

Knowledge and Intake of Sugary Drinks: A Cross-sectional Study From the International Food Policy Study



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ABSTRACT

Background Lack of knowledge about sugary drinks may contribute to the high prevalence of consumption.

Objectives This study aimed to assess knowledge of (1) sugar content and (2) health effects of sugary drinks and associations with intake.

Design Annual cross-sectional data from the International Food Policy Study were analyzed. Using pooled data from 2018 to 2021, Study 1 assessed knowledge of the sugar content of sugary drinks within ± 4 g (1 teaspoon) of the actual value for 1 of 7 beverage types. Using data from 2019 and 2020 only, Study 2 assessed knowledge of health effects (obesity, diabetes, and tooth decay) with true/false measures. Sugary drink frequency of intake was assessed using a Beverage Frequency Questionnaire.

Participants/Settings A total of 61 002 and 37 965 adults (aged 18 years and older) from Australia, Canada, Mexico, the United Kingdom, and the United States were included in Studies 1 and 2, respectively.

Main outcome measures The main outcome measures were self-reported knowledge and intake of sugary drinks.

Statistical analysis performed Negative binomial regressions examined the association between knowledge and sugary drink frequency of intake. Logistic regression models examined differences in knowledge of health effects between countries.

Results Few participants correctly estimated the sugar content of beverages, except for water. Underestimation was most frequent for chocolate milk (34.9%) and 100% juice (29.7%), and overestimation was most frequent for energy and diet soft drinks (51.3% and 50.5%, respectively). Most participants agreed sugary drink consumption can cause obesity (93.3%), diabetes (92.3%), and tooth decay (94.5%), with the highest overall agreement in Mexico and Australia. In relatively few countries, knowledge of the sugar content of sports drinks, 100% juices, and diet soft drinks, as well as knowledge of the health effects of sugary drinks, were associated with intake. No associations were found for chocolate milk, iced tea, and energy drinks.

Conclusion Findings indicate high awareness of the health effects of sugary drinks but lower knowledge of their sugar content. The inconsistent findings between knowledge and intake indicate that measures only targeting knowledge may have limited impact. *J Acad Nutr Diet.* 2026;126(12):156436.

NUTRITION AND FOOD LITERACY ENCOMPASS THE concepts of acquiring, understanding, and applying food-related knowledge to make informed food choices and prepare food, as well as recognizing how these choices can impact health.^{1,2} Nutrition and food literacy are important determinants of dietary behavior and overall health; lower levels of literacy have been associated with poorer overall dietary quality or patterns^{3,4} and with several dietary behaviors such as higher consumption of sugar-sweetened beverages (SSBs).^{3,5} Definitions of SSBs and sugary drinks vary in the literature, but sugary drinks are typically defined as beverages containing

free sugars, that is, SSBs and 100% fruit juices.^{6,7} Sugary drinks are a major dietary source of free and added sugars⁸⁻¹² and are widely consumed worldwide.^{13,14} Their consumption, especially of SSBs, is associated with many health effects, including tooth decay and erosion (because of their acidity),^{15,16} diabetes,¹⁷ and cardiovascular disease.¹⁸

Previous research on knowledge of SSBs among adults suggests a relatively high prevalence of awareness of health effects of SSBs, particularly diabetes and weight gain,¹⁹⁻²³ but more limited knowledge of their sugar content.^{19,24,25} However, studies to date have mainly focused on broad beverage categories such as soft drinks, or SSBs, and have not

examined newer and increasingly popular categories, such as energy drinks,²⁶ for which knowledge may differ. In addition, the relationship between knowledge and intake of SSBs remains unclear.^{19-21,24,27} Many public policies already aim to reduce SSB intake through increased education.²⁸⁻³⁰ Therefore, assessing current levels of knowledge about sugary drinks and the extent to which this knowledge influences consumption may help inform more effective strategies to reduce sugary drink consumption.

Using data from the International Food Policy Study (IFPS)³¹ in Australia, Canada, Mexico, the United Kingdom, and the United States, this research aimed to examine (1) knowledge of the sugar content of sugary drinks and associations with intake of each drink; and (2) knowledge of the health effects of sugary drinks and associations with total sugary drink intake. The research hypothesis was that overestimating the sugar content of sugary drinks and perceiving sugary drinks as having negative health effects would be associated with consuming fewer sugary drinks.

METHODS

Study Design

Annual cross-sectional survey data from the IFPS were analyzed. Two distinct sub-studies were conducted using the IFPS dataset: Study 1 examined knowledge of the sugar content of sugary drinks using pooled data from 2018 to 2021, and Study 2 examined knowledge of sugary drink health effects using data from 2019 and 2020. For all years of data collection, adults aged ≥ 18 y who resided in Australia, Canada, Mexico, the United Kingdom, and the United States were recruited through the Nielsen Consumer Insights Global Panel and their partners' panels, using both probability and non-probability sampling methods.^{32,33} Invitations with unique survey access links were sent to a random sample of panelists within each country. Quotas for age group, sex at birth, and language (Canada and United States only) were applied to facilitate the recruitment of samples that were more representative of each country's population. Self-administered surveys were conducted online, and participants received remuneration based on their panel's usual incentive structure.³⁴ The IFPS study received ethical approval from the University of Waterloo Research Ethics Committee (REB #30829) and the Université Laval Ethics Committee (2021-318 Phases I and II A-3 R-3 / 04-12-2024). All participants provided online consent before completing the survey.

Survey Measures Common to Both Studies

Sociodemographic Characteristics. Sociodemographic variables were selected *a priori* as covariates of interest in both studies because they previously have been associated with sugary drink intake,^{35,36} including age groups, sex at birth, country, ethnicity/race, income adequacy, education, and the presence of a child younger than age 18 years at home. Ethnicity/race was assessed using country-specific ethnicity/race categories and was analyzed as a binary variable (majority ethnicity/minority ethnicity) to facilitate comparisons across countries.³⁴ Perceived income adequacy was assessed with the question, "Thinking about your total monthly income, how difficult or easy is it for you to make ends meet?" (response options: 1, "Very difficult" to 5, "Very easy"), which enables more consistent comparisons across

RESEARCH SNAPSHOT

Research Question: Does knowledge of sugar content and health effects of sugary drinks influence the frequency of sugary drink intake?

Key Finding: This study used data from the 5 countries included in the International Food Policy Study. Although awareness that sugary drinks can cause obesity, diabetes, and tooth decay was high (between 92.3% and 94.5%), objective knowledge of sugar content was low (correct estimations from 5.4% for chocolate milk to 80.9% for water). In some countries and for certain beverages only, associations were observed between overestimating sugar content and lower consumption. Awareness of health effects was also associated with lower consumption in some countries.

countries than absolute household income.³⁷ Education was assessed with the question, "What is the highest level of formal education that you have completed?" with country-specific response options. Responses were classified into low (high-school diploma or less), medium (technical diploma or some post-secondary qualifications), and high education (university degree or higher) to facilitate comparisons across countries. Participants who answered "Refuse to answer" or "Don't know" for any sociodemographic variable were excluded. (Figure 1, available at www.jandonline.org) gives details on exclusions.

Sugary Drink Frequency of Intake. Frequency of beverage intake was estimated using the Beverage Frequency Questionnaire (BFQ), which assessed intakes of 20 non-alcoholic and 4 alcoholic beverage categories. The BFQ has demonstrated reasonable relative validity compared with 7-day food records among Canadian young adults, with moderate to good correlations observed for aggregate categories of SSBs (0.53 for the number of drinks) and all drinks (0.62 for the number of drinks).^{14,38} Participants were asked to report the number of drinks consumed per category with the following question: "During the past 7 days, how many drinks did you have in each category below?" The volume consumed per category was also assessed but was not considered in the current study.

Participants who reported 70 to 100 beverages per week for a single drink category were recoded as 70 drinks/week (for each of those applicable drink categories). Participants were excluded from the BFQ analyses because of data quality concerns if they reported implausibly high consumption (ie, more than 100 beverages per week for a single drink category), inconsistencies or errors in reporting beverage intake (eg, reporting no drinks consumed during the week while also indicating consumption of specific beverages, repetitive or sequential entries across categories, or non-numerical or nonsensical responses), missing information on beverage size, a total reported beverage volume exceeding 49 L/week, or a total reported volume exceeding 36 L/week when water was excluded.³⁴ These thresholds were based on internal data quality criteria and plausibility. (Figure 1, available at www.jandonline.org) gives details on participants excluded for BFQ-related issues.

All analyses were performed using both SAS Studio V.3.81³⁹ and Stata V.15.1.⁴⁰ Data were weighted with post-stratification sample weights constructed using a raking algorithm based on known population totals for age, sex, region, ethnicity (except in Canada), and education level (except in Mexico).³⁴ Weights were rescaled to the final analytic sample size. SAS survey-aware procedures were used to report unadjusted and weighted frequencies and percentages of the sociodemographic and knowledge variables. Weighted regression models adjusted for covariates were reported using adjusted odds ratios (AORs) and incident rate ratios (IRRs). Statistical significance was set at $P < .01$, and 99% confidence intervals were used to account for the large sample size and the number of comparisons examined. Before performing the regression analysis in both studies, multicollinearity among the independent variables was evaluated using variance inflation factors, and no evidence of problematic collinearity was observed. In addition, intraclass correlations within countries were assessed and indicated minimal clustering; therefore, a random country effect was not included in the models.

Methods Specific to Study 1—Knowledge of Sugar Content of Sugary Drinks

Survey Measures. In the 2018 to 2021 surveys, participants were randomized to view 1 of 7 drinks (chocolate milk, 100% juice, iced tea, sports drink, energy drink, diet soft drink, water) and were asked: “A 500-mL bottle of “regular” Coke has 55 g sugar. How much sugar do you think the following beverage contains?” The bottle size and amount of sugar in the Coca-Cola product were country-specific. Images matched brands and products commonly available in each country and remained the same across all waves, except in Mexico, where front-of-pack warning labels were added in 2020, in line with national regulations.⁴¹ Using Coca-Cola as a reference provided a benchmark for participants to compare with. Participants were asked to enter the number of grams of sugar or select “Don’t know” or “Refuse to answer.” Numerical responses were compared with the actual sugar content obtained from retailers’ websites in 2023 (shown in Fig 2, available at www.jandonline.org). To account for product reformulation, 2023 nutritional information for each country was compared with online data collected in 2019. When differences were found between 2023 and 2019, country-specific nutritional databases were consulted to confirm whether the product had indeed been reformulated. Estimates were coded as “correct” if they were within ± 4 g (ie, ± 1 teaspoon of sugar) of the actual value, “underestimated” if they were more than 4 g under the actual value (not applicable to water and diet soft drinks, because they do not contain sugar), and “overestimated” if they were more than 4 g over the actual value, because most studies evaluate sugar knowledge using teaspoons.^{19,24} “Don’t know” was considered a valid answer. Participants who answered “Refuse to answer” ($n = 292$) or who experienced a technical issue that caused them to view all beverages ($n = 289$) were excluded from Study 1 on knowledge of sugar content of sugary drinks. In addition to the 7 previously mentioned drink conditions, some participants ($n = 17\ 151$) were randomized to white milk (added in 2019) or specialty coffee and were excluded because white milk was not available for all study waves, and the specialty coffee tested was not available in the Mexican market.

Statistical Analysis. Separate weighted negative binomial regression models for each drink, adjusted for year, country, and sociodemographic characteristics (age group, ethnicity/race, sex at birth, perceived income adequacy, education, presence of a child younger than age 18 at home), were conducted in Stata to examine associations between knowledge of sugar content of each drink (correct estimation, overestimation, underestimation, or not knowing) and reported frequency of intake within the past 7 days, using the BFQ. For example, models examined the association between sugar estimation of 100% juice (correct estimation, overestimation, underestimation, or not knowing) and frequency of 100% juice consumption in the past 7 days, analyzed as a count variable. Negative binomial regressions were used to account for the overdispersion of the dependent count variable. Interaction terms were integrated into each of the fully adjusted models to assess whether the association between knowledge of sugar content and consumption differed between countries. When an interaction term was significant ($P < .05$), post-estimation linear combinations of coefficients (lincom in Stata) were used to estimate the simple effects of knowledge within each country for the beverage category in question. Differences in the estimation of sugar content between countries based on statistical models are not reported, because the actual sugar content of beverages in each country differed, which may influence the likelihood of over- or under-estimating sugar amounts (Fig 2, available at www.jandonline.org).

Methods Specifics to Study 2—Knowledge of Sugary Drink Health Effects

Survey Measures. To assess knowledge of the health effects of sugary drinks, participants completed the following task: “Please rate if you feel the following are true or false: Frequently drinking sugary drinks increases the risk of ... [obesity/diabetes/tooth decay] ” (underlining was used in the measure wording for emphasis), with response options of “True,” “False,” “Don’t know,” and “Refuse to answer.” These measures were recoded into binary variables of “True” (True) and “Not true” (False/Don’t know) for each health effect. The question wording was slightly different in 2018, and the question was not asked in 2021; therefore, analyses only included years 2019 and 2020. Participants who answered “Refuse to answer” were excluded ($n = 191$).

The total intake of sugary drinks was derived by summing the number of beverages consumed from 8 of the 20 non-alcoholic beverages of the BFQ that contained added sugars (regular soft drinks, sports drinks, energy drinks, chocolate/flavored milk, fruit drinks, flavored/vitamin waters, specialty coffees/teas, and smoothies/protein shakes/drinkable yogurts). This variable did not include 100% juice, which was consistent with the definition given to participants before answering the study-related questions (eg, “Sugary drinks are drinks that contain added sugar, like pop, fruit drinks, sports drinks, energy drinks, chocolate milk, and specialty coffees that have added sugar.”) Alcoholic beverages were not included in this analysis.

Statistical Analysis. Separate weighted logistic regression models for each health effect, with an indicator variable for country and adjusted for year and the same sociodemographic

variables listed previously, were conducted. All possible country-level contrasts were tested. Negative binomial regression models adjusted for year, country, and socio-demographic characteristics were used to examine the associations between each health effect and the total number of sugary drinks consumed in the past 7 days (regular soft drinks, sports drinks, energy drinks, chocolate/flavored milk, fruit drinks, flavored/vitamin waters, specialty coffees/teas, and smoothies/protein shakes/drinkable yogurts). Interaction terms were integrated into the models to assess whether the association between knowledge of sugary drink health effects and consumption of sugary drinks differed between countries. When an interaction term was significant ($P < .05$), post-estimation linear combinations of coefficients (lincom in Stata) were used to estimate the associations by country for the health effect in question.

RESULTS

Sociodemographic characteristics for Study 1 on knowledge of sugar content of sugary drinks and Study 2 on knowledge of sugary drink health effects are shown in [Tables 1 and 2](#), respectively. The samples in both studies were evenly distributed by sex at birth, age group, and education level, except in Mexico, where a larger proportion of participants had a higher education level. Most participants did not have children at home and were from an ethnic majority. Approximately one third reported that their income was “neither easy nor difficult.”

Study 1—Knowledge of Sugar Content of Sugary Drinks

Underestimation (by more than 4 g) was most frequent for chocolate milk (34.9%) and 100% juice (29.7%), and overestimation (by more than 4 g) was most frequent for energy drinks (51.3%) and diet soft drinks (50.5%) ([Fig 3](#)). The proportions of participants who correctly estimated the amounts of sugar in each beverage type within 4 g ranged from 5.4% for chocolate milk to 80.9% for water, and those who reported “don’t know” ranged from 12.1% (water) to 33.6% (energy drinks). Descriptive estimates of knowledge of sugar content by country are shown in ([Figure 4](#), available at www.jandonline.org).

The interaction terms involving country, chocolate milk, iced tea, sports drinks, and energy drinks were not observed to be significant. Therefore, negative binomial regression models that pooled data from all countries were estimated, because there was insufficient statistical evidence of effect modification by country ([Table 3](#), available at www.jandonline.org). Model results for these categories indicated only 1 statistically significant association: on average, participants who overestimated the amount of sugar in sports drinks had 39% lower frequency of consumption of this beverage compared with those who underestimated the amount of sugar (IRR, 0.61; 99% CI, 0.43–0.87). No significant associations were found for chocolate milk, iced tea, and energy drinks.

The interaction terms for models focusing on 100% juice and diet soft drinks were observed to be significant ([Table 3](#), available at www.jandonline.org). In Canada and Mexico, participants who overestimated the sugar content in 100% juice had, on average, 45% and 31% lower frequency of

consumption of these beverages, respectively, compared with those who underestimated (IRR, 0.55; 99% CI, 0.39–0.78; IRR, 0.69; 99% CI, 0.53–0.89). Similarly, in Canada, those who overestimated the amount of sugar in 100% juice consumed this beverage on average 39% less frequently, respectively, compared with those who correctly estimated (IRR, 0.61; 99% CI, 0.39–0.96). Similar patterns were observed for diet soft drinks in all countries. On average, those who overestimated the amount of sugar in diet soft drinks consumed between 54% and 86% less of this drink than those who correctly estimated (United States: IRR, 0.46; 99% CI, 0.23–0.92; United Kingdom: IRR, 0.33; 99% CI, 0.19–0.56; Australia: IRR, 0.33; 99% CI, 0.19–0.57; Mexico: IRR, 0.24; 99% CI, 0.15–0.39; Canada: IRR, 0.14; 99% CI, 0.09–0.23).

Study 2—Knowledge of Sugary Drink Health Effects

Across all countries, awareness of health effects of sugary drinks was high, particularly for tooth decay (94.5%), followed by obesity (93.3%) and diabetes (92.3%) ([Fig 5](#)). Overall, participants in Mexico had higher odds of reporting that frequently drinking sugary drinks increases the risk of obesity and diabetes compared with all countries (AORs between 1.35 and 2.16) ([Table 4](#)). Participants in Australia also had higher odds of reporting associations with obesity (vs the United Kingdom: AOR, 1.47; 99% CI, 1.21–1.79; and the United States: AOR, 1.41; 99% CI, 1.16–1.71); diabetes (vs Canada: AOR, 1.31; 99% CI, 1.09–1.57; and the United States: AOR, 1.57; 99% CI, 1.32–1.87), and tooth decay (vs Canada: AOR, 1.38; 99% CI, 1.10–1.72; the United Kingdom: AOR, 1.27; 99% CI, 1.01–1.61; and the United States: AOR, 1.64; 99% CI, 1.33–2.03).

Interactions between country and each health effect knowledge measure were observed to be significant ([Table 5](#), available at www.jandonline.org). On average, participants who perceived sugary drinks as associated with obesity in Australia and Canada had 42% and 29% lower sugary drink frequency of consumption, respectively, than those who did not know/believed the statement was false (IRR, 0.58; 99% CI, 0.46–0.73; IRR, 0.71; 99% CI, 0.53–0.96). Also, participants in Australia and Mexico who perceived sugary drink consumption as associated with diabetes (IRR, 0.57; 99% CI, 0.45–0.72; and IRR, 0.80; 99% CI, 0.66–0.97, respectively) and those in Australia and Canada perceiving sugary drink as associated with tooth decay (IRR, 0.69; 99% CI, 0.52–0.90; IRR, 0.78; 99% CI, 0.64–0.95; respectively) had a 20% to 43% lower frequency of sugary drink consumption, on average, compared with those who didn’t know/disagreed with the statement.

DISCUSSION

This study found that few participants in any country correctly estimated the sugar content of beverages (with the exception of water) within 4 g of their actual content; by contrast, high proportions of participants across all countries were aware that consumption of sugary drinks is associated with obesity, diabetes, and tooth decay. Underestimation of sugar content was most frequent for chocolate milk and 100% juice, whereas overestimation was most frequent for energy and diet soft drinks. Overestimating the amount of sugar in 100% juice (Canada and Mexico), sports drinks (all countries), and diet soft drinks (all countries) was associated with lower

Table 1. Weighted sociodemographic characteristics of adults participating in the online International Food Policy Study and included in Study 1 on knowledge of the sugar content of sugary drinks (N = 61 002)^a

	All countries (n = 61 002)	Australia (n = 11 831)	Canada (n = 12 254)	Mexico (n = 11 928)	UK ^b (n = 12 721)	US ^c (n = 12 268)
	n (%)					
Survey year						
2018	17 403 (29)	3156 (27)	3326 (27)	3179 (27)	4183 (33)	3559 (29)
2019	14 483 (24)	2942 (25)	2851 (23)	2971 (25)	2842 (22)	2877 (23)
2020	14 869 (24)	2957 (25)	2978 (24)	2945 (25)	2928 (23)	3061 (25)
2021	14 247 (23)	2776 (23)	3099 (25)	2833 (24)	2768 (22)	2771 (23)
Sex at birth						
Male	29 495 (48)	5734 (48)	6013 (49)	5713 (48)	6169 (48)	5866 (48)
Female	31 507 (52)	6097 (52)	6241 (51)	6215 (52)	6552 (52)	6402 (52)
Age group						
18–29 years	13 129 (22)	2424 (20)	2345 (19)	3508 (29)	2380 (19)	2473 (20)
30–44 years	15 959 (26)	3129 (26)	3069 (25)	3749 (31)	3020 (24)	2991 (24)
45–59 years	15 726 (26)	2864 (24)	3071 (25)	3388 (28)	3284 (26)	3119 (25)
≥60 years	16 188 (27)	3414 (29)	3769 (31)	1282 (11)	4037 (32)	3685 (30)
Ethnicity/race^d						
Majority	47 472 (78)	8884 (75)	9694 (79)	9532 (80)	11 387 (90)	7975 (65)
Minority	13 530 (22)	2947 (25)	2560 (21)	2396 (20)	1334 (10)	4293 (35)
Education^e						
Low	25 743 (42)	4903 (41)	5126 (42)	2480 (21)	6346 (50)	6887 (56)
Medium	13 569 (22)	3869 (33)	4098 (33)	1606 (13)	2741 (22)	1255 (10)
High	21 689 (36)	3059 (26)	3029 (25)	7841 (66)	3634 (29)	4126 (34)
Perceived income adequacy^f						
Very difficult	4957 (8)	807 (7)	965 (8)	1371 (11)	703 (6)	1112 (9)
Difficult	12 953 (21)	2125 (18)	2336 (19)	3853 (32)	2160 (17)	2479 (20)
Neither easy nor difficult	22 685 (37)	4513 (38)	4610 (38)	4698 (39)	4631 (36)	4234 (35)
Easy	13 250 (22)	2979 (25)	2760 (23)	1603 (13)	3291 (26)	2617 (21)
Very easy	7158 (12)	1408 (12)	1584 (13)	403 (3)	1936 (15)	1826 (15)
Children (<18 y) at home						
No	42 580 (70)	8721 (74)	9648 (79)	5965 (50)	9451 (74)	8795 (72)
Yes	18 422 (30)	3110 (26)	2606 (21)	5963 (50)	3270 (26)	3473 (28)

^aPercentages and frequencies were weighted. Minor discrepancies may occur between sociodemographic and country totals because of weight rescaling and rounding.

^bUK = United Kingdom.

^cUS = United States.

^dEthnicity/race was assessed using country-specific race/ethnicity categories and was analyzed as a binary variable (majority/minority).

^eParticipants were asked: "What is the highest level of formal education that you have completed?" Country-specific responses were then classified into 3 levels: low (high-school diploma or less), medium (technical diploma or some post-secondary qualifications), and high education (university degree or higher).

^fParticipants were asked: "Thinking about your total monthly income, how difficult or easy is it for you to make ends meet?"

reported frequency of consumption of the respective beverage category, whereas awareness that sugary drink consumption is associated with health effects was associated with a lower frequency of sugary drink consumption in Australia (all 3 health outcomes), Canada (obesity and tooth decay), and Mexico (diabetes only). In both studies, the effect of knowledge on intake was relatively modest.

Study 1—Knowledge of Sugar Content of Sugary Drinks

Awareness of sugar content of sugary drinks varied somewhat by beverage category but was generally lower than found in previous research, in which approximately one third of participants correctly estimated the number of teaspoons of sugar in sodas and SSBs.^{19,24,25} Indeed, in this

Table 2. Weighted sociodemographic characteristics of adults participating in the online International Food Policy Study and included in study 2 on knowledge of sugary drink health effects (N = 37 965)^a

	All countries (n = 37 965)	Australia (n = 7539)	Canada (n = 7523)	Mexico (n = 7651)	UK ^b (n = 7438)	US ^c (n = 7814)
	n (%)					
Survey year						
2019	18 741 (49)	3759 (50)	3674 (49)	3880 (51)	3670 (49)	3758 (48)
2020	19 224 (51)	3780 (50)	3849 (51)	3771 (49)	3768 (51)	4056 (52)
Sex at birth						
Male	18 395 (48)	3678 (49)	3685 (49)	3672 (48)	3616 (49)	3744 (48)
Female	19 570 (52)	3861 (51)	3838 (51)	3979 (52)	3822 (51)	4070 (52)
Age group						
18–29 years	8230 (22)	1573 (21)	1428 (19)	2225 (29)	1390 (19)	1614 (21)
30–44 years	10 025 (26)	2000 (27)	1894 (25)	2437 (32)	1772 (24)	1921 (25)
45–59 years	9759 (26)	1819 (24)	1881 (25)	2192 (29)	1911 (26)	1955 (25)
≥60 years	9951 (26)	2146 (28)	2320 (31)	796 (10)	2365 (32)	2324 (30)
Ethnicity/race^d						
Majority	29 416 (77)	5620 (75)	6004 (80)	6135 (80)	6648 (89)	5010 (64)
Minority	8549 (23)	1919 (25)	1519 (20)	1516 (20)	790 (11)	2804 (36)
Education^e						
Low	16 177 (43)	3143 (42)	3145 (42)	1705 (22)	3817 (51)	4366 (56)
Medium	8249 (22)	2449 (32)	2525 (34)	993 (13)	1502 (20)	779 (10)
High	13 539 (36)	1946 (26)	1853 (25)	4953 (65)	2119 (28)	2668 (34)
Perceived income adequacy^f						
Very difficult	3137 (8)	470 (6)	574 (8)	972 (13)	406 (5)	715 (9)
Difficult	8258 (22)	1392 (18)	1440 (19)	2560 (33)	1200 (16)	1666 (21)
Neither easy nor difficult	14 406 (38)	2988 (40)	2957 (39)	2931 (38)	2808 (38)	2721 (35)
Easy	8089 (21)	1861 (25)	1686 (22)	961 (13)	1938 (26)	1643 (21)
Very easy	4075 (11)	829 (11)	866 (12)	226 (3)	1086 (15)	1069 (14)
Children (<18 y) at home						
No	26 151 (69)	5634 (75)	5851 (78)	3786 (49)	5472 (74)	5408 (69)
Yes	11 814 (31)	1905 (25)	1672 (22)	3865 (51)	1966 (26)	2406 (31)

^aPercentages and frequencies were weighted. Minor discrepancies may occur between sociodemographic and country totals because of weight rescaling and rounding.^bUK = United Kingdom.^cUS = United States.^dEthnicity/race was assessed using country-specific race/ethnicity categories and was analyzed as a binary variable (majority/minority).^eParticipants were asked: "What is the highest level of formal education that you have completed?" Country-specific responses were then classified into 3 levels: low (high-school diploma or less), medium (technical diploma or some post-secondary qualifications), and high education (university degree or higher).^fParticipants were asked: "Thinking about your total monthly income, how difficult or easy is it for you to make ends meet?"

study, correct knowledge of sugar content in grams ranged from 5.4% for chocolate milk to 22.1% for diet soft drinks and 80.9% for water. This divergent result may be explained by differences in the beverage categories surveyed and measurement units across studies, because the range of possible responses is smaller for teaspoons than for grams of sugar.

Approximately half of the total sample in this study overestimated the amount of sugar in diet soft drinks, despite the absence of sugar in these drinks. Confusion

between sweet taste and sugar content⁴² and the increasing popularity of beverages containing both non-nutritive sweeteners and added sugars⁴³ may explain this finding. In addition, approximately one third of consumers underestimated the sugar content of 100% juice, which may reflect a lack of understanding between added sugars and naturally occurring sugars,^{44,45} but also a perception that this beverage type is healthy, especially when compared with other sugary beverages.⁴⁶ The results for water, which

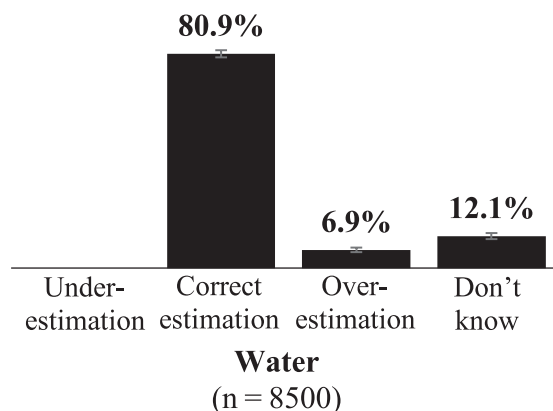
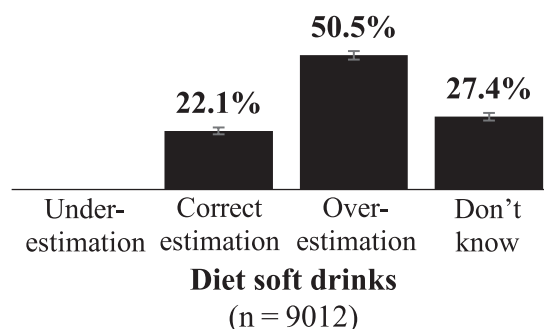
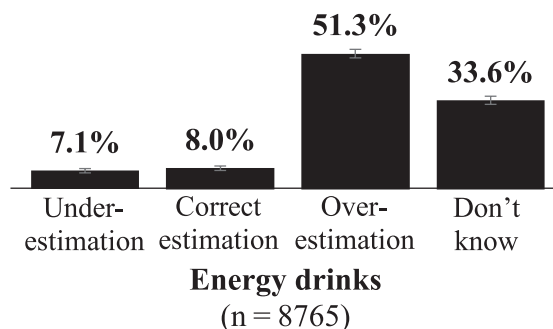
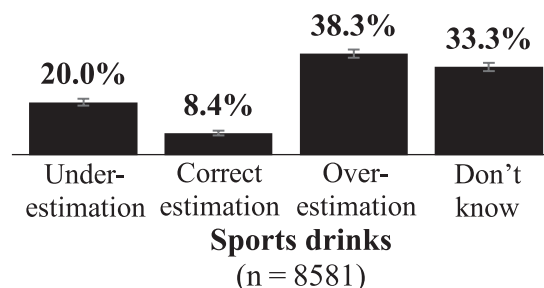
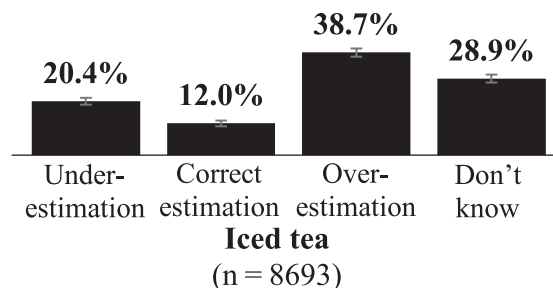
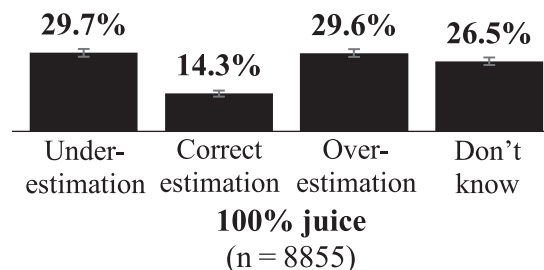
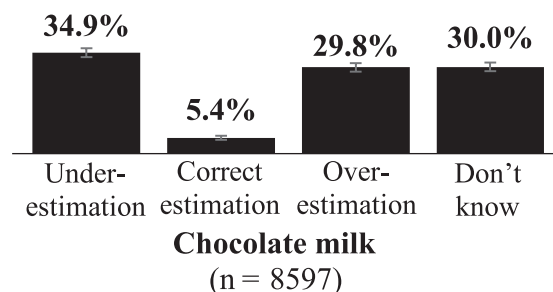


Figure 3. Weighted percentages of participants who under- correctly- or over-estimated or did not know the sugar content in each beverage (2018–2021) from online surveys as part of the International Food Policy Study. Participants were asked: “A 500 mL bottle of ‘regular’ Coke has 55 grams of sugar. How much sugar do you think the following beverage contains?” (in which the bottle size and amount of sugar were country-specific). Estimates within 4 g of the actual value were coded as “correct,” whereas estimates less than 4 g and greater than 4 g of the actual value were considered underestimates and overestimates, respectively. Error bars represent 99% CIs. Minor discrepancies may occur between the sum of each beverage’s subsample and the sum of the entire sample because of weight rescaling and rounding.

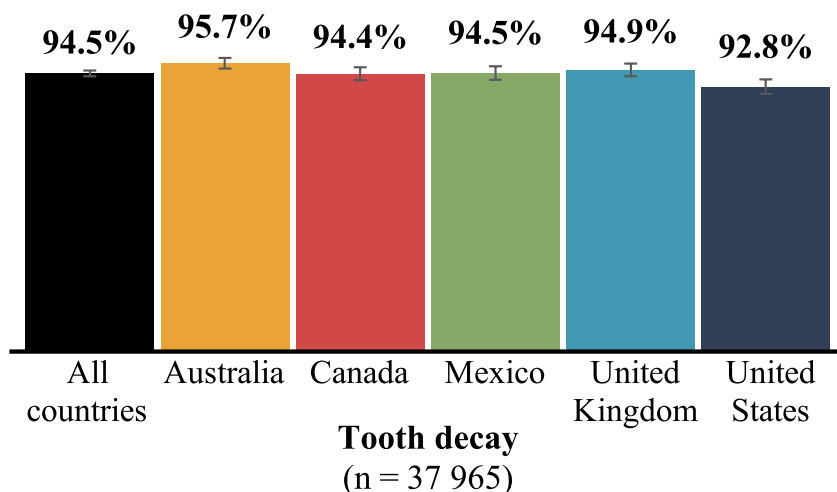
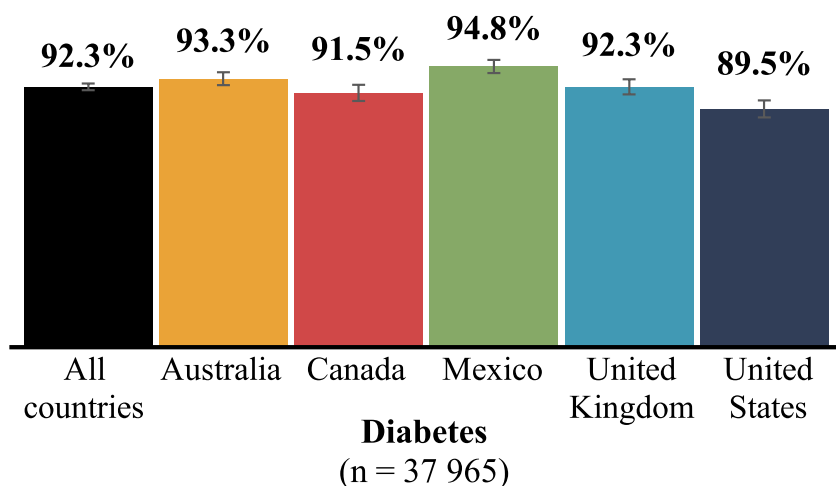
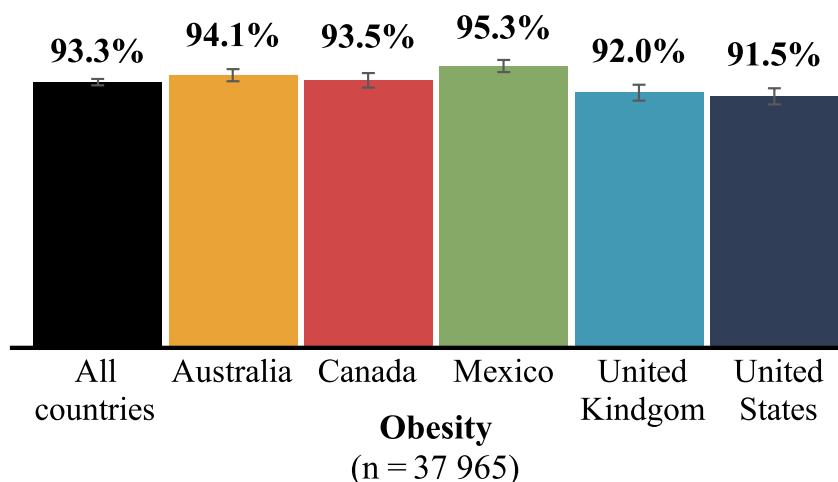


Figure 5. Weighted percentages of participants who perceived that sugary drinks are associated with obesity, diabetes, and tooth decay (2019-2020) from online surveys as part of the International Food Policy Study^a. ^a Participants were asked: Please rate if you feel the following are true or false: "Frequently drinking sugary drinks increases the risk of ... [obesity/diabetes/tooth decay]". Percentages here refer to those who answered "True". All years were combined. Error bars represent 99% confidence intervals.

Table 4. Differences among countries in the perceptions that obesity, diabetes, and tooth decay are associated with sugary drink consumption based on the International Food Policy Study online surveys^a

	Obesity (n = 37 965)		Diabetes (n = 37 965)		Tooth decay (n = 37 965)	
	AOR ^b (99% CI) ^c	P	AOR (99% CI)	P	AOR (99% CI)	P
Australia vs Canada ^d	1.15 (0.93; 1.41)	.084	1.31 (1.09; 1.57)	<.001	1.38 (1.10; 1.72)	<.001
Australia vs UK ^e	1.47 (1.21; 1.79)	<.001	1.17 (0.97; 1.40)	.030	1.27 (1.01; 1.61)	.007
Australia vs US ^f	1.41 (1.16; 1.71)	<.001	1.57 (1.32; 1.87)	<.001	1.64 (1.33; 2.03)	<.001
Mexico vs Australia	1.35 (1.08; 1.69)	.001	1.37 (1.10; 1.72)	<.001	0.80 (0.63; 1.03)	.021
Mexico vs Canada	1.55 (1.23; 1.96)	<.001	1.80 (1.44; 2.25)	<.001	1.11 (0.87; 1.40)	.280
Mexico vs UK	1.99 (1.59; 2.49)	<.001	1.61 (1.29; 2.01)	<.001	1.02 (0.80; 1.30)	.815
Mexico vs US	1.91 (1.52; 2.39)	<.001	2.16 (1.74; 2.69)	<.001	1.32 (1.05; 1.66)	.002
UK vs US	0.96 (0.79; 1.16)	.576	1.34 (1.12; 1.61)	<.001	1.29 (1.04; 1.60)	.003
UK vs Canada	0.78 (0.64; 0.96)	.002	1.12 (0.93; 1.35)	.118	1.08 (0.86; 1.36)	.381
US vs Canada	0.81 (0.66; 1.00)	.010	0.83 (0.70; 1.00)	.009	0.84 (0.68; 1.04)	.033

^aModels were adjusted for sociodemographic variables including age group, ethnicity/race, sex, perceived income adequacy, education, and the presence of a child younger than 18 at home, and year.

^bAOR = adjusted odds ratio.

^cCI = confidence interval.

^dSecond listed country is the reference country.

^eUK = United Kingdom.

^fUS = United States.

indicate that 1 in 5 people are not able to report how much sugar there is in water, underscore major nutrition knowledge gaps.

For sports drinks (all countries), diet soft drinks (all countries), and 100% juice (Canada, Mexico), lower frequency of consumption was observed when participants overestimated the amount of sugar in these drinks than when they underestimated or correctly estimated. When present, the reduction in consumption was relatively modest (31% and 45%), except for diet soft drinks (54%–86%), for which there was no underestimation category and thus potentially inflated correct knowledge of the sugar content. The smaller sample sizes in the country-specific analyses for each beverage category also may explain the lack of some associations. Nevertheless, concerns about the sugar content of sugary drinks^{42,47} and consumer efforts to reduce sugar intake⁴⁸ may explain why participants who overestimated the amount of sugar consumed less. For some beverage types whose sugar content was largely underestimated, informing the public about the sugar content of beverages through more intuitive labeling⁴⁹ could be effective, although the overall impact may be limited.

Results on knowledge of sugar content should be interpreted with caution, because the actual sugar content varied widely among countries and products (Fig 2). Indeed, when the actual sugar content is lower, the likelihood of underestimation is inherently decreased, because the number of potential responses is lower, and vice-versa. In addition, the way in which nutrition information is presented on food products varies from country to country, potentially influencing how participants would understand and answer this type of question. For example, although Canada's Nutrition Facts Table reports the amount of total sugars based on a

serving size (usually the whole bottle),⁵⁰ the United Kingdom reports the amount of total sugars per 100 g or 100 mL.⁵¹ Australia presents this information by serving and by 100 mL,⁵² and the United States reports added sugars separately from total sugars.⁵³ In Mexico, sugars were reported by portion size before 2020 and by 100 mL from 2020 onward.⁴¹

Study 2—Knowledge of Sugary Drink Health Effects

Over 90% of participants perceived each health effect queried to be associated with sugary drink consumption, suggesting that targeting knowledge about obesity, diabetes, and tooth decay in public health campaigns may have limited impact if their goal is solely to increase already high levels of awareness. Knowledge of lesser-known health effects of sugary drinks such as cancer (eg, 6.5% in a previous study¹⁹) was not assessed. Nevertheless, the high levels of awareness observed may reflect recent public health initiatives by governments and nongovernmental organizations linking sugary drinks to health issues. For example, the government-funded LiveLighter® campaign in Australia highlights the health effects and the high sugar content of various SSBs, including sports drinks and iced tea,⁵⁴ and it has been shown to be effective in increasing knowledge and reducing SSB consumption.⁵⁵ The Rethink Sugary Drink campaign in Australia also aims to raise public awareness of the sugar content and acidity of sugary drinks.⁵⁶ Campaigns to communicate the detrimental effects of SSBs have been aired in recent years in Mexico as well.⁵⁷ However, these findings contrast with previous research that reported lower levels of awareness of sugary drinks' health effects (eg, awareness for diabetes ranging from 61.0%–73.6%,^{19,21,24} vs 92.3% in the

current study). Furthermore, some studies have reported lower awareness of tooth decay compared with other health outcomes (eg, 29.1% awareness of associations with tooth decay vs 61.0% awareness of associations with diabetes, in a previous study²⁴), although this was not observed in the current study. This may be explained by methodological differences, because the measures of agreement used in the current study are likely to overestimate unprompted awareness or recall, compared with an open-text or multiple-choice question.

In Australia, knowledge of all 3 health effects was associated with lower sugary drink intake (between 31% and 43%). Some associations were also observed between knowledge and intake in Canada and Mexico (between 20% and 29%), but no statistical associations were observed in the United Kingdom and the United States. The somewhat higher level of public awareness of policies specifically targeting sugary drinks in Australia, compared with the other countries,⁵⁸ may partly explain this observation. A ceiling effect also may have influenced these results, because the overall prevalence of agreement was high, especially in Mexico (ie, agreement 94.5%–95.3% across health outcomes).

In both studies, knowledge showed inconsistent and limited associations with intake, reinforcing that knowledge alone may be insufficient to drive behavior change.^{59–61} This is consistent with behavior change frameworks, such as the COM-B model, which state that knowledge can influence components linked to behavior such as psychological capability and reflective motivation, but additional conditions are required for behavior to change.⁶² The Theory of Planned Behavior also identifies knowledge as a background factor that can indirectly influence behavior.⁵⁹ Other studies have similarly noted that although education is widely used in policies and public strategies, it is not always the most effective approach.^{30,63} Indeed, knowledge is just 1 of many factors that can influence sugary drink consumption, and a variety of approaches are needed to effectively reduce consumption,⁶⁴ including broader measures such as fiscal policies⁶⁴ and industry reformulation.⁶⁵ The limited associations between knowledge of sugar content and health effects of sugary drinks and different behavioral outcomes also provide evidence against a commonly employed argument from the SSB industry that suggests that education-based initiatives would be sufficient to reduce high consumption of sugary drinks.^{66,67} However, although quantitative knowledge of sugar content may be insufficient, providing more qualitative information about beverage sugar content through front-of-pack labels (eg, “high in sugar”), which have well-documented effects on sugary drink purchasing behavior,^{68,69} could still be relevant.

STRENGTHS AND LIMITATIONS

The study used a large sample size and standardized measures across countries that were tailored to each country's beverage market. The questionnaire examined a wide range of beverages, and the analysis accounted for reformulation between 2019 and 2021, which adds precision to the results, as beverages are subject to reformulation over time.⁷⁰

Participants were recruited using non-probability-based sampling, and the results do not necessarily provide nationally representative estimates. Analyses were weighted to better

represent the populations in each country; however, participants with higher education levels were overrepresented in Mexico, which may have influenced knowledge-related outcomes. Also, because these data are cross-sectional, the causal direction of the association between knowledge and sugary drink intake cannot be determined.

Although the BFQ has been previously assessed for validity,³⁸ the use of the self-reported BFQ measure is subject to measurement error, which may vary between different groups and over time as beverage markets change. Also, the BFQ reflects the frequency of consumption over the past 7 days, which may improve the ability to assess consumption of less frequently consumed beverages compared with a measure focused on a shorter time frame, but also increases the difficulty of recall. The sugary drink variable did not include *aguas frescas*, because there was no specific question about this drink in the survey. Therefore, consumption of sugary drinks may have been underestimated among Mexicans and Mexican Americans, who are known to be high consumers of this drink.⁷¹ Results on sugary drink intake also may have been influenced by the COVID-19 pandemic, which has been shown to have a heterogeneous impact on related behaviors.⁷² Sugary drink outcomes were based on frequency and do not account for volume consumed. Moreover, the familiar term of *sugary drinks* was used in the knowledge of health effect questions; however, the definition provided to participants before answering these questions did not include 100% juice, and referred to the more common definition of SSBs (beverages containing added sugars), rather than sugary drinks (beverages containing free sugars).⁷ Participants may have answered differently if the definition of sugary drinks had included 100% juice, highlighting the need for standardized and clear definitions.⁷³

Data collection for sugar content was conducted online, which may differ from the in-store food environment.⁷⁴ In addition, the sugar content varied considerably between beverages and countries, reflecting the actual food environment. A range of ± 4 g sugar was used to determine the “correct” amount of sugar, which may artificially influence the likelihood of under- or overestimating sugar content. For example, the actual sugar content of sports drinks was lower in the United Kingdom than in other countries (Fig 2, available at www.jandonline.org), and United Kingdom participants had higher rates of overestimation of sugar content (Fig 4, available at www.jandonline.org); however, the interaction term for this drink was not observed to be significant, suggesting that the association between knowledge and intake was similar across countries. Additionally, the results suggest that factors other than sugar content may explain the variation in sugar estimates observed between countries. For example, even though the actual sugar content of energy drinks was almost identical in all countries, the estimated sugar content varied, which could mean that differences between countries were not simply a function of different actual sugar content in the same category. The knowledge of sugar content measure also assessed only 1 brand per beverage, and knowledge may vary across brands. Finally, grams of sugar may not be the optimal unit of measurement for assessing consumer knowledge of sugar content; thus, participants' responses may not be representative of their true knowledge. However, grams align with how it is presented on the nutrition fact tables in all

countries, which is the main source of nutrition information for sugar content and nutrition information more generally.

CONCLUSION

This study found that adults in 5 countries had low awareness of sugar content of various sugary drinks but high awareness of the health effects of sugary drink consumption, including diabetes, obesity, and tooth decay. When present, associations between knowledge of sugary drinks and intake were relatively modest and inconsistent across countries and measures. The results suggest that policies that solely target increasing knowledge of sugary drinks are likely to have limited impacts on the frequency of sugary drink consumption.

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STATEMENT OF POTENTIAL CONFLICT OF INTEREST

D. H. has provided paid expert testimony on behalf of public health authorities in response to challenges from the food and beverage industry. S. I. K. is on JAND's editorial board. Other authors have no conflicts of interest to declare.

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AUTHOR DISCLAIMER

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Availability of data and materials: Data are available directly from the International Food Policy Study team on reasonable request (see: foodpolicystudy.com).

AUTHOR CONTRIBUTIONS

L. V. and V. D. L. conceived the idea for the paper. V. D. L. analyzed the data, drafted the manuscript, and was supervised by L. V. All authors read, critically revised, and approved the final manuscript. D. H. conceived the idea for the IFPS and D. H., L. V., J. F. T., S. I. K., and G. S. secured funding. D. H., L. V., and C. M. W. developed the first draft of the survey.

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Table 3. Incident rate ratios (IRRs) for sugary drink intake by knowledge of sugar content based on the International Food Policy Study online surveys^a

		All countries ^b		Australia		Canada		Mexico		UK ^c		US ^d	
		IRR ^e (99% CI) ^f	P	IRR (99% CI)	P	IRR (99% CI)	P	IRR (99% CI)	P	IRR (99% CI)	P	IRR (99% CI)	P
Chocolate milk	Overestimation vs don't know ^g	0.96 (0.71–1.29)	.700	—	—	—	—	—	—	—	—	—	—
	Overestimation vs underestimation	0.76 (0.56–1.02)	.017	—	—	—	—	—	—	—	—	—	—
	Overestimation vs correct estimation	0.75 (0.46–1.23)	.132	—	—	—	—	—	—	—	—	—	—
Iced tea	Overestimation vs don't know	1.22 (0.87–1.70)	.134	—	—	—	—	—	—	—	—	—	—
	Overestimation vs underestimation	0.70 (0.48–1.01)	.013	—	—	—	—	—	—	—	—	—	—
	Overestimation vs correct estimation	0.87 (0.59–1.27)	.333	—	—	—	—	—	—	—	—	—	—
Sports drinks	Overestimation vs don't know	0.95 (0.66–1.37)	.723	—	—	—	—	—	—	—	—	—	—
	Overestimation vs underestimation	0.61 (0.43–0.87)	<.001	—	—	—	—	—	—	—	—	—	—
	Overestimation vs correct estimation	0.77 (0.53–1.12)	.069	—	—	—	—	—	—	—	—	—	—
Energy drinks	Overestimation vs don't know	1.26 (0.84–1.88)	.136	—	—	—	—	—	—	—	—	—	—
	Overestimation vs underestimation	0.74 (0.43–1.29)	.164	—	—	—	—	—	—	—	—	—	—
	Overestimation vs correct estimation	0.63 (0.27–1.45)	.150	—	—	—	—	—	—	—	—	—	—
100% juice	Overestimation vs don't know	—	—	0.88 (0.58–1.34)	.432	0.73 (0.53–1.01)	.014	1.05 (0.75–1.46)	.730	0.74 (0.51–1.06)	.030	0.98 (0.70–1.38)	.890
	Overestimation vs underestimation	—	—	0.92 (0.63–1.34)	.559	0.55 (0.39–0.78)	<.001	0.69 (0.53–0.89)	<.001	0.73 (0.53–1.01)	.014	1.04 (0.72–1.49)	.782
	Overestimation vs correct estimation	—	—	0.72 (0.45–1.14)	.068	0.61 (0.39–0.96)	.005	0.92 (0.61–1.40)	.630	0.72 (0.41–1.26)	.128	0.520 (0.23–1.17)	.039
Diet soft drinks	Overestimation vs don't know	—	—	0.88 (0.41–1.89)	.656	0.64 (0.36–1.14)	.045	1.05 (0.60–1.86)	.809	0.82 (0.41–1.67)	.479	1.02 (0.46–2.25)	.941
	Overestimation vs correct estimation	—	—	0.33 (0.19–0.57)	<.001	0.14 (0.09–0.23)	<.001	0.24 (0.15–0.39)	<.001	0.33 (0.19–0.56)	<.001	0.46 (0.23–0.92)	.004

^aModels examined the association between knowledge of the sugar content of each drink and the reported frequency of intake of that drink in the past 7 days. For example, the models examined the association between sugar estimation in 100% juice and the frequency of intake of 100% juice.

^bThe interaction terms involving country and chocolate milk, iced tea, sports drinks, and energy drinks were not significant; hence, for those models, negative binomial regression models that pooled data from all countries were estimated. For models focusing on 100% juice and diet soft drinks, interactions with country were significant. Models were weighted and adjusted for sociodemographic variables (ie, age group, ethnicity/race, sex at birth, perceived income adequacy, education, presence of a child under 18 at home) and year.

^cUK = United Kingdom.

^dUS = United States.

^eIRR = incident rate ratio.

^fCI = confidence intervals.

^gThe second listed category was used as the reference group.

	Study 1: Knowledge of sugar content of sugary drinks (2018–2021) N	Study 2: Knowledge of sugary drink health effects (2019–2020) N
Baseline sample	86 683	42 721
Ethnicity/race —participant excluded for missing information (Not stated)	1045	444
Education —participant excluded for missing information (Not stated)	379	196
Income adequacy —participant excluded for missing information (“Refuse to answer,” “Don’t know”)	1036	533
Children at home —participant excluded for missing information (Not stated)	179	79
Knowledge of sugar content —Participants excluded for missing information (“Refuse to answer”)	292	—
Knowledge of health effect —Participants excluded for missing information (“Refuse to answer”)	—	191
BFQ^a —Participants excluded for data quality concerns or missing information (“Refuse to answer”; “Don’t know”)	8977	4027
Technical glitch —Participants excluded because they were randomized to more than 1 condition	289	—
Randomization —Participants excluded because of randomization to white milk or specialty coffee (not analyzed in the current study).	17 151	-
Final analytic sample^b	61 002	37 965
^a BFQ = Beverage Frequency Questionnaire. ^b Number of excluded participants may not match final analytic sample sizes because of missing data for multiple variables. No participants were excluded because of missing data on sex.		

Figure 1. Summary of the final analytic sample sizes of Study 1 and Study 2, as part of the online International Food Policy Study.

		Sugar (g)			
		2018	2019	2020	2021
Branded chocolate milk	Australia (500 mL)	45	45	45	45
	Canada (473 mL)	49	49 ^b	45 ^b	45
	Mexico (330 mL)	35	35	35	35
	UK ^c (400 mL)	35	35	35	35
	US ^d (16 fl oz)	53	53	53	53
Branded 100% orange juice	Australia (500 mL)	41	41	41	41
	Canada (355 mL)	34	34	34	34
	Mexico (413 mL)	46	46	46	46
	UK ^c (300 mL)	26	26	26	26
	US ^d (12 fl oz)	34	34	34	34
Branded iced tea	Australia (500 mL)	26	26 ^b	21 ^b	21
	Canada (500 mL)	43	43	43	43
	Mexico (600 mL)	36	36	36	36
	UK ^c (500 mL)	22	22	22	22
	US ^d (16.9 fl oz)	25	25	25	25
Branded sports drink	Australia (600 mL)	36	36	36	36
	Canada (591 mL)	35	35	35	35
	Mexico (600 mL)	36	36	36	36
	UK ^c (500 mL)	20	20	20	20
	US ^d (20 fl oz)	34	34	34	34
Branded energy drink	Australia (250 mL)	28	28	28	28
	Canada (250 mL)	27	27	27	27
	Mexico (250 mL)	27	27	27	27
	UK ^c (250 mL)	28	28	28	28
	US ^d (8.4 fl oz)	27	27	27	27
Branded diet soft drink	Australia (600 mL)	0	0	0	0
	Canada (500 mL)	0	0	0	0
	Mexico (600 mL)	0	0	0	0
	UK ^c (500 mL)	0	0	0	0
	US ^d (20 fl oz)	0	0	0	0
Glass of water	Australia (355 mL)	0	0	0	0
	Canada (355 mL)	0	0	0	0
	Mexico (355 mL)	0	0	0	0

(continued on next page)

Figure 2. Sugar amount references for the seven beverages for which participants were asked to estimate sugar content as part of the International Food Policy Study online surveys.^a

		Sugar (g)			
		2018	2019	2020	2021
	UK ^c (355 mL)	0	0	0	0
	US ^d (12 fl oz)	0	0	0	0

^aThe images shown to participants can be found in the method section of the International Food Policy Website: <https://foodpolicystudy.com/methods/>.

^bIndicates that the product has been reformulated. To assess country-level reformulation, online 2023 nutritional data from each country were compared with online data from 2019. When differences were found between 2023 and 2019, country-specific nutritional databases from other sources were examined to confirm that the product had indeed been reformulated over time (data not shown).

^cUK = United Kingdom.

^dUS = United States.

Figure 2. (continued) Sugar amount references for the seven beverages for which participants were asked to estimate sugar content as part of the International Food Policy Study online surveys.^a

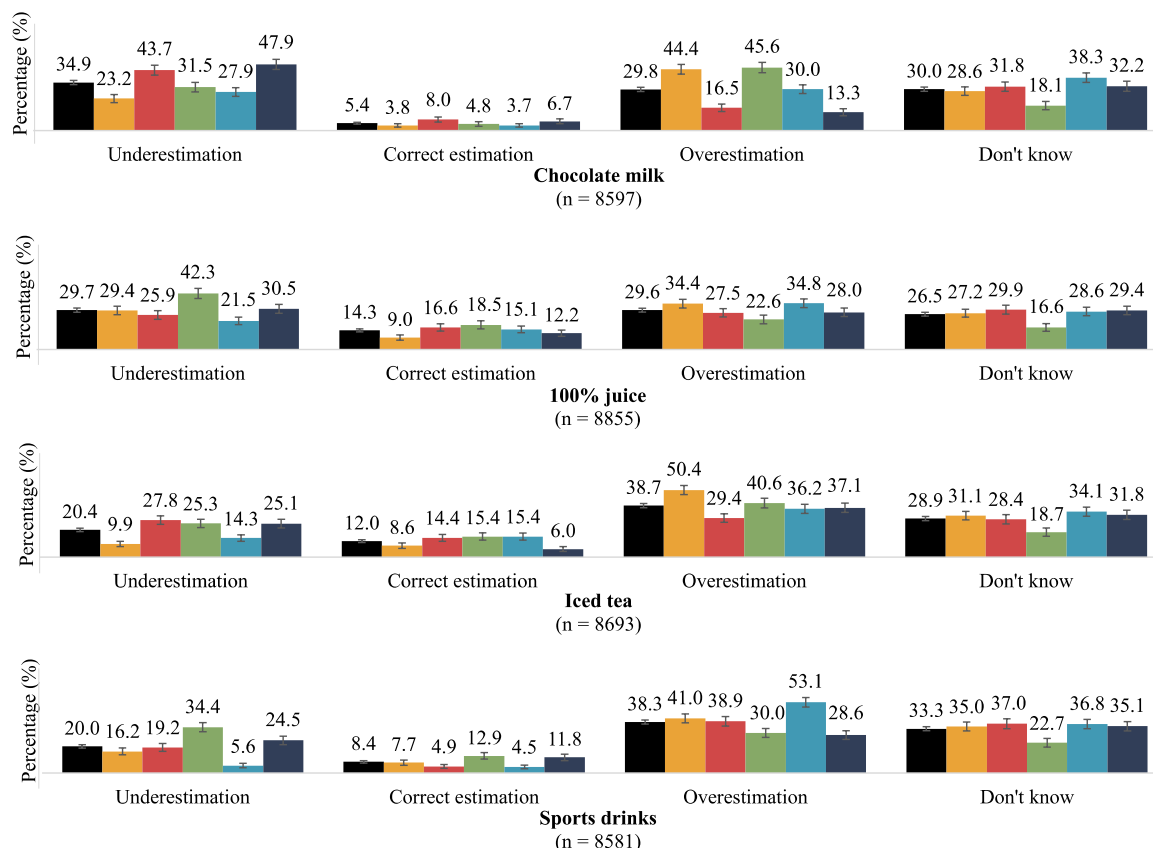


Figure 4. Weighted percentages of participants who under- correctly- or over-estimated or didn't know the sugar amount in each beverage, by country (2018-2021) from online surveys as part of the International Food Policy Study^a. ^aParticipants were asked: "A 500 mL bottle of 'regular' Coke has 55 grams of sugar. How much sugar do you think the following beverage contains?" (in which the bottle size and amount of sugar were country-specific). Estimates within 4 g of the actual value were coded as "correct," while estimates less than 4 g and greater than 4 g of the actual value were considered underestimates and overestimates, respectively. Error bars represent 99% confidence intervals. Minor discrepancies may occur between the sum of each beverage's subsample and the sum of the entire sample due to weight rescaling and rounding. Legend: ■ All countries; ■ Australia; ■ Canada; ■ Mexico; ■ United Kingdom; ■ United States.

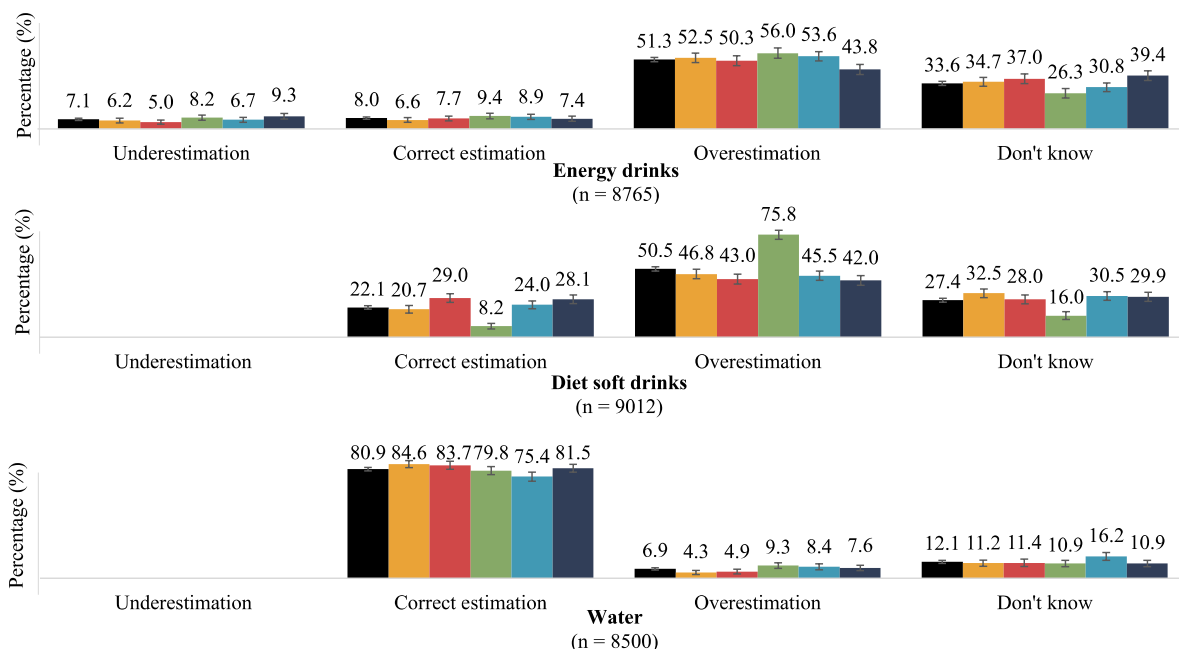


Figure 4. (continued) Weighted percentages of participants who under- correctly- or over-estimated or didn't know the sugar amount in each beverage, by country (2018-2021) from online surveys as part of the International Food Policy Study^a. ^aParticipants were asked: "A 500 mL bottle of 'regular' Coke has 55 grams of sugar. How much sugar do you think the following beverage contains?" (in which the bottle size and amount of sugar were country-specific). Estimates within 4 g of the actual value were coded as "correct," while estimates less than 4 g and greater than 4 g of the actual value were considered underestimates and overestimates, respectively. Error bars represent 99% confidence intervals. Minor discrepancies may occur between the sum of each beverage's subsample and the sum of the entire sample due to weight rescaling and rounding. Legend: ■ All countries; ■ Australia; ■ Canada; ■ Mexico; ■ United Kingdom; ■ United States.

Table 5. Incident rate ratios (IRRs) for sugary drink intake by knowledge of sugary drink health effects based on the International Food Policy Study online surveys^a

		Australia		Canada		Mexico		UK ^b		US ^c	
		IRR ^d (99% CI ^e)	P	IRR (99% CI)	P	IRR (99% CI)	P	IRR (99% CI)	P	IRR (99% CI)	P
Obesity	True vs False/Don't know ^f	0.58 (0.46–0.73)	<.001	0.71 (0.53–0.96)	.003	0.91 (0.75–1.11)	.227	0.90 (0.72–1.12)	.216	0.86 (0.73–1.01)	.016
Diabetes	True vs False/Don't know	0.57 (0.45–0.72)	<.001	0.79 (0.61–1.00)	.011	0.80 (0.66–0.97)	.002	0.90 (0.67–1.20)	.346	0.98 (0.84–1.14)	.682
Tooth decay	True vs False/Don't know	0.69 (0.52–0.90)	<.001	0.78 (0.64–0.95)	.001	0.96 (0.80–1.15)	.549	0.97 (0.63–1.49)	.862	0.96 (0.80–1.16)	.587

^aModels examined the association between knowledge of health effects of sugary drinks and the reported frequency of intake of any sugary drinks in the past 7 days. Models were weighted and adjusted for sociodemographic variables (ie, age group, ethnicity/race, sex at birth, perceived income adequacy, education, presence of a child under 18 at home) and year.

^bUK = United Kingdom.

^cUS = United States.

^dIRR = incident rate ratio.

^eCI = confidence intervals.

^fThe second listed category was used as the reference group.