U.S. FOOD & DRUG ADMINISTRATION

Front of Package Labeling Literature Review

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BACKGROUND AND CONTENTS

FDA is prioritizing its nutrition initiatives to ensure people in the United States have greater access to healthier foods and nutrition information we can all use to identify healthier choices more easily. Increasing the availability of healthier foods could improve eating patterns and, as a result, improve everyone's health and wellness.

Claims and symbols can act as quick signals on the front of food packages to help consumers better understand nutrition information and select foods that are part of healthy eating patterns. Other aspects of food labels can provide consumers with further valuable information to help them to identify healthier foods.

To help consumers easily identify packaged foods that would meet an updated definition for the "healthy" claim, FDA is conducting consumer research to develop a "healthy" symbol that could appear on food packages.

FDA is also exploring the development of a nutrition labeling scheme referred to as front of package (FOP) labels displaying a summary of the product's healthfulness or nutrient content. To support these efforts, FDA conducted and updated reviews of the literature to summarize what is currently known and understood about FOP labeling.

Pages 4 to 10 of this report are the body of the review – the body encompasses 1) a summary of key systematic reviews on FOP symbols, 2) an updated review of the FOP scientific literature, and 3) summaries from guides on government implementation of FOP labels. The Appendices contain: A) a table of FOP labeling schemes and symbols available online and in the scientific literature in 2018; B) the methods report including the study protocol; C) a summary of each article in the updated review; D) citations for articles in the updated review.

LITERATURE REVIEW

General Findings

While the FOP scientific literature is nuanced, the following themes emerged:

- A FOP rating system or symbol can help consumers identify and select healthy foods.
- Consumers generally prefer simple labels (such as the ones using a summary system).
- While more recent studies have examined which type of labels (summary system or nutrient specific) work best, additional research is needed to understand whether consumers' use of these labels result in healthier diets and better health outcomes.
- Some manufacturers have reformulated products following the implementation of FOP nutrition symbols; some evidence suggests increased sales of products bearing a FOP symbol.
- Institutional endorsement of logos may be related to greater confidence in the label.

Introduction

Consumers can use the Nutrition Facts label (NFL) to learn about the product's nutrients and how a serving of that product fits into the context of their daily diet. In recent years, the market has seen a plethora of nutrition indicators on the front panel of the food label, highlighting nutrients that consumers might want to consume more of or those they might want to limit. These FOP nutrient representations can most easily be grouped into two types: 1) Summary and 2) Nutrient-specific

[Andrews et al. 2014] (See Appendix A, Table 1 for examples). Summary indicators are evaluative; that is, they provide an overall interpretive assessment of the healthfulness of a serving of the food, based on a proprietary algorithm. Nutrient-specific indicators, on the other hand, also called "reductive" indicators, are so called because they present a 'reduced amount' of the product's nutrient content on the front of the package.

The scientific literature on FOP nutrition labeling has been the subject of several reviews and reports; we review and summarize them below, and then provide an update of the recent literature (2016 to 2019).

Results of Key Systematic Reviews (2005 to 2016)

A 2005 literature review on consumer understanding and use of nutrition labeling summarized more than 100 studies on NFL usage and FOP nutrition information [Cowburn and Stockley, 2005]. This review was one of the first to conclude that, although consumers report high usage of the NFL, actual usage is likely much lower. The studies reviewed showed that consumers could perform information retrieval tasks and simple calculations using the NFL but it was difficult for them to fully interpret nutrition information on the food label. The review concluded that interpretational aids could contribute to consumers making healthy point-of-purchase choices and moreover, that these aids could help consumers interpret the contribution of the food to the overall diet.

The first large systematic review of FOP nutrient indicators was conducted by the National Academies of Sciences, Engineering, and Medicine (NASEM, formerly the Institute of Medicine (IOM) IOMa, 2010). This report, requested by the U.S. Congress, evaluated the international landscape on FOP nutrition symbols generated by manufacturers, supermarkets, organizations, and governments. The report discusses three types of FOP symbols: 1) Nutrient-Specific Systems; 2) Summary Indicator Systems; and 3) Food Group Information Systems. The overall conclusion was that a FOP rating system or symbol could help consumers identify and select healthy foods, that calories and serving size would be helpful to include in the symbol, and that further testing of consumer use and understanding of "nutrient-specific information" or a "summary indicator" would be necessary. The NASEM report also concluded that a FOP symbol should be geared toward the general population.

The NASEM followed up the report with a Phase II report (IOMb, 2012), focused on consumers' use of FOP symbols. The Phase II report concluded that, for a FOP symbol to encourage healthier food choices, a simple FOP summary symbol "…that serves as a signal or cue…" would be better than detailed information about nutrient content; the Phase II report recommended "…shifting from an informational approach to an interpretive one…," and asserted that a successful symbol system would encourage product reformulation or development of products that meet the criteria.

Meanwhile, FDA commissioned a literature review to update the 2005 literature review discussed above. The 2011 FDA review (published by Hersey, et al. 2013) consisted solely of scientific studies on FOP and Shelf Label Nutrition Systems - to learn which types of FOP systems are most effective for influencing healthy food choices. Analysts searched 17 literature databases (e.g., PubMed, Web of Science, ScienceDirect) using a targeted search algorithm. Thirty-eight out of 111 articles were retained for inclusion in the review. This literature review found that summary systems incorporating text and color worked better than those using only numeric information in attracting consumer attention and

getting them to make healthier food choices - but that the nutrient-specific systems (the reductive indicators) worked better than the single summaries for providing consumers with details about what made the food healthy.

In 2016, FDA commissioned an update to the 2011 literature review discussed in the previous paragraph. This update captured the scientific literature on FOP from 2010 to August 2016 (RTI, 2016). Following the format of the previous literature reviews, the Addendum examined 79 articles and summarized them using the same categories identified in earlier reviews. Similar to previous reviews, the Addendum reported that 1) the literature suggests that graphic elements help consumers with food purchase decisions; 2) consumers – especially diverse subpopulations - prefer simple labels over those that have numerical information; 3) color coding with some text leads to better understanding of the nutrition information; 4) there is not enough evidence to indicate exactly which type of FOP label most influences consumers behavior; and 5) there is some evidence that FOP labels influence sales but no evidence on whether they lead to decreasing consumption of nutrients to limit or increasing consumption of nutrients to get enough of.

Results of Key Systematic Reviews (2016 to 2018)

The FDA updated the 2016 FOP literature review by reviewing the scientific literature on FOP from August 2016 to October 2018, using the same targeted database search algorithm and the analytical categories used in earlier reviews. Fifty-one scientific articles on FOP were analyzed for this FOP literature update. Table 1 below presents the highlights and conclusions of this literature review by analytical category.

Table 1. Highlights and Conclusions of updated FOP nutrition labeling literature by analytical category (August 2016 to October 2018)

ANALYTICAL CATEGORY	HIGHLIGHTS AND CONCLUSIONS
Attention and Processing	Multiple FOP labeling systems were examined in the identified studies, including: Multiple Traffic Light, Guideline Daily Amounts, 5-Color Nutrition Label (a summary system proposed to France Health Minister, which later was updated to Nutri-Score), Guiding Stars, Health Star Rating, Health checks, NuVal, Logos, and warning signs. Studies have shown that FOPs, health claims, and warnings all drew consumers' attention. Whether consumers noticed FOPs and how much attention consumers attribute to FOPs varied by different factors (such as the type of FOP, the design of FOP, and the presence of educational effort). Furthermore, the interaction between FOPs and other marketing components on the package was emphasized. One study (De la Cruz-Gongora et al. 2017) found that FOP symbols were perceived as easy to understand, highly acceptable, and useful for decision making, compared to Rating Stars, Guideline Daily Amounts, and Multiple Traffic Light. FOP labels are used differently depending on time pressure. One study (Reis et al. 2016) looked at how time-constraint plays a role in consumers' attention process and found that while time-constraint did not largely change the way consumers visually processed images of bottled products, it was linked to more fixating time on the information that differentiates among labels (FOP, nutrition claim, and processing

ANALYTICAL CATEGORY	HIGHLIGHTS AND CONCLUSIONS
Attention and Processing (Cont'd)	claim). Another study (Sanjari et al. 2017) found that time pressure interacts on consumers' processing mode. **Conclusion:** These studies extend the findings of the 2016 RTI Addendum which found that FOP labels catch consumers' attention; the newer studies highlighted interactions among a) FOPs, b) other marketing components on the package, and c) time pressure.
Liking, Satisfaction, and Label Preference	Our review identified nine studies in this category, with three experimental studies, three cross-sectional surveys, two focus group studies, and one systematic review. These studies were conducted in different countries, including Australia, France, Uruguay, Germany, and Canada. Multiple FOP labeling systems were examined in the identified studies, including: Daily Intake Guide, Multiple Traffic Light, Health Star Rating, Nutri-Score (a summary FOP system proposed to the French Health Minister), SENS (a summary FOP system proposed by the French retailers), Modified Reference Intakes, and warnings. Results from these studies suggest that consumers think FOP labels are more useful than health claims or warnings, and they prefer simple to use and interpretive FOP labels (such as Health Star Rating and Nutri-Score) over others. **Conclusion:** Consistent with 2016 RTI Addendum, results from these recent studies reveal that despite some varied preferences, consumers prefer simple labels, such as the ones using a summary system (e.g., SENS).
Understanding	Our review identified 16 studies in this category, with 11 experimental studies, two quasi-experimental study, one focus group study, and one study using sales data and convenience sample survey. These studies were conducted in different countries, including US, France, Norway, Mexico, Australia, Germany, Brazil, Uruguay, and Canada. Multiple FOP labeling systems were examined in the identified studies, including: Single and Multiple Traffic Light, Keyhole, Guideline Daily Amounts, 5-Color Nutrition Label (a summary system proposed to France Health Minister, which later was updated to Nutri-Score), Guiding Stars, Health Star Rating, binary check, NuVal, Facts Up Front, logos, and warnings. Studies found that consumers' ability to understand different FOPs differed. In general, summary systems (Keyhole, binary check symbol, logos, and rating stars) were easier to understand compared to nutrient specific systems (such as Guideline Daily Amounts). However, one study (Cook et al., 2017) suggested that while a symbol-based (Stars) label helps consumers understand and choose a product in a comparative setting when they elaborate on the importance of nutrition information, the more complex label (Facts Up Front) helps consumers to interpret it when distracted.

ANALYTICAL CATEGORY	HIGHLIGHTS AND CONCLUSIONS
Understanding (Cont'd)	Consumers in general lack understanding of various FOPs. However, one study (Julia et al., 2016) showed that when the FOP label was presented with educational information, understanding was improved. **Conclusion:** The updated literature review confirms the 2016 RTI findings. Studies indicate FOPs in general can help consumers to understand nutrition information, but to different extents and suggests that the more simplified FOPs are easier for consumers to understand.
Effects on Use and Likely Purchase Behavior	Our review identified 23 studies in this category, with 19 experimental studies, two quasi-experimental study, one set of open interviews, and one study using sales data and convenience sample survey. These studies were conducted in the US, France, Australia, New Zealand, Uruguay, and Canada. The labels examined include the NuVal, 5-NCL, Keyhole Symbol, Traffic light, Daily Intake Guide, Health Star Rating, Guideline Daily Amounts, Guiding Stars, Facts-up-Front. Several studies showed that FOP labels led to selections of "mock" foods with better nutrition profiles. Several studies showed greater purchase intention for products with FOP symbols versus those without a symbol but one study on willingness to pay found no effects. Some studies found no purchase intention effects. FOP symbol rated third behind bottle design and general claims in purchase intention effects. In another study (Georgina, et al, 2017) Health Stars had significant effects (more stars versus fewer) for purchase intentions but the image of the product had a greater effect than the Health Stars. **Conclusion:** Studies suggest that FOP nutrition symbols lead to mock 'purchase' of foods with better overall nutrition profiles, but results appear to be mixed on experimental and self-assessed purchase intentions; some studies showed significant FOP effects and others did not.
Effects on Sales (Purchases) and Consumption	Our review identified 10 studies in this category, with 4 experimental studies, one quasi-experimental study, three qualitative studies using interview methods, two product content analyses, and one study using sales data and a convenience sample survey. These studies were conducted in the US, Turkey, New Zealand, Uruguay, and Canada Lesser-known brands, versus brand leaders, showed positive sales effects when bearing FOP nutrition symbol. A study on Guiding Stars™ show an increase in product sales for products bearing the symbol. Several studies showed evidence of product reformulation toward removal of sat-fat, *trans*-fat, and sodium with FOP implementation.

ANALYTICAL CATEGORY	HIGHLIGHTS AND CONCLUSIONS
Effects on Sales (Purchases) and Consumption (Cont'd)	**Conclusion:** The studies suggest that implementation of FOP Nutrition symbols has led to product reformulations and there is some evidence of increases in sales of products bearing a FOP symbol.
Effects on Educational Differences	Our review identified 10 studies that measured effects on education, with 4 experimental studies, 5 surveys, 1 set of focus groups, and 1 literature review. (1 study was multi-modal.) These studies were conducted in France, Mexico, Canada, Uruguay, Germany, Australia, and the USA. Summary systems (versus nutrient-descriptive systems) worked best for those with a less deliberative style of making food selections, i.e., those with high nutrition knowledge and those with low nutrition knowledge but high motivation. There were very small differences in preference for certain labels by education; no difference in healthfulness of food choice; understanding, self-reported use, trust. **Conclusion:** Although one study found differences in response to food labels by nutrition knowledge and motivation to eat healthfully, education-level was not revealed to be a significant factor in consumers' differentiating of FOP labels.
Effects on Diverse Populations	Our review identified 7 studies in this category, with 4 experimental studies, one set of focus groups and two surveys. These studies were conducted in Uruguay, Mexico, France and Australia. FOP effects seen for low-income children but not for middle and higher income. For children in general (Uruguay), claims and FOP symbols led to increases in understanding of product healthfulness. **Conclusion:** While results from the studies varied, they point toward positive comprehension effects of FOP nutrition information for low-income children.
Evaluation of Government FOP Nutrition Symbols	One study (Acton, et al., 2018) revealed that when a government attribution was present on a health warning label, it increased the believability of the label and the possible influence on likelihood of purchase. Another study (De la Cruz-Gongora et al., 2017) found that while symbol schemes in general were perceived as easy to understand, highly acceptable, and useful for decision-making, institutional endorsement of logos was related to greater confidence in the label. **Conclusion:** These studies highlighted the potential benefits of having a government-created symbol.

In January 2019, the World Cancer Research Fund released a report entitled "Building momentum: lessons on implementing a robust front-of-pack food label" that focuses on instructions for government implementation of FOP nutrition labels. Authors conducted a literature review on challenges to international, government implemented nutrition labels and interviewed 23 international policymakers, academics, advocates. With a focus on interpretive FOP labels –which they prefer over nutrient-specific systems - the report contains recommendations for the development, design, implementation, defense, monitoring and evaluation of the FOP. The report recommends governments institute mandatory FOP labels to overcome limited industry uptake but acknowledged that voluntary labels will also help to achieve public health goals by adhering to a process starting with clear policy objectives, knowledge of the legal context, cultivating partners and stakeholders, implementing well-designed public education, and evaluating the labels' effectiveness post implementation. The report cited challenges to government FOP label implementation - specifically tactics to delay, divide, deflect, and deny.

Additionally, in 2019 the World Health Organization (WHO) released a manual entitled, "WHO guiding principles and framework manual for front-of-pack labelling for promoting healthy diets". The document is meant to support countries in the development, implementation, and monitoring and evaluation of an appropriate FOP system to help improve dietary patterns and reduce the burden of diet-related noncommunicable diseases. The five overarching guiding principles for FOP that form the basis of the manual are as follows:

- Principle 1: The FOP system should be aligned with national public health and nutrition policies and food regulations, as well as with relevant WHO guidance and Codex guidelines.
- Principle 2: A single system should be developed to improve the impact of the FOP system.
- Principle 3: Mandatory nutrient declarations on food packages are a prerequisite for FOP systems.
- Principle 4: A monitoring and review process should be developed as part of the overall FOP system for continuing improvements or adjustments, as required.
- Principle 5: The aims, scope, and principles of the FOP system should be transparent and easily accessible

Results of Key Systematic Reviews (2018 - 2021)

Mirroring methods discussed in the previous section, FDA further reviewed the literature, beginning where the last review, conducted August 2016 - October 2018, was completed. The review in this section covers the scientific literature on FOP from November 2018 to August 2021, using the same targeted database search algorithm and the analytical categories used in earlier reviews. We analyzed one hundred and eight additional scientific articles on FOP for this update. Table 2 below presents the highlights and conclusions of this review by analytical category.

Table 2. Highlights and Conclusions of updated FOP nutrition labeling literature by analytical category (November 2018 – August 2021)

Analytical Category	Highlights and conclusions
Attention and Processing	Our review identified six studies in this category, including one experimental study, four surveys, and one narrative review. These six studies were conducted in Brazil, Italy, and Uruguay. Three studies examined each country respectively, while three others examined FOP systems across all three countries. Multiple FOP labeling systems were examined in the identified studies, including Multiple Traffic Light, Nutri-Score, Guidelines Daily Amounts, Facts-up-front, Health Logos, and Warning Labels The studies highlighted interactions among: a) FOP labeling systems, b) nutrition information panels on the back or side of packages, c) color and shape, and d) processing time. Warning Labels were found to be efficient in attracting consumers' attention and required less time to process than other FOP schemes (Totora, 2018). One study (Deliza, 2019) found that, although warning signs (also called Warning Labels) are generally attended to by consumers, the familiarity of signs matters. Graphic warning signs that are commonly used to convey a 'warning message' outperformed other graphic warning signs in terms of their ability to facilitate the interpretation of nutrition information. Furthermore, black warning signs required significantly less time to be detected, compared to red signs, on color food labels. Studies indicate that FOP labels help shoppers to distinguish between healthy and less healthy foods. One review (Temple, 2020) found the designs that appear to be most successful in this regard are Multiple Traffic Light symbols, Warning Labels, and Nutri-Score. Additionally, studies confirm the advantages of Warning Labels, Multiple Traffic Light symbols and Nutri-Score, compared to the GDA, to facilitate the identification of products with high nutrient levels. **Conclusion:** These studies extend the findings of the 2016 RTI Addendum, which found that FOP labels catch consumers' attention. Additionally, one of the studies (Deliza, 2019) suggests that over time, as consumers become more familiar with FOP labels, they will become even more useful.
Liking, Satisfaction, and Label Preference	Our review identified 12 studies in this category, including three experimental studies, eight cross-sectional surveys, and one focus group study. These studies were conducted in eight different countries: Australia, Brazil, Canada, Colombia, Portugal, Spain, the UK, and Uruguay. Two of the studies evaluated multiple countries. Multiple FOP labeling systems were examined in the identified studies, including Multiple Traffic Light, Health Star Rating, Nutri-Score, Guidelines Daily Amounts, Warning Labels, Modified Reference Intakes, and logos.

Analytical Category	Highlights and conclusions
Liking, Satisfaction, and Label Preference (Cont'd)	Few studies have been conducted to compare participants' preferences for one type of FOP label over others. One study (Ares, 2020) found consumers have positive attitudes toward nutritional warnings. They were regarded as easy to understand and identify, compared to summary labels (i.e., Multiple Traffic Light symbols or Health Star Rating). Another study (Talati, 2018) that compared five summary labels across 12 countries suggested that participants preferred the Multiple Traffic Light symbols over other summary labels. Additionally, no meaningful differences were observed between country and FOP type, indicating that culture was not a strong predictor of general perceptions. However, another study (Dana, 2019) found different forms of FOPs featuring varying degrees of information about energy and specific nutrients were likely to be preferred and used by different market segments. For example, those who are more concerned about their health are more likely to use a FOP label. Furthermore, an additional study (Pettigrew, 2021) found that participants preferred color versions of summary FOP labels over monochrome versions and those that included nutrient-specific information. **Conclusion:** Results from these recent studies reveal that additional research should be conducted to determine which type of FOP is preferred by most U.S. consumers. However, based on these findings, it appears consumers prefer simple, color labels, such as the ones using a summary system (i.e., Multiple Traffic Light symbols).
Understanding	Our review identified 26 studies in this category, including eight experimental studies, 14 surveys, one focus group study, two systematic reviews, and one narrative review. These studies were conducted in Belgium, Brazil, Bulgaria, Italy, Mexico, Netherlands, Spain, Switzerland, Thailand, Uruguay, and the United States. Three of the studies assessed findings across several countries. Multiple FOP systems were examined in the identified studies, including Multiple Traffic Light symbols, Nutri-Score, Health Star Rating, Warning Labels, Reference Intake, and logos. Studies found that, compared to purely informative systems (i.e., Guideline Daily Amounts), summary/interpretive label systems (i.e., Multiple Traffic Light symbols, Nutri-Score, and Health Star Rating) have the greatest potential to improve consumers' understanding of the total nutritional quality of foods. One study (Andreeva, 2021) found Nutri-Score is most effective at improving consumers' abilities to correctly classify food according to its nutritional quality. Additional studies have confirmed the effectiveness of Nutri-Score to aid consumers in their ability to rank products according to nutritional quality (Egnell, 2019). Studies found that Warning Labels, while less effective at aiding consumers' understanding of the total nutritional quality of a food, are significantly more effective at helping consumers identify products with excessive amounts of a

Analytical Category	Highlights and conclusions
Understanding (Cont'd)	particular nutrient (e.g., sugar, fat, saturated fat, and sodium). One study (Andrews, 2021) found Warning Labels were more effective for evaluating levels of negative nutrients and their associated disease risks compared to the Traffic Light Label (also called Multiple Traffic Light symbols) or no FOP label. **Conclusion:** The updated literature review confirms the 2016 RTI findings. The adoption and implementation of a uniform FOP labeling system could be beneficial to consumers at the point of purchase, help consumers better understand nutrition information, and therefore could help consumers improve their diet quality leading to a reduction in the incidence of diet-related chronic diseases. The updated literature review also further supports the conclusions of FDA's previous updated literature review that the summary/interpretive systems are likely to be more effective than purely informative systems in helping consumers understand the total nutritional quality of foods.
Effects on Use & Likely Purchase Behavior	Our review identified 20 studies in this category, including 10 experimental studies, six surveys, three systematic reviews, and one narrative review. These studies were conducted in Australia, Belgium, Canada, Chile, France, Israel, Morocco, Peru, Portugal, UK, Uruguay, and the United States. Four of these studies assessed findings across several countries. Multiple FOP labeling systems were examined in the identified studies, including Multiple Traffic Light symbols, Nutri-Score, Health Star Rating, Guidance Daily Amounts, Warning Labels, Reference Intake, and logos. These studies found that, compared to the control with no-interpretive-label, FOP labels were effective tools that helped consumers identify healthier food choices. The most effective labels were the Nutri-Score and the Multiple Traffic Light symbols, followed by the Warning Label, the Health Star Rating, and lastly the Reference Intakes (Talati, 2019). However, there was no robust evidence of superiority of a specific FOP scheme's effect, either on consumers' understanding of nutritional content or on food choices. **Conclusion:** These recent studies suggest that FOP labels are effective at helping consumers identify products with higher nutritional quality and also may be effective at positively impacting consumers' intent to purchase healthful foods.
Effects on Sales (Purchases) and Consumption	Our review identified 19 studies in this category, which included 13 experimental studies, three surveys, two systematic reviews and one narrative review. These studies were conducted in Brazil, Canada, Colombia, France, Singapore, Switzerland, the UK, and the United States. Two of the studies assessed findings across several countries. Multiple FOP labeling systems were examined in the identified studies, including Multiple Traffic Light symbols, Health Star Rating, Nutri-Score, Warning Labels, SENS (*Système d'Etiquetage Nutritionnel Simplifié* [simplified nutrition labelling system]), Modified Reference Intakes, and symbols meant to indicate the product meets some "healthy" criteria.

Analytical Category	Highlights and conclusions
Effects on Sales (Purchases) and Consumption (Cont'd)	The use of online/simulated grocery store shelves and access to real-world sales data has enabled researchers to better understand the impact of FOP labels on product consumption. Overall, results show that the presence of FOP labels leads to product purchases. However, not all FOP labels are equally effective. Warning labels, like "High-in" labels have been shown to be most effective at reducing the purchase of products that are high in negative nutrients. In contrast, summary labels, like the Nutri-Score, Multiple Traffic Light symbols, and Health Star Rating were found to be more effective with regard to overall healthy choices. One study from the United Kingdom (Elshiewy, 2018) that examined real-world sales data of store-brand products that carried a voluntary Guidelines Daily Amount type scheme on the front of the food label found that the presence of the scheme resulted in greater sales of products that had fewer calories. Another study (Finkelstein, 2021) found Nutri-Score may be preferred if the goal is to improve overall diet quality, but Multiple Traffic Light symbols may perform better if the goal is to reduce total energy intake. An economics study from France (Egnell, 2019), using data simulations, modeled the sales data of products carrying five different schemes (Nutri-Score, Health Star Rating, Multiple Traffic Lights, Reference intakes, and SENS to dietary intake data to estimate changes in chronic disease mortality by scheme. Results indicated that use of the Nutri-Score scheme led to the greatest estimated reduction in mortality (3.4%). **Conclusion:** These findings suggest that FOPs can influence healthier food purchases in supermarkets and, with prolonged use, may lead to improved health outcomes.
Effects on Educational Differences	Our review identified two experimental studies that measured effects of FOPs on education and health literacy. The studies were conducted in Canada and the UK. Multiple FOPs were examined, including Multiple Traffic Light symbols, Nutri-Score, Warning Label, Health Star Rating, and Nutrition Facts label. These studies examined the impact of FOPs on participants' ability to accurately identify the healthfulness of foods. A study (Packer, 2021) that looked at Nutri-Score, Multiple Traffic Lights. Warning Schemes, and a "Positive Choice Tick" (i.e., a symbol indicating the food met some "healthy" criteria), found that, compared to a "no-symbol" food package, participants were able to correctly identify the three-category levels of healthfulness of the food. Further analysis indicated that more highly educated participants, versus those with lower education, identified healthfulness with more accuracy. However, regardless of education level, compared to a "no symbol" control, participants could use the schemes to accurately rank the foods' healthfulness. Another study (Vanderlee, 2021) that compared Multiple Traffic Lights, Health Star Rating, a Warning Label, and a "no symbol" control found that, to varying degrees, all the schemes helped participants correctly identify the healthier and

Analytical Category	Highlights and conclusions
Effects on Educational Differences (Cont'd)	less healthy products compared to a "no symbol" product. However, there were notable differences between participants with lower health literacy and those with higher health literacy; both groups ranked the product correctly, compared to the "no symbol" condition but those with lower health literacy consistently ranked even the less healthy products as healthier. **Conclusion:** Both studies found that interpretive FOP schemes, versus a "no FOP" condition, helped all consumers, regardless of education or health literacy levels, to correctly assess a food's healthfulness even if some differences between higher and lower education and health literacy were found.
Effects on Diverse Populations (Income, Age, Race/Ethnicity, Minority)	We identified 14 studies in this category, including eight experimental studies, two sets of focus groups, three surveys, and one systematic literature review. These studies were conducted in Australia, Brazil, Chile, France, New Zealand, and Mexico. The systematic literature review included research from multiple countries. These studies focused on a range within and between demographic categories and included low- and middle-income populations, parents, children and adolescents, college students, and individuals at risk for obesity and its associated diseases. Multiple FOP schemes were evaluated in the studies, including Multiple Traffic Light symbols, Nutri-Score, Guiding Stars, Warning Labels, and Reference Intake Labels. Studies found that, compared to no FOP label, all FOP schemes led to these populations selecting foods with a healthier nutrient profile, although between-scheme results were not consistent. Nutri-Score appears to have potential to encourage the purchasing of products with higher nutritional quality among a variety of groups. One study (Egnell, 2019) found that students (ages 18-25) purchased more nutritious foods when foods had Nutri-Score labels compared to foods with either the Reference Intakes label or no label. In an additional study (Egnell, 2021), low-income participants purchased more nutritious foods when products had the Nutri-Score label compared to foods with the Reference Intakes label. **Conclusion:** While results from the studies varied, they point toward positive effects of FOP labels on consumers' ability to select healthier products among diverse populations.
Evaluation of Government-Instituted FOP Nutrition Labeling Systems	Our review identified six studies in this category, with one set of focus groups, three surveys, and one systematic review. These studies were conducted in Australia, Denmark, Ecuador, France, and New Zealand. These studies focused on a range of FOP schemes developed and instituted by the governments of the study countries. These FOP schemes included Nutritional

Analytical Category	Highlights and conclusions
Evaluation of Government-Instituted FOP Nutrition Labeling Systems (Cont'd)	Traffic Light (Ecuador), Nutri-Score (France), Health Star Rating (Australia and New Zealand), the Keyhole (Denmark), and the Whole Grain logo (Denmark). Multiple studies evaluated the course of performance of Australia/New Zealand's Health Star Rating since its introduction in June 2014. Between 2015 and 2018, consumers' overall awareness and trust in the Health Star Rating system has increased (e.g., prompted awareness increased from 33% in April 2015 to 84% in July 2018) (Jones, 2019). However, lower awareness is observed in consumers who are overweight, from rural areas, or consumers with lower incomes (Jones, 2019). Furthermore, it was found that better diet quality as defined by the Health Star Rating dietary index was associated with lower risk of all-cause and cardiovascular disease mortality among Australian adults, supporting continued use of the Health Star Rating (Pan, 2020). Findings from other studies include: (1) the use of the Danish FOP schemes (the Keyhole and the Whole Grain logo) was associated with better overall dietary quality, which was driven by lower intake of added sugar and higher intake of fiber (Rønnow, 2020); and (2) study participants in Ecuador showed a high level of knowledge of Nutritional Traffic Light but a low level of usage of this FOP scheme. **Conclusion:** These studies highlighted the potential benefits of having a government-created and sponsored FOP labeling scheme for assisting consumer food choices.

Results of Key Systematic Reviews (2021 - 2022)

FDA further updated the 2018-2021 FOP literature review by reviewing the scientific literature on FOP from January 2021 to August 2022, using a slightly modified version of the targeted database search algorithm but the same analytical categories used in earlier reviews. Because of the proliferation in FOP schemes worldwide since the earlier iterations of this literature review, we included the names of the schemes to the targeted database search algorithms that were used in the 2016-2020 reviews (See highlighted text in Appendix B). We analyzed 77 scientific articles on FOP in the January 2021 to August 2022 FOP literature review update. Table 3 below presents the highlights and conclusions of this literature review by analytical category.

Table 3. Highlights and conclusions of updated FOP nutrition labeling literature by analytical category (January 2021 – August 2022)

Analytical Category	Highlights and conclusions
Attention and Processing	Our review identified four experimental studies in this category. These studies were conducted in Chile, France, Portugal, and the United States. FOP labeling systems examined in the identified studies include Facts Up Front, Health Star Rating, Multiple Traffic Light, Nutri-Score, Reference Intakes, and Warning Labels. The studies highlighted interactions among types of FOP schemes, including black-and-white, and colored versions, and nutrition information panels on the back or side of packages. Nearly all FOPs were found to capture attention and improve the ability of participants to estimate healthfulness of products compared to products with no labels. Studies indicate that color FOPs are more effective than black-and-white labels in capturing attention, but that lack of knowledge about the FOP can undermine that effectiveness. One study that compared a 3-category Nutri-Score with a 5-category Nutri-score found that the 5-category scheme resulted in more accurate identification of healthful products, but study participants also spent more time processing the information in the 5-category scheme. **Conclusion:** These studies extend previous findings, which found that FOP labels – particularly those utilizing color – catch consumers' attention. Also, in keeping with the prior reviews, these studies suggest that familiarity with FOP labels will make them even more useful.
Liking, Satisfaction, and Label Preference	Our review identified seven studies in this category, with two experimental studies, three surveys, and two focus group studies. These studies were conducted in Australia, Brazil, Chile, China, and India. Two of the studies assessed findings across several countries. FOP labeling systems examined in the identified studies include Health Star Rating, Multiple Traffic Light, Nutri-Score, Reference Intakes, Warning Labels, and pictograms (e.g., teaspoons of sugar). Although few studies compare participants' preferences for one type of FOP scheme to another, one study (Bhattacharya, 2022) that compared five FOP schemes found Warning Labels to be the most preferred, followed by Multiple Traffic Lights. In studies comparing different types of Warning Labels, one study (Khandpur, 2022) found triangular warning labels to be more useful than those displayed with a magnifying glass, while another (Mazzonetto, 2022) found that most participants preferred black rather than red warning labels regardless of shape.

Analytical Category	Highlights and conclusions
Liking, Satisfaction, and Label Preference (Cont'd)	Labels communicating teaspoons of sugar, whether in text or pictograms, were perceived as highly factual, relatable, and interpretable, and as having the most potential to influence attitudes and intentions (Miller, 2022b). One study (Septia Irawan, 2022) analyzed Twitter posts concerning FOP labels, and found that the discussion was very limited; Nutri-Score was mentioned most often but with conflicting sentiments. Authors concluded that education programs are needed to educate consumers in order for FOP labels to be useful. A study on stakeholder and consumer perspectives on FOP schemes (Xuejun, 2022) revealed the complexity of reaching consensus for FOP schemes, and that major barriers include agreement on FOP format and the limited knowledge of FOP labelling, pointing again to the need for educating consumers. **Conclusion:** These current findings reinforce the earlier finding that consumers prefer labels that convey a clear message. However, as with previous reviews, results from these recent studies reveal that the literature is not conclusive about consumer preferences on FOP schemes.
Understanding	Our review identified 16 studies in this category, with two experimental studies and 14 surveys. These studies were conducted in Australia, Brazil, Canada, Chile, China, Ecuador, Greece, Mexico, Netherlands, Slovenia, South Africa, Spain, the United Kingdom, and the United States. Three studies assessed findings across several countries. FOP systems examined in the identified studies include Health Star Rating, Multiple Traffic Light, Nutri-Score, Positive Choice tick, Reference Intakes, Warning Labels, health logos, and NutrInform Battery which has been proposed as an alternative to the EU's Nutri-Score scheme. Studies continued to support the finding that summary/interpretive label systems (i.e., Multiple Traffic Lights, Nutri-Score and Health Star Rating) offer the greatest potential - compared to purely informative systems - to improve consumers' understanding of the nutritional quality of foods. Two studies (Packer, 2022; Fialon, 2021) found Nutri-Score performed best at helping consumers rank products according to nutritional quality. A newly introduced FOP, the NutrInform Battery, outperformed Nutri-Score in understanding and comprehensibility (Baccelloni, 2021), presumably because it provides information about nutrients per usual serving. Additional studies confirm the finding that Warning Labels are more effective at helping consumers identify products with excessive amounts of a particular nutrient (i.e., sugar, fat, saturated fat, and sodium). One Chilean study (Mediano Stoltze, 2021) examined consumer perception of the co-occurrence of Warning Labels and nutrient content marketing claims because in Chile the use of nutrient content marketing claims is not prohibited even when the food is required to carry a warning label (due to excessive nutrients to limit) and this could confuse consumers. The study found that Warning Labels can mitigate

Analytical Category	Highlights and conclusions
Understanding (Cont'd)	the "health halo" effect of nutrient content marketing claims on perceived healthfulness of the product. **Conclusion:** The updated literature review confirms earlier findings and demonstrates that since most FOP labels help consumers understand nutrition quality of a food, the adoption and implementation of a uniform FOP labeling system could be beneficial to consumers.
Effects on Use & Likely Purchase Behavior	Our review identified 19 studies in this category, with nine experimental studies, six surveys, two systematic reviews, and two narrative reviews. These studies were conducted in Australia, Belgium, Brazil, Canada, Columbia, Denmark, France, Germany, Israel, Italy, Mexico, Morocco, Netherlands, Peru, Poland, Portugal, Singapore, Spain, Switzerland, the United Kingdom, Uruguay, and the United States. Four of these studies assessed findings across several countries. Multiple FOP labeling systems were examined in the identified studies, including Multiple Traffic Lights, NutrInform Battery, Nutri-Score, Health Star Rating, Guidance Daily Amounts, Warning Labels, Reference Intake, and logos. Studies confirm earlier findings showing that compared to control with no interpretive label, FOPs are effective tools to help consumers identify healthier food choices. Warning Labels are most effective in helping consumers to identify "high-in…" products, but Nutri-Score and NutrInform Battery were effective in helping to identify the healthiest and unhealthiest products. However, robust evidence of superiority of a specific FOP scheme's effect is still lacking. Studies show disagreement in the ability of a given FOP system to always improve consumers' understanding of nutritional content or food choices. Several studies found no impact of FOP schemes on purchase intentions (Folkvord, 2021; Muzzioli, 2022; Leão, 2022; Medina-Molina, 2021), while one study (Richetin, 2022) found that the presence of an organic label drives the perception of healthiness, and inclusion of Multiple Traffic Lights did not change that impact. **Conclusion:** These recent studies suggest that FOP schemes can be effective at helping consumers identify products with higher nutritional quality and can positively impact consumers' intent to purchase healthful foods, with varying results.
Effects on Sales (Purchases) and Consumption	Our review identified 12 studies in this category, with 8 experimental studies, one survey, two systematic reviews, and one narrative review. These studies were conducted in Australia, Canada, France, Korea, Singapore, Switzerland, the Netherlands, and the United States. Two of the studies assessed findings across several countries. FOP labeling systems examined in the identified studies include Multiple Traffic Light, Health Star Rating, Nutri-Couleurs (France) Nutri-Repère (France), Nutri-Score, SENS (*Système d'Etiquetage Nutritionnel Simplifié* [simplified nutrition

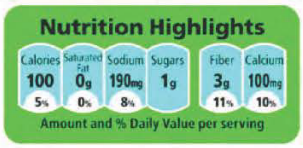
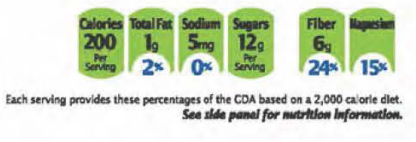
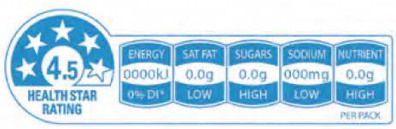
Analytical Category	Highlights and conclusions
Effects on Sales (Purchases) and Consumption (Cont'd)	labelling system]), Warning Labels, Modified Reference Intakes, pictograms (e.g., sugar teaspoons), and nutrient content claims Studies continue to make use of online/simulated grocery store shelves and access to real-world sales data, both of which enable researchers to better understand the impact of FOP labels on product purchase. Overall, there is a positive impact on consumers' purchases as a result of the presence of FOP labels, with an increase in sales of products with healthier FOP scores and a decrease in sales of products displaying "high in" warning labels, particularly those indicating the product is high in sugar. However, a review examining studies of various FOP (Donini, 2022) found little evidence that clearly correlates FOP labels with health outcomes such as risk of obesity or other non-communicable diseases, primarily due to the lack of any long-term study periods. Not all FOP schemes appear to be equally effective. Warning Labels have shown to be most effective at reducing purchases of products high in a particular nutrient. Depending on the nuanced study specifics summary systems, such as Health Star Rating, Multiple Traffic Lights, and Nutri-Score vary in their ability to discourage purchases of products with high levels of nutrients of concern or in improving overall purchases of healthier products. In one study (Dubois, 2021), sales data from 60 supermarkets showed that consumers who saw products labeled with Nutri-Score increased purchases of foods in the top third (i.e., healthiest) of the food category, but there was no change for purchases with medium, low, or unlabeled nutrient quality. The net result was a modest improvement in the overall nutritional quality of the purchased foods. Another study (Acton, 2021) found that Warning Labels and Multiple Traffic Light symbols were more effective at discouraging purchases of products high in nutrients to limit than positive Health Star Rating or Nutri-Score scores were at encouraging purchases of healthier products. And a third study (Kühne, 2022) found that although FOP labels boosted healthy food product sales, more products and calories were purchased, such that use of the FOP labels did not result in a reduction of calories purchased. Results are somewhat clearer when assessing the impact of FOPs on reducing purchases of products high in added sugar. Studies from Australia (Miller, 2022a), the United States (Taillie, 2022) and a review that assessed findings across several countries (Scapin, 2021) reported that Warning Labels (both text and image-based) increased the likelihood that consumers would identify items high in added sugar. One systematic review (Song, 2021) found that Nutri-Score and Warning Labels were effective in reducing purchases of less healthful products, while Multiple Traffic Light, nutrient warnings, and health warning labels were associated with the purchase of more healthful products. The Nutri-Score and Warning Labels were also associated with increased overall healthfulness of products across all purchases. Color-coded labels performed better at directing consumers toward more healthful products than black-and-white labels. **Conclusion:** These findings suggest that simplified, summary, colorful FOP schemes can encourage healthier purchases in supermarkets but that more research is

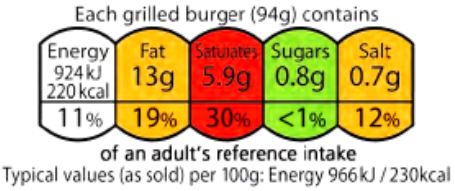
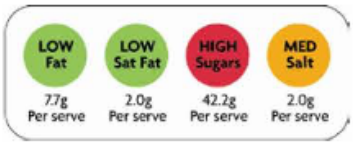
Analytical Category	Highlights and conclusions
Effects on Sales (Purchases) and Consumption (Cont'd)	needed to demonstrate the ability of FOP schemes with regard to overall health and diet-related chronic disease outcomes.
Effects on Educational Differences	Our review identified two surveys that measured interactions among FOPs, education, and health literacy. These studies were conducted in Canada and the United Kingdom. The current studies examined the Multiple Traffic Lights and Nutri-Score label systems. These studies examined the impact of education and health knowledge on the extent to which FOP labels affected participants' ability to accurately identify the healthfulness of foods. While face-to-face education significantly increased participants' understanding of the Multiple Traffic Lights system, and their knowledge, attitude, and perceptions toward assessing the healthfulness of products displaying these FOPs (Esfandiari, 2021), a study among medical professionals (Riccò, 2022) found that overall understanding was low, with less than half of the participants reporting any knowledge of Nutri-Score. **Conclusion:** These studies highlight the importance of specific FOP labeling education in order to help consumers make informed, healthier choices.
Effects on Diverse Populations	Our review identified 8 studies in this category, with one experimental study, one focus group, and six surveys. These studies were conducted in Australia, Belgium, Canada, Chile, China, France, India, Mexico, New Zealand, Poland, Taiwan, and the United States. These studies focused on a range of populations which included children, adolescents, parents, and students, and also reported results by gender. FOP schemes evaluated in the studies include Guideline Daily Amount, Health Star Rating (both simple and hybrid), Multi-Traffic Light, Nutri-Score, Guiding Stars, Warning Labels (both traditional and numeric), Reference Intake Labels, and health logos. Studies generally found that, among diverse populations, all FOP schemes led to participants making healthier decisions, although one focus group study reported that mothers expressed fatigue with Warning Labels four years after full implementation (Correa, 2022), and suggested the need to identify groups of consumers that could experience similar reactions over time and consider ways to address. Nutri-Score continued to show potential to encourage the purchasing of products with higher nutritional quality among different groups. A variety of age and gender groups reported knowledge and understanding of the Nutri-Score, and demonstrated improved ability to rank food items according to nutritional quality relative to the Reference Intake label (Andreeva, 2022; Ducrot, 2022).

Analytical Category	Highlights and conclusions
Effects on Diverse Populations (Cont'd)	Additionally, Nutri-Score was found to be more effective in guiding students with lower health literacy, from non-university institutions, and with low self-estimated nutrition knowledge or low self-estimated diet quality to improve the nutritional quality of their food choices (Hoge, 2022). A study investigating gender differences (Meng, 2022) found men to be more responsive than women to color, while text information on the package affected women's but not men's perceptions of product healthfulness. **Conclusion:** While results from the studies varied as in previous reviews, they continue to show generally positive effects of FOP labels on the ability of different populations to select healthier products. Of particular importance are findings on the influence of color and design in helping to inform purchasing decisions of these populations.
Evaluation of Government-Instituted FOP Nutrition Symbols	Our review identified three studies in this category, with two narrative reviews and one report from a roundtable. These studies were conducted in Israel, Italy, and the United Kingdom. These studies focused on a range of FOP schemes developed and instituted by the governments of the study countries and provided summaries of government or expert positions on the current usage of FOP labels. These FOP schemes included Health Star Rating, Healthy/Healthier choice, Heart/Health logos, Keyhole logo, Multiple Traffic Light, NutrInform Battery, Nutri-Score, Red and green FOP label, Reference Intakes, and Warning Labels. Since it was introduced, Nutri-Score performance has been evaluated in multiple studies in France, where it was developed, as well as internationally. Nutri-Score has been found to be useful for consumers in determining the healthier choice products, although results are not always consistent. One study and position paper (Carruba, 2021) proposed that Nutri-Score is limited by providing an assessment of nutrient intake based on 100 grams of the product instead of a usual portion. This study suggested that the NutrInform Battery, which was developed in Italy and was intended to help consumers better understand how to improve their dietary choices, may perform better than Nutri-Score. An additional review (SINU Scientific, 2021) concurs, finding that the NutrInform Battery is more focused on helping consumers understand food choices that can lead to a reduction in obesity and non-communicable diseases. Most FOP labels help consumers make informed choices but there is a lack of strong evidence indicating that one particular FOP is clearly superior to the others. The roundtable participants (Gibson-Moore, 2022) recommended using one consistent FOP scheme as an important consideration for ensuring that consumers notice the FOP label, become familiar with it, and develop confidence in its use. **Conclusion:** These studies highlighted the potential benefits of having a government created and mandated FOP labeling system for assisting consumer food choices.

Appendix A: Front of Pack Nutrition Labeling Schemes and Symbols Available Online and in the Scientific Literature in 2018.

Overview of Existing Front-of-Package Programs

Nutrient-Specific Systems					
System Icon	Program Name	System Developer	Country	Criteria Publicly Available	Basis for Nutrient Criteria
	General Mills Nutrition Highlights	Food manufacturer	U.S.	Yes	FDA %DVs
	General Mills Goodness Corner	Food manufacturer	U.S.	Yes	FDA regulations for nutrient content claims
	Harris Teeter Wellness Keys	Retailer	U.S.	Yes	FDA regulations for nutrient content claims
	Kellogg's Nutrition at a Glance	Food manufacturer	U.S.	Yes	FDA %DVs presented as %GDAs
	Wegmans Wellness Keys	Retailer	U.S.	Yes	FDA regulations for nutrient content claims
 	Health Star and Traffic-light System	Government agency	Australia and New Zealand	Yes	Australian Dietary Guidelines

Nutrient-Specific Systems					
System Icon	Program Name	System Developer	Country	Criteria Publicly Available	Basis for Nutrient Criteria
	Nutriscore	Government agency	France	Yes	Santé publique France
	Healthier Choice Symbol	Government agency	Singapore	Yes	Nutritional standards set by Health Promotion Board
	Multiple 'Traffic Lights	Government agency	United Kingdom	Yes	UK's Dietary Reference Values
	UK Traffic Light	Government agency	United Kingdom	Yes	Regulation No. 1924/2006 for green/amber boundaries; COMA and SACN advice for amber/red boundaries

Summary Indicator Systems					
System Icon	Program Name	System Developer	Country	Criteria Publicly Available	Basis for Nutrient Criteria
	American Heart Association Heart Check	Nonprofit organization	U.S.	Yes	FDA %DVs, implied nutrient content claims, coronary heart disease health claims
	Giant Food Healthy Ideas	Retailer	U.S.	Yes	Dietary Guide-lines for Americans 2005, FDA regulation for "healthy"
	Guiding Stars	Retailer	U.S.	No	Proprietary algorithm based upon FDA, USDA, HHS, IOM, and WHO recommenda-tions
	Kraft Sensible Solution	Food manufacturer	U.S.	Yes	*Dietary Guidelines for Americans* and authoritative statements from NAS and FDA
--Not able to locate graphic--	Nutrient Rich Foods Index	Non-industry experts	U.S.	Yes	FDA %DVs
	NuVal	Non-industry experts	U.S.	No	Proprietary algorithm based upon Dietary Guidelines for Americans and DRIs, as well as established data in scientific literature

Summary Indicator Systems					
System Icon	Program Name	System Developer	Country	Criteria Publicly Available	Basis for Nutrient Criteria
	PepsiCo Smart Spot	Food manufacturer	U.S.	Yes	Authoritative statements from FDA and NAS
	Smart Choices	Industry and non-industry consortium	U.S.	Yes	*Dietary Guidelines for Americans* and authoritative statements from NAS and FDA
	Canada's Health Check	Nonprofit organization	Canada	Yes	Canada's Food Guide
	Choices (EU)	Non-industry experts	European Union	Yes	FWHO guide-lines for saturated and trans fats, sodium, sugars; dietary guidelines
	Sweden National Food Administration Keyhole	Government agency	Sweden	Yes	National Food Administration Regulation LIVSFS 2005:9
	Tick Programme	Industry and non-industry working group	Australia/ New Zealand	Yes	Working-group determined values

Food Group Information Systems					
System Icon	Program Name	System Developer	Country	Criteria Publicly Available	Basis for Nutrient Criteria
	ConAgra Start Making Choices	Food manufacturer	U.S.	Yes	USDA's MyPyramid
	Whole Grain Council Whole Grain Stamp	Industry and non-industry consortium	U.S.	Yes	USDA's MyPyramid

Appendix B: Methods Report for Systematic Review of Literature on FOP Labeling Including Study Protocol

Introduction

FDA updated the 2016 FOP literature review by reviewing the scientific literature on FOP labeling in four stages. The Phase I literature search covered August 2016 to the end of March 2018. The Phase II search covered the literature from April 2018 to October 2018. The Phase III search covered literature from November 2018 to August 2021. The Phase IV search covered literature from January 2021 to August 2022, in order to capture literature published in early 2021 that may not have been included in databases at the time of the Phase III search. The first three stages used the same targeted database search algorithm and the analytical categories used in the earlier literature reviews for which this project is a follow-on. For the Phase IV search, the database search algorithm was expanded to include the names of the FOP labeling systems identified in the previous three stages.

Objective

Conduct a systematic review of the literature on front of package nutrition labeling/systems/frameworks/symbols/icons since August 2021, using the same search algorithm that had been used for the Hersey, et al (2013), RTI Addendum (2016), and FDA (2021) reviews.

Methods

Articles in English meeting the search criteria and time frame constraints (January 2021 to present for the Phase IV search) were eligible for inclusion in the literature search.

Search Strategy

We searched the following databases: PubMed, Web of Science, ScienceDirect, *under which the following databases are subsumed:* CHINAHL, Business Source Corporate, PsycINFO, AGRICOLA, Food Science and Technology Abstracts, New York Academy of Medicine Grey Literature Report, NTIS, AgEcon, and CAB Abstracts. The databases Web of Science, CAB Abstracts and New York Academy of Medicine Grey Literature Report, none of which had results in the Phase II or III searches, were not searched in Phase IV.

The following are the search terms used for each database identified above, with the additional terms used in Phase IV indicated by bold type, as well as the number of results returned by database. The first number on the “Results” line is from the Phase I search; the second number, the one in parentheses, is the number returned for the Phase II search; the third number, the one in brackets, is the number returned for the Phase III search, and the fourth number, the one in curly brackets, is the number returned for the Phase IV search. The total number of articles returned in Phases I, II, III and IV searches include many duplicates that were identified and deleted before researchers began the review.

PubMed
Results = 66 (18) [148] {152}

((("front of package nutrition label" OR "front of package nutrition labels" OR "front of pack nutrition label" OR "front of pack nutrition labels" OR "FOP label" OR "FOP labels" OR "front of package label" OR "front of package labels" OR “shelf-labeling” OR "shelf labeling" OR "shelf nutrition label" OR "shelf nutrition labels") AND (consumer OR "consumer behavior" OR "consumer behaviors" OR "consumer preference" OR "consumer preferences" OR "consumer satisfaction" OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers)) AND ("2021"[Date - Publication] : "3000"[Date - Publication])) **OR (("Health Star" OR "Traffic Light*" OR "Reference Intakes" OR "Warning symbol" OR "Heart-check" OR "Healthier Choice Symbol" OR "Nutri-Score" OR "Nutri score" OR Nutri-Score OR NuVal) AND label* AND (consumer OR "consumer behavior" OR "consumer behaviors" OR "consumer preference" OR "consumer preferences" OR "consumer satisfaction" OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers) AND ("2021"[Date - Publication] : "3000"[Date - Publication])))**

Web of Science
Results = 22 (0) [0]

(TS=("front of package nutrition label" OR "front of package nutrition labels" OR "front of pack nutrition label" OR "front of pack nutrition labels" OR "FOP label" OR "FOP labels" OR "front of package label" OR "front of package labels" OR "shelf-labeling" OR "shelf labeling" OR “shelf nutrition label” OR “shelf nutrition labels”) AND TS=(consumer OR consumers OR “consumer behavior” OR “consumer behaviors” OR “consumer preference” OR “consumer preferences” OR “consumer satisfaction” OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers))

Science Direct
Results = 0 (advanced search) (3) [39] {45}

Title-Abstr-Key ("front of pack* nutrition label*" OR "FOP label*" OR "front of package label*" OR “shelf labeling” OR “shelf nutrition label*”) AND Title-Abstr-Key (consumer* OR effective OR design* OR nutrition OR producer* OR retailer*) date: 2016-2018
Phase IV search information: Science Direct limits the number of Boolean operators that can be used in any one field at a time to no more than 8. Science Direct also does not support truncation. As a result, searches were conducted as follows:

- **Title, abstract, keywords: ("front of pack nutrition label" OR "front of package nutrition label" OR "front of pack nutrition labeling" OR "front of package nutrition labeling" OR "front of pack label" OR "front of pack labeling" OR "front of package label" OR "front of package labeling" OR "FOP label") Year: 2021-2022**
- **Title, abstract, keywords: ("front of pack nutrition labels" OR "front of package nutrition labels" OR "front of pack labels" OR "front of package labels" OR "FOP labels" OR “FOP labeling”) Year: 2021-2022**

- **Title, abstract, keywords: ("shelf label" OR "shelf labels" OR "shelf labeling" OR "shelf nutrition label" OR "shelf nutrition labels" OR "shelf nutrition labeling") AND (nutrition OR design OR effective) Year: 2021-2022**
- **Title, abstract, keywords: ("shelf label" OR "shelf labels" OR "shelf labeling" OR "shelf nutrition label" OR "shelf nutrition labels" OR "shelf nutrition labeling") AND (consumer OR retailer OR producer) Year: 2021-2022**
- **Title, abstract, keywords: ("Health Star" OR "Traffic Light" OR "Reference Intakes" OR "Warning symbol" OR "Heart-Check" OR "Healthier Choice Symbol") AND (label OR labels OR labeling) Year: 2021-2022**
- **Title, abstract, keywords: ("Nutri-Score" OR "Nutri score" OR Nutri-Score OR NuVal) AND (label OR labels OR labeling) Year: 2021-2022**

Food Science and Technology Abstracts
Results = 13 (2) [0] {99}

((("front of package nutrition label" OR "front of package nutrition labels" OR "front of pack nutrition label" OR "front of pack nutrition labels" OR "FOP label" OR "FOP labels" OR "front of package label" OR "front of package labels" OR shelf-labeling OR "shelf labeling" OR "shelf nutrition label" OR "shelf nutrition labels") AND (consumer OR consumers OR "consumer behavior" OR "consumer behaviors" OR "consumer preference" OR "consumer preferences" OR "consumer satisfaction" OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers)) **OR (("Health Star" OR "Traffic Light*" OR "Reference Intakes" OR "Warning symbol" OR "Heart-check" OR "Healthier Choice Symbol" OR "Nutri-Score" OR "Nutri score" OR Nutri-Score OR NuVal) AND label* AND (consumer OR consumers OR "consumer behavior" OR "consumer behaviors" OR "consumer preference" OR "consumer preferences" OR "consumer satisfaction" OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers))) AND (pd(20210101-20221231)**

CINAHL
Results = 15 (1) [0] {96}

((("front of package nutrition label" OR "front of package nutrition labels" OR "front of pack nutrition label" OR "front of pack nutrition labels" OR "FOP label" OR "FOP labels" OR "front of package label" OR "front of package labels" OR "shelf-labeling" OR "shelf labeling" OR “shelf nutrition label” OR “shelf nutrition labels”)) AND (consumer OR consumers OR “consumer behavior” OR “consumer behaviors” OR “consumer preference” OR “consumer preferences” OR “consumer satisfaction” OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers) **AND (Limiters - Published Date: 20210101-20221231; English Language)) OR (("Health Star" OR "Traffic Light*" OR "Reference Intakes" OR "Warning symbol" OR "Heart-check" OR "Healthier Choice Symbol" OR "Nutri-Score" OR "Nutri score" OR Nutri-Score OR NuVal) AND label* AND (consumer OR "consumer behavior" OR "consumer behaviors" OR "consumer preference" OR "consumer preferences" OR "consumer satisfaction" OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers) AND (Limiters - Published Date: 20210101-20221231; English Language)))**

PsycInfo

Results = 7 (0) [0] {21}
(noft(("front of package nutrition label" OR "front of package nutrition labels" OR "front of pack nutrition label" OR "front of pack nutrition labels" OR "FOP label" OR "FOP labels" OR "front of package label" OR "front of package labels" OR "shelf-labeling" OR "shelf labeling" OR “shelf nutrition label” OR “shelf nutrition labels”) AND (consumer OR consumers OR “consumer behavior” OR “consumer behaviors” OR “consumer preference” OR “consumer preferences” OR “consumer satisfaction” OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers))) **OR (noft(("Health Star" OR "Traffic Light*" OR "Reference Intakes" OR "Warning symbol" OR "Heart-check" OR "Healthier Choice Symbol" OR "Nutri-Score" OR "Nutri score" OR Nutri-Score OR NuVal) AND label* AND (consumer OR "consumer behavior" OR "consumer behaviors" OR "consumer preference" OR "consumer preferences" OR "consumer satisfaction" OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers))) AND pd(2021-2022)**

Business Source Complete

Results = 8 (2) [0] {32}
(((("front of package nutrition label" OR "front of package nutrition labels" OR "front of pack nutrition label" OR "front of pack nutrition labels" OR "FOP label" OR "FOP labels" OR "front of package label" OR "front of package labels" OR "shelf-labeling" OR "shelf labeling" OR “shelf nutrition label” OR “shelf nutrition labels”)) AND (consumer OR consumers OR “consumer behavior” OR “consumer behaviors” OR “consumer preference” OR “consumer preferences” OR “consumer satisfaction” OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers) **AND (Limiters - Published Date: 20210101-20221231: English language)) OR (("Health Star" OR "Traffic Light*" OR "Reference Intakes" OR "Warning symbol" OR "Heart-check" OR "Healthier Choice Symbol" OR "Nutri-Score" OR "Nutri score" OR Nutri-Score OR NuVal) AND label* AND (consumer OR "consumer behavior" OR "consumer behaviors" OR "consumer preference" OR "consumer preferences" OR "consumer satisfaction" OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers) AND (Limiters - Published Date: 20210101-20221231; English Language)))**

AGRICOLA (Dialog Proquest)

Results = 5 (1) [0] {71}
((ab,ti(("front of package nutrition label" OR "front of package nutrition labels" OR "front of pack nutrition label" OR "front of pack nutrition labels" OR "FOP label" OR "FOP labels" OR "front of package label" OR "front of package labels" OR "shelf-labeling" OR "shelf labeling" OR “shelf nutrition label” OR “shelf nutrition labels”) AND (consumer OR consumers OR “consumer behavior” OR “consumer behaviors” OR “consumer preference” OR “consumer preferences” OR “consumer satisfaction” OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers)) **AND (Limited by: Date: From 2021 to August 2022; Language:English)) OR (ab,ti(("Health Star" OR "Traffic Light*" OR "Reference Intakes" OR "Warning symbol" OR "Heart-check" OR "Healthier Choice Symbol" OR "Nutri-Score" OR "Nutri score" OR Nutri-**

Score OR NuVal) AND label* AND (consumer OR "consumer behavior" OR "consumer behaviors" OR "consumer preference" OR "consumer preferences" OR "consumer satisfaction" OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers) AND (Limited by: Date: From 2021 to August 2022; Language:English))) AND (all(label*))

Cab Abstracts (via ProQuest Dialog)

Results = 14 (0) [0]
("front of package nutrition label" OR "front of package nutrition labels" OR "front of pack nutrition label" OR "front of pack nutrition labels" OR "FOP label" OR "FOP labels" OR "front of package label" OR "front of package labels" OR "shelf-labeling" OR "shelf labeling" OR “shelf nutrition label” OR “shelf nutrition labels”) AND (consumer OR consumers OR “consumer behavior” OR “consumer behaviors” OR “consumer preference” OR “consumer preferences” OR “consumer satisfaction” OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers)

AgEcon
Results = 18 (0) [0] {3}

Search filter = any field / (date added/modified 01/04/2016 to 31/12/2018)
Results total = 51 (0) removal of duplicates = 33; [1]
front of pack* nutrition label* = 15 (1=2016); [1]
FOP label* = 6 (none 2016-) [0]
front of package label* = 8 (none 2016-) [1, duplicate]
shelf labeling = 8 (only 1=2017) [0]
shelf nutrition label* = 14 (1=2016; 3=2017) [0]

- **("front of package nutrition label" OR "front of package nutrition labels" OR "front of pack nutrition label" OR "front of pack nutrition labels" OR "FOP label" OR "FOP labels" OR "front of package label" OR "front of package labels" OR shelf-labeling OR "shelf labeling" OR "shelf nutrition label" OR "shelf nutrition labels") AND (consumer OR "consumer behavior" OR "consumer behaviors" OR "consumer preference" OR "consumer preferences" OR "consumer satisfaction" OR "consumer response" OR "consumer responses" OR effective OR design OR designs OR nutrition OR producer OR producers OR retailer OR retailers) AND year:2021->2022**
- **"Health Star" AND year:2021->2022**
- **"Traffic Light*" AND year:2021->2022**
- **"Reference Intakes" AND year:2021->2022**
- **"Warning symbol" AND year:2021->2022**
- **“Heart-check” AND year:2021->2022**
- **"Healthier Choice Symbol" AND year:2021->2022**
- **“Nutri-Score” AND year:2021->2022**
- **"Nutri score" AND year:2021->2022**
- **Nutri-Score AND year:2021->2022**
- **NuVal AND year:2021->2022**

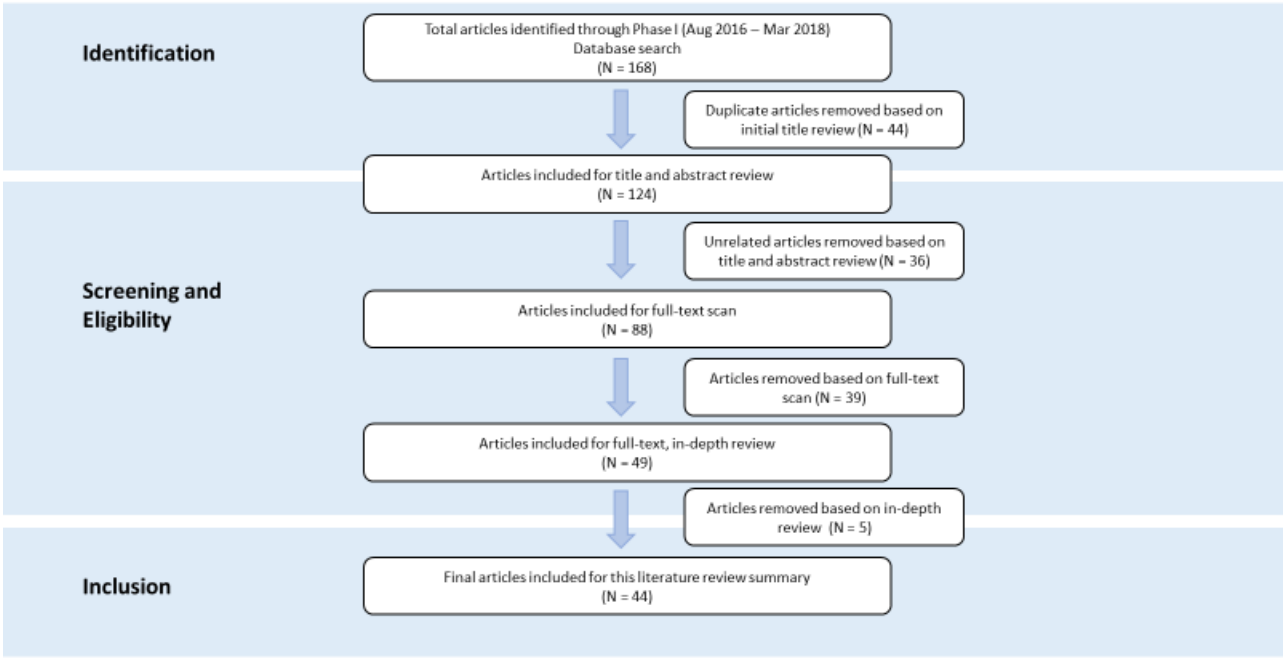
NTIS
Results = {0}

No search terms provided for Phase I, II or III. For Phase IV, each labeling term listed below was searched individually. The consumer terms were not used, so as not to limit the search results.

- "front of package nutrition label"
- "front of package nutrition labels"
- "front of pack nutrition label"
- "front of pack nutrition labels"
- "FOP label"
- "FOP labels"
- "front of package label"
- "front of package labels"
- shelf-labeling
- "shelf labeling"
- "shelf nutrition label"
- "shelf nutrition labels"
- "Health Star"
- "Traffic Light*"
- "Reference Intakes"
- "Warning symbol"
- “Heart-check”
- "Healthier Choice Symbol"
- “Nutri-Score”
- "Nutri score"
- Nutri-Score
- NuVal

Phase I (Search period: August 2016 – March 2018)

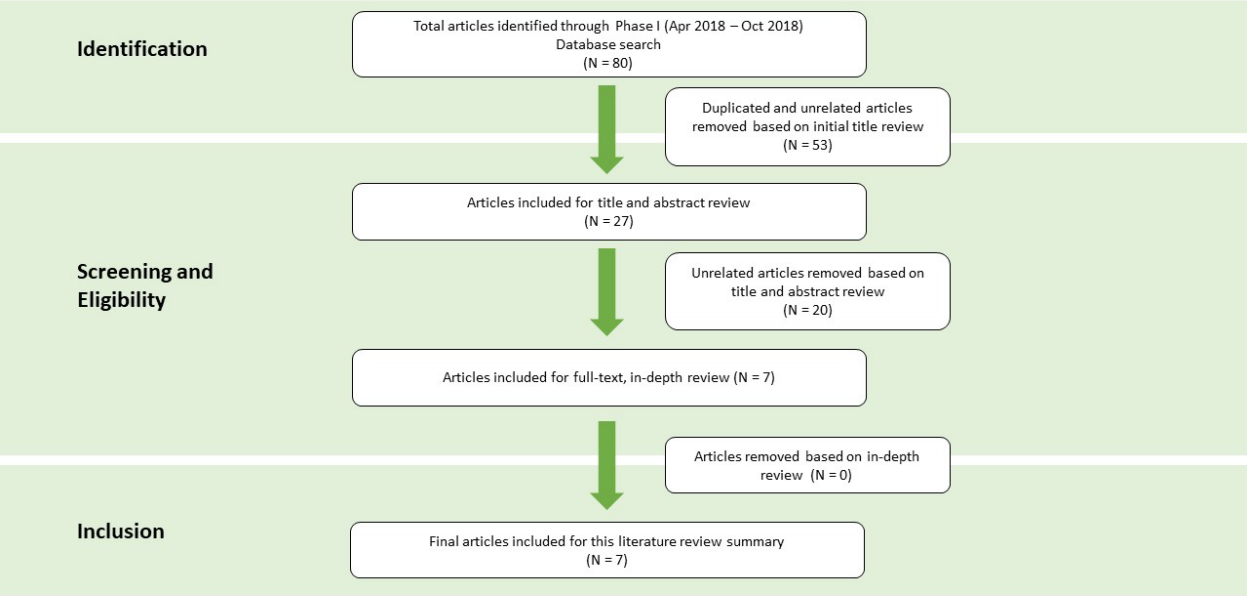
Overall, 168 articles were identified in the literature search; 44 duplicates were removed; 36 articles were removed because they were not related to the research topic; 39 additional articles were removed because, 1) upon closer examination they were not related to the research topic, 2) they were already reported in one of the previous literature reviews, or 3) they were duplicates of articles in the review; five articles were removed at the final stage, after the in-depth review because they were determined by both researchers that they were not relevant to the research topic. 44 articles from this stage of search were included in this literature review summary.



Stage I

Phase II (Search period: April 2018 – October 2018)

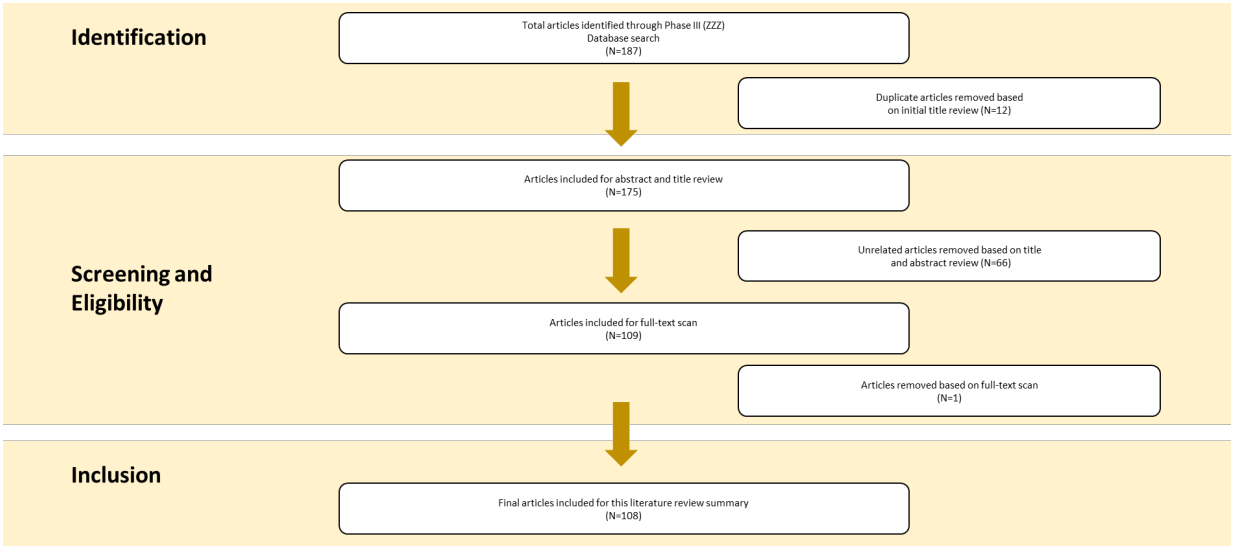
Overall, 80 articles were identified in the literature search; 53 duplicates were removed; 20 articles were further removed because they were not related to the research topic. Seven articles from this stage of search were included in this literature review summary.



Stage II

Phase III (Search period: November 2018 to August 2021)

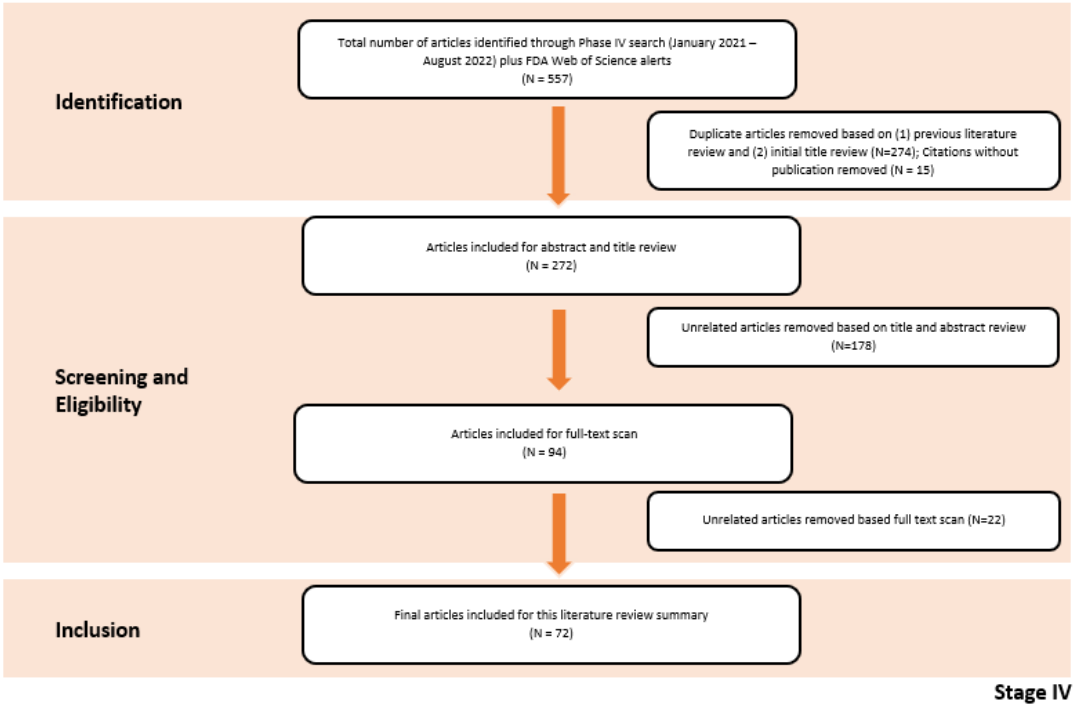
Overall, 187 articles were identified in the literature search; 12 duplicates were removed; 66 articles were further removed because they were not related to the research topic. One article was removed because it was not published in English. One hundred and eight articles from this stage of search were included in this literature review summary.



Stage III

Phase IV (Search period: January 2021 to August 2022)

Overall, 517 articles were identified in the literature search, to which 40 articles were added from FDA's Web of Science updates, resulting in 557 articles. Of those, 46 articles included in Phase III were removed as well as 224 duplicates and 15 citations for which no publication existed; 200 articles were further removed because they were not related to the research topic (178 removed based on title and abstract review; 22 removed following full text review). Seventy-two articles from this stage of search were included in this literature review summary.



Stage IV

Mechanism Used to Manage the Review

Search results were downloaded to- and delivered in- EndNote (20.4.1, Bld 16297), a reference management software program supported by FDA's reference library.

Selection Process

Researchers imported basic information for each of the 94 identified articles identified in Phase IV into Excel, into a file that listed author, year, title, study type, method, sample size, type of FOP, FOP image, country, highlight of findings, and whether the study included "education" as a variable. The articles were divided evenly among five researchers who read them and sorted them into the summary categories that had been used by the prior studies: Attention and processing; Liking, satisfaction, and label preference; Understanding, Effects on use and likely purchase; Effects on sales (purchases and consumption); Effects on Diverse Populations; and Evaluation of Government FOP Nutrition Symbols. At the request of the HSIT, we added a category for Effects on Educational Differences. Researchers also wrote a summary of each article's findings. These summaries were used to develop overall conclusions by category. The Phase IV reviews were completed by one researcher, who sorted the articles into the same categories used in Phase III and summarized the articles' findings.

Appendix C: Citations for all References

Acton, R. B., & Hammond, D. (2018). The impact of price and nutrition labelling on sugary drink purchases: Results from an experimental marketplace study. *Appetite, 121*, 129-137. https://doi:10.1016/j.appet.2017.11.089

Acton, R.B., & Hammond, D. (2018). Do Consumers Think Front-of-Package "High in" Warnings are Harsh or Reduce their Control? A Test of Food Industry Concerns. *Obesity*, 26, 1687-1691. https://doi:10.1002/oby.22311

Acton, R.B., & Hammond, D. (2018). Do manufacturer 'nutrient claims' influence the efficacy of mandated front-of-package labels? *Public Health Nutrition*, 21(18), 3354–3359. https://doi:10.1017/S1368980018002550

Acton, R.B., & Hammond, D. (2020). Impact of sugar taxes and front-of-package nutrition labels on purchases of protein, calcium and fibre. *Preventative Medicine*, 136, 106091. https://doi:10.1016/j.ypmed.2020.106091

Acton, R.B., Jones, C., Kirkpatrick, S., Roberto, C., & Hammond, D. (2019). Taxes and front-of-package labels improve the healthiness of beverage and snack purchases: a randomized experimental marketplace. *International Journal of Behavioral Nutrition and Physical Activity*, 16(1), 46. https://doi.org/10.1186/s12966-019-0799-0

Acton, R. B., Kirkpatrick, S. I., & Hammond, D. (2021). Exploring the main and moderating effects of individual-level characteristics on consumer responses to sugar taxes and front-of-pack nutrition labels in an experimental marketplace. *Canadian journal of public health*, *112*(4), 647-662. https://doi.org/10.17269/s41997-021-00475-x

Acton, R. B., Kirkpatrick, S. I., & Hammond, D. (2022). Comparing the Effects of Four Front-of-Package Nutrition Labels on Consumer Purchases of Five Common Beverages and Snack Foods: Results from a Randomized Trial. *Journal of the Academy of Nutrition and Dietetics*, *122*(1), 38-48.e39. https://doi.org/10.1016/j.jand.2021.07.014

Acton, R. B., Vanderlee, L., & Hammond, D. (2018). Influence of front-of-package nutrition labels on beverage healthiness perceptions: Results from a randomized experiment. *Preventive Medicine, 115*, 83-89. https:/doi:10.1016/j.ypmed.2018.08.022

Acton, R. B., Vanderlee, L., Roberto, C. A., & Hammond, D. (2018). Consumer perceptions of specific design characteristics for front-of-package nutrition labels. *Health Education Research, 33*(2), 167-174. https://doi:10.1093/her/cyy006

Adasme-Berríos, C., Aliaga-Ortega, L., Schnettler, B., Parada, M., Andaur, Y., Carreño, C., Lobos, G., Jara-Rojas, R., & Valdes, R. (2022). Effect of Warning Labels on Consumer Motivation and Intention to Avoid Consuming Processed Foods. *Nutrients*, *14*(8), 1547. https://doi.org/10.3390/nu14081547

Adasme-Berríos, C., Aliaga-Ortega, L., Schnettler, B., Sánchez M. , Pinochet, C., & Lobos, G. (2020). What Dimensions of Risk Perception are Associated with Avoidance of Buying Processed Foods with Warning Labels? *Nutrients,* 12, 2987. https://doi:10.3390/nu12102987

Agarwal, D., Ravi, P., Purohit, B., & Priya, H. (2022). The effect of energy and fat content labeling on food consumption pattern: a systematic review and meta-analysis. *Nutrition reviews*, *80*(3), 453-466. https://doi.org/10.1093/nutrit/nuab035

Aguenaou, H., El Ammari, L., Bigdeli, M., El Hajjab, A., Lahmam, H., Labzizi, S., Gamih, H., Talouizte, A., Serbouti, C., El Kari, K., Benkirane, H., El Berri, H., Al-Jawaldeh, A., & Yahyane, A. (2020). Comparison of appropriateness of Nutri-Score and other front-of-pack nutrition labels across a group of Moroccan consumers: awareness, understanding and food choices. *Archives of Public Health*, 79(1), 71. https://doi:10.1186/s13690-021-00595-3

Ahn, C., & Lee, C. G. (2022). Effect of NUTRI-SCORE labeling on sales of food items in stores at sports and no Nutri-Scoreports facilities. *Preventive medicine reports*, *29*, 101919. https://doi.org/10.1016/j.pmedr.2022.101919

Akgüngör, S., Gröppel-Klein, A., Koenigstorfer, J., Gülcan, Y., & Kustepeli, Y. (2016). The impact of nutrition labels on food sales: an in-Store experiment in a Turkish supermarket. *Economia Agro-Alimentare/Food Economy, 18*(2), 207-228. https://doi:10.3280/ECAG2016-002002

Al-Jawaldeh, A., Rayner, M., Julia, C., Elmadfa, I., Hammerich, A., & McColl, K. (2020). Improving Nutrition Information in the Eastern Mediterranean Region: Implementation of Front-of-Pack Nutrition Labelling. *Nutrients*, 12, 330. https://doi:10.3390/nu12020330

An, R., Shi, Y., Shen, J., Bullard, T., Liu, G., Yang, Q., Chen, N., & Cao, L. (2020). Effect of front-of-package nutrition labeling on food purchases: a systematic review. *Public Health*, 191, 59-67. https://doi: 10.1016/j.puhe.2020.06.035 0033-3506

Anabtawi, O., Swift, J. A., Hemmings, S., Gertson, L., & Raaff, C. (2020). Perceived healthiness of food items and the traffic light front of pack nutrition labelling: choice-based conjoint analysis and cross-sectional survey. *Journal of Human Nutrition and Dietetics*, 33(4), 487-495. https://doi: 10.1111/jhn.12741

Andreeva, V., Egnell, M., Handjieva-Darlensk, T., Talati, Z., Touvier, M., Galan, P., Hercberg, S., Pettigrew, S., & Julia, C. (2021). Bulgarian consumers' objective understanding of front-of-package nutrition labels: a comparative, randomized study. *Archives of Public Health*, 78, 35. https://doi:10.1186/s13690-020-00416-z

Andreeva, V. A., Egnell, M., Stoś, K., Przygoda, B., Talati, Z., Touvier, M., Galan, P., Hercberg, S., Pettigrew, S., & Julia, C. (2022). Polish Consumers' Understanding of Different Front-of-Package Food Labels: A Randomized Experiment. *Foods*, *11*(1), 134. https://doi.org/10.3390/foods11010134

Andreeva, V., Egnell, M., Touvier, M., Galan, P., Julia, C., & Hercberg, S. (2021). International evidence for the effectiveness of the front-of-package nutrition label called Nutri-Score. *Central European Journal of Public Health*, 29(1): 76–79.
https:// doi: 10.21101/cejph.a6239

Andrews, C., C Lin, A Levy, & S Lo. (2014). Consumer Research Needs from the Food and Drug Administration on Front-of-Package Nutritional Labeling. *Journal of Public Policy and Marketing* 33(1), 10-16.
https://doi:10.1509/jppm.33.1.10

Andrews, J.C., Netemeyer, R., Burton, S., & 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*, 128, 140–155.
https://doi:10.1016/j.jbusres.2021.01.036 R

Ang, F., Agrawal, S., & Finkelstein, E. (2019). Pilot randomized controlled trial testing the influence of front-of-pack sugar warning labels on food demand. *BMC Public Health*, 19, 164.
https://doi:10.1186/s12889-019-6496-8

Ares, G., Aschemann-Witzel, J., Curutchet, M.R., Antúnez, L., Moratorio, X., & Bove, I. (2018). A citizen perspective on nutritional warnings as front-of-pack labels: insights for the design of accompanying policy measures. *Public Health Nutrition,* 21(18), 3450–3461.
https://doi:10.1017/S1368980018002045

Ares, G., Machín, L., Vidal, L., Aschemann-Witzel, J., Otterbring, T., Curutchet, M.R., Giménez, A., & Bove, I. (2019). How Can We Motivate People to Use Nutritional Warnings in Decision Making? Citizen Co-Created Insights for the Development of Communication Campaigns. *Health Education & Behavior*, 47(2), 321-331.
https://doi:10.1177/1090198119889086

Ares, G., Antúnez, L., Curutchet, M.R., Galicia, L., Moratorio, X., Giménez, A., & Bove, I. (2020). Immediate effects of the implementation of nutritional warnings in Uruguay: awareness, self-reported use and increased understanding. *Public Health Nutrition*: 24(2), 364–375.
https://doi:10.1017/S1368980020002517

Ares, G., Varela, F., Machin, L., Antúnez, L., Giménez, A., Curutchet, M. R., & Aschemann-Witzel, J. (2018). Comparative performance of three interpretative front-of-pack nutrition labelling schemes: Insights for policy making. *Food Quality and Preference, 68*, 215-225.
https://doi:10.1016/j.foodqual.2018.03.007

Arrua, A., Curutchet, M. R., Rey, N., Barreto, P., Golovchenko, N., Sellanes, A., Velazco, G, Winokur, M., Gimenez, A. & Ares, G. (2017). Impact of front-of-pack nutrition information and label design on children's choice of two snack foods: Comparison of warnings and the traffic-light system. *Appetite, 116*, 139-146.
https://doi:10.1016/j.appet.2017.04.012

Arrua, A., Machin, L., Curutchet, M. R., Martinez, J., Antunez, L., Alcaire, F., Gimenez, A. & Ares, G. (2017). Warnings as a directive front-of-pack nutrition labelling scheme: comparison with the Guideline Daily Amount and traffic-light systems. *Public Health Nutrition, 20*(13), 2308-2317. https://doi:10.1017/s1368980017000866

Arrua, A., Vidal, L., Antunez, L., Machin, L., Martinez, J., Curutchet, M. R., Gimenez, A. & Ares, G. (2017). Influence of Label Design on Children's Perception of 2 Snack Foods. *Journal of nutrition education and behavior, 49*(3), 211-217.e211. https://doi:10.1016/j.jneb.2016.10.021

Baccelloni, A., Giambarresi, A., & Mazzù, M. F. (2021). Effects on Consumers' Subjective Understanding and Liking of Front-of-Pack Nutrition Labels: A Study on Slovenian and Dutch Consumers. *Foods*, *10*(12), 2958. https://doi.org/10.3390/foods10122958

Bandeira, L. M., Pedroso, J., Toral, N., & Gubert, M. B. (2021). Performance and perception on front-of-package nutritional labeling models in Brazil. *Revista de saude publica*, *55*, 19. https://doi.org/10.11606/s1518-8787.2021055002395

Bhattacharya, S., Bera, O. P., & Shah, V. (2022). Consumers' Perception About Front of Package Food Labels (FOP) in India: A Survey of 14 States. *Frontiers in Public Health*, *10*, 936802. https://doi.org/10.3389/fpubh.2022.936802

Bhawra, J., Kirkpatrick, S. I., Hall, M. G., Vanderlee, L., Thrasher, J. F., & Hammond, D. (2022). Correlates of Self-Reported and Functional Understanding of Nutrition Labels across 5 Countries in the 2018 International Food Policy Study. *The Journal of nutrition*, *152*(Suppl 1), 13s-24s. https://doi.org/10.1093/jn/nxac018

Billich, N., Blake, M., Backholder, K., Cobcroft, M., Li, V., & Peeters, A. (2018). The effect of sugar-sweetened beverage front-of-pack labels on drink selection, health knowledge and awareness: An online randomized controlled trial*. Appetite*, 128: p. 233-241. https://doi: 10.1016/j.appet.2018.05.149

Blitstein, J. L., Guthrie, J., & Rains, C. (2020). Low-Income Parents' Use of Front-of-Package Nutrition Labels in a Virtual Supermarket. *Journal of Nutrition Education and Behavior*, 52(9), 850-858. https://doi:10.1016/j.jneb.2020.04.003

Bossuyt, S., Custers, K., Tummers, J., Verbeyst, L., & Oben, B. (2021). Nutri-Score and Nutrition Facts Panel through the Eyes of the Consumer: Correct Healthfulness Estimations Depend on Transparent Labels, Fixation Duration, and Product Equivocality. *Nutrients*, *13*(9), 2915. https://doi.org/10.3390/nu13092915

Bromberg, M., Sinai, T., Keinan-Boker, L., Endevelt, R., & Frankenthal, D. (2022). Current use of nutrition facts tables and attitudes towards new red and green front-of-package labels among Israeli consumers. *International journal of food sciences and nutrition.*, *73*(2), 230-237. https://doi.org/10.1080/09637486.2021.1955841

Brown, H. M., de Vlieger, N., Collins, C., & Bucher, T. (2017). The influence of front-of-pack nutrition information on consumers' portion size perceptions. *Health Promot Journal of Australia, 28*(2), 144-147. https://doi:10.1071/he16011

Cabrera, T., Sarasty, O., Watson, S. E., Gonzalez, M.S., & Carpio, C. E. (2022, July 31 – Aug 2, 2022). *Traffic-light nutrition labeling use and demand among Ecuadorean children* [Paper presentation]. Agricultural & Applied Economics Association Annual Meeting, Anaheim, CA, United States. https://ageconsearch.umn.edu/record/322586/

Carruba, M. O., Caretto, A., De Lorenzo, A., Fatati, G., Ghiselli, A., Lucchin, L., Maffeis, C., Malavazos, A., Malfi, G., Riva, E., Ruocco, C., Santini, F., Silano, M., Valerio, A., Vania, A., & Nisoli, E. (2022). Front-of-pack (FOP) labelling systems to improve the quality of nutrition information to prevent obesity: NutrInform Battery vs Nutri-Score. *Eating and Weight Disorders*, *27*(5), 1575-1584. https://doi.org/10.1007/s40519-021-01316-z

Carter, K. A., & Gonzalez-Vallejo, C. (2018). Nutrient-specific system versus full fact panel: Testing the benefits of nutrient-specific front-of-package labels in a student sample. *Appetite, 125*, 512-526. https://doi:10.1016/j.appet.2018.03.001

Cole, M., Peek, H., & Cowen, D. (2018) UK consumer perceptions of a novel till-receipt 'traffic-light' nutrition system. *Health Promotion International*, 34 (4), 640-647. https://doi:10.1093/heapro/day007

Constantin, A., Cabrera, O. A., Ríos, B., Barbosa, I., Ramírez, A. T., Cinà, M. M., & Serrano Guzmán, S. (2021). A human rights-based approach to non-communicable diseases: mandating front-of-package warning labels. *Global Health*, 17(1), 85. https://doi:10.1186/s12992-021-00734-z

Contreras-Manzano, A., Jáuregui, A., Vargas-Meza, J., Nieto, C., Granich-Armenta, A., de Lourdes Alemán Escobar, M., G-Olvera, A., Cruz-Casarrubias, C., Munguía, A., & Barquera, S. (2022). Objective understanding of front of pack warning labels among Mexican children of public elementary schools. A randomized experiment. *Nutrition journal*, *21*(1), 1-14. https://doi:10.1186/s12937-022-00791-z

Cook, L. A., & Kizilova, E. (2017). Direct and Indirect Processing Effects of Front-of-Package Labels. *AMA Marketing & Public Policy Academic Conference Proceedings, 27*, 45-46.

Cooper, S., Butcher, l., Scagnelli, S., Lo, J., Ryan, M. M., Devine, A., & O'Sullivan, T. Australian Consumers Are Willing to Pay for the Health Star Rating Front-of-Pack Nutrition Label. *Nutrients*, 12, 3876. https://doi:10.3390/nu12123876

Cordero-Ahiman, O. V., Vanegas, J. L., Fernández-Lucero, C. A., Torres-Torres, D. F., Ayaviri-Nina, V. D., & Quispe-Fernández, G. M. (2022). Responsible Marketing in the Traffic Light Labeling of Food Products in Ecuador: Perceptions of Cuenca Consumers. *Sustainability*, *14*(6), 3247. https://doi:10.3390/su14063247

Correa, T., Fierro, C., Reyes, M., Carpentier, F., Taillie, L., & Corvalan, C. (2019). Responses to the Chilean law of food labeling and advertising: exploring knowledge, perceptions and behaviors of mothers of young children. *International Journal of Behavioral Nutrition and Physical Activity*, 16(1), 21. https://doi.org/10.1186/s12966-019-0781-x

Correa, T., Fierro, C., Reyes, M., Taillie, L. S., Carpentier, F. R. D., & Corvalán, C. (2022). Why Don't You [Government] Help Us Make Healthier Foods More Affordable Instead of Bombarding Us with Labels? Maternal Knowledge, Perceptions, and Practices after Full Implementation of the Chilean Food Labelling Law. *International journal of environmental research and public health*, *19*(8), 4547. https://doi.org/10.3390/ijerph19084547

Cowburn, G., & Stockley, L. (2005). Consumer Understanding and Use of nutrition labeling: a systematic review. Public health Nutrition*,* 8(1), 21-28. https://doi:10.1079/phn2005666

Croker, H., Packer, J., Russell, S., Stansfield, C., & Viner, R. M. (2020). Front of pack nutritional labelling schemes: a systematic review and meta-analysis of recent evidence relating to objectively measured consumption and purchasing. *Journal of Human Nutrition and Dietetics*, 33(4), 518–537. https://doi.org/10.1111/jhn.12758

Cui, J., Yan, R., Astell-Burt, T., Gong, E., Zheng, L., Li, X., Zhang, J., Xiang, L., Ye, L., Hu, Y., Tang, Y., Gao, C., Xiao, L., Jiang, Y., Shao, R., Feng, X., Zhang, J., & Yang, Y. (2022). Types and Aspects of Front-of-Package Labeling Preferred by Parents: Insights for Policy Making in China. *Nutrients*, *14*(4), 800. https://doi.org/10.3390/nu14040800

Dana, L., Chapman, K., Talati, Z., Kelly, B., Dixon, H., Miller, C., & Pettigrew, S. (2019). Consumers' Views on the Importance of Specific Front-of-Pack Nutrition Information: A Latent Profile Analysis. *Nutrients*, 11(5), 1158. https://doi:10.3390/nu11051158

Dang, A., & Nichols, B. S. (2022). Consumer response to positive nutrients on the facts up front (FUF) label: A comparison between healthy and unhealthy foods and the role of nutrition motivation . *Journal of Marketing Theory & Practice*, 31, 223-242. https://doi.org/10.1080/10696679.2021.2020662

de Alcantara, M., Aresb, G., Leme de Castrod, I.P., & Deliza, R. (2020). Gain vs. loss-framing for reducing sugar consumption: Insights from a choice experiment with six product categories. *Food Research International*, 136, 109458. https://doi:10.1016/j.foodres.2020.109458

de Alcantara, M., Ares, G., & Deliza, R. (2022). How Do Nutritional Warnings Work on Commercial Products? Results from a Hypothetical Choice Experiment. *Frontiers in Nutrition*, *9*, 921515. https://doi.org/10.3389/fnut.2022.921515

de la Cruz-Gongora, V., Torres, P., Contreras-Manzano, A., Jauregui de la Mota, A., Mundo-Rosas, V., Villalpando, S., & Rodriguez-Oliveros, G. (2017). Understanding and acceptability by Hispanic consumers of four front-of-pack food labels. *International journal of behavioral nutrition and physical activity, 14*(1), 28. https://doi:10.1186/s12966-017-0482-2

de Morais SatoI, P., Amaral Mais, L., Khandpur, N., Ulian, M.D., Bortoletto Martins, A.P., Garcia, M., Spinillo, C., Rojas, C., Jaime, P., & Scagliusi, F. (2019). Consumers' opinions on warning labels on food packages: A qualitative study in Brazil. PLoS ONE 14(6), e0218813. https://doi.org/10.1371/journal.pone.0218813

de Temmerman, J., Heeremans, E., Slabbinck, H., & Vermeir, I. (2021). The impact of the Nutri-Score nutrition label on perceived healthiness and purchase intentions. *Appetite*, 157, 104995. https://doi.org/10.1016/j.appet.2020.104995

Defago, D., Fernando Geng, J., Molina, O., & Santa María, D. (2019). Can traffic light nutritional labels induce healthier consumer choices? Experimental evidence from a developing country. *International Journal of Consumer Studies*. 44, 151-161. https://doi.org/10.1111/ijcs.12554

Deliza, R., de Alcantarab, M., Pereirac, R., & Aresd, G. (2019). How do different warning signs compare with the guideline daily amount and traffic-light system? *Food Quality and Preference*, 80, 103821. https://doi.org/10.1016/j.foodqual.2019.103821

Donini, L. M., Penzavecchia, C., Muzzioli, L., Poggiogalle, E., Giusti, A. M., Lenzi, A., & Pinto, A. (2022). Efficacy of front-of-pack nutrition labels in improving health status. *Nutrition*, *102*, 111770. https://doi.org/10.1016/j.nut.2022.111770

Dubois, P., Albuquerque, P., Allais, O., Bonnet, C., Bertail, P., Combris, P., Lahlou, S., Rigal, N., Ruffieux, B., & Chandon, P. (2021). Effects of front-of-pack labels on the nutritional quality of supermarket food purchases: Evidence from a large-scale randomized controlled trial. *Journal of the Academy of Marketing Science*, *49*(1), 119-138. https://doi.org/10.1007/s11747-020-00723-5

Ducrot, P., Julia, C., & Serry, A.J. (2022). Nutri-Score: Awareness, Perception and Self-Reported Impact on Food Choices among French Adolescents. *Nutrients*, *14*(15), 3119. https://doi.org/10.3390/nu14153119

Dukeshire, S., & Nicks, E. (2017). Benchmarks and Blinders: How Canadian Women Utilize the Nutrition Facts Table. *Canadian journal of dietetic practice and research, 78*(2), 53-58. https://doi:10.3148/cjdpr-2016-032

Dunford, E. K., Poti, J. M., Xavier, D., Webster, J. L., & Taillie, L. S. (2017). Color-Coded Front-of-Pack Nutrition Labels-An Option for US Packaged Foods? *Nutrients, 9*(5), 1-10. https://doi:10.3390/nu9050480

Dunford, E. K., Wu, J. H. Y., Wellard-Cole, L., Watson, W., Crino, M., Petersen, K., & Neal, B. (2017). A comparison of the Health Star Rating system when used for restaurant fast foods and packaged foods. *Appetite, 117*, 1-8. https://doi:10.1016/j.appet.2017.06.005

Egnell, M., Boutron, I., Péneau, S., Ducrot, P., Touvier, M., Galan, P., Buscail, C., MD, PhD, el Porcher, R., Ravaud, P., Hercberg, S., Kesse-Guyot, E., & Julia, C. (2019). Front-of-Pack Labeling and the Nutritional Quality of Students' Food Purchases: A 3-Arm Randomized Controlled Trial. *American Journal of Public Health*, 109, 1122–1129. https://doi:10.2105/AJPH.2019.305115

Egnell, M., Crosetto, P., d'Almeida, T., Kesse-Guyot, E., Touvier, M., Ruffieux, M., Hercberg, S., Muller, L., & Chantal, J. (2019) Modelling the impact of different front-of-package nutrition labels on mortality from non-communicable chronic disease. *International Journal of Behavioral Nutrition and Physical Activity*, 16, 56. https://doi.org/10.1186/s12966-019-0817-2

Egnell, M., Ducrot, P., Touvier, M., Alles, B., Hercberg, S. Kesse-Guyot, E. & Julia, C. (2018). Objective understanding of Nutri-Score Front-Of-Package nutrition label according to individual characteristics of subjects: Comparisons with other format labels. *PLoS One*, 2018. 13(8), e0202095. https://doi:10.1371/journal.pone.0202095

Egnell, M., Galan, P., Farpour-Lambert, N., Talati, Z., Pettigrew, S., Hercberg, S., Julia, C. (2020). Compared to other front-of-pack nutrition labels, the Nutri-Score emerged as the most efficient to inform Swiss consumers on the nutritional quality of food products. PLoS ONE 15(2), e0228179. https://doi.org/10.1371/journal.pone.0228179

Egnell, M., Galan, P., Fialon, M., Touvier, M., Péneau, S., Kesse-Guyot, E., Hercberg, S., & Julia, C. (2021). The impact of the Nutri-Score front-of-pack nutrition label on purchasing intentions of unprocessed and processed foods: posthoc analyses from three randomized controlled trials. *International Journal of Behavioral Nutrition and Physical Activity*, 18, 38. https://doi:10.1186/s12966-021-01108-9

Egnell, M., Boutron, I., Péneau, S., Ducrot, P., Touvier, M., Galan, P., Buscail, C., Porcher, R., Ravaud, P., Hercberg, S., Kesse-Guyot, E., & Julia, C. (2021). Randomized controlled trial in an experimental online supermarket testing the effects of front-of-pack nutrition labelling on food purchasing intentions in a low-income population. *BMJ Open*, 11(2), e041196. https://doi:10.1136/ bmjopen-2020-041196

Egnell, M., Kesse-Guyot, E., Galan, P. Touvier, M., Rayner, M., Jewell, J., Breda, J., Hercberg, S., & Julia, C. (2018). Impact of Front-of-Pack Nutrition Labels on Portion Size Selection: An Experimental Study in a French Cohort. *Nutrients*, 10(9), 1268. https://doi:10.3390/nu10091268

Egnell ,M., Talati, Z., Gombaud, M., Galan, P., Hercberg, S., Pettigrew, S., & Julia, C. (2019). Consumers' Responses to Front-of-Pack Nutrition Labelling: Results from a Sample from The Netherlands. *Nutrients*, 11, 1817. https://doi:10.3390/nu11081817

Egnell, M., Talati, Z., Galan, P., Andreeva, V. Vandevijvere, S., Gombaud, M., Dréano-Trécant, L., Hercberg, S., Pettigrew, S., & Julia, C. (2020). Objective understanding of the Nutri-Score front-of-pack label by European consumers and its effect on food choices: an online experimental study. *International Journal of Behavioral Nutrition and Physical Activity*, 17, 146. https://doi.org/10.1186/s12966-020-01053-z

el-Abbadi, N., Taylor, S., Micha, R., & Blumberg, B. (2020). Nutrient Profiling Systems, Front of Pack Labeling, and Consumer Behavior. *Current Atherosclerosis Reports*, 22, 36. https://doi.org/10.1007/s11883-020-00857-5

Elshiewy, O. & Boztug, Y. (2018). When Back of Pack Meets Front of Pack: How Salient and Simplified Nutrition Labels Affect Food Sales in Supermarkets. *Journal of Public Policy & Marketing*, 37, 55–67. https://doi:10.1509/jppm.16.100

Epstein, L. H., Finkelstein, E. A., Katz, D. L., Jankowiak, N., Pudlewski, C., & Paluch, R. A. (2016). Effects of nutrient profiling and price changes based on NuVal® scores on food purchasing in an online experimental supermarket. *Public Health Nutrition, 19*(12), 2157-2164. https://doi:10.1017/S1368980015002931

Esfandiari, Z., Mirlohi, M., Tanha, J. M., Hadian, M., Mossavi, S. I., Ansariyan, A., Ghassami, N., Adib, S., Bahraini, T., Safaeian, L., Pakmehr, F., Mashhadian, F., Abolhasani, M., Marasi, M. R., Isteki, F., Abedi, R., Ghorbani, P., Shoaei, P., & Kelishadi, R. (2021). Effect of Face-to-Face Education on Knowledge, Attitudes, and Practices Toward "Traffic Light" Food Labeling in Isfahan Society, Iran. *International quarterly of community health education*, *41*(3), 275-284. https://doi.org/10.1177/0272684x20916612

Fernan, C., Schuldt, J. P., & Niederdeppe, J. (2018). Health Halo Effects from Product Titles and Nutrient Content Claims in the Context of "Protein" Bars. *Health communication*, *33*(12), 1425–1433. https://doi:10.1080/10410236.2017.1358240

Feteira-Santos, R., Fernandes, J., Virgolino, A., Alarcao, V., Sena, C., Vieira, C., Gregorio, M., Nogueira, P., Costa, I., Graca, P., & Santos, O. (2020). Effectiveness of interpretive front-of-pack nutritional labelling schemes on the promotion of healthier food choices: a systematic review. *International Journal of Evidence-Based Healthcare,* 18(1), 24-37. https://doi:10.1097/XEB.0000000000000214

Feteira-Santos, C., Alarcao, V., Santos, O., Virgolino, A., Fernandes, J., Vieira, C., Gregorio, M., Nogueira, . P., Costa, A., & Graca, P. (2021). Looking Ahead: Health Impact Assessment of Front-of-Pack Nutrition Labelling Schema as a Public Health Measure*. International Journal of Environmental Research and Public Health*, 18, 1422. https://doi:10.3390/ijerph18041422

Fialon, M., Egnell, M., Talati, Z., Galan, P., Dreano-Trecant, L., Touvier, M., Pettigrew, S., Hercberg, S., & Julia, C. (2020). Effectiveness of Different Front-of-Pack Nutrition Labels among Italian Consumers: Results from an Online Randomized Controlled Trial. *Nutrients*, 12, 2307. https://doi:10.3390/nu12082307

Fialon, M., Salas-Salvadó, J., Babio, N., Touvier, M., Hercberg, S., & Galan, P. (2021). Is FOP Nutrition Label Nutri-Score Well Understood by Consumers When Comparing the Nutritional Quality of Added Fats, and Does It Negatively Impact the Image of Olive Oil? *Foods*, *10*(9), 2209. https://doi.org/10.3390/foods10092209

Finkelstein, E. A., Ang, F., Doble, B., Wong, W., & van Dam, R. (2019). A Randomized Controlled Trial Evaluating the Relative Effectiveness of the Multiple Traffic Light and Nutri-Score Front of Package Nutrition Labels. *Nutrients*, 11, 2236. https://doi:10.3390/nu11092236

Finkelstein, E. A., Ang, F., & Doble, B. (2020). Randomized trial evaluating the effectiveness of within versus acrosscategory front-of-package lower-calorie labelling on food demand. *BMC Public Health*, 20, 312. https://doi.org/10.1186/s12889-020-8434-1

Finkelstein, E. A., Ang, F., Doble, B., Wong, W., & van Dam, R. (2021). A randomized controlled trial testing the effects of a positive front-of-pack label with or without a physical activity equivalent label on food purchases. *Appetite*, 158, 104997. https://doi.org/10.1016/j.appet.2020.104997 R

Finkelstein, E. A., Li, W., Melo, G., Strombotne, K., & Zhen, C. (2018). Identifying the effect of shelf nutrition labels on consumer purchases: results of a natural experiment and consumer survey. *American Journal of Clinical Nutrition, 107*(4), 647-651. https://doi:10.1093/ajcn/nqy014

Folkvord, F., Bergmans, N., & Pabian, S. (2021). The effect of the Nutri-Score label on consumer's attitudes, taste perception and purchase intention: An experimental pilot study. *Food Quality and Preference*, *94*, 7. https://doi.org/10.1016/j.foodqual.2021.104303

Fondevila-Gascón, J. F., Berbel-Giménez, G., Vidal-Portés, E., & Hurtado-Galarza, K. (2022). Ultra-Processed Foods in University Students: Implementing Nutri-Score to Make Healthy Choices. *Healthcare (Basel)*, *10*(6), 984. https://doi.org/10.3390/healthcare10060984

Franco-Arellanoa, B., Vanderlee, L., Ahmeda, M., Oha, A., & L'Abbe, M. (2020). Influence of front-of-pack labelling and regulated nutrition claims on consumers' perceptions of product healthfulness and purchase intentions: A randomized controlled trial. *Appetite*, 149, 104629. https://doi.org/10.1016/j.appet.2020.104629 R

Fuchs, K., Barattin, T., Haldimann, & M., Ilic, A. (2019). Towards Tailoring Digital Food Labels Insights of a Smart-RCT on User-specific Interpretation of Food Composition Data. *Proceedings of the 5th International Workshop on Multimedia Assisted Dietary Management, 65-75*. https://doi:10.1145/3347448.3357171

Galana, P., Egnell, M., Salas-Salvado, J., Babio, N., Pettigrew, S., Hercberg, S., & Julia, C. (2020). Understanding of different front-of-package labels by the Spanish population: Results of a comparative study. *Endocrinología, Diabetes y Nutrición*, 67(2), 122-129. https://doi.org/10.1016/j.endien.2019.03.016

Georgina Russell, C., Burke, P. F., Waller, D. S., & Wei, E. (2017). The impact of front-of-pack marketing attributes versus nutrition and health information on parents' food choices. *Appetite, 116*, 323-338. https://doi:10.1016/j.appet.2017.05.001

Gibson-Moore, H., & Spiro, A. (2021). Evolution not revolution – what might the future hold for front-of-pack nutrition labelling in the UK?: A British Nutrition Foundation roundtable. *Nutrition Bulletin*, *46*(3), 383-394. https://doi.org/10.1111/nbu.12517

Goiana-da-Silva, F., Cruz, E. S. D., Nobre-da-Costa, C., Nunes, A. M., Fialon, M., Egnell, M., Galan, P., Julia, C., Talati, Z., Pettigrew, S., Darzi, A., Araújo, F., & Hercberg, S. (2021). Nutri-Score: The Most Efficient Front-of-Pack Nutrition Label to Inform Portuguese Consumers on the Nutritional Quality of Foods and Help Them Identify Healthier Options in Purchasing Situations. *Nutrients*, *13*(12), 4335. https://doi.org/10.3390/nu13124335

Goodman, S., Vanderlee, L., Acton, R., Mahamad, S., & Hammond, D. (2018). The Impact of Front-of-Package Label Design on Consumer Understanding of Nutrient Amounts. *Nutrients*, 10, 1624. https://doi:10.3390/nu10111624

Gorski Findling, M. T., Werth, P. M., Musicus, A. A., Bragg, M. A., Graham, D. J., Elbel, B., & Roberto, C. A. (2018). Comparing five front-of-pack nutrition labels' influence on consumers' perceptions and purchase intentions. *Preventive Medicine, 106*, 114-121. https://doi:10.1016/j.ypmed.2017.10.022

Graham, D. J., Lucas-Thompson, R. G., Mueller, M. P., Jaeb, M., & Harnack, L. (2017). Impact of explained v. unexplained front-of-package nutrition labels on parent and child food choices: a randomized trial. *Public Health Nutrition, 20*(5), 774-785. https://doi:10.1017/s1368980016002676

Grandi, B., Cardinali, M.G., & Bellini, S. (2019). How to communicate healthy products inside grocery stores. *British Food Journal*, 121 (11), 2637-2650. https://doi:10.1108/BFJ-01-2019-0047

Grummon, A., Halla, M., Taillie, S., & Brewer, T. (2019). How should sugar-sweetened beverage health warnings be designed? A randomized experiment. *Preventative Medicine*, 121, 158–166. https://doi:10.1016/j.ypmed.2019.02.010 R

Grummon, A., Taillie, L., Golden, S., Hall, M., Ranny, L., Brewer, N. (2019) Sugar-Sweetened Beverage Health Warnings and Purchases: A Randomized Controlled Trial. *American Journal of Preventative Medicine*, 57(5), 601-610. https://doi.org/10.1016/j.amepre.2019.06.019

Gupta, A., Billich, N., George, N. A., Blake, M. R., Huse, O., Backholer, K., Boelsen-Robinson, T., & Peeters, A. (2021). The effect of front-of-package labels or point-of-sale signage on consumer knowledge, attitudes and behavior regarding sugar-sweetened beverages: a systematic review. *Nutrition Reviews*, *79*(10), 1165-1181. https://doi.org/10.1093/nutrit/nuaa107

Gustafson, C. (2019). Front-of-Pack Nutrition Labels and Point-of-Decision Strategies to Improve Food Choice Quality. *American Journal of Public Health*, 109 (12), 1624-1625. https://doi: 10.2105/AJPH.2019.305384

Gustafson, C., & Prate, M. (2019). Healthy Food Labels Tailored to a High-Risk, Minority Population More Effectively Promote Healthy Choices than Generic Labels. *Nutrients*, 11, 2272. https://doi:10.3390/nu11102272

Hagmann, D., & Siegrist, M. (2020). Nutri-Score, multiple traffic light and incomplete nutrition labelling on food packages: Effects on consumers' accuracy in identifying healthier snack options. *Food Quality and Preference*, 83, 103894. https://doi: 10.1016/j.foodqual.2020.103894 R

Hallez, L., Qutteina, Y., Raedschelders, M., Boen, F., & Smits, T. (2019). That's My Cue to Eat: A Systematic Review of the Persuasiveness of Front-of-Pack Cues on Food Packages for Children vs. Adults. *Nutrients*, 12, 1062. http://doi:10.3390/nu12041062

Hamlin, R., & Hamlin, B. (2020). An Experimental Comparison of the Impact of 'Warning' and 'Health Star Rating' FOP Labels on Adolescents' Choice of Breakfast Cereals in New Zealand. *Nutrients*, 12, 1545. https://doi:10.3390/nu12061545

Hamlin, R., & L. McNeill (2018). The Impact of the Australasian 'Health Star Rating', Front-of-Pack Nutritional Label, on Consumer Choice: A Longitudinal Study. *Nutrients*, 10(7), 906. https://doi.org/10.3390/nu10070906

Harrington, R., Scorborough, P., Hodgkins, C., Raats, M. M., Cowburn, G., Dean, M., Doherty, A., Foster, C., Juszczak, E., Ni Mhurchu, C., Winstone, N., Shepherd, R., Timotijevic, L., & Rayner, M. (2019). A Pilot Randomized Controlled Trial of a Digital Intervention Aimed at Improving Food Purchasing Behavior: The Front-of-Pack Food Labels Impact on Consumer Choice Study. *JMIR Formative Research*, 3(2), e9910. https://doi.org/10.2196/formative.9910

Hercberg, S., Touvier, M., & Salas-Salvado, J. (2021). The Nutri-Score nutrition label A public health tool based on rigorous scientific evidence aiming to improve the nutritional status of the population. *International Journal of Vitamin Nutritional Research*, 92, 147-157. https://doi: 10.1024/0300-9831/a000722

Hersey, JC, KC Wohlgenant, JE Arsenault, KM Kosa, & MK Muth. (2013). Effects of front-of-package and shelf nutrition labeling systems on consumers. *Nutrition Reviews*. 71(1), 1-14. https://doi.org/10.1111/nure.12000

Hobin, E., Bollinger, B., Sacco, J., Liebman, E., Vanderlee, L., Zuo, F., Rosella, L., L'abbe, M., Manson, H., & Hammond, D. (2017). Consumers' Response to an Nutri-Scorehelf Nutrition Labelling System in Supermarkets: Evidence to Inform Policy and Practice. *Milbank Q, 95*(3), 494-534. https://doi:10.1111/1468-0009.12277

Hock, K., Acton, R. B., Jáuregui, A., Vanderlee, L., White, C. M., & Hammond, D. (2021). Experimental study of front-of-package nutrition labels' efficacy on perceived healthfulness of sugar-sweetened beverages among youth in six countries. *Prev Med Rep*, *24*, 101577. https://doi.org/10.1016/j.pmedr.2021.101577

Hoge, A., Labeye, M., Donneau, A. F., Nekoee, H. Z., Husson, E., & Guillaume, M. (2022). Health Literacy and Its Associations with Understanding and Perception of Front-of-Package Nutrition Labels among Higher Education Students. *Int J Environ Res Public Health*, *19*(14), 8751. https://doi.org/10.3390/ijerph19148751

Ikonen, I., Sotgiu, F., Aydinli, A., & Verlegh, P. (2019). Consumer effects of front-of-package nutrition labeling: an interdisciplinary meta-analysis. *Journal of the Academy of Marketing Science*, 48, 360–383. https://doi:10.1007/s11747-019-00663-9

International Food Information Council. *Knowledge, Understanding and Use of Front-of-Pack Labeling in Food and Beverage Decisions: Insights from U.S. Shoppers.* 16 November 2021. https://foodinsight.org/ific-survey-fop-labeling/

Institute of Medicine (US) (IOMa) Committee on Examination of Front-of-Package Nutrition Rating Systems and Symbols, Wartella, E. A., Lichtenstein, A. H., & Boon, C. S. (Eds.). (2010). *Front-of-Package Nutrition Rating Systems and Symbols: Phase I Report*. National Academies Press (US). https://doi:10.17226/12957

McGuire S. Institute of Medicine (IOMb). (2012). Front-of-Package Nutrition Rating Systems and Symbols: Promoting Healthier Choices. Washington, DC: The National Academies Press. *Advances in nutrition* (Bethesda, Md.), 3(3), 332–333. https://doi.org/10.3945/an.112.001933

Jáuregui, A., Vargas-Meza, J., Nieto, C., Contreras-Manzano, A., Alejandro, N. Z., Tolentino-Mayo, L., Hall, M. G., & Barquera, S. (2020). Impact of front-of-pack nutrition labels on consumer purchasing intentions: a randomized experiment in low- and middle-income Mexican adults. *BMC Public Health*, 20(1), 463. https://doi:10.1186/s12889-020-08549-0

Jáuregui, A., White, C. M., Vanderlee, L., Hall, M. G., Contreras-Manzano, A., Nieto, C., Sacks, G., Thrasher, J. F., Hammond, D., & 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*, *25*(4), 1094-1104. https://doi.org/10.1017/s1368980021004535

Jones, A., Thow, A. M., Nhurchu, C., Sacks, G., & 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*, 43 (4), 355-365. https://doi.org/10.1111/1753-6405.12908

Julia, C., Blanchet, O., Mejean, C., Peneau, S., Ducrot, P., Alles, B., Fezeu, L. K., Touvier, M., Kesse-Guyot, E., Singler, E., & Hercberg, S. (2016). Impact of the front-of-pack 5-colour nutrition label (5-CNL) on the nutritional quality of purchases: an experimental study. *The international journal of behavioral nutrition and physical activity, 13*(1), 101. https://doi:10.1186/s12966-016-0416-4

Julia, C., Peneau, S., Buscail, C., Gonzalez, R., Touvier, M., Hercberg, S., & Kesse-Guyot, E. (2017). Perception of different formats of front-of-pack nutrition labels according to sociodemographic, lifestyle and dietary factors in a French population: cross-sectional study among the NutriNet-Sante cohort participants. *BMJ Open, 7*(6), e016108. https://doi:10.1136/bmjopen-2017-016108

Khandpur, N., Maisb, L., de Morais Satoa, P., Martins, A. P. B., Spinillo, C. G., Rojas, C. F. U., Garcia, M. T., & Jaime, P.C. (2019). Choosing a front-of-package warning label for Brazil: A randomized, controlled comparison of three different label designs. *Food Research International*, 121, 854-861. https://doi: 10.1016/j.foodres.2019.01.008

Khandpur, N., Amaral Mais, L., & Bortoletto Martins, A. P. (2022). A comparative assessment of two different front-of-package nutrition label designs: A randomized experiment in Brazil. *PLoS One*, *17*(4), e0265990. https://doi.org/10.1371/journal.pone.0265990

Kontopoulou, L., Karpetas, G., Fradelos E, C., Papathanasiou, I. V., Malli, F., Papagiannis, D., Mantzaris, D., Fialon, M., Julia, C., & Gourgoulianis, K. I. (2021). Online Consumer Survey Comparing Different Front-of-Pack Labels in Greece. *Nutrients*, *14*(1), 46. https://doi.org/10.3390/nu14010046

Kühne, S. J., Reijnen, E., Granja, G., & Hansen, R. S. (2022). Labels Affect Food Choices, but in What Ways? *Nutrients*, *14*(15), 3204. https://doi.org/10.3390/nu14153204

Leão, R. D., dos Santos Alves, M. J., Moraes Monteiro, C. R., Ribeiro Gagliardi, T., & Ayala Valencia, G. (2022). Impact of front-of-pack labels in chocolate bars and soft drinks on consumer perceptions: A cross-sectional study using free word association. *Packaging Technology & Science*, *35*(7), 579-586. https://doi.org/10.1002/pts.2670

Lima, M., Ares, G., & Deliza, R. (2018). How do front of pack nutrition labels affect healthfulness perception of foods targeted at children? Insights from Brazilian children and parents. *Food Quality and Preference, 64*, 111-119. https://doi:10.1016/j.foodqual.2017.10.003

Lima, M., de Alcantara, M., Martins, I., Aresc, G., & Deliza, R. (2019). Can front-of-pack nutrition labeling influence children's emotional associations with unhealthy food products? An experiment using emoji. *Food Research International*, 120, 217-225. https://doi:10.1016/j.foodres.2019.02.027

Lima, M., de Alcantra, M., Rosenthal, A., & Deliza, R. (2019). Effectiveness of traffic light system on Brazilian consumers perception of food healthfulness. *Food Science and Human Wellness*, 8, 368-374. https://doi: 10.1016/j.fshw.2019.10.001 2

Lundeberg, P. J., Graham, D. J., & Mohr, G. S. (2018). Comparison of two front-of-package nutrition labeling schemes, and their explanation, on consumers' perception of product healthfulness and food choice. *Appetite, 125*, 548-556. https://doi:10.1016/j.appet.2018.02.027

Machin, L., Aschemann-Witzel, J., Curutchet, M. R., Gimenez, A., & Ares, G. (2018). Traffic Light System Can Increase Healthfulness Perception: Implications for Policy Making. *Journal of nutrition education and behavior*, *50*(7), 668–674. https://doi.org/10.1016/j.jneb.2018.03.005

Machín, L., Curutchetb, M.R., Gimenez, A., Aschemann-Witzeld, A., & Ares, G. (2019). Do nutritional warnings do their work? Results from a choice experiment involving snack products. *Food Quality and Preference*, 77, 159-165. https://doi:10.1016/j.foodqual.2019.05.012

Machin, L., Cabrera, M., Curutchet, M. R., Martinez, J., Gimenez, A., & Ares, G. (2017). Consumer Perception of the Healthfulness of Ultra-processed Products Featuring Different Front-of-Pack Nutrition Labeling Schemes. *Journal of nutrition education and behavior, 49*(4), 330-338.e331. https://doi:10.1016/j.jneb.2016.12.003

Mansfield, E., Ibanez, D., Chen, F., Chen, E., & de Grandpre, E. (2020). Efficacy of “High in” Nutrient Specific Front of Package Labels—A Retail Experiment with Canadians of Varying Health Literacy Levels. *Nutrients*, 12, 3199. https://doi:10.3390/nu12103199

Marette, S. (2021). Ecological and/or Nutritional Scores for Food Traffic-Lights: Results of an Online Survey Conducted on Pizza in France. *Sustainability*, *14*(1), 247. https://doi.org/10.3390/su14010247

Mauri, C., Grazzini, L., Ulqinaku, A., & Poletti, E. (2021). The effect of front-of-package nutrition labels on the choice of low sugar products. *Psychology & Marketing*, 38(8), 1323-1339. https://doi.org/https://doi.org/10.1002/mar.21473

Mazzonetto, A. C., Fernandes, A. C., de Souza, A. D., Rodrigues, V. M., Scapin, T., Uggioni, P. L., Veiros, M. B., Bernardo, G. L., & da Costa Proença, R. P. (2022). Front-of-pack nutrition labels: perceptions and preferences of Brazilian adult consumers. *British Food Journal*.

Mazzù, M. F. (2022). Introducing the Front-Of-Pack Acceptance Model: the role of usefulness and ease of use in European consumers' acceptance of Front-Of-Pack Labels. *International journal of food sciences and nutrition*, *v. 73*(no. 3), pp. 378-395-2022 v.2073 no.2023. https://doi.org/10.1080/09637486.2021.1980866

Mazzù, M. F., Baccelloni, A., & Finistauri, P. (2022). Uncovering the Effect of European Policy-Making Initiatives in Addressing Nutrition-Related Issues: A Systematic Literature Review and Bibliometric Analysis on Front-of-Pack Labels. *Nutrients*, *14*(16), 3423. https://doi.org/10.3390/nu14163423

Mazzù, M. F., Baccelloni, A., Romani, S., & Andria, A. (2022). The role of trust and algorithms in consumers' front-of-pack labels acceptance: a cross-country investigation. *European Journal of Marketing*, 56(11), 3107-3137. https://doi:10.1108/EJM-10-2021-0764

Mazzù, M., Romani, S., Baccelloni, A., & Gambicorti, A. (2021). A cross-country experimental study on consumers' subjective understanding and liking on front-of-pack nutrition label. *International Journal of Food Sciences and Nutrition*, *72*(6), 833–847. https://doi:10.1080/09637486.2021.1873918

Mazzù, M., Romani, S., & Gambicorti, A. (2020). Effects on consumers' subjective understanding of a new front-of-pack nutritional label: a study on Italian consumers. *International Journal of Food Sciences and Nutrition*, *72*(3), 357–366. https://doi:10.1080/09637486.2020.1796932

McCrickerda, K., Tanga, C., & Forde, C. (2020). The independent and combined impact of front-of-pack labelling and sensory quality on calorie estimations and portion selection of commercial food products. Food Quality and Preference, 79. https://doi:10.1016/j.foodqual.2019.103766

Mediano Stoltze, F., Busey, E., Taillie, L. S., & Dillman Carpentier, F. R. (2021). Impact of warning labels on reducing health halo effects of nutrient content claims on breakfast cereal packages: A mixed-measures experiment. *Appetite*, *163*, 105229. https://doi.org/https://doi.org/10.1016/j.appet.2021.105229

Medina-Molina, C., & Pérez-González, B. (2020). Nutritional labelling and purchase intention interaction of interpretative food labels with consumers' beliefs and decisions. *British Food Journal*, 123(2), 754-770. https://doi.org/10.1108/BFJ-04-2020-0353

Medina-Molina, C., Rey-Moreno, M., & Periáñez-Cristóbal, R. (2021). Analysis of the moderating effect of front-of-pack labelling on the relation between brand attitude and purchasing intention. *Journal of Business Research*, *122*, 304-310. https://doi.org/10.1016/j.jbusres.2020.08.062

Meng, Y., & Chan, E. Y. (2022). Traffic light signals and healthy food choice: Investigating gender differences. *Psychology & Marketing*, *39*(2), 360-369. https://doi.org/10.1002/mar.21601

Mhurchu, C. N., Eyles, H., & Choi, Y. H. (2017). Effects of a Voluntary Front-of-Pack Nutrition Labelling System on Packaged Food Reformulation: The Health Star Rating System in New Zealand. *Nutrients, 9*(8),918. https://doi:10.3390/nu9080918

Miller, C., Ettridge, K., Pettigrew, S., Wittert, G., Wakefield, M., Coveney, J., Roder, D., Martin, J., Brownbill, A., & Dono, J. (2022a). Warning labels and interpretive nutrition labels: Impact on substitution between sugar and artificially sweetened beverages, juice and water in a real-world selection task. *Appetite*, *169*, 105818. https://doi.org/10.1016/j.appet.2021.105818

Miller, C., Wright, K., Dono, J., Pettigrew, S., Wakefield, M., Coveney, J., Wittert, G., Roder, D., Durkin, S., Martin, J., & Ettridge, K. (2022b). "You can't just eat 16 teaspoons of sugar so why would you drink 16 teaspoons' worth of sugar?": a qualitative study of young adults' reactions to sugary drink warning labels. *BMC Public Health*, *22*(1), 1241. https://doi.org/10.1186/s12889-022-13648-1

Mora-García, C., Tobar, L, & Young, J. (2019). The Effect of Randomly Providing Nutri-Score Information on Actual Purchases in Colombia. *Nutrients*, 11, 491. https://doi:10.3390/nu11030491

Mora-Plazas, M., Aida Higgins, I. C., Gomez, L. F., Hall, M., Parra, M. F., Bercholz, M., Murukutla, N., & Taillie, L. S. (2022). Impact of nutrient warning labels on choice of ultra-processed food and drinks high in sugar, sodium, and saturated fat in Colombia: A randomized controlled trial. *PLoS One*, *17*(2), e0263324. https://doi.org/10.1371/journal.pone.0263324

Muller, L., & Ruffieux, B. (2020). What Makes a Front-of-Pack Nutritional Labelling System Effective: The Impact of Key Design Components on Food Purchases. *Nutrients*, 12, 2870. https://doi:10.3390/nu12092870

Muzzioli, L., Penzavecchia, C., Donini, L. M., & Pinto, A. (2022). Are Front-of-Pack Labels a Health Policy Tool? *Nutrients*, *14*(4), 771. https://doi.org/10.3390/nu14040771

Neal, B., Crino, M., Dunford, E., Gao, A., Greenland, R., Li, N., Ngai, J., Ni Mhurchu, C., Pettigrew, S., Sacks, G., Webster, J. (2017). Effects of Different Types of Front-of-Pack Labelling Information on the Healthiness of Food Purchases-A Randomised Controlled Trial. *Nutrients, 9*(12). https://doi:10.3390/nu9121284

Nieto, C., Jáuregui1, A., Contreras-Manzano, A., Arillo-Santillan, E., Barquera, S., White, C.M., Hammond, D. & Thrasher, J. F. (2019). Understanding and use of food labeling systems among Whites and Latinos in the United States and among Mexicans: Results from the International Food Policy Study, 2017. *International Journal of Behavioral Nutrition and Physical Activity*, 16, 87. https://doi:10.1186/s12966-019-0842-1

Ning, S. X., Mainvil, L. A., Thomson, R. K., & McLean, R. M. (2017). Dietary sodium reduction in New Zealand: influence of the Tick label. *Asia Pacific journal of clinical nutrition, 26*(6), 1133-1138. https://doi:10.6133/apjcn.032017.06

Oswald, C., Adhikari, K., & Mohan, A. (2022). Effect of front-of-package labels on consumer product evaluation and preferences. *Current research in food science*, *5*, 131-140. https://doi.org/10.1016/j.crfs.2021.12.016

Packer, J., Russell, S., Ridout, D., Hope, S., Conolly, A., Jessop, C., Robinson, O. J., Stoffel, S. T., Viner, R. M., & Croker, H. (2021). Assessing the Effectiveness of Front of Pack Labels: Findings from an Online Randomised-Controlled Experiment in a Representative British Sample. *Nutrients*, 13, 900. https://doi:10.3390/nu13030900

Packer, J., Russell, S. J., Ridout, D., Conolly, A., Jessop, C., Viner, R. M., & Croker, H. (2022). Secondary Outcomes of a Front-of-Pack-Labelling Randomised Controlled Experiment in a Representative British Sample: Understanding, Ranking Speed and Perceptions. *Nutrients*, *14*(11), 2188. https://doi.org/10.3390/nu14112188

Pan, X., Magliano, D., Zheng, M., Shahid, M., Taylor, F., Julia, C., Ni Mhurchu, C., Pan, A., Shaw, J. E., Neal, B., & Wu, J. (2020). Seventeen-Year Associations between Diet Quality Defined by the Health Star Rating and Mortality in Australians: The Australian Diabetes, Obesity and Lifestyle Study. *Current developments in nutrition*, *4*(11), nzaa157. https://doi.org/10.1093/cdn/nzaa157

Pelly, F., Swanepoel, L., Rinella, J., & Cooper, S. (2020). Consumers' Perceptions of the Australian Health Star Rating Labelling Scheme. *Nutrients*, 12(3), 704. https://doi:10.3390/nu12030704

Pettigrew, S., Dana, L. M., Talati, Z., Tian, M., & Praveen, D. (2021). The role of colour and summary indicators in influencing front-of-pack food label effectiveness across seven countries. *Public Health Nutrition*, *24*(11), 3566-3570. https://doi.org/10.1017/s1368980020004966

Pettigrew, S., Dana, L., & Talati, Z. (2019). Enhancing the effectiveness of the Health Star Rating via presentation modifications. *Australian and New Zealand journal of public health*, *44*(1), 20–21. . https://doi:10.1111/1753-6405.12952

Pettigrew, S., Jongenelis, M., Jones, A., Hercberg, S., & Julia, C. (2022). An 18-country analysis of the effectiveness of five front-of-pack nutrition labels. *Food Quality and Preference*, 104,104691. https://doi.org/https://doi.org/10.1016/j.foodqual.2022.104691

Pettigrew, S., Talati, Z., Miller, C., Dixon, H., Kelly, B., & Ball, K. (2017). The types and aspects of front-of-pack food labelling schemes preferred by adults and children. *Appetite, 109*, 115-123. https://doi:10.1016/j.appet.2016.11.034

Pongutta, S., Tantayapirak, P., & Paopeng, C. (2019). Packaged food consumption and understanding of front-of-pack labels in urban Thailand. *Public Health*, 172, 8-14. https://doi.org:10.1016/j.puhe.2019.04.004

Poqueta, D., Ginonb, E., Goubela, B., Chabaneta, C., Marettec, S., Issanchoua, S., & Monnery-Patris, S. (2019). Impact of a front-of-pack nutritional traffic-light label on the nutritional quality and the hedonic value of mid-afternoon snacks chosen by mother-child dyads. *Appetite*, 143, 104425. https://doi:10.1016/j.appet.2019.104425

Research Triangle Institute (RTI). 2016. Addendum to Policy Research for Front of Package Nutrition Labeling: Environmental Scan and Literature Review. Report prepared for U.S. Food and Drug Administration.

Raine, K. D., Ferdinands, A. R., Atkey, K., Hobin, E., Jeffery, B., Nykiforuk, C. I. J., Vanderlee, L., Vogel, E., & Von Tigerstrom, B. (2017). Policy recommendations for front-of-package, shelf, and menu labelling in Canada: Moving towards consensus. *Canadian journal of public health, 108*(4), e409-e413. https://doi:10.17269/cjph.108.6076

Reis, F., Machin, L., Rosenthal, A., Deliza, R., & Ares, G. (2016). Does a time constraint modify results from rating-based conjoint analysis? Case study with orange/pomegranate juice bottles. *Food research international, 90*, 244-250. https://doi:10.1016/j.foodres.2016.11.006

Riccò, M., Ranzieri, S., Balzarini, F., Vezzosi, L., Marchesi, F., Valente, M., & Peruzzi, S. (2022). Understanding of the Nutri-Score front-of-pack label by Italian Medical Professionals and its effect on food choices: a web-based study on knowledge, attitudes and practices. *Acta Biomed*, *93*(2), e2022042. https://doi.org/10.23750/abm.v93i2.11191

Richetin, J., Caputo, V., Demartini, E., Conner, M., & Perugini, M. (2022). Organic food labels bias food healthiness perceptions: Estimating healthiness equivalence using a Discrete Choice Experiment. *Appetite*, *172*, 105970. https://doi.org/10.1016/j.appet.2022.105970

Roberto, C., Ng, S., Ganderats-Fuentes, M., Hammond, D., Barquera, S., Jauregui, A., & Taillie, L. (2021). The Influence of Front-of-Package Nutrition Labeling on Consumer Behavior and Product Reformulation. *The Annual Review of Nutrition*, 41, 22.1–22.22. https://doi:10.1146/annurev-nutr-111120-094932

Roseman, M. G., Joung, H. W., & Littlejohn, E. I. (2017). Attitude and Behavior Factors Associated with Front-of-Package Label Use with Label Users Making Accurate Product Nutrition Assessments. *Journal of the Academy of Nutrition and Dietetics*, *118*(5), 904–912. https://doi:10.1016/j.jand.2017.09.006

Rønnow, H. (2020). The Effect of Front-of-Pack Nutritional Labels and Back-of-Pack Tables on Dietary Quality. *Nutrients*, 12, 1704. https://doi:10.3390/nu12061704

Roudsari, A. H., Pouri Hosseini, S. F. A., Bonab, A. M., Zahedi-rad, M., Nasrabadi, F. M., & Zargaraan, A. (2021). Consumers' perception of nutritional facts table and nutritional traffic light in food products' labelling: A qualitative study [Article]. *International Journal of Health Planning & Management*, 36(3), 628-642. https://doi.org/10.1002/hpm.3105

Sagaceta-Mejía, J., Tolentino-Mayo, L., Cruz-Casarrubias, C., Nieto, C., & Barquera, S. (2022). Understanding of front of package nutrition labels: Guideline daily amount and warning labels in Mexicans with non-communicable diseases. *PLoS One*, 17(6), e0269892. https://doi.org/10.1371/journal.pone.0269892

Salazar, N., Fiszman, S., Orrego, C., & Tarrega, A. (2019). Evaluation of Some Ingredients and Energy Content on Front-of-Pack Cereal Bar Labeling as Drivers of Choice and Perception of Healthiness: A Case Study with Exercisers. Journal of Food Science, 84(8), 2269–2277. https://doi:10.1111/1750-3841.14726

Sanjari, S., Jahn, S., & Boztug, Y. (2017). Choosing Fast and Slow: Processing Mode and Consumer Response to FOP Nutrition Label Formats. *AMA Winter Educators' Conference Proceedings, 28*, A-18-A-19.

Sanjari, S. S., Jahn, S., & Boztug, Y. (2017). Dual-process theory and consumer response to front-of-package nutrition label formats. *Nutrition Review, 75*(11), 871-882. https://doi:10.1093/nutrit/nux043

Santos, O., Alarcao, V., Feteira-Santos, R., Fernandes, J., Virgolino, A., Sena, C., Vieira, C. P., Gregório, M. J., Nogueira, P., Graça, P., & Costa, A. (2020). Impact of different front-of-pack nutrition labels on online food choices. *Appetite*, 154, 104795. https://doi:1016/j.appet.2020.104795

Sarda, B., Julia, C., Serry, A., & Ducrot, P. (2020). Appropriation of the Front-of-Pack Nutrition Label Nutri-Score across the French Population: Evolution of Awareness, Support and Purchasing Behaviors between 2018 and 2019. *Nutrients*, 12(9), 2887. https://doi: 10.3390/nu12092887

Scapin, T., Fernandes, A. C., Curioni, C. C., Pettigrew, S., Neal, B., Coyle, D. H., Rodrigues, V. M., Bernardo, G. L., Uggioni, P. L., & Proença, R. P. C. (2021). Influence of sugar label formats on consumer understanding and amount of sugar in food choices: a systematic review and meta-analyses. *Nutrition Review*, 79(7), 788-801. https://doi.org/10.1093/nutrit/nuaa108

Schneider, G., & Ghosh, A. (2019). Should We Trust Front-of-Package Labels? How Food and Brand Categorization Influence Healthiness Perception and Preference. *The Association for Consumer Research*, 5(2), 149-161. https://doi: 10.1086/707929

Septia Irawan, A., Shahin, B., Wangeshi Njuguna, D., Nellamkuzhi, N. J., Thiện, B. Q., Mahrouseh, N., & Varga, O. (2022). Analysis of Content, Social Networks, and Sentiment of Front-of-Pack Nutrition Labeling in the European Union on Twitter. *Frontiers in nutrition*, *9*, 846730. https://doi.org/10.3389/fnut.2022.846730

Shahrabani, S. (2021). The impact of Israel's Front-of-Package labeling reform on consumers' behavior and intentions to change dietary habits. *Israel Journal of Health Policy Research*, *10*(1), 44. https://doi.org/10.1186/s13584-021-00482-w

Shin, S., van Dam, R., & Finkelstein, E. (2020). The Effect of Dynamic Food Labels with Real-Time Feedback on Diet Quality: Results from a Randomized Controlled Trial. *Nutrients*, 12, 2158. https://doi:10.3390/nu12072158

Siegrist, M., Hartmann, C., & Lazzarini, G. (2019). Healthy choice label does not substantially improve consumers' ability to select healthier cereals: results of an online experiment. *British Journal of Nutrition*, 121, 1313–1320. https://doi:10.1017/S0007114519000448

Silva, A. R. C. S., Mhurchu, C. N., & Anastácio, L. R. (2022). Comparison of two front-of-pack nutrition labels for Brazilian consumers using a smartphone app in a real-world grocery store: A pilot randomized controlled study. *Frontiers in Nutrition*, *9,* 898021. https://doi.org/10.3389/fnut.2022.898021.

Silva, B., Lima, J. P., Baltazar, A. L., Pinto, E., & Fialho, S. (2022). Perception of Portuguese Consumers Regarding Food Labeling. *Nutrients*, *14*(14), 2944. https://doi.org/10.3390/nu14142944

Sinu Scientific Board, & Sinu Scientific Committee (2021). "Front-of-pack" nutrition labeling. *Nutrition, metabolism, and cardiovascular diseases*, *31*(11), 2989-2992. https://doi.org/10.1016/j.numecd.2021.07.021

Song, J., Brown, M. K., Tan, M., MacGregor, G. A., Webster, J., Campbell, N. R. C., Trieu, K., Ni Mhurchu, C., Cobb, L. K., & He, F. J. (2021). Impact of color-coded and warning nutrition labelling schemes: A systematic review and network meta-analysis. *PLoS Med*, *18*(10), e1003765. https://doi.org/10.1371/journal.pmed.1003765

Sundstrom, W., McIntyre, S., Baker, G., & Avants, B. (2020). Bearers of Bad News: Heterogeneous Effects of Alternative Front-of-Package Labeling Schemes for Nutritional Information. *Journal of Agribusiness*, 38, 1. https://doi:10.22004/ag.econ.307139

Taillie, L., Hall, M., Gomez, L., Higgins, I., Bercholz, M., Murukutla, N., & Mora-Plazas, M. (2020). Designing an Effective Front-of-Package Warning Label for Food and Drinks High in Added Sugar, Sodium, or Saturated Fat in Colombia: An Online Experiment. *Nutrients*, 12(1), 3124. https://doi:10.3390/nu12103124

Taillie, L., Hall, M., Popkin, B., Ng, S., & Murukutla, N. (2020). Experimental Studies of Front-of-Package Nutrient Warning Labels on Sugar-Sweetened Beverages and Ultra-Processed Foods: A Scoping Review. *Nutrients*, 12, 569. https://doi:10.3390/nu12020569

Taillie, L. S., Higgins, I. C. A., Lazard, A. J., Miles, D. R., Blitstein, J. L., & Hall, M. G. (2022). Do sugar warning labels influence parents' selection of a labeled snack for their children? A randomized trial in a virtual convenience store. *Appetite*, *175*, 106059. https://doi.org/10.1016/j.appet.2022.106059

Talati, Z., Norman, R., Pettigrew, S., Neal, B., Kelly, B., Dixon, H., Ball, K., Miller, C., & Shilton, T. (2017). The impact of interpretive and reductive front-of-pack labels on food choice and willingness to pay. *The international journal of behavioral nutrition and physical activity, 14*(1), 171. doi:10.1186/s12966-017-0628-2

Talati, Z., Pettigrew, S., Dixon, H., Neal, B., Ball, K., & Hughes, C. (2016). Do Health Claims and Front-of-Pack Labels Lead to a Positivity Bias in Unhealthy Foods? *Nutrients,* 8(12), 787. https://doi:10.3390/nu8120787

Talati, Z., Pettigrew, S., Hughes, C., Dixon, H., Kelly, B., Ball, K., & Miller, C. (2016). The combined effect of front-of-pack nutrition labels and health claims on consumers' evaluation of food products. *Food Quality and Preference,* 53, 57-65. https://doi:10.1016/j.foodqual.2016.05.016

Talati, Z., Norman, R., Kelly, B., Dixon, H., Neal, B., Miller, C., & Pettigrew, S. (2018). A randomized trial assessing the effects of health claims on choice of foods in the presence of front-of-pack labels. *American Journal of Clinical Nutrition*, 108, 1–8. https://doi.org/10.1093/ajcn/nqy248

Talati, Z., Egnell, M., Hercberg, S., Julia, C., & Pettigrew, S. (2018). Consumers' Perceptions of Five Front-of-Package Nutrition Labels: An Experimental Study Across 12 Countries. *Nutrients*, 11, 1934; https://doi:10.3390/nu11081934

Talati, Z., Egnell, M., Hercberg, S., Julia, C., & Pettigrew, S. (2019). Food Choice Under Five Front-of-Package Nutrition Label Conditions: An Experimental Study Across 12 Countries. *American Journal of Public Health*, 109, 1770–1775. https://doi:10.2105/AJPH.2019.305319

Talati, Z., Pettigrew, S., Kelly, B., Ball, K., Neal, B. Shilton, T., & Miller, C. (2018). Can front-of-pack labels influence portion size judgements for unhealthy foods? *Public Health Nutrition*, 21(15), 2776-2781. https://doi.org/10.1017/S1368980018001702

Talati, Z., Pettigrew, S., Neal, B., Dixon, H., Hughes, C., Kelly, B., & Miller, C. (2017). Consumers' responses to health claims in the context of other on-pack nutrition information: a systematic review. *Nutrition Review, 75*(4), 260-273. https://doi:10.1093/nutrit/nuw070

Temple, N. (2020). Front-of-package food labels: A narrative review. *Appetite*, 144, 104485. https://doi: 10.1016/j.appet.2019.104485

Teran, S., Hernandez, I., Freire, W., Leon, B., & Teran, E. (2019). Use, knowledge, and effectiveness of nutritional traffic light label in an urban population from Ecuador: a pilot study. *Globalization and Health*, 15, 26.
https://doi: 10.1186/s12992-019-0467-9

Thomas, D., Seenivasan, S., & 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*, *55*(10), 2735-2768.
https://doi.org/10.1108/EJM-11-2019-0851

Thomson, R. K., McLean, R. M., Ning, S. X., & Mainvil, L. A. (2016). Tick front-of-pack label has a positive nutritional impact on foods sold in New Zealand. *Public Health Nutrition, 19*(16), 2949-2958.
https://doi:10.1017/s1368980016001208

Todd, M., Guetterman, T., Volschenk, J., Kidd, M., & Joubert, E. (2022). Healthy or Not Healthy? A Mixed-Methods Approach to Evaluate Front-of-Pack Nutrition Labels as a Tool to Guide Consumers. *Nutrients*, *14*(14), 2801.
https://doi.org/10.3390/nu14142801

Tortora, G., & Ares, G. (2018). Influence of time orientation on food choice: Case study with cookie labels. *Food research international, 106*, 706-711.
https://doi:10.1016/j.foodres.2018.01.045

Tortora, G. Machina, L., & Ares, G. (2019). Influence of nutritional warnings and other label features on consumers' choice: Results from an eye-tracking study. *Food Research International*, 119, 605–611.
https://doi: 10.1016/j.foodres.2018.10.038

van den Akker, K., Bartelet, D., Brouwer, L., Luijpers, S., Nap, T., & Havermans, R. (2022). The impact of the Nutri-Score on food choice: A choice experiment in a Dutch supermarket. *Appetite*, *168*, 105664.
https://doi.org/10.1016/j.appet.2021.105664

Vanderlee, L., Franco-Arellano, B., Ahmed, M., Oh, A., Lou, W., & L'Abbé, M. R. (2021). The efficacy of 'high in' warning labels, health star and traffic light front-of-package labelling: an online randomised control trial. *Public Health Nutrition*, *24*(1), 62-74.
https://doi.org/10.1017/s1368980020003213

Vandevijvere, S., Vermote, M., Egnell, M., Galan, P., Talati, Z., Pettigrew, S., Hercberg, S., & Julia, C. (2020). Consumers' food choices, understanding and perceptions in response to different front-of-pack nutrition labelling systems in Belgium: results from an online experimental study. *Archives of Public Health*, 78, 30.
https://doi:10.1186/s13690-020-00404-3

Vargas-Meza, J., Jáuregui, A., Contreras-Manzano, A., Nieto, C. & Barquera, S. (2019). Acceptability and understanding of front-of-pack nutritional labels: an experimental study in Mexican consumers. *BMC Public Health*, 19, 1751.
https://doi:10.1186/s12889-019-8108-z

Vargas-Meza, J., Jáuregui, A., Pacheco-Miranda, S., Contreras-Manzano, A., & Barquera, S. (2019). Front-of-pack nutritional labels: Understanding by low- and middle-income Mexican consumers. *PloS one*, *14*(11), e0225268. https://doi:10.1371/journal.pone.0225268

Wang, C. Y., Hsu, C. J., & Cai, D. (2022). Effects of food nutrition labels on the health awareness of school-age children. *BMC Public Health*, 22(1), 1249. https://doi.org/10.1186/s12889-022-13613-y

Waterlander, W. (2019). Are Front-of-Pack Nutrition Labels the Silver Bullet for Achieving Healthier Population Diets? *American Journal of Public Health*, 109(8), 1067–1068. https://doi:10.2105/AJPH.2019.305169

Werle, C. O. C., Pruski Yamim, A., Trendel, O., Roche, K., & Nadaud, P. (2022). When Detailed Information Works Better: Comparison of Three- and Five-Color/Letter Front-of-Package Nutrition Labels. *Journal of Public Policy & Marketing*, *41*(2), 177-195. https://doi.org/10.1177/07439156211061289

World Cancer Research Fund International (2019). Building momentum: lessons on implementing a robust front-of-pack food label. Available at wcrf.org/frontofpack

World Health Organization. (2019). Guiding principles and framework manual for front-of-pack labelling for promoting healthy diet. Department of Nutrition for Health and Development. World Health Organization. http://www.who.int

Xuejun, Y. (2022). Key Stakeholder Perspectives on Introducing a Front-of-Pack Labelling Scheme on Packaged Foods in China: A Qualitative Study. *Nutrients*, 14(3), 516. https://doi.org/10.3390/nu14030516

Yang, C., Liu, X., Ford, P., Leishman, S., & Schubert, L. (2016). Analysis of Front-of-Pack labelling systems on packaged non-alcoholic beverages for Australian consumer guidance. *Nutrition & Dietetics, 73*(5), 410-419. https://doi:10.1111/1747-0080.12257

Yoo, H. J., Machin, L., Arrua, A., Antunez, L., Vidal, L., Gimenez, A., Curutchet, M.R., & Ares, G. (2017). Children and adolescents' attitudes towards sugar reduction in dairy products. *Food Research International, 94*, 108-114. https://doi:10.1016/j.foodres.2017.02.005

Zafar, M. Z., Hashim, N. A., Halim, F. B., & Masud, S. (2021). Readable Labels and Moderating Effect of Individual Personality Traits Effect on Consumer Healthy Packaged Food Selection Intention. *South Asian Journal of Management*, 15(2), 191-218. https://doi:10.21621/sajms.2021152.05

Zhu, C., Lopez, R., & Liu, X. (2019). Consumer responses to front-of-package labeling in the presence of information spillovers. *Food Policy*, 86, 101723. doi: 10.1016/j.foodpol.2019.05.006

Zlatevska, N., Chowdhury, M., Tam, L., & Holden, S. (2019). Facts-up-front: should food companies follow the FDA or industry label format? The effects of combining virtue and vice information on consumer evaluations. *Marketing Letters*, 30, 321–334. https://doi: 10.1007/s11002-019-09504-9