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# Consumer perceptions of specific design characteristics for front-of-package nutrition labels

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## Abstract

**An increasing number of countries are developing front-of-package (FOP) labels; however, there is limited evidence examining the impact of specific design characteristics for these labels. The current study investigated consumer perceptions of several FOP label design characteristics, including potential differences among sociodemographic sub-groups. Two hundred and thirty-four participants aged 16 years or older completed nine label rating tasks on a laptop at a local shopping mall in Canada. The rating tasks asked participants to rate five primary design characteristics (border, background presence, background colour, 'caution' symbol and government attribution) on their noticeability, readability, believability and likelihood of changing their beverage choice. FOP labels with a border, solid background and contrasting colours increased noticeability. A solid background increased readability, while a contrasting background colour reduced it. Both a 'caution' symbol and a government attribution increased the believability of the labels and the perceived likelihood of influencing beverage choice. The effect of the design characteristics was generally similar across sociodemographic groups, with modest differences in five of the nine outcomes. Label design characteristics, such as the use of a border, colour and symbols can enhance the salience of FOP nutrition labels and may increase the likelihood that FOP labels are used by consumers.**

## Introduction

Nutrition labelling has emerged as a key population-level intervention for improving dietary intake [1]. In most Western countries, food manufacturers are required to disclose the nutrition information of food and beverage products in tables or panels displayed on the side or back of packages. Although reported rates of the use of back-of-package nutrition information on food and beverage packages are high in Canada and other Western countries [2], such labels require a high level of health literacy and many consumers struggle to interpret the quantitative information regarding nutrient amounts, particularly with respect to serving size and percent daily values [2–4].

Simplified 'interpretive' nutrition labels have emerged as an important intervention to complement the quantitative information typically provided on food labels. In most cases, interpretive nutrition labels are placed on the front of food packages to increase their noticeability and use. A range of interpretive front-of-package (FOP) labelling systems have been implemented internationally, which communicate simplified nutrition messages to consumers using either nutrient-specific warnings or ratings, or summary indicators rating the overall nutrient profile of a product [5]. A growing body of research has focused on comparing and evaluating the various FOP label systems that exist [6, 7]. The majority of these studies report outcomes related to label use, understanding, perceived effectiveness or actual behavioural outcomes (purchasing or


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consumption); however, these studies compare different label systems as a whole, without addressing the impact of specific design details, regardless of the FOP system.

The visual design of product labels has an important influence on consumer use and comprehension. Evidence from a variety of research domains suggests that design features can increase the contrast of a warning or label relative to the package or advertisement and therefore enhance its noticeability and likelihood to be processed, as well as message acceptance [8]. In particular, labels featuring a prominent border to distinguish them from the surrounding information are more likely to attract attention compared with similar warnings with thin or no borders [9]. Studies of alcohol advertisements using eye-tracking methodology have found that health warnings without distinctive design features, such as a prominent border, are rarely viewed, and when they are viewed, it is for a very small percentage of the overall ad viewing time [10]. The use of colour in warnings has also been shown to enhance consumer attention across a variety of product domains, particularly when the colour is distinguishable from the background and the surrounding colours of a package or advertisement [11]. Differences in label 'content', such as the use of symbols/images or government attributions, can also influence believability [12–14], which is often ultimately linked to actual behavioural outcomes through its impact on message acceptance [15, 16]. Overall, design factors can play a large role in influencing noticeability, readability, believability and ultimately, the likelihood of changing a consumer's product selection [17, 18].

To date, there is surprisingly little published evidence on the efficacy of specific design characteristics in the context of nutrition labels. Although studies have examined different nutrition labelling systems, which often vary in their use of colour and contrast, few studies have explicitly tested design factors in isolation from message content [6, 19]. Design features for FOP nutrition labels may be particularly important in distinguishing government-mandated FOP content from voluntary, unregulated nutrition claims and information conveyed by manufacturers.

The current study sought to test consumer perceptions of specific label design characteristics in the context of FOP nutrition labels. In particular, participants' perceptions of noticeability, readability, believability and likelihood of behaviour change were investigated when design characteristics (border presence, background presence, background colour, 'caution' symbol and government attribution) were varied. The study also explored potential sociodemographic influences.

## Materials and methods

The study was conducted in September and October 2016 as a component of a larger survey [37]. Participants aged 16 years and older were recruited using convenience sampling in a shopping mall in Waterloo, Ontario. A total of 239 participants completed the study and 5 participants were removed due to data quality concerns for a final sample size of 234.

### Measures

The current study examined participants' ratings of various FOP label design characteristics using a series of brief survey tasks. Participants were shown pairs of nutrition warning labels (see Fig. 1) featuring five different label design characteristics: (i) border versus no border, (ii) white background versus no background, (iii) white background versus yellow background, (iv) 'caution' symbol versus no 'caution' symbol and (v) government attribution versus no government attribution. For each of the five pairs of nutrition labels, participants selected the label perceived as 'most noticeable' [pairs (i)–(iii)], 'easiest to read' [pairs (ii) and (iii)], 'most believable' [pairs (4) and (5)] and/or 'more likely to change your choice of beverage' [pairs (iv) and (v)]. Similar ranking and rating scales are widely used across many domains, including product labelling research, and generally demonstrate high reliability [20].

Due to time constraints, not all attributes were tested in each image pair. Border and background

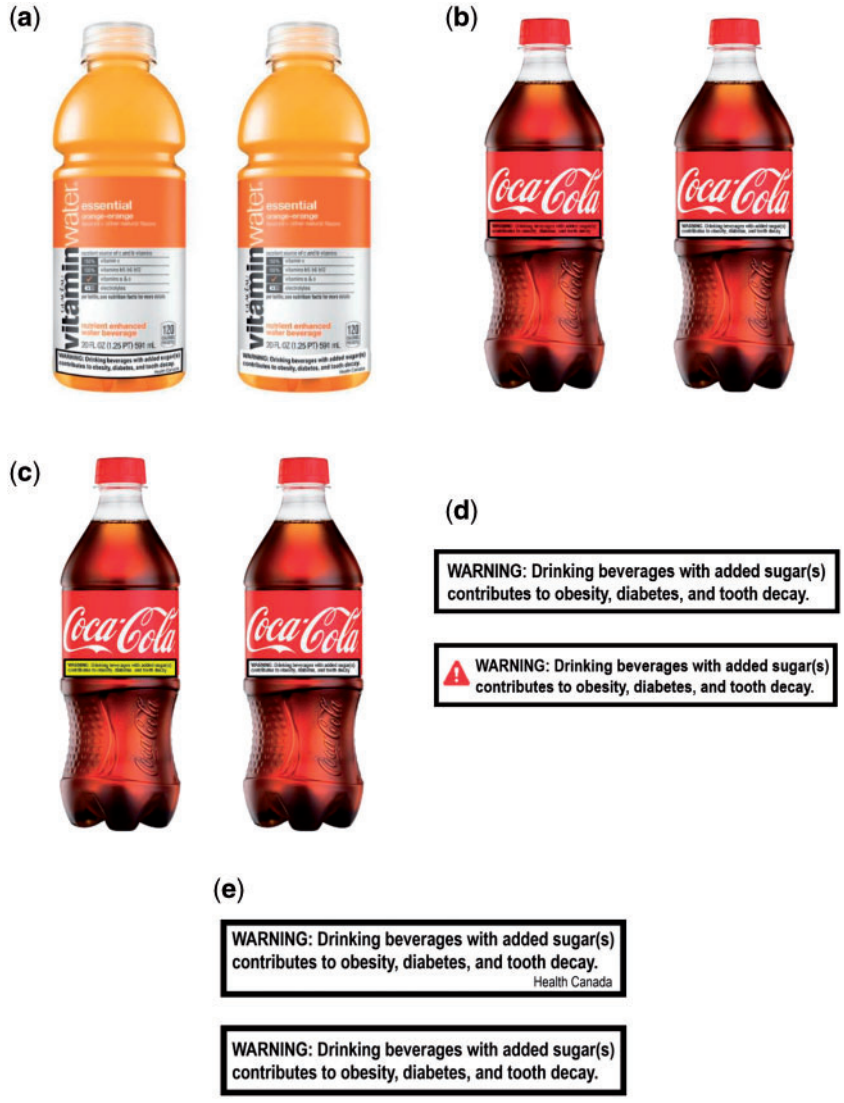


**Fig. 1.** Images presented to participants in each rating task. (a) Border versus no border, tested for noticeability; (b) background versus no background, tested for noticeability and readability; (c) coloured (yellow) background versus white background, tested for noticeability and readability; (d) 'caution' symbol versus no 'caution' symbol, tested for believability and likelihood of influencing beverage choice; (e) government attribution versus no government attribution, tested for believability and likelihood of influencing beverage choice.

characteristics were identified as being most relevant to noticeability and readability, with the exception of readability in pair (1) due to there being no differences in the text or its background. For the 'caution' symbol and government attribution, the focus was placed on participants' perceptions of the labels' influence: in particular, whether potential interpretations of the designs might lead to lower ratings of believability and beverage choice (if the caution symbol is interpreted as 'extreme'), or higher ratings (if the government attribution is interpreted as a sign of trustworthiness or authority).

Response options for each item included two images of labels corresponding to the design characteristic being tested. 'Don't know' and 'refuse to answer' were also available as valid responses for all items.

Warning labels testing border presence, background presence and background colour were displayed on beverage packages (see Fig. 1). When testing for outcomes related to salience and noticeability, it is important to present warnings within the context of the package and competing visual design of the package imagery. Beverage products were used in the images for these tasks due to the strong link between sugar-sweetened beverages and weight-related diseases [21, 22]. The cola beverage was selected as one of the leading beverages in the marketplace. The vitamin water package was selected for pair (1) to test how the warning label would perform with and without a border when the background package was a similar colour to the warning. Alternatively, when testing 'content' related components such as the use of symbols and government attribution, these were tested in isolation from the package in order to focus participants' attention on these elements and to isolate the effects from the background package.

The nutrition warning label format and content selected for the survey tasks were based on a sugar-sweetened beverage warning label proposed in San Francisco, for which behavioural outcomes have been investigated elsewhere [23, 24]. The government attribution tested in this study consisted of a small footnote stating 'Health Canada'. Health Canada is the federal regulatory agency for health, food and nutrition in Canada, and is widely recognized by most Canadians.

All participants were asked to report their age, gender, ethnicity, height and weight. Self-reported height and weight were used to calculate body mass index (BMI), which was categorized into 'underweight', 'normal weight', 'overweight' and 'obese' using the World Health Organization (WHO) thresholds [25]. BMI for participants 19 years of age or younger were calculated using growth charts as recommended by WHO guidelines [25].

### Analysis

Statistical analyses were conducted using SPSS software (version 24.0; IBM Corp., Armonk, NY; 2015). Univariate $\chi^2$ tests were used to test whether participants were significantly more likely to endorse either labelling formats in each task. To examine sociodemographic characteristics associated with participants' selections, binary logistic regression models were fitted for each of the nine rating tasks. Each model included the following covariates: *age* (16–82), *gender* (male, female), *ethnicity* (white, non-white) and *BMI* (underweight, normal weight, overweight, obese, not reported). All odds ratios are adjusted for other covariates in the model (i.e. 'adjusted odds ratios' or 'AOR's), with 95% confidence intervals. Participants who responded with 'don't know' or 'refuse to answer' were omitted from regression models. The significance threshold was set at 0.05 for all tests.

## Results

Sample characteristics are presented in Table I.

### Consumer perceptions of design characteristics

As shown in Table II, virtually all respondents rated the label with a border as more noticeable than a label with no border. Similarly, over 90% of participants indicated that a label with a white background was both more noticeable and easier to read than a label with no background. Approximately 80% of participants rated a label with a yellow background as more noticeable than a label with a white background; on the contrary, most participants indicated that a label with a white background was easier to read than a yellow background. When presented with labels with and without a 'caution' symbol, only about half of the participants found the label with the caution symbol to be more believable, but almost three quarters of participants noted that the same label would be more likely to change their choice of beverage. When a government attribution was tested, over 80% of participants rated the label with an attribution as both more believable and more

**Table I.** *Sample characteristics* (N = *234*)

| Characteristic | % (*n*) |
|---|---|
| Age | |
| 16–18 | 17.1 (40) |
| 19–24 | 46.6 (109) |
| 25–45 | 19.2 (45) |
| 46+ | 17.1 (40) |
| Gender | |
| Male | 47.4 (111) |
| Female | 52.6 (123) |
| Ethnicity | |
| White | 44.9 (105) |
| Non-white | 55.1 (129) |
| BMI (kg/m$^2$) | |
| Underweight (<18.5) | 5.1 (12) |
| Normal weight (18.5–24.9) | 48.7 (114) |
| Overweight (25.0–29.9) | 20.9 (49) |
| Obese (30 +) | 13.7 (32) |
| Not reported | 11.5 (27) |

likely to change their choice of beverage than a label with no attribution. Univariate $\chi^2$ tests indicated that responses in all nine rating tasks were significantly different from the assumption that responses would be equally distributed across the two label formats in each task ($P < 0.03$ in all cases).

### Sociodemographic influences

Significant sociodemographic differences in the preferred label formats were observed for five of the nine outcomes. Older participants were less likely to rate a label with a caution symbol as being more likely to change their choice of beverage than a label without the symbol (AOR = 0.97, 0.94—0.99; $P = 0.013$). Older participants were also more likely to rate a label with no government attribution as more likely to change their choice of beverage than a label with a government attribution (AOR = 1.05, 1.01—1.08; $P = 0.007$). In addition, female participants were more likely than males to rate a white background as easier to read than a yellow background (AOR = 2.53, 1.42—4.53; $P = 0.002$), while participants who reported their ethnicity as 'non-white' were significantly more likely to perceive labels with a 'caution' symbol as more believable than a label with no symbol (AOR = 2.08, 1.15—3.78; $P = 0.016$). Finally, participants with 'underweight' BMI were significantly less likely to rate labels with a yellow background as more noticeable than labels with a white background compared with participants with BMIs corresponding to 'normal weight' (AOR = 0.14, 0.04—0.52; $P = 0.004$), 'overweight' (AOR = 0.11, 0.02—0.50; $P = 0.004$) and 'obese' (AOR = 0.21, 0.05—0.98; $P = 0.047$).

## Discussion

The findings indicate clear consumer preferences for several FOP design features. The perceived efficacy of the design characteristics tested in the current study is consistent with research on other consumer products, such as tobacco and alcohol warnings, as well as chemical hazard labelling [8–11]. The current findings on the impact of colour on noticeability are also comparable with results from nutrition labelling research that has found coloured labels draw more attention than monochromatic labels [26–29]. Label designs that incorporate a distinct border, a solid background, and contrasting colour all increased the noticeability of the warning labels. In terms of ensuring that labels are clear and legible, the results suggest that black text on a solid white background was preferable.

The investigation of a caution symbol in the specific context of health warning labels was unique to this study; however, previous research investigating FOP nutrition labels that utilize 'caution'- or 'warning'-like symbols has demonstrated similar influence on individuals' perceptions of food products [30]. Warnings that featured a government attribution to 'Health Canada' were perceived as more credible, similar to previous research. In particular, a study conducted with participants in several European countries found that ratings of FOP labels' credibility were significantly higher when the labels featured endorsements by national or international health organizations [31]. In addition, participants from a qualitative study in the Netherlands expressed that a FOP health logo's credibility would be improved if it was known that

**Table II.** *Participant responses to rating tasks comparing label design characteristics (*N = *234)*

| Design characteristic | | | % (*n*) | $\chi^{2a}$ | *p* value[a] |
|---|---|---|---|---|---|
| Border | | | | | |
| | *Most noticeable* | Border | 91.5 (214) | 191.2 | <0.001 |
| | | No border | 3.4 (8) | | |
| | | Don't know | 5.1 (12) | | |
| | | Refuse to answer | 0.0 (0) | | |
| Background presence | | | | | |
| | *Most noticeable* | Background | 93.2 (218) | 181.9 | <0.001 |
| | | No background | 5.6 (13) | | |
| | | Don't know | 0.9 (2) | | |
| | | Refuse to answer | 0.4 (1) | | |
| | *Easiest to read* | Background | 95.7 (224) | 203.9 | <0.001 |
| | | No background | 3.0 (7) | | |
| | | Don't know | 1.3 (3) | | |
| | | Refuse to answer | 0.0 (0) | | |
| Background colour | | | | | |
| | *Most noticeable* | Yellow background | 81.6 (191) | 97.0 | <0.001 |
| | | White background | 17.5 (41) | | |
| | | Don't know | 0.4 (1) | | |
| | | Refuse to answer | 0.4 (1) | | |
| | *Easiest to read* | Yellow background | 33.8 (79) | 23.1 | <0.001 |
| | | White background | 65.0 (152) | | |
| | | Don't know | 0.4 (1) | | |
| | | Refuse to answer | 0.9 (2) | | |
| Caution symbol | | | | | |
| | *Most believable* | Symbol | 55.1 (129) | 5.2 | 0.023 |
| | | No symbol | 40.6 (95) | | |
| | | Don't know | 3.0 (7) | | |
| | | Refuse to answer | 1.3 (3) | | |
| | *More likely to change beverage choice* | Symbol | 72.2 (169) | 67.5 | <0.001 |
| | | No symbol | 20.5 (48) | | |
| | | Don't know | 5.6 (13) | | |
| | | Refuse to answer | 1.7 (4) | | |
| Government attribution | | | | | |
| | *Most believable* | Attribution | 85.5 (200) | 140.5 | <0.001 |
| | | No attribution | 9.8 (23) | | |
| | | Don't know | 4.3 (10) | | |
| | | Refuse to answer | 0.4 (1) | | |
| | *More likely to change beverage choice* | Attribution | 82.5 (193) | 140.5 | <0.001 |
| | | No attribution | 8.5 (20) | | |
| | | Don't know | 8.1 (19) | | |
| | | Refuse to answer | 0.9 (2) | | |

[a]$\chi^2$ and *P*-values correspond to univariate chi-square tests testing the assumption that responses would be equally distributed across the two label formats in each task.

governmental and scientific authorities supported it [32]. If policymakers wish to increase the credibility and potential efficacy of FOP nutrition labels, the current findings suggest that they should consider using visual symbols and text attributes, such as the caution symbol or short text government attribution tested in this study. Further research using experimental, between-subjects methods is

recommended in order to determine effects on actual behavioural outcomes such as purchasing or consumption.

In our exploratory analyses, consumer perceptions were relatively consistent across sociodemographic sub-groups, with few differences observed by age, gender, ethnicity and BMI. It is not clear why older respondents were less likely to rate a government attribution as effective, or why younger respondents and those identifying as 'non-white' reported greater preference for labels with a 'caution' symbol. It may be that older respondents are less accustomed to using icons or symbols than younger respondents. For example, a previous study exploring consumer responses to an on-shelf nutrition labelling system found that older shoppers (over 45 years) had lower odds of understanding the symbolic labelling system and were less likely to be aware of the system [33]. We are unaware of any plausible reason to account for the associations with BMI or gender, although it is worth noting that the direction of the findings was consistent in both cases—the differences by BMI and gender reflected differences in the strength of preference rather than a distinct pattern or direction, as did the differences between age groups. Overall, the general consistency in consumer label preferences across sub-groups is consistent with previous research [34–36].

Limitations of this study include the non-probability based sample, which was not representative of the Canadian population. For example, the sample over-represented those reporting 'non-white' ethnicities compared with the general Canadian population. However, the recruitment strategy produced a diverse sample and the analyses tested for potential socio-demographic differences in consumer perceptions. Due to the large proportion of university-aged students in the sample, the analysis did not include education level; future studies should explore the extent to which education is associated with consumer perceptions of label design elements. In addition, the study only tested design features for one type of label (a warning label) and results may differ with other types of FOP labels that incorporate different information or symbols. Finally, the use of an online task does not represent a real-world scenario in which participants interact with actual product labels; however, this type of survey is well suited to draw attention to label attributes of interest, as examined in the current study.

## Conclusions

The findings highlight the importance of basic design features that may enhance the efficacy of FOP labels. To date, most nutrition labelling regulations do not reflect best practices in product labelling design; e.g. most current nutrition panels continue to use black and white text-only designs and fail to incorporate contrasting colours or intuitive symbols. As an increasing number of countries consider implementing interpretive FOP labels, they should ensure that labels incorporate simple, specific design aspects to maximize consumer salience and use.

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## Conflict of interest statement

David Hammond has provided paid expert testimony on behalf of public health authorities in response to legal challenges from the food and beverage industry. All remaining authors report no conflicts of interest.

## References


1. Roberto CA, Khandpur N. Improving the design of nutrition labels to promote healthier food choices and reasonable portion sizes. *Int J Obes* 2014; **38**:S25–33.
2. Cowburn G, Stockley L. Consumer understanding and use of nutrition labelling: a systematic review. *Public Health Nutr* 2005; **8**:21–8.
3. Hobin E, Shen-Tu G, Sacco J *et al*. Comprehension and use of nutrition facts tables among adolescents and young adults in Canada. *Can J Diet Pract Res* 2016; **77**:59–65.
4. Vanderlee L, White CM, Bordes I *et al*. The efficacy of sugar labeling formats: implications for labeling policy. *Obesity* 2015; **23**:2406–13.
5. European Food Information Council. *Global Update on Nutrition Labelling: Executive Summary*. Brussels: Tassel House, 2016.
6. Hawley KL, Roberto CA, Bragg MA *et al*. The science on front-of-package food labels. *Public Health Nutr* 2013; **16**:430–9.
7. Cecchini M, Warin L. Impact of food labelling systems on food choices and eating behaviours: a systematic review and meta-analysis of randomized studies. *Obes Rev* 2016; **17**:201–10.
8. Braun CC, Silver NC. Interaction of signal word and colour on warning labels: differences in perceived hazard and behavioural compliance. *Ergonomics* 1995; **38**:2207–20.
9. Wogalter MS, Rashid R. A border surrounding a warning sign affects looking behavior: a field observational study. *Proc Hum Factors Ergon Soc 42nd Annu Meet* 1998; **42**:1628.
10. Thomsen SR, Fulton K. Adolescents' attention to responsibility messages in magazine alcohol advertisements: an eye-tracking approach. *J Adolesc Heal* 2007; **41**:27–34.
11. Young SL. Increasing the noticeability of warnings: effects of pictorial color, signal, icon and border. *Proc Hum Factors Ergon Soc 36th Annu Meet* 1991; **35**:580–4.
12. Bansal-Travers M, Hammond D, Smith P *et al*. The impact of cigarette pack design, descriptors, and warning labels on risk perception in the U.S. *Am J Prev Med* 2011; **40**:674–82.
13. Guttman N, Peleg H. Public preferences for an attribution to government or to medical research versus unattributed messages in cigarette warning labels in Israel. *Health Commun* 2003; **15**:1–25.
14. Duffy SA, Burton D. Cartoon characters as tobacco warning labels. *Arch Pediatr Adolesc Med* 2000; **154**:1230–6.
15. Hammond D. Health warning messages on tobacco products: a review. *Tob Control* 2011; **20**:327–37.
16. Emery LF, Romer D, Sheerin KM *et al*. Affective and cognitive mediators of the impact of cigarette warning labels. *Nicotine Tob Res* 2014; **16**:263–9.
17. Wogalter M, DeJoy D, Laughery K. *Warnings and Risk Communication*. London: Taylor & Francis, 1999.
18. Campos S, Doxey J, Hammond D. Nutrition labels on pre-packaged foods: a systematic review. *Public Health Nutr* 2011; **14**:1496–506.
19. Becker MW, Sundar RP, Bello N *et al*. Assessing attentional prioritization of front-of-pack nutrition labels using change detection. *Appl Ergon* 2016; **54**:90–9.
20. International Agency for Research on Cancer. Measures to assess the effectiveness of restrictions on tobacco product labeling policies. In: *IARC Handbooks of Cancer Prevention, Tobacco Control, Vol. 12: Methods for Evaluating Tobacco Control Policies*. Lyon: IARC, 2008, 287.
21. Malik VS, Popkin BM, Bray GA *et al*. Sugar-sweetened beverages and risk of metabolic syndrome and type 2 diabetes: a meta-analysis. *Diabetes Care* 2010; **33**:2477–83.
22. Xi B, Huang Y, Reilly KH *et al*. Sugar-sweetened beverages and risk of hypertension and CVD: a dose–response meta-analysis. *Br J Nutr* 2015; **113**:709–17.
23. Roberto CA, Wong D, Musicus A *et al*. The influence of sugar-sweetened beverage health warning labels on parents' choices. *Pediatrics* 2016; **137**:e20153185.
24. VanEpps EM, Roberto CA, Han E *et al*. The influence of sugar-sweetened beverage warnings. *Am J Prev Med* 2016; **51**:664–72.
25. World Health Organization. *BMI Classification.* Available at: http://apps.who.int/bmi/index.jsp? introPage=intro_3.html. Accessed: 16 January 2018.
26. Becker MW, Bello NM, Sundar RP *et al*. Front of pack labels enhance attention to nutrition information in novel and commercial brands. *Food Policy* 2015; **56**:76–86.
27. Koenigstorfer J, Wąsowicz-Kiryłło G, Styśko-Kunkowska M *et al*. Behavioural effects of directive cues on front-of-package nutrition information: the combination matters! *Public Health Nutr* 2014; **17**:2115–21.
28. Jones G, Richardson M. An objective examination of consumer perception of nutrition information based on healthiness ratings and eye movements. *Public Health Nutr* 2007; **10**:238–44.
29. Antúnez L, Giménez A, Maiche A *et al*. Influence of interpretation aids on attentional capture, visual processing, and understanding of front-of-package nutrition labels. *J Nutr Educ Behav* 2015; **47**:292–9.e1.
30. Arrúa A, Curutchet MR, Rey N *et al*. 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* 2017; **116**:139–46.
31. Feunekes GIJ, Gortemaker IA, Willems AA *et al*. Front-of-pack nutrition labelling: testing effectiveness of different nutrition labelling formats front-of-pack in four European countries. *Appetite* 2008; **50**:57–70.
32. Vyth EL, Steenhuis IHM, Mallant SF *et al*. A front-of-pack nutrition logo: a quantitative and qualitative process evaluation in the Netherlands. *J Health Commun* 2009; **14**:631–45.
33. Hobin E, Bollinger B, Sacco J *et al*. Consumers' response to an on-shelf nutrition labelling system in supermarkets: evidence to inform policy and practice. *Milbank Q* 2017; **95**:494–534.
34. Comans T, Moretto N, Byrnes J. Public preferences for the use of taxation and labelling policy measures to combat obesity in young children in Australia. *Int J Environ Res Public Health* 2017; **14**:324.
35. Pettigrew S, Talati Z, Miller C *et al*. The types and aspects of front-of-pack food labelling schemes preferred by adults and children. *Appetite* 2017; **109**:115–23.
36. Talati Z, Pettigrew S, Kelly B *et al*. Consumers' responses to front-of-pack labels that vary by interpretive content. *Appetite* 2016; **101**:205–13.
37. Acton RB, Hammond D. The impact of price and nutrition labelling on sugary drink purchases: results from an experimental marketplace study. *Appetite* 2018; **121**:129–37.