

Diet vs Sugar-Sweetened Soda Preferences and Attitudes in a Sample of Adolescents

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Abstract: North American adolescents' consumption of sodas is of concern in the face of the obesity epidemic. We wished to determine if their perceptions about sugared and diet sodas were reflected in their blinded preferences. Our n=194, with an average age of 15.2 years, and a response rate of 97%. Among respondents, 3% stated that they strongly preferred diet soda, 3% somewhat preferred diet soda, 37% strongly preferred sugar-sweetened soda, 27% somewhat preferred sugar-sweetened soda, and 30% had no preference between diet and sugar-sweetened soda. The average rating for sugar-sweetened soda was 5.9 vs 5.1 vs diet sodas. The r2 was 0.034 (p=0.73) between actual sugar content and taste rating. Public health campaigns that wish to convert adolescents from sugar-sweetened to diet sodas would do well to lessen adolescents' concerns about health risks of diet sodas, and manufacturers might consider that adolescents seek tastes in soda beyond merely sugar consumption.

Keywords: Adolescent, nutrition, soda, dietary preferences.

INTRODUCTION

There is concern about the 300% increase in soda consumption among North American adolescents over the last twenty years. Soda consumption is a critical issue in nutrition, because of the obesity epidemic and because sodas are the leading source of added sugars in the U.S. diet; [1, 2] a large (n=1,810) U.S. study of children and adolescents found that those consuming non-diet soft drinks averaged an energy intake of 2,018 kcal/day vs 1,830 for non-consumers [3]. In the U.S., 56-85% of schoolchildren drink ≥ 1 soda/day, increasing their odds ratio of becoming obese 1.6 times for each additional sugar-sweetened soda [1]. In order to inform interventions to decrease soda consumption, we sought to answer three sets of questions regarding adolescents and diet vs sugared sodas: (1) attitudes regarding healthfulness, and perceived preferences regarding the taste of diet vs sugar-sweetened soda; (2) if those perceived preferences are mirrored by actual taste preferences; (3) whether adolescents can discern the difference between diet vs sugar-sweetened soda. We hypothesized that perceptions about sugared and diet sodas would influence beverage choices, and hence adolescents' caloric intake.

METHODS

We received expedited exemption from the Behavioural Research Ethics Board at the University of British Columbia. We offered small (<1 ounce) servings of 6 regular and 6 diet sodas to children unknown to us, ages 12-17, in a convenience-selected public secondary school in North Vancouver, British Columbia, Canada. Students were invited

by their teacher to decline participation, if preferred, for any reason. Tested sodas were diet and sugar-sweetened versions of Coca-Cola, Nestea, Pepsi, 7-Up, and Life brand Peach and Cranberry/Raspberry sodas. To blind the study, we removed sodas' labels; diet and sugar-sweetened versions of sodas were already bottled identically by the manufacturers. All twelve sodas were randomly numbered, and students poured tastes for themselves into small disposable cups.

Data collected included age, gender, and current diet and sugar-sweetened soda consumption. We also studied: (1) perceived healthfulness of diet vs sugar-sweetened sodas ("1=very bad for your health" to "10=very good for your health"), (2) perceived preference for diet vs sugar-sweetened sodas ("strongly prefer diet soda", "strongly prefer sugared soda", "somewhat prefer diet soda", "somewhat prefer sugared soda", and "have no preference between diet and sugared soda"), (3) actual, blinded preferences for diet vs sugar-sweetened sodas, and (4) whether blinded subjects could tell the difference between diet vs sugar-sweetened sodas. As our main outcome measures were primarily tests of preference and without standardized measurements, we constructed simple questionnaire items with Likert-scaled responses, and first pilot tested them (n=9 students) at another school for face validity. Data were entered onto Excel spreadsheets, and analyzed using Excel.

RESULTS

Our population's demographics showed a total sample size of 194, a mean age of 15.2 years, 47% male gender, and a response rate of 97%. Mean monthly consumption of diet soda was 1.7 servings; mean monthly consumption of sugar-sweetened soda was 7.0 servings. Among respondents, 3% strongly preferred diet soda, 3% somewhat preferred diet soda, 37% strongly preferred sugar-sweetened soda, 27%

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somewhat preferred sugar-sweetened soda, and 30% had no preference between diet and sugar-sweetened soda.

Respondents were asked “If 1=very bad for your health and 10=very good for your health, please rate [diet] / [sugared] sodas”; the average ratings were 3.6 for diet soda, and 4.1 for sugared soda.

Table 1 shows the actual sugar content of each presented soda, its taste rating, and the percentage of participants believing that a soda is sugar-sweetened. The average rating for sugared soda was 5.9 vs 5.1 vs diet sodas. Sodas were correctly identified as being either diet or sugared 62.4% of the time. The six sugar-sweetened sodas were correctly identified an average of 65.5% of the time (52% of respondents correctly identified sugar-sweetened Coke as sugar-sweetened, 57% for sugared Nestea, 66% for sugared Cran-Raspberry, 66% for sugared Pepsi, 72% for sugared 7-Up, and 80% for sugared Peach). The six diet sodas were correctly identified as diet an average of 59.2% of the time (42% of respondents correctly identified diet Cran-Raspberry as a diet soda, 43% for diet Nestea, 62% for diet Pepsi, 63% for diet 7-Up, 66% for diet peach, and 79% for diet Coke).

Fig. (1) shows the relationship between actual sugar content and taste rating; the r^2 was 0.034 ($p=0.73$). Fig. (2) shows the percent of respondents believing that sodas were sugar-sweetened versus their taste ratings of those same sodas; the r^2 was .004 for sugar-sweetened drinks ($p=0.91$), and the r^2 was .18 for sugar-sweetened drinks ($p=0.41$).

DISCUSSION

Our population was an average age of 15 years old, and drank both and sugar-sweetened sodas, preferring sugar-sweetened both in both their blinded opinions and in their reported consumption. They recognized that neither sugared nor artificially-sweetened sodas were healthful, believing that diet sodas were slightly less healthy than sugared ones. Sugar-sweetened sodas were correctly identified as such 66% of the time, and diet sodas were correctly identified 59% of the time; somewhat, though not markedly better than would be expected by chance alone.

These adolescents reported very strong perceived taste preferences for sugared sodas, and they preferred sugar-sweetened sodas in blinded testing. But contrary to their strongly held perceptions, the blinded rating difference

between sugared and diet soda was only 16%, the amount of sugar in the sugar-sweetened sodas was not correlated with its taste ranking, and they were not much more likely than chance alone to be able to correctly distinguish between sugared and artificially-sweetened soda. Unsurprisingly, perceived soda preferences make a large difference in soda consumption: a study of 560 children ages 8-13 showed that those with the strongest preference for the taste of soft drinks were 4.5 times as likely (2.9-7.0 95% CI) than others to drink sodas $\geq 5x/week$ [4]. And environment clearly plays a role: the same study showed that children whose parents were regular soda drinkers were 2.9 times as likely to drink sodas $\geq 5x/week$ [4].

Table 1. Actual Sugar Content (Per Serving) of Each Soda, its Taste Rating, and the Percentage of Participants Believing that a Soda is Sugar-Sweetened

Soda	Sugar (Grams)	Taste Rating	% Believing the Soda is Sugar-Sweetened
7-Up (sugared)	30	6.3	72
7-Up (diet)	0	5.8	37
Coke (sugared)	30	6.2	52
Coke (diet)	0	4.5	21
Cran/Raspberry (sugared)	33	4.7	66
Cran/Raspberry (diet)	0	4.7	58
Nestea (sugared)	21	5.8	57
Nestea (diet)	0	5.9	57
Peach (sugared)	33	6.1	80
Peach (diet)	0	4.8	34
Pepsi (sugared)	29	6.3	66
Pepsi (diet)	0	4.9	38

The generalizability of these findings is limited by our sample size of 194.

IMPLICATIONS

Based on these data, public health campaigns that seek to convert adolescents from sugar-sweetened to diet sodas

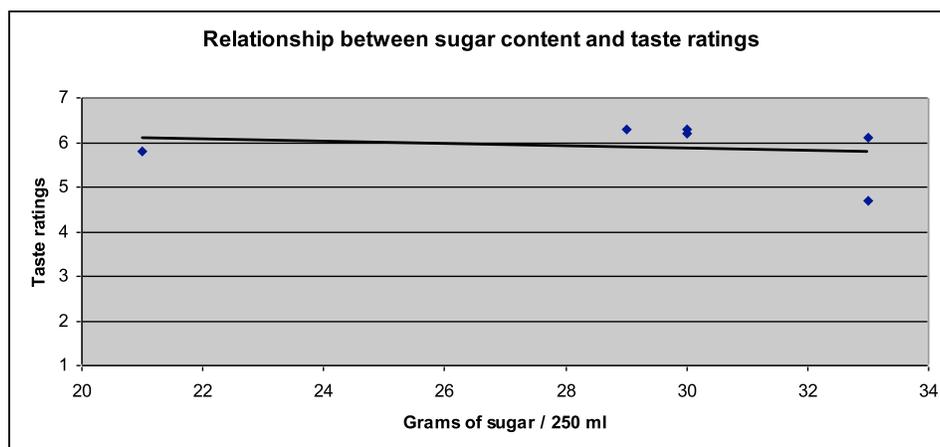


Fig. (1). Relationship between sugar content and taste ratings for sugar-sweetened sodas.

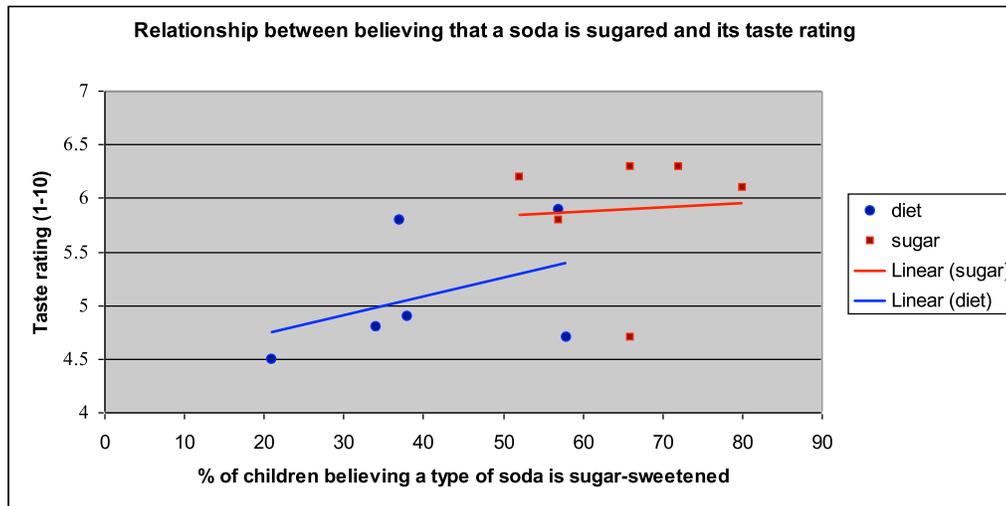


Fig. (2). Relationship between believing that a soda is sugared and its taste rating.

would do well to lessen adolescents' concerns about health risks of diet sodas (and to potentially address their parents' attitudes and other environmental factors), and manufacturers might consider that adolescents seek tastes in soda beyond merely sugar consumption. These are important and encouraging messages for public health advocates that are trying to decrease adolescents' consumption of sugar from soda.

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Received: March 19, 2010

Revised: May 11, 2010

Accepted: June 7, 2010

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