Published in final edited form as:

Acad Pediatr. 2017 July ; 17(5): 529–536. doi:10.1016/j.acap.2017.01.015.

Home Sweet Home: Parent and Home Environmental Factors in Adolescent Consumption of Sugar-Sweetened Beverages

Laura M. Bogart, PhD^{1,2,3}, Marc N. Elliott, PhD¹, Allison J. Ober, PhD¹, David J. Klein, MS^{1,2}, Jennifer Hawes-Dawson, BA¹, Burton O. Cowgill, PhD, MPH⁴, Kimberly Uyeda, MD⁵, and Mark A. Schuster, MD, PhD^{2,3}

¹RAND Corporation, 1776 Main St, P.O. Box 2138, Santa Monica, CA, 90407-2138

²Division of General Pediatrics, Department of Medicine, Boston Children's Hospital, 300 Longwood Ave, Boston, MA, 02115

³Department of Pediatrics, Harvard Medical School, 25 Shattuck St, Boston, MA, 02115

⁴Department of Health Policy and Management, UCLA Fielding School of Public Health, 650 Charles Young Drive South, A2-125 CHS, Box 9569000, Los Angeles, CA 90095-6900

⁵Community Partners and Medi-Cal Programs, Student Health and Human Services, Los Angeles Unified School District, 333 South Beaudry Ave, 29th floor, Los Angeles, CA 90017

Abstract

OBJECTIVE—Sugar-sweetened beverages (SSBs) are key contributors to obesity among youth. We investigated associations among parental and home-related factors (parental attitudes and consumption; home availability) regarding three types of SSBs—soda, sports drinks, and fruit-flavored drinks—with consumption of each type of SSB in a general school-based sample of adolescents.

METHODS—Data were collected across three school semesters, from 2009–2011. A total of 1,313 seventh-grade student-parent dyads participated. Students completed in-class surveys across 9 schools in a large Los Angeles school district; their parents completed telephone interviews. Youth were asked about their SSB consumption (soda, sports drinks, and fruit-flavored drinks), and parents were asked about their attitudes, consumption, and home availability of SSBs.

RESULTS—We estimated expected rates of youth SSB consumption for hypothetical parents at very low (5th) and very high (95th) percentiles for home/parental risk factors (i.e., they [a] consumed little, had negative attitudes, and did not keep SSBs in the home, or [b] consumed a lot, had positive attitudes, and did keep SSBs in the home). Youth of “lower-risk” parents (at the 5th

Corresponding Author: Laura M. Bogart, PhD, RAND Corporation, 1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138. Phone: (310) 393-0411 x7281. lbogart@rand.org.

Financial Disclosure: The authors have no financial relationships relevant to this article to disclose.

Conflict of Interest: None of the authors has any potential conflicts of interest to report. The funder had no role in the preparation, completion, or reporting of this work.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

percentile) were estimated to drink substantially less of each type of beverage than did youth of “higher-risk” parents (at the 95th percentile). For example, youth with higher-risk parents averaged nearly double the SSB consumption of youth of lower-risk parents (2.77 vs. 1.37 glasses on the previous day; overall model significance $F_{22,1312}=3.91$, $p<.001$).

CONCLUSIONS—Results suggest a need to focus on parental and home environmental factors when intervening to reduce youths’ SSB consumption.

Keywords

Adolescent; Obesity Prevention; Parent; Sugar-Sweetened Beverages

INTRODUCTION

In the United States, obesity levels are significant among adolescents aged 12–19, affecting 23% of non-Hispanic Black youth, 23% of Hispanic youth, and 20% of non-Hispanic White youth.¹ Youth with obesity are at greater risk for type 2 diabetes and metabolic syndrome, cardiovascular disease, and psychiatric and psychological problems, as well as social and economic problems related to the persistence of obesity into adulthood.^{2,3}

Multiple studies indicate that sugar-sweetened beverages (SSBs), including sodas, sports drinks, and fruit-flavored drinks, are key contributors to obesity among youth.⁴ For example, an observational longitudinal study indicated that even one additional serving per day of SSBs is associated with a greater risk of increased BMI among youth.⁵ SSBs, the primary source of added sugars in U.S. youths’ diets,⁶ may lead to obesity in part because of lower satiety from liquid calories compared to solid calories, resulting in a lack of compensation for increased liquid caloric intake (i.e., a failure to reduce calories in subsequent meals).⁷ Youth consumption of calories from beverages decreased from 2001–2010, although calories from beverages still account for over 20% of energy intake among US youth in the form of added sugars.⁸ Moreover, significant racial/ethnic and income-level disparities exist: For example, a study in California, the setting of the present research, found a steeper decline in SSB consumption from 2003–2009 among White youth than Latino youth, who showed higher levels of SSB consumption overall.⁹ Children of lower-socioeconomic status also show a higher likelihood of heavy SSB consumption.¹⁰

SSBs provide a specific, modifiable intervention target whose reduction has the potential to have a large impact on health.¹¹ Indeed, reduced SSB consumption alone has been associated with a reduction in body mass index (BMI) among adolescents and adults.^{12,13} Some data suggest that unless consumption of SSBs and other unhealthy snacks is reduced, interventions focused on increasing fruit and vegetable intake and physical activity are unlikely to have much effect on obesity.¹⁴ A better understanding of the factors that contribute to youth consumption of SSBs can contribute to the development of effective interventions.

Multiple studies suggest associations between adolescent SSB consumption and a range of behavioral, social, and environmental factors such as physical inactivity (e.g., watching television, playing video games), low levels of fruit and vegetable consumption, high levels

of fast food consumption, perceptions of high peer consumption, and the keeping of SSBs at home.^{15–19} Factors in the home environment in particular may be a key influence on youths' SSB consumption.^{15,18,20} For example, an analysis of data from the National Health and Nutrition Examination Survey (1999–2004) found that on a typical weekday, 55% to 70% of all sugar-sweetened beverage calories ingested by U.S. youth were consumed in the home environment, compared with 7% to 15% in schools.²⁰

Interventions targeting reduction in access to SSBs among adolescents aged 12–19 are primarily school-based and have had mixed results at lowering long-term SSB intake.^{12,21} Although policy interventions that limit or ban SSBs in schools can lower in-school access to and purchasing of SSBs, they do not appear to decrease overall SSB consumption.²² Thus, there is a need for a better understanding of factors outside of school that are associated with adolescent SSB consumption and potential intervention points.

Family-related factors, including home availability and parental attitudes and consumption, have been found to be associated with adolescents' dietary behaviors, including consumption of fruits and vegetables^{23,24} and SSBs.^{15,18,25–29} For example, research has found correlations between availability of soft drinks at home and adolescent SSB consumption.^{15,26} Qualitative interviews with Latino adolescents and their parents corroborate these findings, with youth citing home availability as a key factor in their SSB consumption.¹⁸ In another study, youth whose parents regularly drank soft drinks were about three times more likely to regularly drink soft drinks, compared to youth whose parents did not drink soft drinks.²⁸ Parental attitudes about soft drinks (e.g., as enjoyable/not enjoyable or good/bad) have also been associated with youth consumption of soft drinks.²⁵

In the present study, we surveyed a general school-based sample of adolescents to investigate the associations of consumption of each of three types of SSBs—soda, sports drinks, and fruit-flavored drinks—with home availability and parental attitudes and consumption. Although a few prior studies have examined associations between the home environment and youth consumption of SSBs, none has studied the relationship of multiple home factors with specific types of SSBs. Furthermore, none has focused on low-income and primarily Latino youth, a group that has disproportionately high levels of obesity and SSB consumption in the U.S. We hypothesized that home availability of, positive parental attitudes about, and parental consumption of each SSB would be associated with greater adolescent consumption of that SSB.

METHODS

Participants and Procedures

Data were collected as part of a middle-school obesity-prevention intervention study that was conducted in partnership with the Los Angeles Unified School District (LAUSD) from 2009–2011.^{30,31} For the present analysis, we analyzed data from student-parent dyads who were surveyed pre-intervention. Students were drawn from seventh-grade classes from nine LAUSD schools with >50% National School Lunch Program (NSLP) eligibility, a proxy for low income. English and Spanish consent forms were distributed in-class for all seventh graders to bring to parents. Parents provided informed consent for children; children

provided assent. Of the 4,022 eligible students, 91% had parental consent for surveys (see Figure 1). A total of 3,211 students completed baseline surveys in class.

Parents or guardians (subsequently called parents) were invited to complete a 30-minute computer-assisted telephone interview (CATI) if they agreed on their seventh grader's parent permission form to be contacted. Parents consented verbally to participate. A total of 1,985 parents completed interviews, and there were 1,724 complete parent-child dyads at baseline. We excluded 269 dyads from two schools for which an initial survey version did not contain key SSB variables that were used in the present analysis. Moreover, because we were interested in students' consumption of SSBs on a school day, student surveys were administered only on Tuesdays, Wednesdays, Thursdays, or Fridays, and students were asked about consumption of SSBs on the prior day, if they were present in school. Thus, we excluded an additional 142 dyads in which the student did not attend school on the day prior to the survey and was skipped out of questions regarding SSB consumption on the previous day. Our analysis therefore included 1,313 dyads. Among the 1,313 dyads included in the present analysis, predictors were missing at rates ranging from 0% to 9.5%, with 15 of the 18 predictors missing for less than 0.5% of observations. For all predictors, missing data were imputed using the weighted mean within each school.

Incentives included small non-cash gifts for students (e.g., pens, pencils, and key chains with the project logo). The research was approved by the RAND Corporation Human Subjects Protection Committee and the LAUSD Committee for External Research Review.

Surveys

Socio-Demographic Characteristics—Youth reported their gender, age, and ethnicity (Latino vs. not), and whether they were born in the U.S. Parents reported their gender, age, marital/relationship status, highest education level, and annual household income, and whether they were born in the U.S. We also obtained parental consent to extract students' weight category (underweight, normal, overweight, obese) and National School Lunch Program eligibility status from school records. As described in detail elsewhere, study staff assessed height and weight using a stadiometer for height and an electronic scale for weight, and these measurements were included in the schools' records.³²

Youth and Parent SSB Consumption—SSB consumption was assessed by asking the following question for each of three beverage types, adapted from prior research:³³

“Yesterday, how many glasses of [soda, like Coke®; sports drinks, like Gatorade®; fruit-flavored drinks like Snapple®, or aqua frescas like tamarindo or Jamaica] did you drink?”

Response options were: *I did not drink any [soda, sports drinks, fruit-flavored drinks] yesterday; less than 1 glass; 1 glass (one cup = 1 glass); 2 glasses (one bottle = 2 glasses); 3 glasses; and 4 or more glasses.* Response options were coded on a continuous 0 to 4 scale to represent the number of glasses consumed (i.e., a “consumption score”), with “less than 1 glass” coded as 0.5 glasses and “4 or more glasses” coded as 4 glasses. We additionally calculated the sum of non-missing responses for the number of glasses consumed across all three SSBs.

Parental Attitudes—Parental attitudes about soda and sports drinks were measured with the following question, adapted from prior research:³⁴ “On a scale from 0 to 10, how do you feel about drinking [soda, like Coke®; sports drinks, like Gatorade®]?” with response options 0 = *very negatively* and 10 = *very positively*.

Home Availability of SSBs—As has been done in prior research,³⁵ parents were asked: “In the past week, were any of the following beverages kept in your home by you or anyone you live with? Please tell me “yes” or “no” for each beverage I read.” SSBs included in the present analysis were described as follows: “Regular sodas like Coke®, do not count diet sodas;” “Sports drinks like Gatorade®, do not count diet sport drinks”; and “Fruit-flavored drinks like Snapple®, or agua frescas like tamarindo or Jamaica.”

Statistical Analysis

Our main analyses focused on examining the associations of the combination of parental and home factors (i.e., parental attitudes about and parental consumption of each beverage and whether each beverage was kept in the home) with youth consumption of SSBs (soda, sports drinks, fruit-flavored drinks, and their sum). Specifically, we calculated the predicted value of each youth outcome for a hypothetical parent who was at the 5th percentile of the distribution for consumption of each beverage, attitudes about each beverage (except for fruit-flavored drinks), and keeping beverages in the home (i.e., they drink little to none of the beverage, have relatively negative attitudes about each beverage, and do not keep it in the home). We did the same for a hypothetical parent at the 95th percentile (i.e., parents who drink a lot of each beverage, have relatively positive attitudes about each beverage, and keep the beverage in the home). To obtain these predicted values, we conducted multivariate weighted linear regression models for each of the three youth consumption outcome variables (youth consumption of soda, sports drinks, and fruit-flavored drinks), as well as their sum. Predictors in each multivariate model included parental attitudes about and parental consumption of each beverage and whether each beverage was kept in the home, as well as socio-demographic characteristics (parent and youth age and gender, youth race/ethnicity, NSLP eligibility, and weight category, parent U.S. born, youth U.S. born, parent income, education, and marital status). The surveys did not assess parental attitudes about fruit-flavored drinks and thus this variable was not included in models predicting SSB consumption. In addition, we conducted a sensitivity analysis, testing the multivariate models as ordered logit models (instead of linear regression models). Results for the overall model were similar in magnitude and significance to the linear regression models, and thus we present the linear regression models.

A multiple logistic regression determined that male gender, black race, older age, and school were significantly ($p < .05$) or marginally ($p < .10$) associated with nonresponse to either the parent or student baseline survey. Predicted probabilities from this regression were inverted to produce nonresponse weights for all analyses.

RESULTS

Participants

Table 1 shows the weighted descriptive statistics for the socio-demographic characteristics of the 1,313 parent-adolescent dyads. Most youth in the sample reported that they were Latino (74%); 10% were Black, 6% White, 6% multiple races/ethnicities, 5% Asian/Pacific Islander, and 0.2% American Indian/Alaskan Native. Of those reporting Latino ethnicity, 71% were Mexican/Chicano, 16% Salvadorian, 5% Guatemalan, 2% Honduran, and 6% other. About a quarter of parents (23%) and most youth (83%) were born in the United States. Most (88%) parents earned less than \$50,000 per year, with 60% earning under \$25,000. Most (89%) of the youth were eligible for the NSLP. Twenty-eight percent of parents had obtained a high school diploma but no other schooling, and 38% had not completed high school. Seventy percent of parents were married or living together as married. Forty-nine percent of adolescents for whom we obtained BMI data (42% of the overall sample including missing data) had overweight or obesity.

The average amount of consumption on the day prior to the survey was almost two glasses ($M = 1.8$, $SD = 1.8$) across all three SSBs, and less than a glass of each individual type of SSB [M (SD) = 0.63 (0.90) for soda, 0.43 (0.81) for sports drinks, and 0.83 (1.00) for fruit-flavored drinks. Only 21% of participants drank zero glasses of SSBs on the prior day; 56% of participants drank zero glasses of soda, 71% drank zero glasses of sports drinks, and 46% drank zero glasses of fruit-flavored drinks.

Rates of Youth SSB Consumption at High and Low Levels of Home/Parental Factors

We estimated the expected rates of youth SSB consumption for hypothetical parents at very low (5th) and very high (95th) percentiles for home/parental risk factors (i.e., they [a] consumed little, had negative attitudes, and did not keep SSBs in the home, or [b] consumed a lot, had positive attitudes, and did keep SSBs in the home). Youth of “lower-risk” parents (i.e., at the 5th percentile of all three SSB-related variables) were estimated to drink substantially less of each type of beverage than did youth of “higher-risk” parents (i.e., at the 95th percentile) (see Figure 2). That is, youth of parents who were less likely to drink SSBs, to have positive attitudes about SSBs, and to keep SSBs at home drank fewer glasses of SSBs themselves, whereas youth of parents who were more likely to drink a lot of SSBs, to have positive attitudes about SSBs, and to keep SSBs at home drank more glasses of SSBs. Specifically, for soda consumed the day before the survey, an average youth whose parents were in the low (5th) percentile would drink less than half a glass (0.41 glasses), whereas an average youth whose parents were in the high (95th) percentile would drink a little more than a glass (1.07 glasses) ($F_{22, 1293} = 3.86$, $p < .001$ for overall model significance). For sports drinks, youth whose parents were in the low percentile had a consumption score of 0.30; in contrast, youth whose parents were in the high percentile had a score of 0.65 ($F_{22, 1310} = 2.60$, $p < .001$). Youth with parents in the low percentile for fruit-flavored drinks had a consumption score of 0.69, and youth with parents in the high percentile had a score of 1.09 ($F_{22, 1264} = 1.74$, $p = .02$). For the sum, youth with higher-risk parents averaged nearly double the SSB consumption of youth with lower-risk parents (2.77 vs. 1.37 glasses for consumption on the previous day, $F_{22, 1312} = 3.91$, $p < .001$).

Multivariate Models: Parental Factors and Youth SSB Consumption

In Table 2, we present the multivariate models from which we drew the predicted probabilities for the analysis presented above. In the multivariate model predicting youth soda consumption, parental consumption of soda, parental consumption of fruit-flavored drinks, and keeping soda in the home were all significantly associated with greater youth consumption of soda. In the multivariate model predicting youth consumption of sports drinks, keeping sports drinks in the home was significantly associated with greater youth consumption of sports drinks. In addition, keeping fruit-flavored beverages in the home was marginally associated with greater youth consumption of these beverages. Finally, keeping sports drinks in the home and parental consumption of fruit-flavored beverages were significantly associated with youth consumption of all three types of SSBs combined.

DISCUSSION

We examined relationships between both home environmental and parental factors—home availability, parental consumption, and parental attitudes regarding three types of SSBs (soda, sports drinks, fruit-flavored drinks)—and youth consumption of each of these SSBs. In particular, to extend prior research, which has focused on the independent contribution of individual predictors,^{25–29} we sought to determine whether a combination of risk factors related to SSBs (parental consumption, parental attitudes, and home availability) was associated with youth SSB consumption. Results indicated that youth drank fewer SSBs if their parents had less positive attitudes about SSBs, drank only small quantities of the beverages themselves, and did not keep SSBs in the home. This finding was most striking for soda consumption, with youth with low home availability, low-consuming parents, and parents with less favorable attitudes drinking less than a glass of soda on average, and youth of high home availability and high-consuming parents with more favorable attitudes drinking more than one glass on the prior day. Overall, lower parental consumption and less positive attitudes about SSBs, when combined with not keeping the beverage in the home, resulted in more favorable youth outcomes.

In multivariate models conducted to examine the independent contribution of each predictor, home availability had the most consistent association with youth consumption, and parental consumption of soda (unlike parental consumption of sports drinks or fruit-flavored drinks) was associated with increased youth consumption of soda. Although prior studies have found relationships between home availability and youth consumption of SSBs in general,^{15,20} none has assessed multiple home and parental factors and their relative influence on youth consumption of each beverage.

Although the school environment has been the focus of multiple educational and policy interventions,^{12,21,22,36} the fact that most SSBs are consumed in the home,²⁰ along with our findings on home availability and parental consumption, suggest the need to develop multi-level interventions that supplement school-based interventions with home-based interventions. Pertinent to interventions aimed at reducing SSB availability in schools, Taber et al. (2011) examined data from 40 states with and without policies banning the sale of SSBs in schools. They found that the bans were associated with reduced in-school SSB purchases, but had little association with overall youth SSB consumption.²² Further, some

school-based educational interventions have reduced SSB consumption, but few have had a long-term impact.²¹ Thus, interventions are needed that educate parents about the link between SSB consumption with obesity among youth and adults, so that they can make informed decisions about storing SSB at home and consuming SSB themselves. Such information could be conveyed in parenting programs, as well as in mass media campaigns that use the same marketing channels (e.g., billboards, online advertisements) to reach parents and youth that beverage companies use.

Results from intervention research on home availability have been promising. In the only randomized controlled trial focused on the home environment, Ebbeling and colleagues tested the effects of a home-based intervention designed to displace SSB consumption with consumption of non-caloric beverages among adolescents with overweight or obesity.¹³ The intervention consisted of home delivery of non-caloric beverages (e.g., bottled water and “diet” beverages) every two weeks for a year, monthly motivational telephone calls with parents, and check-in visits with participants.¹³ Participants also were regularly mailed messages reminding them to drink delivered beverages and not to purchase any SSBs. After one year, youth in the intervention group reduced SSB intake to near zero and showed lower BMI, whereas youth in the control group increased SSB intake. Effects on BMI were mediated by sugar intake and moderated by race/ethnicity, such that changes in BMI were only significant for Latino youth. This intervention targeted parental purchase of SSBs for home consumption, a factor we found to be significantly associated with youth consumption, but it required a high commitment from parents and youth, and high levels of staffing. Further research is needed to determine whether less resource-heavy home-based interventions could be similarly effective at reducing SSB consumption.

While our findings have important implications, our study is limited to LAUSD middle school youth and parents, so generalizations should be made with caution. Furthermore, we did not assess acculturation, a key covariate that could have been associated with SSB consumption. In addition, causal relationships cannot be established based on the cross-sectional, non-experimental design. In sum, the present study’s findings support the home environment, combined with parental attitudes and consumption, as an important point of intervention for lowering youth consumption of SSBs. Given associations between home availability and increased youth consumption of soda and sports drinks, as well as the association between parental soda consumption and youth soda consumption, interventions targeting home availability and parental attitudes might lower both youth and parental consumption.

Acknowledgments

Funding Source: This work was supported by the National Institute on Minority Health and Health Disparities (R24 MD001648).

We are grateful to the students and their parents who participated in this research, as well as the members of the Healthy Living Advisory Board (the community advisory board for this study).

References

1. Ogden CL, Carroll MD, Lawman HG, et al. Trends in obesity prevalence among children and adolescents in the united states, 1988–1994 through 2013–2014. *JAMA*. 2016; 315(21):2292–2299. [PubMed: 27272581]
2. Dietz W. Health consequences of obesity in youth: childhood predictors of adult disease. *Pediatrics*. 1998; 101:518–525. [PubMed: 12224658]
3. Reilly J, Methven E, McDowell Z, et al. Health consequences of obesity. *Arch Dis Child*. 2003; 88:748–752. [PubMed: 12937090]
4. Malik VS, Pan A, Willett WC, Hu FB. Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. *Am J Clin Nutr*. Oct; 2013 98(4):1084–1102. [PubMed: 23966427]
5. Ludwig DS, Peterson KE, Gortmaker SL. Relation between consumption of sugar-sweetened drinks and childhood obesity: a prospective, observational analysis. *Lancet (London, England)*. Feb 17; 2001 357(9255):505–508.
6. Reedy J, Krebs-Smith SM. Dietary sources of energy, solid fats, and added sugars among children and adolescents in the United States. *J Am Diet Assoc*. Oct; 2010 110(10):1477–1484. [PubMed: 20869486]
7. Hu FB, Malik VS. Sugar-sweetened beverages and risk of obesity and type 2 diabetes: epidemiologic evidence. *Physiol Behav*. Apr 26; 2010 100(1):47–54. [PubMed: 20138901]
8. Mesirow MS, Welsh JA. Changing beverage consumption patterns have resulted in fewer liquid calories in the diets of US children: National Health and Nutrition Examination Survey 2001–2010. *J Acad Nutr Diet*. Apr; 2015 115(4):559–566. e554. [PubMed: 25441966]
9. Beck AL, Patel A, Madsen K. Trends in sugar-sweetened beverage and 100% fruit juice consumption among California children. *Acad Pediatr*. Jul-Aug;2013 13(4):364–370. [PubMed: 23688439]
10. Han E, Powell LM. Consumption patterns of sugar sweetened beverages in the United States. *J Acad Nutr Diet*. 2013; 113(1):43–53. [PubMed: 23260723]
11. Singh GM, Micha R, Khatibzadeh S, Lim S, Ezzati M, Mozaffarian D. Estimated global, regional, and national disease burdens related to sugar-sweetened beverage consumption in 2010. *Circulation*. Jun 29.2015
12. Levy DT, Friend KB, Wang YC. A review of the literature on policies directed at the youth consumption of sugar sweetened beverages. *Adv Nutr*. Mar; 2011 2(2):182S–200S. [PubMed: 22332051]
13. Ebbeling CB, Feldman HA, Chomitz VR, et al. A randomized trial of sugar-sweetened beverages and adolescent body weight. *N Engl J Med*. Oct 11; 2012 367(15):1407–1416. [PubMed: 22998339]
14. Cohen DA, Sturm R, Scott M, Farley TA, Bluthenthal R. Not enough fruit and vegetables or too many cookies, candies, salty snacks, and soft drinks? *Public Health Rep*. Jan-Feb;2010 125(1):88–95.
15. Denney-Wilson E, Crawford D, Dobbins T, Hardy L, Okely AD. Influences on consumption of soft drinks and fast foods in adolescents. *Asia Pac J Clin Nutr*. 2009; 18(3):447–452. [PubMed: 19786394]
16. Park S, Blanck HM, Sherry B, Brener N, O'Toole T. Factors associated with sugar-sweetened beverage intake among United States high school students. *J Nutr*. Feb; 2012 142(2):306–312. [PubMed: 22223568]
17. Ranjit N, Evans MH, Byrd-Williams C, Evans AE, Hoelscher DM. Dietary and activity correlates of sugar-sweetened beverage consumption among adolescents. *Pediatrics*. Oct; 2010 126(4):e754–761. [PubMed: 20876172]
18. Bogart LM, Cowgill BO, Sharma AJ, et al. Parental and home environmental facilitators of sugar-sweetened beverage consumption among overweight and obese Latino youth. *Acad Pediatr*. Jul-Aug;2013 13(4):348–355. [PubMed: 23680295]

19. Perkins JM, Perkins HW, Craig DW. Misperceptions of peer norms as a risk factor for sugar-sweetened beverage consumption among secondary school students. *J Am Diet Assoc.* Dec; 2010 110(12):1916–1921. [PubMed: 21111101]
20. Wang YC, Bleich SN, Gortmaker SL. Increasing caloric contribution from sugar-sweetened beverages and 100% fruit juices among US children and adolescents, 1988–2004. *Pediatrics.* Jun; 2008 121(6):e1604–1614. [PubMed: 18519465]
21. Avery A, Bostock L, McCullough F. A systematic review investigating interventions that can help reduce consumption of sugar-sweetened beverages in children leading to changes in body fatness. *J Hum Nutr Diet.* Jan; 2015 28(Suppl 1):52–64. [PubMed: 25233843]
22. Taber DR, Chriqui JF, Powell LM, Chaloupka FJ. Banning all sugar-sweetened beverages in middle schools: reduction of in-school access and purchasing but not overall consumption. *Arch Pediatr Adolesc Med.* Mar; 2011 166(3):256–262. [PubMed: 22064875]
23. Lawman HG, Wilson DK. A review of family and environmental correlates of health behaviors in high-risk youth. *Obesity (Silver Spring).* Jun; 2012 20(6):1142–1157. [PubMed: 22282044]
24. Rasmussen M, Krolner R, Klepp KI, et al. Determinants of fruit and vegetable consumption among children and adolescents: a review of the literature. Part I: Quantitative studies. *Int J Behav Nutr Phys Act.* 2006; 3:22. [PubMed: 16904006]
25. Pettigrew S, Jongenelis M, Chapman K, Miller C. Factors influencing the frequency of children's consumption of soft drinks. *Appetite.* Aug 1.2015 91:393–398. [PubMed: 25953597]
26. Hebden L, Hector D, Hardy LL, King L. A fizzy environment: availability and consumption of sugar-sweetened beverages among school students. *Prev Med.* Jun; 2013 56(6):416–418. [PubMed: 23480973]
27. Campbell KJ, Crawford DA, Salmon J, Carver A, Garnett SP, Baur LA. Associations between the home food environment and obesity-promoting eating behaviors in adolescence. *Obesity (Silver Spring).* Mar; 2007 15(3):719–730. [PubMed: 17372323]
28. Grimm GC, Harnack L, Story M. Factors associated with soft drink consumption in school-aged children. *J Am Diet Assoc.* Aug; 2004 104(8):1244–1249. [PubMed: 15281041]
29. Ezendam NP, Evans AE, Stigler MH, Brug J, Oenema A. Cognitive and home environmental predictors of change in sugar-sweetened beverage consumption among adolescents. *Br J Nutr.* Mar; 2010 103(5):768–774. [PubMed: 20003610]
30. Bogart LM, Cowgill BO, Elliott MN, et al. A randomized controlled trial of Students for Nutrition and eXercise: a community-based participatory research study. *J Adolesc Health.* Sep; 2014 55(3):415–422. [PubMed: 24784545]
31. Bogart LM, Elliott MN, Cowgill BO, et al. Two-year BMI outcomes from a school-based intervention for nutrition and exercise: a randomized trial. *Pediatrics.* 2016; 137(5) 2016-05-01 00:00:00.
32. California Department of Education. 2010–2011 California Physical Fitness Report Overall — Meeting Healthy Fitness Zone Summary of Results Los Angeles Unified District. 2011.
33. Babey, SH., Jones, M., Goldstein, H. Bubbling over: soda consumption and its link to obesity in California. UCLA Center for Health Policy Research; Sep 1. 2009
34. Kassem NO, Lee JW. Understanding soft drink consumption among male adolescents using the theory of planned behavior. *J Behav Med.* Jun; 2004 27(3):273–296. [PubMed: 15259456]
35. Bjelland I M, Lien N, Grydeland M, et al. Intakes and perceived home availability of sugar-sweetened beverages, fruit and vegetables as reported by mothers, fathers and adolescents in the HEIA (HEalth In Adolescents) study. *Public Health Nutr.* 2011; 14(12):2156–2165. [PubMed: 21729482]
36. Muckelbauer R, Libuda L, Clausen K, Toschke AM, Reinehr T, Kersting M. Promotion and provision of drinking water in schools for overweight prevention: randomized, controlled cluster trial. *Pediatrics.* Apr; 2009 123(4):e661–667. [PubMed: 19336356]

WHAT'S NEW

Among seventh graders in Los Angeles, California, home availability and parental consumption of sugar-sweetened beverages were associated with increased youth consumption of sugar-sweetened beverages.

FIGURE 1.
Parent and Youth Participant Enrollment, Assessment, and Analysis Flow Diagram

FIGURE 2. Rates of Youth SSB Consumption at High and Low Levels of Parental/Home Environmental Factors

Note: P-values are for joint significance of all terms in the model. Number of glasses consumed was based on the question: “Yesterday, how many glasses of [regular soda/sports drinks/fruit-flavored drinks] did you drink?” with response options: 0 = I did not drink [regular soda/sports drinks/fruit-flavored drinks] yesterday; .5 = Less than 1 glass; 1 = 1 glass (one can or cup = 1 glass); 2 = 2 glasses (one bottle = 2 glasses); 3 = 3 glasses; and 4 = 4 or more glasses.

TABLE 1

Sample Characteristics (n = 1,313)

	%
YOUTH	
Age (years)	
11	10%
12	57%
13	30%
14	3%
Male	50%
Latino Ethnicity	74%
Born in the United States	83%
Eligible for National School Lunch Program	89%
Weight category	
Underweight	2%
Normal Weight	44%
Overweight	18%
Obese	24%
Missing / did not give consent	12%
SSB Consumption: Soda (# glasses)	
0 glasses	56%
Less than a glass	11%
1 glass	19%
2 glasses	8%
3 glasses	4%
4 or more glasses	2%
SSB Consumption: Sports Drinks (# glasses)	
0 glasses	71%
Less than a glass	6%
1 glass	11%
2 glasses	8%
3 glasses	2%
4 or more glasses	2%
SSB Consumption: Fruit Drinks (# glasses)	
0 glasses	46%
Less than a glass	11%
1 glass	21%
2 glasses	14%
3 glasses	6%
4 or more glasses	3%
SSB Consumption: Overall Sum (# glasses)	
0 glasses	21%

	%
0.10–0.99 glasses	9%
1–1.99 glasses	26%
2–2.99 glasses	18%
3–3.99 glasses	11%
4 or more glasses	14%
PARENT	
Age (years)	
18 – 34	22%
35 – 39	28%
40 – 44	22%
45 and older	28%
Male	17%
Born in the United States	23%
Income	
<\$25K	60%
\$25K–<\$50K	28%
\$50K–<\$75K	7%
\$75K–<100K	3%
100K +	3%
Education	
<High School Degree	38%
High School Graduate	28%
Some college	16%
2-year degree	8%
4-year degree	6%
Some Graduate School	3%
Marital status	
Married	56%
Domestic partnership	2%
Living as Married	12%
Widowed	2%
Divorced	6%
Separated	9%
Never Married	13%

Note: Percentages may not equal 100% due to rounding. In regression analyses, youth and parent age were treated as continuous; non-Latino categories were combined for the race/ethnicity variable; married, living as married, and domestic partnership were combined for the marital status variable; and underweight and normal weight were combined for the weight category variable.

TABLE 2
Weighted Multivariate Linear Regressions for Parental Correlates of Youth SSB Consumption

Parent Characteristic	Youth SSB Consumption			
	Soda b (SE) N=1,293	Sports Drinks b (SE) N=1,311	Fruit-Flavored Drinks b (SE) N=1,265	All SSBs b (SE) N=1,313
Overall Model Significance	p < .001	p < .001	p = .02	p < .001
<i>Soda</i>				
Parent drinks soda	.05 (.03) *	-.01 (.02)	-.01 (.03)	.04 (.05)
Parent keeps soda in the home	.27 (.06) ***	.00 (.06)	-.07 (.07)	.20 (.13)
Parent has favorable attitude toward soda	.01 (.01)	.00 (.01)	.02 (.01)	.03 (.03)
<i>Sports drinks</i>				
Parent drinks sports drinks	.02 (.02)	.02 (.02)	.02 (.03)	.06 (.05)
Parent keeps sports drinks in the home	.11 (.06) +	.23 (.05) ***	.06 (.07)	.41 (.12) ***
Parent has favorable attitude toward sports drinks	.00 (.01)	.00 (.01)	.01 (.01)	-.01 (.02)
<i>Fruit-flavored drinks</i>				
Parent drinks fruit-flavored drinks	.05 (.03) *	.04 (.02)	.03 (.03)	.10 (.05) *
Parent keeps fruit-flavored drinks in the home	-.08 (.06)	.00 (.06)	.13 (.07) +	.04 (.13)

+ p<.10

* p<.05

*** p<.001