefer this product over another without the label.

Few studies have directly addressed this issue by comparing a labeled product with a non-labeled one. An HSR label can be most effective as a marketing tool when presented in contrast to an unlabeled product. In this case, the consumer does not have a clear reference point to evaluate whether or not the label indicates greater healthiness than the unlabeled product. Therefore, the consumer is more likely to assume that the labeled product is better than the unlabeled product. In line with this assumption, more participants chose the healthier product when an HSR label was present than when it was not in a previous study (Thomas *et al.*, 2021). The authors explained that the label helped participants evaluate the healthiness of the product, and coherently, the HSR label also increased consumers' actual purchase of the healthier product (Thomas *et al.*, 2021). Indeed, products with an HSR label also induced consumers to reduce portion sizes of pizzas and cornflakes compared with the same products but with no label (Talati *et al.*, 2018). These findings suggest that the mere presence of a FOP label can be an effective marketing technique. However, other findings found no effect of the label: products with an HSR label were not chosen more often than products without the label in an experiment where participants had to pick one of two products, one with an HSR label and one without it (Anderson and O'Connor, 2019). Thus, it is unclear if the mere presence of an HSR label increases the chance of buying a product, calling for more research on this topic. To add to the extant literature, this study investigates whether the mere presence of an HSR label on the packaging gives the product a competitive advantage over another that lacks the label, making a product more appealing to consumers. We leave our hypothesis explorative, given that the literature reviewed previously (e.g. Talati *et al.*, 2017; Thomas *et al.*, 2021) did not show a consistent effect of the HSR label on the attractiveness of the product.

- H1. The mere presence of an HSR label on a product's packaging will influence a consumer's purchase intentions over a competing product that lacks the label.

### 2.3 Effect of HSR label on product healthiness

One way the HSR system can influence product selection is by increasing a product's perceived healthiness, making it more attractive to health-conscious consumers. Previous evidence supports this notion. For instance, the HSR label increased the perceived healthiness of plant-based packaged foods (e.g. burgers) and subsequent purchase intentions (Ang *et al.*, 2023), particularly when the level of perceived believability was low. The authors suggest that as participants lack confidence in a product's ingredients and potential health impact, the HSR label can fill this gap. However, another study found that the HSR label decreased the perceived healthiness of a sweetened fruit drink, which was usually misperceived as healthy. However, this effect was only observed among Australian consumers and not those from other countries (Canada, Mexico, the UK and the US) (Jauregui *et al.*, 2022). The HSR label could, therefore, increase or decrease perceived healthiness depending on the rating. Yet, the presence of an HSR label on a product could signal greater care and attentiveness by the manufacturer toward consumer health. In addition, if the HSR label displays a high rating (4.0 and 4.5), consumers should perceive the product as healthier, as shown by previous research. However, this relationship needs to be further tested. Consequently, our second hypothesis is related to the association between the presence of an HSR and the perceived healthiness of the product as follows:

*H2.* The mere presence of an HSR label on a product's packaging will influence its perceived healthiness compared to a competing product without the label.

### 2.4 Effect of HSR system on choice difficulty

When consumers choose a product, they often analyze and compare competing items, which can be a mentally fatiguing process. For example, they have to combine nutritional and health information into one overall quality rating. This process can be quite challenging, and only a few well-informed and health-conscious consumers may be capable of accomplishing it (Andrews *et al.*, 2021). That's why a simple summary indicator like a FOP label might help consumers make decisions more easily by reducing complexity and effort. A meta-analysis of 33 publications showed that consumers trust, appreciate, understand and use the HSR logo (Jones *et al.*, 2019). A recent study found that the HSR system also aids decision-making because it matches the level of cognitive processing needed to compare food products (Anderson and O'Connor, 2019). Therefore, it is reasonable to expect that the HSR can make the decision process between two competing products easier and simpler. Therefore, we hypothesized that:

*H3.* The mere presence of an HSR label on a product's packaging will decrease consumers' perceived choice difficulty compared to a competing product without a label.

### 2.5 Control variables

The impact of the HSR label on product choice can be moderated by consumers' product-related experiences, such as brand familiarity and prior liking, as well as consumers' characteristics. In other words, when choosing between two competing products, a consumer who lacks prior product experience can be influenced by the presence of the HSR label. In contrast, a consumer who has prior experience might be immune to the presence of an HSR label. This was observed in a study, where product perception, or liking, was found to have a strong influence on product choice, even in the presence of an HSR label: around half of the respondents chose a lower-rated product based on their perception of the product rather than the HSR rating itself (Maganja *et al.*, 2019). In the present study, we measured product liking

and previous experience to test for any interaction effect of these features on the influence of the presence of an HSR on consumer preferences.

Other consumer-related characteristics, such as age and gender, also typically play a role in consumer preferences. Gender, indeed, is known to be a strong determinant in product choice. For example, gender influenced the choice between a healthy and an unhealthy option, with females choosing the healthy option more often than males, irrespective of whether an HSR was present or not on the product packaging (Thomas *et al.*, 2021). Therefore, the moderating effect of individual consumer characteristics and the mere presence effect of the HSR label on purchase intention still needs further examination. In the present study, we collected information on consumers' age and gender. We used this data to test any interaction effect of these factors on the influence of the presence of an HSR on product preferences.

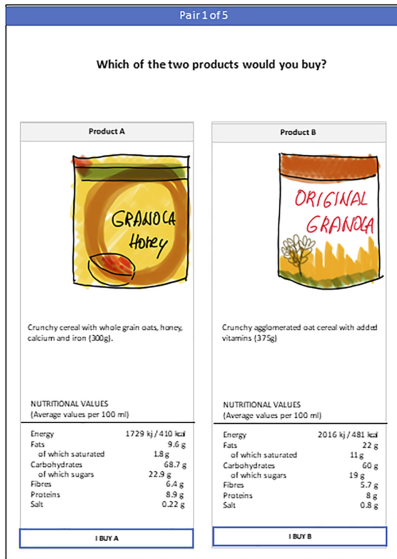
### 3. Method and materials

Consumers were shown two products on a computer screen side by side, as described in Figure 1, and asked to choose which one they would buy. Each participant was randomly placed into one of four different groups, each experiencing a slightly different scenario. In treatment 1, both products were shown just as they are, without labels (Figure 1a). In treatments 2 and 3, one product had a label, but the other did not (Figures 1b and 1c). The difference between 2 and 3 was related to which product was labeled and which was not. In treatment 4, both products were fully labeled (Figure 1d). This design was implemented to test how the mere presence of a label might sway the participants' choices.

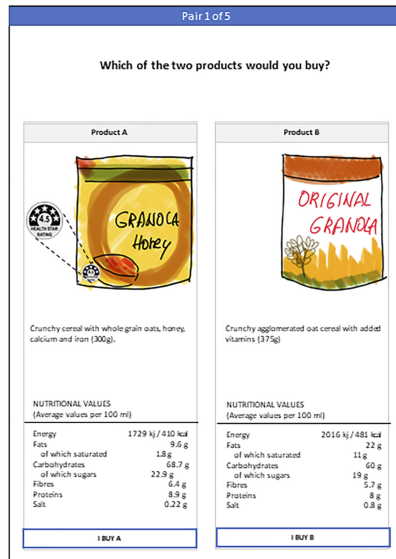
Overall, the treatments yielded a 2 (HSR on product A: with vs. without) x 2 (HSR on product B: with vs. without) full factorial between-subjects experimental design. In treatment 1, we collected the baseline product preferences when neither product had an FOP label: how much consumers preferred product A or B when they were not labeled. By comparing treatment 1 with treatments 2 and 3, we observed whether applying an HSR label on one of the two products nudged consumers' preferences towards a product. In treatments 2 and 3, the labeled product was different to account for any label-product interaction that could not be previewed in advance. For example, it could be that the mere presence (vs. absence) of an FOP label increased the preferences for one product brand but not another. Given that we did not have any prior data on how the presence (vs. absence) of an HSR would interact with product brand, we preferred to control for this product-label interaction by including both treatments, 2 and 3. Finally, treatment 4 served as another baseline condition. In this condition, both products have an FOP label representing those situations where the label is mandatory. By comparing treatment 4 with treatments 2 and 3, we can observe how the absence (vs. the presence) of an HSR influences consumers' preferences. Overall, the four treatments gave us a clear picture of the effect of the mere presence (vs. absence) of an HSR label on consumer purchase intentions.

Three hundred ninety-four Italian consumers ( $M_{age} = 28.1$  years, min 18 max 64; 53.9% male) recruited on Prolific participated in the study. The required sample size calculated with the `pwr.2p.test` function in R (R Core Team, 2022) for a small effect size (0.20), a significance level of 0.05 and a power of 0.80 was 392 participants. Thus, we collected 394 participants to account for any unplanned losses. Approximately a minimum of 96 participants were assigned to each treatment. The four treatment groups did not statistically differ regarding gender distribution  $\chi^2(3, N = 393) = 1.70; p = 0.769$ , or age,  $F(3, 213) = 1.99; p = 0.116$ .

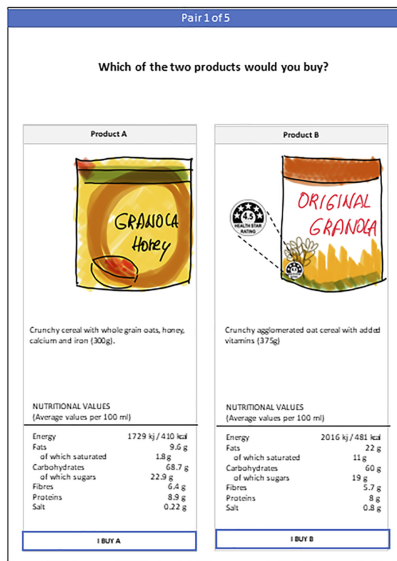
Each participant was presented with a series of 5 forced choices between two competing products: Product A and Product B (see Figure 1). The two products were always similar regarding their category (e.g. two morning cereals), increasing the ecological validity of choice. The two products were accompanied by the respective pictures, nutrition tables, a list of ingredients and an HSR label (for treatments 2 to 4). Five food categories were used:



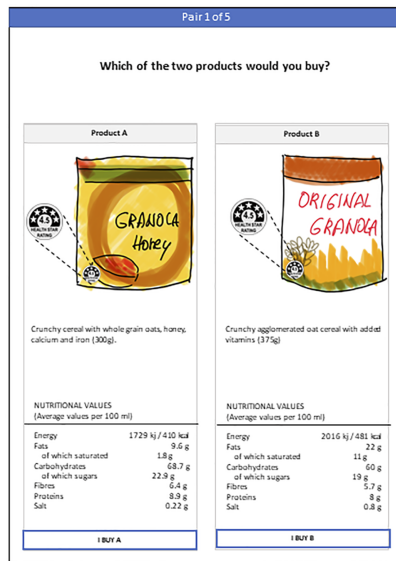
(a)



(b)



(c)



(d)

Sources(s): Authors' illustration; treatment pictures

**Figure 1.**  
The four treatments used in the study: Treatment 1 without HSR (a), treatment 2 with HSR on Product A (b), treatment 3 with HSR on Product B (c) and treatment 4 with HSR on both Products A and B (d)

yogurt, juice, breakfast cereal, cookie and milk (see Table S6 for pictures). These product categories were chosen because they represent a wide range of everyday food items, encompassing both beverages and solid foods, that vary in nutritional value and consumer health consciousness. Yogurt, breakfast cereals and milk had an HSR of 4.5; cookies and orange juice had an HSR of 4.0.

All participants provided written, electronic online informed consent prior to enrolment in the study by clicking on the “I consent” option on the screen. The position (left/right) of each product within the product pair was fully counterbalanced, so that the same product was not always presented in the same position. The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments.

After providing a choice for each of the five product categories, participants were asked about a series of judgments regarding four dependent measures: product healthiness, product liking, previous experience and choice difficulty. Product healthiness was measured using an item adapted from previous literature (Schneider and Ghosh, 2020), asking the following: “To what extent do you think this product is healthy?”. Responses were provided on a 1 (not at all) to 7 (very much) response scale. Product liking was measured by asking the following: “How much do you like or dislike (or you think you would like or dislike) each product in terms of taste and flavor?”. Responses were provided from 1 (I don’t like it at all) to 7 (I like it very much). Previous experience with the product was measured by asking the following: “Have you ever tried the product?”. Responses were provided on a 1 (no, never) to 7 (yes, many times) response scale. Finally, decision difficulty was measured for each choice by asking, “How difficult was it to choose?”. Answers could range from 1 (not at all) to 7 (very much).

### 3.1 Data analysis strategy

The study’s dependent variable was the frequency with which consumers reported that they would have purchased product A over product B in the four experimental conditions. Since the dependent variable was dichotomous, a binomial logistic regression was used to analyze the data. The regression allowed us to observe how the independent variables (the presence vs. absence of the HSR label) influenced consumers’ choices. The hierarchical binomial logistic regression was run on the binary variable choice (0 = Product A vs. 1 = Product B) separately for each pair to test the effect of the mere presence of the HSR on Product A (0 = without HSR on A vs. 1 = with HSR on A) and the mere presence of the HSR on Product B (0 = without HSR on B vs. 1 = with HSR on B) and their interaction. At the first stage of the analysis, the participant’s age and gender were always added as predictors along with the main independent variables to hold their effect fixed (Model 1). Interaction terms between those variables revealing a significant effect were also added at this stage to test for moderating effects. In the second stage (Model 2), we added the product-related experiences as control variables (product liking and previous experience) to adjust the effects by holding these variables constant. To test whether the experimental treatments impacted perceived healthiness, we used a  $2 \times 2 \times 2$  repeated measure ANOVA with the healthiness ratings for product A and product B as the within-subjects factor and the presence or absence of the Health Star Rating label on product A and product B as the two between-subjects factors. To measure whether the experimental treatments impacted perceived choice difficulty, we ran a separate  $2 \times 2$  ANOVA on the judgment of decision difficulty for each of the five forced choices. All analyses were conducted using Jamovi (Version 2.3).

## 4. Results and discussion

### 4.1 Effect of HSR presence on product choice

The frequency of choices of products A and B in the four experimental conditions is shown in Table 1. The detailed results of the hierarchical logistic regressions are shown in the Supplementary Materials (Tables S1-S5) separately for each product category, but they are commented on hereafter.

Analysis of participants’ preferences for the two yogurts revealed that the mere presence of an HSR label on yogurt A did not influence choices, while the presence of the label on

Treatment	Yogurt		Cereals		Cookies		Milk		Fruit juice	
	Product A <i>n (%)</i>	Product B <i>n (%)</i>	Product A <i>n (%)</i>	Product B <i>n (%)</i>	Product A <i>n (%)</i>	Product B <i>n (%)</i>	Product A <i>n (%)</i>	Product B <i>n (%)</i>	Product A <i>n (%)</i>	Product B <i>n (%)</i>
Without HSR label	27 (28.1%)	69 (71.9%)	47 (49.0%)	49 (51.0%)	22 (22.9%)	74 (77.1%)	47 (49.0%)	49 (51.0%)	70 (72.9%)	26 (27.1%)
With HSR on Product A	26 (26.5%)	72 (73.5%)	62 (63.3%)	36 (36.7%)	23 (23.5%)	75 (76.5%)	71 (72.4%)	27 (27.6%)	71 (72.4%)	27 (27.6%)
With HSR on Product B	19 (19.2%)	80 (80.8%)	51 (51.5%)	48 (48.5%)	25 (25.3%)	74 (74.7%)	45 (45.5%)	54 (54.5%)	63 (63.6%)	36 (36.4%)
With HSR on both	19 (18.8%)	82 (81.2%)	59 (58.4%)	42 (41.6%)	20 (19.8%)	81 (80.2%)	60 (59.4%)	41 (40.6%)	73 (72.3%)	28 (27.7%)

**Source(s):** Authors' work

**Table 1.**  
Choices of the products  
in the four  
experimental  
conditions  
(percentages are in  
parenthesis)

yogurt B significantly influenced consumers' choices ( $\beta = 0.84, p = 0.04, OR = 2.31$  [95% CI: 1.03, 5.15]). The odds of a participant choosing yogurt B over yogurt A when yogurt B had an HSR label was 2.31 times the odds of making the same choice when yogurt B did not have an HSR label. Confirming our hypothesis (H1), the mere presence of an HSR label significantly increased consumers' purchase intentions for that product. Additionally, results also showed that the consumers' gender predicted their preference for yogurt ( $\beta = 0.99, p = 0.02, OR = 2.69$  [95% CI: 1.12, 6.43]): The odds of choosing yogurt B over yogurt A were 2.69 times higher for females than for males. Thus, we included the gender  $\times$  HSR interaction term in Model 1 to test how gender moderated the effect of the presence of an HSR label on purchase intentions. Results revealed that the interaction effect was only marginally significant ( $p = 0.054$ ). We, therefore, implemented model 2 to control for product-related experiences. Model 2 included the control variables (product liking and previous experience) and made a significant improvement in explaining the variance,  $\Delta\chi^2(4) = 15.8, p = 0.003$ , while keeping the effect of the label on yogurt B significant ( $p = 0.02$ ). The results also revealed that the gender  $\times$  HSR interaction term on purchase intentions of yogurt B was now significant ( $\beta = -1.26, p = 0.017, OR = 0.28$ , [95% CI: 0.10, 0.80]), showing that displaying the label on yogurt B predicted choice, depending on gender. When the consumer was female, the presence of an HSR label on yogurt B did not significantly alter the estimated odds of choosing that product, which slightly decreased from 85% to 82%. In contrast, for male participants, the odds of selecting yogurt B when it carried the HSR label increased notably from 64% to 84%, compared to when the label was absent. To summarize, the mere presence (vs. absence) of an HSR label on one of the two yogurts increased consumers' purchase intentions for that product. However, the effect of the mere presence (vs. absence) of the HSR label was qualified by gender: we observed an increase in purchase preferences when the HSR was present (vs. absent) only for male participants but not female participants. Confirming our hypothesis 1, the mere presence (vs. absence) of an HSR label on a product's packaging increased purchase intentions for that product. However, this effect was moderated by gender, as it was manifest only in male participants.

The same analysis was performed for the choice between the two cereals. Results revealed that the mere presence (vs. absence) of an HSR had no effect on purchase preferences for cereals B, but it did on cereals A ( $\beta = 0.63, p = 0.03, OR = 1.88$ , [95% CI: 1.05, 3.36]). The odds of choosing cereal A when it had an HSR label were 1.88 times those of when it did not have any label. Choices for cereals A were significantly higher (50%) when it had a label than when it did not (39%). When the control variables were introduced into the model (Model 2), they made no significant change in explaining the results,  $\Delta\chi^2(4) = 2.20, p = 0.70$ , and the effect of an HSR label on cereals A was still significant at  $p < 0.01$ . This pattern of results shows that the mere presence (vs. absence) of an HSR label on a cereal's packaging increased consumer's purchase intentions for that product. However, the results also show a product-related contingency in that this competitive advantage was only present in one cereal, while the other cereal (from a different brand) was immune to this marketing strategy despite being in the same product category.

The analysis of the preferences for the two cookies showed that the mere presence of an HSR label did not influence it. However, the choice was significantly influenced by age ( $\beta = -0.06, p = 0.004, OR = 0.94$ , [95% CI: 0.90, 0.98]). For every one-year increase in age, the odds of choosing cookies A increased by 1.05. No difference was observed when the product-related experiences control variables were added in Model 2,  $\Delta\chi^2(4) = 6.29, p = 0.179$ . Overall, these results suggest that consumer preferences for some products, such as cookies, are resistant to marketing strategies such as applying an HSR label.

The purchase preferences between the two competing milk products were significantly influenced by the mere presence of an HSR on milk A ( $\beta = -1.01, p = 0.001, OR = 0.36$ , [95% CI: 0.20, 0.67]). When milk A had an HSR label on the packaging, consumers were 2.78 times more likely to choose that product over its competitor compared to when it did not have

an HSR label. Confirming our [hypothesis 1](#), applying an HSR label on the product packaging influenced consumer preferences for that product, giving this product a competitive advantage over the rival product, which lacked the label. Introducing the control variables did not make any significant change to the predictive power of the model,  $\Delta\chi^2(4) = 4.96$ ,  $p = 0.291$ . However, the mere presence (vs. absence) of an HSR label on milk B did not increase purchase intentions. This opens up speculations on the potential moderating effect of the specific product brand.

Finally, the preferences between the two fruit juices were not influenced by the mere presence (vs. absence) of an HSR label, and introducing the control variables made no significant improvement,  $\Delta\chi^2(4) = 4.76$ ,  $p = 0.313$ . Contrary to our [hypothesis 1](#), consumer preferences for two competing fruit juices were not influenced by the mere presence of an HSR label on the product packaging.

The results across the five product categories showed that the mere presence (vs. absence) of an HSR label on the product's packaging gave that product a competitive advantage, in terms of purchase intention, over its rival product without the label. However, the effect was observed for 3 out of five categories and only in one product for each category (one yogurt, one cereal, one milk). Our [Hypothesis 1](#), therefore, was confirmed for some products but disconfirmed for others. The specificity of the effect of the mere presence (vs. absence) of the label is not related to the product category; in fact, the effect of mere presence was observed for one product in one category (e.g. Cereal B) but not for the other product in the same category (e.g. Cereal A). The discontinuous presence of the effect, therefore, must be attributed to some other reason, such as the product brand. The control variables we measured were not always able to clean the effect. Indeed, gender had the power to clean the effect on one product (yogurt) but not the other products. Similarly, the control variables made no significant improvement, showing that the reason for the lack of competitive advantage of an HSR label is not to be searched in these control variables.

In the next set of analyses, we tested whether the mere presence (vs. absence) of an HSR could impact the perceived healthiness, a variable that could have particular importance in the manifestation of the effect. Some products, indeed, might be perceived as healthier than others, and the impact of the HSR label could vary depending on this perception.

#### 4.2 Perceived healthiness

The mean and standard deviation of the perceived healthiness for each product in each experimental treatment are shown in [Table 2](#). Contrary to our second hypothesis, the mere presence (vs. absence) of an HSR label did not make any significant change to the relative perceived healthiness (all  $p$ -s > 0.43) of the two yogurts. The analysis on the two morning cereals, instead, showed a significant 3-way interaction between the repeated measure factor (product A vs. product B) and the two between-subjects factors (HSR on product A and HSR on product B),  $F(1,390) = 6.29$ ,  $p = 0.013$ . Inspection of the means showed that whereas the perceived healthiness of cereals A did not change when an HSR label was present, the perceived healthiness of cereals B changed according to the experimental treatment: it was the lowest (4.21) when no label was present and the highest (4.58) when the label was present. However, no pairwise comparison (Tuckey's post-hoc) reached significance (all  $p$ -s > 0.423). This might be due to the small sample size of pairwise comparisons. The same analysis on the perceived healthiness of the two cookies did not reveal any effect of the mere presence of an HSR label on perceived healthiness (all  $p$ -s > 0.119). Similarly, the healthiness of the two milks was not perceived as different when the HSR labels were present (vs. absent) (all  $p$ -s > 0.104). Finally, the healthiness of the two fruit juice products was also not perceived as different when the HSR labels were present (vs. absent) (all  $p$ -s > 0.235). Overall, the presence (vs. absence) of the HSR did not impact product perceived healthiness in our study.

Treatment	Yogurt		Cereals		Cookies		Milk		Fruit juice	
	Product A <i>M (SD)</i>	Product B <i>M (SD)</i>	Product A <i>M (SD)</i>	Product B <i>M (SD)</i>	Product A <i>M (SD)</i>	Product B <i>M (SD)</i>	Product A <i>M (SD)</i>	Product B <i>M (SD)</i>	Product A <i>M (SD)</i>	Product B <i>M (SD)</i>
1- Without HSR	5.30 (1.20)	5.35 (1.16)	4.44 (1.38)	4.21 (1.44)	3.58 (1.5)	3.52 (1.42)	5.09 (1.16)	5.09 (1.20)	4.47 (1.51)	4.52 (1.53)
2- With HSR on Product A	5.37 (0.99)	5.29 (0.98)	4.39 (1.31)	4.56 (1.25)	3.53 (1.47)	3.43 (1.40)	5.17 (0.98)	5.20 (0.95)	4.49 (1.42)	4.56 (1.41)
3- With HSR on Product B	5.36 (0.99)	5.37 (0.99)	4.49 (1.22)	4.58 (1.25)	3.41 (1.40)	3.56 (1.27)	5.19 (1.08)	5.28 (1.10)	4.58 (1.27)	4.58 (1.24)
4- With HSR on both	5.38 (1.02)	5.42 (1.02)	4.42 (1.13)	4.36 (1.27)	3.33 (1.27)	3.45 (1.30)	5.22 (1.20)	5.15 (1.22)	4.58 (1.27)	4.49 (1.22)
Mean	5.35 (1.05)	5.36 (1.04)	4.43 (1.26)	4.43 (1.31)	3.46 (1.41)	3.49 (1.34)	5.17 (1.11)	5.18 (1.12)	4.53 (1.37)	4.54 (1.35)

**Source(s):** Authors' work

**Table 2.**  
Perceived healthiness  
of the products in the  
four experimental  
conditions (standard  
deviations are in  
parenthesis)

#### 4.3 Decision difficulty

Participants' average ratings of decision difficulty did not vary as an effect of the presence (vs. absence) of an HSR on the packaging for all product categories except the fruit juice. For this product category, participants reported more difficulty choosing when the HSR label was present on both fruit juices B and A ( $M = 4.03$ ,  $SE = 0.176$ ). In contrast, decision difficulty was the lowest when an HSR label was present only on product A and was absent on product B ( $M = 3.21$ ,  $SE = 0.179$ ), as shown by the significant interaction effect of the two factors (HSR on Product A and HSR on Product B) on decision difficulty,  $F(1,390) = 4.658$ ,  $p = 0.032$ . Overall, the mere presence of an HSR on the product package did not impact perceived choice difficulty.

### 5. Discussion and implications

In previous studies, the HSR label has been advocated as a means to improve consumer understanding of the nutritional value of foods (Grunert and Wills, 2007; Thomas *et al.*, 2021). However, its impact as a marketing tool on product purchase intentions has not been sufficiently investigated. For example, it has been observed that the mere presence of a FOP does not always translate into healthier decisions (Ikonen *et al.*, 2020) and the mere presence of a HSR did not have a consistent effect on consumer choices (Anderson and O'Connor, 2019; Talati *et al.*, 2017; Thomas *et al.*, 2021) (e.g. Talati *et al.*, 2017; Thomas *et al.*, 2021).

To fill this gap, in this study, we tested whether the mere presence of an HSR label can serve as a marketing tool that increases preferences for labeled versus unlabeled products. Results showed that the mere presence (vs. absence) of an HSR label on a product increased the purchase intentions of the labeled product compared to the unlabeled product. However, the results also revealed a significant variability in the occurrence of the effect. We tested the effect for five product categories (yogurt, cereals, milk, cookies and fruit juices), but the "mere presence" effect was observed in three out of five categories. More precisely, the presence (vs. absence) of an HSR increased the purchase intentions of one yogurt (yogurt B) but not of the other yogurt (yogurt A). Similarly, the presence (vs. absence) of an HSR increased the purchase intentions of one morning cereal (cereals A) but not for the other cereal. The same occurred for the two brands of milk. Therefore, the "mere presence" effect was confirmed by our results, although it appears to be more variable than expected.

These findings contribute to the extant literature by providing empirical evidence of the "mere presence" effect. However, the results were unable to completely fill the research gap. The "mere presence" effect still shows unexplained inconsistency across product brands. Several explanations can be put forward to account for these results. First, the three product categories for which there was a significant "mere presence" effect all had a 4.5 HSR rating, whereas the two product categories for which we did not find any effect had a 4.0 rating. Therefore, the presence of the effect might be due to the higher ratings of the products. This could suggest that displaying an HSR label on the packaging enhances purchase preferences for a product only if the rating is high enough (at least 4.5). However, this explanation does not account for the fact that even within the same product category, one of the two products gained an advantage from the mere presence of the HSR label, whereas the other did not, despite being of the same category and having the same rating (e.g. 4.5 for both product A and B). A second explanation, therefore, could be that the "mere presence" effect of an HSR label as a tool for promoting sales varies depending on the specific product brand. It suggests that the presence (vs. absence) of an HSR label can provide a competitive advantage only for a specific brand of a product, while it may have little or no effect on other brands of the same product. One reason could be that while consumers may have strong levels of trust or health

awareness for specific brands, they may lack this trust for others. For example, a brand that has a reputation for being healthy or natural may be less likely to see a significant impact from adding an HSR label on the packaging, as consumers may already perceive it as a healthy choice. On the other hand, a brand that is less well-known or has a reputation for being less healthy may see a larger impact from the introduction of an HSR label on the packaging, as it may help to inform consumers of the health benefits of the product. Indeed, there is converging evidence suggesting that front-of-packaging nutrition information impacts healthy products but not unhealthy ones (Bui *et al.*, 2013). This could also explain why the HSR label increased purchase preference for yogurt, breakfast cereals and milk but not for cookies and orange juice.

Overall, our findings confirming the “mere presence” effect are in line with the hypothesis that consumers should be facilitated in their choice when an HSR label is present, compared to when it is absent, based on the heuristic-systematic model (Chaiken *et al.*, 1989; Kahneman, 2011). Indeed, previous literature showed that the FOP labels help consumers process information quickly during shopping (van Herpen and Trijp, 2011) and have positive effects on the perception of healthiness (Ikonen *et al.*, 2020). However, our data do not support the healthiness explanation, as the presence of an HSR label did not increase perceived healthiness ratings. However, it may be that an explicit measure of healthiness, such as the one used in this study, was not adequate to capture this construct. Future studies could consider using more implicit measures for such a mediating variable or using an alternated-ordered design where the measure of perceived healthiness does not always follow the choice measure. Despite participants not explicitly admitting that their perceived healthiness was increased, it is, however, possible that an HSR label induced a health halo effect (Andrews *et al.*, 2000), making the product appear healthier by simply having a label associated with health on it.

Alternate explanations involve the consumer-firm relationship (Sirdeshmukh *et al.*, 2002; Wilson, 1995): the voluntary decision of the firm to adopt a FOP label might signal the firm’s intention to care for the customer’s needs or the product with an HSR label might be perceived as more innovative than the one without it (Bigliardi and Filippelli, 2022; Orth and Malkewitz, 2008). Simplified nutrition labels on product fronts could also serve as differentiating signals from competitors (Orth and Malkewitz, 2008), representing an element of innovation within the food industry (Bigliardi and Filippelli, 2022). However, these alternate explanations should be further examined in future studies. In the present study, we controlled for consumers’ prior experience with the product and liking of the product so that the results we obtained are adjusted for these two evaluations, but we cannot exclude that there are other qualities of the products that we did not measure and that could have an impact on the “mere presence” effect.

The results of our study have practical implications for the food industry. In a highly competitive environment, as with food products, a simplified label such as the HSR can act as a purchase incentive through automatic and quick consumer choice procedures. Indeed, a label quickly signals to the buyer that the product is healthy or, at the very least, that the company has taken care to test its healthiness. This makes the product unique and distinguishable and, based on our results, can increase the chances of being chosen by consumers. Simplified food labels also have the effect of generally increasing the healthiness of products. This happens because making health information transparent triggers competition among production companies to improve their market positioning, trying to be more successful than their competitors in terms of healthiness as well as price. Those who will ultimately benefit are consumers who will get overall healthier products to choose from. In addition, it should be easier for consumers to make a trade-off between the price and the healthiness of the product, making the choice faster but also more informed.

## 6. Limitations and further research

The study identifies several limitations that suggest avenues for future research. The study's focus on five product categories and younger adults may restrict the generalizability of findings, warranting broader analysis across diverse product ranges and age groups. Secondly, we used only two levels of HSR scores (i.e. 4.5 and 4.0) across all products, but it could be important to explore varying scores based on food categories in future investigations. Third, while online data was collected, future studies could benefit from exploring consumer behavior in real grocery environments with natural shopping experiences to support findings and enhance validity. Fourth, the study's European focus raises questions about the implications of results to other Non-Western, Educated, Industrialized, Rich and Democratic (Non-WEIRD) regions, highlighting the importance of exploring HSR's impact in diverse cultural contexts.

## 7. Conclusion

This study highlights the competitive advantage of the mere presence of an HSR label on the product's packaging over the rival product, which lacked the label. Findings confirmed that the mere presence of an HSR on the packaging increases purchase intentions. However, the effect was variable across products. Therefore, this study also stressed the need to take into account the unique characteristics of the product and brand when evaluating the competitive advantage of HSR labels as a tool for promoting sales. Noteworthy, on no occasion we found that an HSR label reduced purchase intentions. When it had an effect, it always increased purchase intentions. These findings indicate that the label can be effectively utilized as a marketing tool, although the impact of the label might differ based on the product or brand. Future research should explore the specific interactions between the HSR label and product characteristics that contribute to the competitive advantage or lack thereof.

## References

- Anderson, C.L. and O'Connor, E.L. (2019), "The effect of the health star rating on consumer decision-making", *Food Quality and Preference*, Vol. 73, November 2018, pp. 215-225, doi: [10.1016/j.foodqual.2018.11.005](https://doi.org/10.1016/j.foodqual.2018.11.005).
- Andrews, J.C., Burton, S. and Netemeyer, R.G. (2000), "Are some comparative nutrition claims misleading? The role of nutrition knowledge, ad claim type and disclosure conditions", *Journal of Advertising*, Vol. 29 No. 3, pp. 29-42, doi: [10.1080/00913367.2000.10673615](https://doi.org/10.1080/00913367.2000.10673615).
- Andrews, J.C., Netemeyer, R., Burton, S. and Kees, J. (2021), "What consumers actually know: the role of objective nutrition knowledge in processing stop sign and traffic light front-of-pack nutrition labels", *Journal of Business Research*, Vol. 128, pp. 140-155, doi: [10.1016/j.jbusres.2021.01.036](https://doi.org/10.1016/j.jbusres.2021.01.036).
- Ang, M.Y.A., Pontes, N. and France, C. (2023), "The influence of health star rating labels on plant-based foods: the moderating role of consumers' believability", *Food Quality and Preference*, Vol. 107, 104827, doi: [10.1016/j.foodqual.2023.104827](https://doi.org/10.1016/j.foodqual.2023.104827).
- Bigliardi, B. and Filippelli, S. (2022), "A review of the literature on innovation in the agrofood industry: sustainability, smartness and health", *European Journal of Innovation Management*, Vol. 25 No. 6, pp. 589-611, doi: [10.1108/EJIM-05-2021-0258](https://doi.org/10.1108/EJIM-05-2021-0258).
- Borgmeier, I. and Westenhoefer, J. (2009), "Impact of different food label formats on healthiness evaluation and food choice of consumers: a randomized-controlled study", *BMC Public Health*, Vol. 9 No. 1, p. 184, doi: [10.1186/1471-2458-9-184](https://doi.org/10.1186/1471-2458-9-184).
- Bui, M., Kaltcheva, V.D., Patino, A., Leventhal, C. and R. (2013), "Front-of-package product labels: influences of varying nutritional food labels on parental decisions", *The Journal of Product and Brand Management*, Vol. 22 Nos 5/6, pp. 352-361, doi: [10.1108/JPBM-05-2013-0298](https://doi.org/10.1108/JPBM-05-2013-0298).

- Chaiken, S., Liberman, A. and Eagly, A.H. (1989), "Heuristic and systematic information processing within and beyond the persuasion context", in Uleman, J.S. and Bargh, J.A. (Eds), *Unintended Thought*, The Guilford Press, New York, NY, pp. 212-252.
- Cheikh Ismail, L., Radwan, H., Osaili, T., Mustafa, E.H., Nasereddin, F.M., Saleh, H.J., Matar, S.A., Saleh, S.T., Mohamad, M.N., Al Daour, R., Al Rajaby, R., Saif, E.R., Stojanovska, L. and Al Dhaheri, A.S. (2024), "Use of nutrition facts panels and traffic light labelling and perceived healthiness of food: conjoint analysis and cross-sectional survey", *British Food Journal*, Vol. 126 No. 6, pp. 2229-2248, doi: [10.1108/BFJ-08-2023-0763](https://doi.org/10.1108/BFJ-08-2023-0763).
- Clement, J., Kristensen, T. and Grønhaug, K. (2013), "Understanding consumers' in-store visual perception: the influence of package design features on visual attention", *Journal of Retailing and Consumer Services*, Vol. 20 No. 2, pp. 234-239, doi: [10.1016/j.jretconser.2013.01.003](https://doi.org/10.1016/j.jretconser.2013.01.003).
- Commonwealth of Australia (2014), "Health star rating system", Website 2023-02-10, available at: <http://healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/home> (accessed 10 February 2023).
- Grunert, K.G. and Wills, J.M. (2007), "A review of European research on consumer response to nutrition information on food labels", *Journal of Public Health*, Vol. 15 No. 5, pp. 385-399, doi: [10.1007/s10389-007-0101-9](https://doi.org/10.1007/s10389-007-0101-9).
- Hamlin, R. and McNeill, L. (2016), "Does the Australasian 'health star rating' front of pack nutritional label system work?", *Nutrients*, Vol. 8 No. 6, p. 327, doi: [10.3390/nu8060327](https://doi.org/10.3390/nu8060327).
- Hawley, K.L., Roberto, C.A., Bragg, M.A., Liu, P.J., Schwartz, M.B. and Brownell, K.D. (2013), "The science on front-of-package food labels", *Public Health Nutrition*, Vol. 16 No. 3, pp. 430-439, doi: [10.1017/S1368980012000754](https://doi.org/10.1017/S1368980012000754).
- Ikonen, I., Sotgiu, F., Aydinli, A. and Verlegh, P.W.J. (2020), "Consumer effects of front-of-package nutrition labeling: an interdisciplinary meta-analysis", *Journal of the Academy of Marketing Science*, Vol. 48 No. 3, pp. 360-383, doi: [10.1007/s11747-019-00663-9](https://doi.org/10.1007/s11747-019-00663-9).
- Jáuregui, A., White, C.M., Vanderlee, L., Hall, M.G., Contreras-Manzano, A., Nieto, C., Sacks, G., Thrasher, J.F., Hammond, D. and Barquera, S. (2022), "Impact of front-of-pack labels on the perceived healthfulness of a sweetened fruit drink: a randomised experiment in five countries", *Public Health Nutrition*, Vol. 25 No. 4, pp. 1094-1104, doi: [10.1017/S1368980021004535](https://doi.org/10.1017/S1368980021004535).
- Jones, A., Thow, A.M., Ni Mhurchu, C., Sacks, G. and Neal, B. (2019), "The performance and potential of the Australasian Health Star Rating system: a four-year review using the RE-AIM framework", *Australian and New Zealand Journal of Public Health*, Vol. 43 No. 4, pp. 355-365, doi: [10.1111/1753-6405.12908](https://doi.org/10.1111/1753-6405.12908).
- Junkkari, T., Kantola, M., Arjanne, L., Luomala, H. and Hopia, A. (2023), "The effect of nutrition labels on lunch buffet consumption: a real-life experiment", *British Food Journal*, Vol. 126 No. 13, pp. 18-39, doi: [10.1108/BFJ-06-2023-0532](https://doi.org/10.1108/BFJ-06-2023-0532).
- Kahneman, D. (2011), *Thinking, Fast and Slow*, Farrar, Straus and Giroux, New York.
- Lichtenstein, A.H., Appel, L.J., Vadiveloo, M., Hu, F.B., Kris-Etherton, P.M., Rebholz, C.M., Sacks, F.M., Thorndike, A.N., Van Horn, L. and Wylie-Rosett, J. (2021), "2021 dietary guidance to improve cardiovascular health: a scientific statement from the American heart association", *Circulation*, Vol. 144 No. 23, pp. e472-e487, doi: [10.1161/CIR.0000000000001031](https://doi.org/10.1161/CIR.0000000000001031).
- Maganja, D., Buckett, K., Stevens, C. and Flynn, E. (2019), "Consumer choice and the role of front-of-pack labelling: the Health Star Rating system", *Public Health Research and Practice*, Vol. 29 No. 1, 2911909, doi: [10.17061/phrp2911909](https://doi.org/10.17061/phrp2911909).
- Mauri, C., Grazzini, L., Ulqinaku, A. and Poletti, E. (2021), "The effect of front-of-package nutrition labels on the choice of low sugar products", *Psychology and Marketing*, Vol. 38 No. 8, pp. 1323-1339, doi: [10.1002/mar.21473](https://doi.org/10.1002/mar.21473).
- Miller, L.M.S. and Cassady, D.L. (2015), "The effects of nutrition knowledge on food label use. A review of the literature", *Appetite*, Vol. 92, pp. 207-216, The Authors, doi: [10.1016/j.appet.2015.05.029](https://doi.org/10.1016/j.appet.2015.05.029).

- Orth, U.R. and Malkewitz, K. (2008), "Holistic package design and consumer brand impressions", *Journal of Marketing*, Vol. 72 No. 3, pp. 64-81, doi: [10.1509/jmkg.72.3.64](https://doi.org/10.1509/jmkg.72.3.64).
- R Core Team (2022), *R: A Language and Environment for Statistical Computing*, R Foundation for Statistical Computing, Vienna, Austria, available at: <https://www.R-project.org/>
- Reutskaja, E., Nagel, R., Camerer, C.F. and Rangel, A. (2011), "Search dynamics in consumer choice under time pressure: an eye-tracking study", *The American Economic Review*, Vol. 101 No. 2, pp. 900-926, doi: [10.1257/aer.101.2.900](https://doi.org/10.1257/aer.101.2.900).
- Schneider, G. and Ghosh, A.P. (2020), "Should we trust front-of-package labels? How food and brand categorization influence healthiness perception and preference", *Journal of the Association for Consumer Research*, Vol. 5 No. 2, pp. 149-161, doi: [10.1086/707929](https://doi.org/10.1086/707929).
- Seenivasan, S., Nagpal, A., Thomas, D. and Sacks, G. (2024), "Trends (2014-2018) in the healthiness of packaged food purchases of Australian consumers before and after the introduction of voluntary Health Star Rating nutrition labels", *Public Health Nutrition*, Vol. 27, pp. 1-24, doi: [10.1017/S1368980024000892](https://doi.org/10.1017/S1368980024000892).
- Shrestha, A., Cullerton, K., White, K.M., Mays, J. and Sendall, M. (2023), "Impact of front-of-pack nutrition labelling in consumer understanding and use across socio-economic status: a systematic review", *Appetite*, Vol. 187, 106587, doi: [10.1016/j.appet.2023.106587](https://doi.org/10.1016/j.appet.2023.106587).
- Silayoi, P. and Speece, M. (2004), "Packaging and purchase decisions", *British Food Journal*, Vol. 106 No. 8, pp. 607-628, doi: [10.1108/00070700410553602](https://doi.org/10.1108/00070700410553602).
- Sirdeshmukh, D., Singh, J. and Sabol, B. (2002), "Consumer trust, value, and loyalty in relational exchanges", *Journal of Marketing*, Vol. 66 No. 1, pp. 15-37, doi: [10.1509/jmkg.66.1.15.18449](https://doi.org/10.1509/jmkg.66.1.15.18449).
- Srivastava, P., Ramakanth, D., Akhila, K. and Gaikwad, K.K. (2022), "Package design as a branding tool in the cosmetic industry: consumers' perception vs. reality", *SN Business and Economics*, Vol. 2 No. 6, p. 58, doi: [10.1007/s43546-022-00222-5](https://doi.org/10.1007/s43546-022-00222-5).
- Talati, Z., Norman, R., Pettigrew, S., Neal, B., Kelly, B., Dixon, H., Ball, K., Miller, C. and Shilton, T. (2017), "The impact of interpretive and reductive front-of-pack labels on food choice and willingness to pay", *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 14 No. 1, p. 171, doi: [10.1186/s12966-017-0628-2](https://doi.org/10.1186/s12966-017-0628-2).
- Talati, Z., Pettigrew, S., Kelly, B., Ball, K., Neal, B., Dixon, H., Shilton, T. and Miller, C. (2018), "Can front-of-pack labels influence portion size judgements for unhealthy foods?", *Public Health Nutrition*, Vol. 21 No. 15, pp. 2776-2781, doi: [10.1017/S1368980018001702](https://doi.org/10.1017/S1368980018001702).
- Thomas, D., Seenivasan, S. and Wang, D. (2021), "A nudge toward healthier food choices: the influence of health star ratings on consumers' choices of packaged foods", *European Journal of Marketing*, Vol. 55 No. 10, pp. 2735-2768, doi: [10.1108/EJM-11-2019-0851](https://doi.org/10.1108/EJM-11-2019-0851).
- van den Akker, K., Bartelet, D., Brouwer, L., Luijpers, S., Nap, T. and Havermans, R. (2022), "The impact of the nutri-score on food choice: a choice experiment in a Dutch supermarket", *Appetite*, Vol. 168, 105664, doi: [10.1016/j.appet.2021.105664](https://doi.org/10.1016/j.appet.2021.105664).
- van Herpen, E. and Trijp, H.C.M.v.a. van. (2011), "Front-of-pack nutrition labels. Their effect on attention and choices when consumers have varying goals and time constraints", *Appetite*, Vol. 57 No. 1, pp. 148-160, doi: [10.1016/j.appet.2011.04.011](https://doi.org/10.1016/j.appet.2011.04.011).
- Wandel, M. (1997), "Food labelling from a consumer perspective", *British Food Journal*, Vol. 99 No. 6, pp. 212-219, doi: [10.1108/00070709710181559](https://doi.org/10.1108/00070709710181559).
- Wilson, D.T. (1995), "An integrated model of buyer-seller relationships", *Journal of the Academy of Marketing Science*, Vol. 23 No. 4, pp. 335-345, doi: [10.1177/009207039502300414](https://doi.org/10.1177/009207039502300414).

### Supplementary material

The supplementary material for this article can be found online.

#### About the authors

Muhammad Junaid Shahid Hasni is a Postdoctoral Research Fellow at the Department of Economics and Management, University of Trento (Italy). He has a doctoral degree in Economics and Management from the same institution. He examines research issues related to, for example, consumer behavior, food labeling, food waste behavior, anti-consumption behavior, brand hate, mobile banking and social media marketing. His research has been published in peer-reviewed journals, such as the *Journal of Business Ethics*, *European Journal of Marketing*, *Food Quality and Preference*, *International Journal of Bank Marketing*, *International Journal of Retail & Distribution Management* and *Journal of Consumer Behaviour*. Muhammad Junaid Shahid Hasni is the corresponding author and can be contacted at: [muhammad.hasni@unitn.it](mailto:muhammad.hasni@unitn.it)

Luigi Mittone is working as a full Professor in the Department of Economics and Management of the University of Trento (Italy). His main research interests include Behavioral Economics (Intertemporal decision-making, Strategic Interaction, Choice under Uncertainty, Tax compliance), Nudging (applied to Public Policies) and Health Economics. He is the author of 142 scientific works, including book chapters and journal articles, such as *Applied Psychology: An International Review*, *Technovation*, *Food Quality and Preference*, *Economic Inquiry and Judgment and Decision Making*.

Lucia Savadori is an Associate Professor of psychology at the Department of Economics and Management of the University of Trento (Italy) and a member of the Doctoral School in Economics and Finance at the University of Trento and Bolzano. Her research focuses on the cognitive aspects of risk perception and risk communication in the health and economic domains. Her work has been published in peer-reviewed journals, such as *Applied Psychology: An International Review*, *Journal of Experimental Psychology: Applied*, *Risk Analysis* and *Journal of Risk Research*.

---

For instructions on how to order reprints of this article, please visit our website:

[www.emeraldgroupublishing.com/licensing/reprints.htm](http://www.emeraldgroupublishing.com/licensing/reprints.htm)

Or contact us for further details: [permissions@emeraldinsight.com](mailto:permissions@emeraldinsight.com)