Original Article
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Obesity

The Efficacy of Sugar Labeling Formats: Implications for Labeling Policy

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Objective: To examine knowledge of sugar recommendations and test the efficacy of formats for labeling total and added sugar on pre-packaged foods.
Methods: Online surveys were conducted among 2008 Canadians aged 16-24. Participants were asked to identify recommended limits for total and added sugar consumption. In Experiment 1, participants were randomized to one of six labeling conditions with varying information for total sugar for a high- or low-sugar product and were asked to identify the relative amount of total sugar in the product. In Experiment 2, participants were randomized to one of three labels with different added sugar formats and were asked if the product contained added sugar and the relative amount of added sugar.
Results: Few young people correctly identified recommendations for total sugar (5%) or added sugar (7%). In Experiment 1, those who were shown percent daily value information were more likely to correctly identify the relative amount of total sugar ($P < 0.05$). In Experiment 2, those shown added sugar information were more likely to correctly identify that the product contained added sugar and the relative amount of added sugar in the product ($P < 0.05$).
Conclusions: Improved labeling may improve consumer understanding of the amount of sugars in food products.

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Introduction

Sugar consumption is increasingly being recognized as an important focus for population-level health (1). There are concerns around the consumption of "added" sugars, which are added to foods during processing or preparation. Added sugars provide no essential nutrients and are distinct from naturally occurring sugars found in some foods and food products, such as the lactose in dairy products and fructose in fruit. Excessive consumption of added sugar, in particular from sugar-sweetened beverages, has been associated with greater energy density in diets and poorer diet quality, as well as weight gain and increased risk of chronic diseases (2-9). Additionally, increased consumption of sugars has been associated with a greater risk of dental caries (10-12).

Many health authorities recommend limiting consumption of added sugar. The World Health Organization's (WHO) recent guidelines suggest that less than 10% of daily energy intake should come from free or added sugars, with a further reduction to below 5% of total energy intake per day for additional health benefits (5). To date, there is little evidence examining whether consumers are aware of or trying to adhere to these guidelines.

The most recent estimates from self-report and national availability data suggest that 11-13% of the average Canadian's total daily energy intake comes from added sugar (13). In the US, national self-reported data from the NHANES surveys in 2005-2010 suggest that the average intake of added sugar consumption was as high as 15% of total energy intake, and less than 30% of the population met the 10% target recommended by the WHO (7).

Nutrition labels on pre-packaged food items are a primary source of nutrition information for Canadian and US consumers (14-16); however, at present, the availability of sugar information on labels is limited. Current nutrition labels in Canada and the US provide information on total sugars, with no differentiation between naturally occurring or added sugars, and do not provide a percent daily value (%DV) as a reference for recommended dietary intake. Instead, consumers must infer the presence of added sugar by scanning the ingredient list and recognizing more than 20 various names that are used to indicate that sugar has been added to a product (17).

In 2014, Health Canada and the US Food and Drug Administration (USFDA) proposed changes to Nutrition Facts labels on pre-packaged

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foods in Canada and the US (18,19). One proposed change includes a mandatory requirement to list added sugar content in addition to total sugar, as well as the inclusion of a %DV for total (but not added) sugar in Canada (18,19). These proposed regulations have been met with opposition, largely from industry groups, who have argued against the labeling of added sugar (20).

Little empirical research has examined the impact of these proposed label changes on how consumers use and understand sugar information. One study found that fewer people correctly calculated the total amount of sugars when added sugar information was labeled, which was partially improved by additional labeling of "total" sugars in the Nutrition Facts panel (21). This study was limited, in that it focused solely on confusion around total sugar information and did not test for any benefit of providing added sugar information on how consumers interpret total or added sugar information. Other consumer research suggests that a majority of consumers reported that added sugar information would be helpful, and few found the information confusing (22). This study was limited to public opinion and did not test consumer use or comprehension of the labels. Although comprehension and use does not always result in behavior change, research has shown that self-reported use of sugar information on labels is associated with a diet lower in added sugar (23).

The objective of this study was to examine understanding and knowledge of total and added sugar among young people and to experimentally test the efficacy of several labeling formats for total and added sugar on pre-packaged foods labels. The formats tested in the study were informed by Health Canada and the USFDA's proposed changes, as well as formats that are commonly associated with sugar (such as labeling in teaspoons). Young people are a particularly important demographic for nutrition education in Canada, as they report the poorest quality diets across all age groups, with high consumption of "other" foods typically high in added sugar (24,25).

We expect that additional sugar information will help consumers understand the presence and relative amount of sugar or added sugar in food products. This is congruent with the Grunert et al. (26) conceptual model portraying the effects of nutrition labels on consumer food choice, whereby adding sugar information will improve consumer understanding of the sugar content of foods and ultimately improve inferences regarding the healthiness of food products.

Methods

The study was conducted in August 2014 as a component of a larger online experimental study among young people in Canada.

Participants

Participants aged 16-24 years were recruited from an online commercial panel (Nielsen Consumer Insights Panel). A stratified random sample of Nielsen online panelists were sent an email invitation to complete the survey. Quotas were set to include 50% females and males and 50% of participants ages 16-18. Participants residing outside of the Canadian provinces were excluded. A total of 2011 participants completed the survey; one participant was excluded due to data quality concerns and two due to geographic region being out of scope, for a final sample size of 2008.

Upon completion of the survey, participants were given remuneration of approximately $2-$3 CAN. Sample weights were constructed using population estimates from the Canadian 2011 National Household Survey for age, gender, and geographic region (27). Surveys were only offered in English, and participant consent was obtained. Participants were encouraged to refrain from using Google, smartphones, calculators, or any other resources to assist with answering survey questions. Ethical approval for the study was received from the Office of Research Ethics at the University of Waterloo.

Protocol

The study consisted of several questions examining how participants think about sugar and their knowledge of sugar recommendations and two between-group experiments examining the efficacy of various sugar labeling formats, in addition to sociodemographic characteristics.

Sociodemographic measures. Participants reported their age, gender, ethnicity, and self-reported height and weight to calculate body mass index (BMI). Province of residence was provided by the survey firm and was grouped into five regions: British Columbia (BC), Prairies (Alberta, Saskatchewan, Manitoba), Ontario, Quebec, and Atlantic Canada (Nova Scotia, Newfoundland & Labrador, New Brunswick, Prince Edward Island).

Perceptions and knowledge of sugar. Participants were first asked "When you think about the amount of total sugar in pre-packaged foods, do you use teaspoons, grams, or some other type of measure?" Participants were then asked "What is the recommended limit of total sugar for one day? Please give your answer in [teaspoons/grams (depending on the metric identified in the previous question)]" and "What is the recommended limit of added sugar for one day? Please give your answer in [teaspoons/grams]." Total sugar and added sugar were underlined in the question for emphasis. For questions regarding total sugar, participants were shown the statement "Total sugar includes naturally occurring sugar in foods and all added sugars." For questions regarding added sugar, participants were shown the statement "Added sugar is only the sugar that is added in processing or in preparation and does not include naturally occurring sugars."

Correct responses for total sugar recommendations included either 90 g (22-23 teaspoons) or 100 g (25 teaspoons), consistent with the UK's reference intake for total sugar (28) and Health Canada's proposed daily value for total sugar intake (29). Correct responses for added sugar recommendations were evaluated using both of the World Health Organization's recommendations of 10% of total daily energy intake (approximately 50 g or 12.5 teaspoons of added sugar) and 5% of total daily energy intake (approximately 25 g or 5-6 teaspoons).

Experiment 1. Experiment 1 examined formats for total sugar labeling. Participants were randomized into a 2 × 6 between-subjects factorial design. Participants were randomized to view a product with either *high sugar* content (24 g) or *low sugar* content (4 g) in one of six format conditions: (1) the current Canadian Nutrition Facts table; (2) the current label with a %DV for total sugars; (3) the current label with an infographic for number of teaspoons of total sugar per serving; (4) the current label with an infographic and

a %DV; (5) the current label with additional information for teaspoons per serving; or (6) the current label with additional information for teaspoons and a %DV. The %DV was based on 90 g per day, the UK's reference intake for total sugar (28). See Figure 1 for the six labeling conditions.

Participants were asked to indicate whether the amount of total sugar in the product was "a little," "a moderate amount," or "a lot." Criteria for correct responses were based on Health Canada's Nutrition Facts Education Campaign, which uses the guidelines that 5% DV or less is "a little" and 15% DV or more is "a lot," similar to the USFDA's guidelines for interpreting %DVs of 5% as "low" and 20% as "high" (29,30). For the *low-sugar* conditions (4 g of sugar, 5% DV), the response of "a little" was coded as correct, whereas in the *high-sugar* conditions (24 g of sugar, 27% DV), the response of "a lot" was coded as correct.

Experiment 2. Experiment 2 examined the efficacy of various formats for added sugar labeling. Participants were randomized to view one of three labels: (1) the current Canadian Nutrition Facts table with an ingredient list; (2) the current label with an ingredient list and an additional line with added sugar amount in grams; and (3) the current label with an ingredient list and an additional line for added sugar amount in grams and a %DV. The %DV for condition 3 was based on the WHO's lower recommendation of 5% of total daily energy intake, or 25 g of added sugar. (5) The line displaying sugar information was labeled as "total sugars," as proposed by Health Canada. See Figure 2 for the three conditions. Participants were asked if there was any added sugar in the product, with a yes/no response. Participants were then asked if the amount of added sugar in the product was "a little," "a moderate amount," or "a lot." Due to a technical error, the sample size for the added sugar analysis was reduced ($n = 641$).

Analysis

Statistical analysis was conducted using SPSS software (version 22.0; IBM Corp., Armonk, NY; 2014). Chi-square tests were used to test for sociodemographic differences between experimental conditions. Descriptive statistics were used to examine knowledge and conceptualization of total and added sugar. A binary logistic regression model was fitted to examine sociodemographic characteristics associated with correct knowledge of total and added sugar recommendations, where correct responses were modeled as the dependent variable (1 = correct, 0 = incorrect/do not know). Predictor variables included age (16-24), gender (male, female), ethnicity (White, other, not stated), BMI (underweight, normal weight, overweight, obese, not reported), and region (BC, Prairies, Ontario, Quebec, Atlantic Provinces, and not reported).

For Experiments 1 and 2, separate logistic regression models were fitted to examine the effect of labeling condition on correct responses (1 = correct, 0 = incorrect/do not know). For Experiment 1, the model included indicator variables for sugar content condition (*high* vs. *low*) and labeling condition (current, %DV only, infographic only, infographic + %DV, teaspoon information, teaspoon information + %DV). An interaction term was tested (sugar content X labeling condition) to examine differences in the efficacy of the various labeling conditions for high-sugar and low-sugar products. For Experiment 2, the regression model included an indicator variable for labeling condition (current with no added sugar information, added sugar information in grams, and added sugar information in grams + %DV). All analyses were conducted using sample weights, with the exception of the sample table, for which un-weighted data are reported.

Results

Study sample

Sample characteristics can be found in Table 1. There were no significant differences in sociodemographic measures between the experimental conditions in either Experiment 1 or 2.

Sugar perceptions and knowledge

When asked how they thought about sugar in pre-packaged food items, 59.1% of participants considered total sugar in grams, 32.6% used teaspoons, 0.8% used another type of measure, and 7.5% did not know.

Participants who responded either grams or teaspoons in the previous question ($n = 1830$) were then asked about knowledge of sugar recommendations. Overall, 4.8% correctly identified the recommended limit for total sugar intake in one day, 43.4% answered incorrectly and 51.9% responded "do not know" and did not provide a guess. Gender was the only significant demographic characteristic, such that males were more likely to correctly identify total sugar limits than females (OR = 1.73, 95% CI 1.10-2.71, $P = 0.018$).

For added sugar, 7.5% of the sample correctly identified either the 10% recommendation (3.2% of the sample) or the 5% recommendation (4.3% of the sample). Males were more likely to correctly identify either added sugar recommendation (OR = 1.45, 95% CI 1.01-2.08, $P = 0.043$), and those who reported White ethnicity were more likely to correctly respond than those who were of any other ethnicity (OR = 1.76, 95% CI 1.17-2.64, $P = 0.007$).

Experiment 1. Participants randomized to the *high-sugar* conditions were more likely to correctly report the amount of sugar in the product compared to those exposed to the *low-sugar* conditions (64% vs. 48%, $X^2 = 56.23$, OR = 1.99, 95% CI 1.66-2.39, $P < 0.001$).

Figure 3 shows the proportion of the sample who correctly identified sugar amounts in each of the six labeling conditions. There were significant differences in correct responses between the conditions. Those randomized to the *%DV only* label were more likely to correctly respond than those randomized to the *current* condition ($X^2 = 5.64$, OR = 1.46, 95% CI 1.07-1.99, $P = 0.018$), and the *teaspoon information only* condition ($X^2 = 4.33$, OR = 1.39, 95% CI 1.02-1.90, $P = 0.037$). Those who were randomized to the *infographic + %DV* condition were more likely to correctly respond than those randomized to the *current* condition ($X^2 = 7.51$, OR = 1.54, 95% CI 1.13-2.09, $P = 0.006$), the *infographic* condition ($X^2 = 5.03$, OR = 1.44, 95% CI 1.05-1.98, $P = 0.025$) and the *teaspoon information only* condition ($X^2 = 5.98$, OR = 1.47, 95% CI 1.08-2.00, $P = 0.014$). Finally, those who were randomized to see the *teaspoon information + %DV* condition were more likely to correctly respond than those who were randomized to see the *current* condition ($X^2 = 7.92$, OR = 1.55, 95% CI 1.14-2.11, $P = 0.005$), the *infographic* condition ($X^2 = 1.45$, OR = 1.45, 95% CI 1.06-2.00, $P = 0.021$) and the *teaspoon information only* condition ($X^2 = 6.34$,

Condition 1: Current label

Nutrition Facts
Valeur nutritive
Per one cup (63g)/par une tasse (63g)

Amount / Teneur	% Daily Value / % valeur quotidienne
Calories / Calories 200	
Fat / Lipides 2 g	**3** %
Saturated / saturés 1 g + Trans / trans 0 g	**6** %
Cholesterol / Cholestérol 0 mg	
Sodium / Sodium 220 mg	**10** %
Carbohydrate / Glucides 48 g	**16** %
Fibre / Fibres 10 g	**40** %
Sugars / Sucres 24 g	
Protein / Protéines 9 g	
Vitamin A / Vitamine A	15 %
Vitamin C / Vitamine C	10 %
Calcium / Calcium	5 %
Iron / Fer	8 %

Condition 2: %DV only

Nutrition Facts
Valeur nutritive
Per one cup (63g)/par une tasse (63g)

Amount / Teneur	% Daily Value / % valeur quotidienne
Calories / Calories 200	
Fat / Lipides 2 g	**3** %
Saturated / saturés 1 g + Trans / trans 0 g	**6** %
Cholesterol / Cholestérol 0 mg	
Sodium / Sodium 220 mg	**10** %
Carbohydrate / Glucides 48 g	**16** %
Fibre / Fibres 10 g	**40** %
Sugars / Sucres 24 g	**27** %
Protein / Protéines 9 g	
Vitamin A / Vitamine A	15 %
Vitamin C / Vitamine C	10 %
Calcium / Calcium	5 %
Iron / Fer	8 %

Condition 3: Infographic

Nutrition Facts
Valeur nutritive
Per one cup (63g)/par une tasse (63g)

Amount / Teneur	% Daily Value / % valeur quotidienne
Calories / Calories 200	
Fat / Lipides 2 g	**3** %
Saturated / saturés 1 g + Trans / trans 0 g	**6** %
Cholesterol / Cholestérol 0 mg	
Sodium / Sodium 220 mg	**10** %
Carbohydrate / Glucides 48 g	**16** %
Fibre / Fibres 10 g	**40** %
Sugars / Sucres 24 g	
Protein / Protéines 9 g	
Vitamin A / Vitamine A	15 %
Vitamin C / Vitamine C	10 %
Calcium / Calcium	5 %
Iron / Fer	8 %

One serving contains **6 teaspoon of sugar

Condition 4: Infographic + %DV

Nutrition Facts
Valeur nutritive
Per one cup (63g)/par une tasse (63g)

Amount / Teneur	% Daily Value / % valeur quotidienne
Calories / Calories 200	
Fat / Lipides 2 g	**3** %
Saturated / saturés 1 g + Trans / trans 0 g	**6** %
Cholesterol / Cholestérol 0 mg	
Sodium / Sodium 220 mg	**10** %
Carbohydrate / Glucides 48 g	**16** %
Fibre / Fibres 10 g	**40** %
Sugars / Sucres 24 g	**27** %
Protein / Protéines 9 g	
Vitamin A / Vitamine A	15 %
Vitamin C / Vitamine C	10 %
Calcium / Calcium	5 %
Iron / Fer	8 %

One serving contains **6 teaspoon of sugar

Condition 5: teaspoon information

Nutrition Facts
Valeur nutritive
Per one cup (63g)/par une tasse (63g)

Amount / Teneur	% Daily Value / % valeur quotidienne
Calories / Calories 200	
Fat / Lipides 2 g	**3** %
Saturated / saturés 1 g + Trans / trans 0 g	**6** %
Cholesterol / Cholestérol 0 mg	
Sodium / Sodium 220 mg	**10** %
Carbohydrate / Glucides 48 g	**16** %
Fibre / Fibres 10 g	**40** %
Sugars / Sucres 24 g (6 tsp)	
Protein / Protéines 9 g	
Vitamin A / Vitamine A	15 %
Vitamin C / Vitamine C	10 %
Calcium / Calcium	5 %
Iron / Fer	8 %

Condition 6: teaspoon information + %DV

Nutrition Facts
Valeur nutritive
Per one cup (63g)/par une tasse (63g)

Amount / Teneur	% Daily Value / % valeur quotidienne
Calories / Calories 200	
Fat / Lipides 2 g	**3** %
Saturated / saturés 1 g + Trans / trans 0 g	**6** %
Cholesterol / Cholestérol 0 mg	
Sodium / Sodium 220 mg	**10** %
Carbohydrate / Glucides 48 g	**16** %
Fibre / Fibres 10 g	**40** %
Sugars / Sucres 24 g (6 tsp)	**27** %
Protein / Protéines 9 g	
Vitamin A / Vitamine A	15 %
Vitamin C / Vitamine C	10 %
Calcium / Calcium	5 %
Iron / Fer	8 %

Figure 1 Experiment 1 labeling conditions manipulating total sugar labeling (high-sugar conditions only, low-sugar conditions not shown).

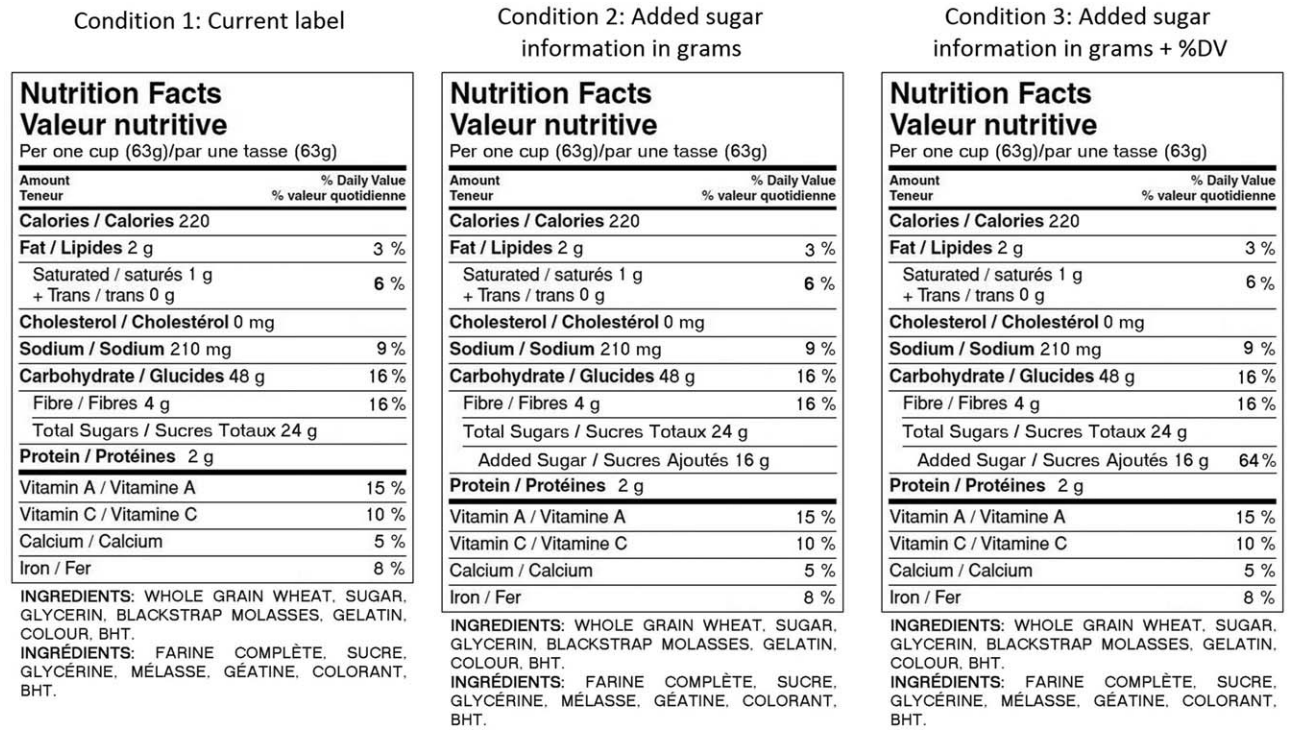

Figure 2 Experiment 2 labeling conditions manipulating added sugar labeling.

OR = 1.48, 95% CI 1.09-2.02, $P = 0.012$). There was no significant interaction effect between the sugar content (*high* vs. *low*) and experimental condition.

Experiment 2. In Experiment 2, participants were randomized to see labels with varying added sugar information. Those who were randomized to see the label with added sugar information in *grams only* or *grams + %DV* were significantly more likely to correctly identify that the product contained added sugar than those randomized to see the *current* label ($X^2 = 13.76$, OR = 2.85, 95% CI 1.64-4.96, $P < 0.001$ and $X^2 = 15.63$, OR = 2.99, 95% CI 1.74-5.14, $P < 0.001$, respectively) (see Figure 4).

Participants were more likely to correctly identify that the amount of added sugar in the product was "a lot" when they were randomized to see the *grams + %DV* label compared to the *current* condition ($X^2 = 44.15$, OR = 3.89, 95% CI 2.61-5.80, $P < 0.001$) or the *grams only* condition ($X^2 = 13.37$, OR = 2.13, 95% CI 1.42-3.19, $P < 0.001$). Participants were also more likely to correctly identify the amount of added sugar when they were randomized to see the *grams only* condition compared to the *current* condition ($X^2 = 9.22$ OR = 1.83, 95% CI 1.24-2.69, $P = 0.002$) (see Figure 5).

Discussion

The results indicate that knowledge of sugar recommendations among this population of young people is extremely low. It is not clear why males had better knowledge of sugar recommendations than women, which is contrary to existing literature on nutrition knowledge (31); however, knowledge was poor across all groups. Low knowledge of sugar recommendations is perhaps not surprising, as sugar may be less important to consumers compared to other nutrients (32). Contrary to colloquial beliefs, few consumers reported that they considered sugar amounts in teaspoons; instead, the majority reported using grams. This may be due to the present state of labeling which only uses grams to identify sugar amounts.

Sugar labeling had a significant effect on understanding sugar amounts in the products. In this study, a greater proportion of young people were able to identify the presence of added sugar in a product when information for added sugar was clearly labeled in the nutrition label. For the product used in this experiment, the ingredient list explicitly identified that the product contained both sugar and molasses. One would expect an even greater impact of added sugar labeling in cases where the ingredient list includes less intuitive names for added sugars, such as maltose, barley malt, or agave nectar.

The addition of a %DV helped young people understand the relative amount of total sugar and added sugar in products, regardless of any additional labeling information that was provided. Evidence examining the usefulness of %DV on labels is mixed. Previous research from Health Canada suggests that Canadians struggle with using the %DV to compare across food products to choose healthier products, and only around half of consumers report looking at the %DV information when purchasing products (33). Conversely, recent eye-tracking research found that consumers who pay more attention to the %DV values are better able to evaluate the healthfulness of food products (34). Although the inclusion of a %DV for sugars is not

TABLE 1 Sample characteristics of the actual non-weighted sample who completed the online survey ($N = 2008$)

Characteristic	% (*n*)
Gender	
Male	49.9% (1001)
Female	50.1% (1007)
Age	
16-18	50.0% (1004)
19-21	25.0% (503)
22-24	25.0% (501)
Ethnicity	
White	58.4% (1173)
Other	38.4% (771)
Not stated	3.2% (64)
Region	
BC	18.3% (368)
Prairies (AB, SK, MB)	23.3% (468)
Ontario	41.8% (839)
Quebec	6.2% (124)
Atlantic provinces (NS, NB, PEI, NL)	8.6% (173)
Not stated	1.8% (36)
BMI	
<18.5	10.4% (209)
18.5-24.9	56.2% (1129)
25.0-29.9	14.8% (297)
30+	7.0% (140)
Not reported	11.6% (233)

perfect, it does provide some context for consumers. The use of symbols or colors may do an even better job at communicating relative amounts of nutrients in packaged foods (35). A %DV was proposed only for total sugar in Canada and has not been proposed for total sugar in the US. The challenges of analytically distinguishing between added and naturally occurring sugars is often cited as a barrier to added sugar labeling (36).

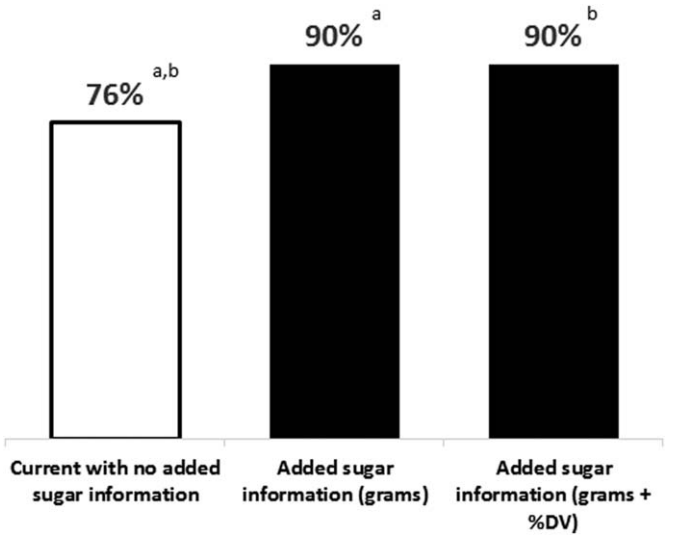

Figure 4 Proportion of participants who correctly identified the presence of sugar in a product. Values with the same letters are significantly different at the $P < 0.05$ level.

Participants were more likely to correctly identify the relative amount of total sugar in high-sugar products. Products with lower sugar content may be more ambiguous and lead consumers to poorly estimate the relative amount in a product when they are not provided contextual information such as a %DV, which may be compounded by poor knowledge of recommendations for total and added sugar.

The infographic did not improve participant's understanding of sugar amounts, despite previous evidence that the use of non-numeric information on nutrition labels may increase consumer

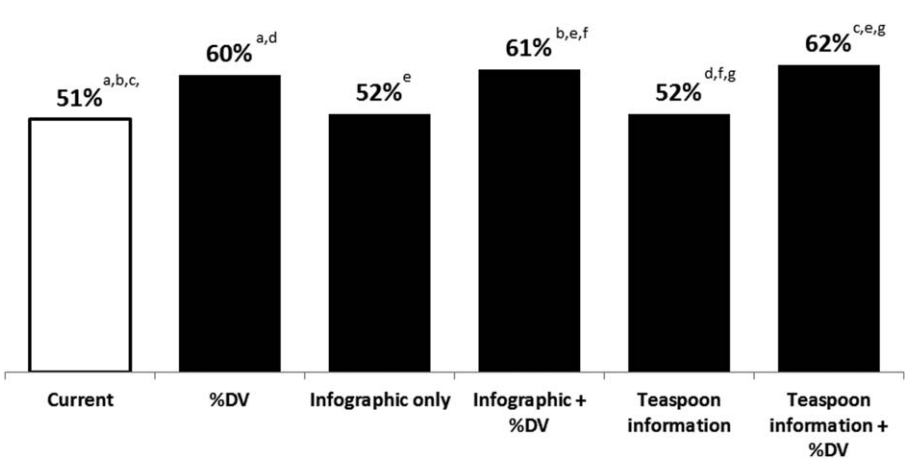

Figure 3 Proportion of participants exposed to labeling condition who correctly identified the amount of sugar in the product. Values with the same letters are significantly different at the $P < 0.05$ level.

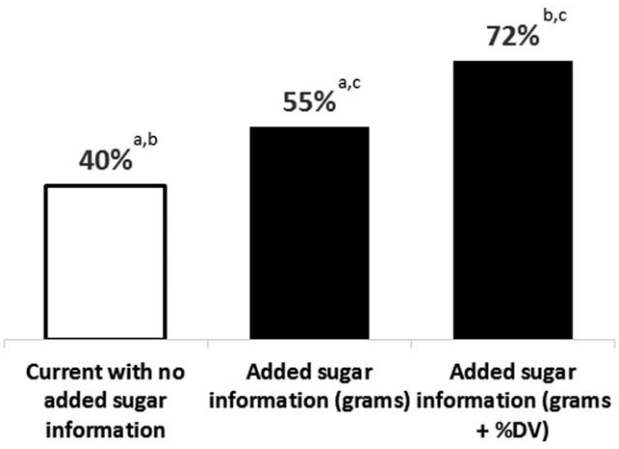

Figure 5 Proportion of participants who correctly identified that the amount of added sugar in the product was "a lot." Values with the same letters are significantly different at the $P < 0.05$ level.

understanding (35). The particular infographic in this study did not provide interpretive or contextual information to help participants understand whether the amount of sugar depicted in the image was high or low. Additionally, the infographic was placed at the bottom of the Nutrition Facts table, which is rarely viewed by consumers, and incorporated teaspoons, which our results suggest few people use when thinking about sugar amounts in pre-packaged food products (37). There did not appear to be any benefit of labeling sugar with additional information for teaspoons.

The study used a non-probability based sample, and although weighting aligns the sample with population estimates, these weights may increase the likelihood of over-representation of some individuals in the study. The use of an online survey may not represent how consumers naturally interact with nutrition labels in a real-world setting. Additionally, models did not include a predictor for income, due to limitations with current measures among the target age group; further research should aim to develop better measures for socioeconomic status among this age group. The reduced sample size did not negatively influence the power to detect significant differences in Experiment 2. The use of a between-subjects design and images of actual food labels represent strengths of the study.

Conclusion

Few young people know recommended limits for sugar intake, and many are unable to identify the presence of added sugar using the current food labels in Canada. The addition of added sugar amounts and the use of a %DV significantly improved awareness and understanding of sugar amounts in pre-packaged food products.

These results have implications for food labeling policies. In July 2014, Health Canada proposed labeling changes that included a %DV for total sugar and labeling for added sugar; however, a subsequent announcement in June 2015 suggested that Health Canada will not be proceeding with added sugar labeling but will move forward with providing a %DV for total sugar on labels (38). Recently, the USFDA revised the proposed changes to US labels to include a %DV for added sugars, using the WHO's recommendation of limiting calories from added sugar to 10% (19). This study found that the addition of added sugar information and the use of a %DV significantly improved awareness and understanding of sugar amounts in the products. Whether or not to emphasize total sugars compared to added sugars is an important policy issue. Although many health organizations currently promote limiting added sugar consumption, few provide recommendations for total sugar consumption. Including additional information for total sugar has the potential to obscure the distinction between naturally occurring and added sugars. For example, promoting daily values for total sugar may lead consumers to decrease consumption of foods that are nutrient dense, such as fruit or dairy.

Overall, the findings suggest a potential benefit from the separate labeling of added and total sugars. Including added sugar information on food labels also may facilitate monitoring of added sugar in the food supply and can support education efforts as a tool for consumers who want to identify and reduce the amount of added sugar in their diets. Future research should examine how important sugar is to consumers relative to other nutrients, what consumers consider "high" or "low" amounts of sugar in products, and what innovative labeling formats may better communicate sugar content of food products. O

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