

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

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## 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 3 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 3 school semesters, from 2009 to 2011. A total of 1313 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 (ie, they consumed little, had negative attitudes, and did not keep SSBs in the home; or they consumed a lot, had positive attitudes, and did keep SSBs in the home). Youth of lower-risk parents (at the 5th 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

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## WHAT'S NEW

Among 7th graders in Los Angeles, California, home availability and parental consumption of sugar-sweetened beverages (SSBs) were associated with increased youth consumption of SSBs.

IN THE UNITED States, obesity levels are significant among adolescents aged 12 to 19, affecting 23% of non-Hispanic black youth, 23% of Hispanic youth, and 20% of non-Hispanic white youth.<sup>1</sup> 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.<sup>2,3</sup>

Multiple studies indicate that sugar-sweetened beverages (SSBs), including sodas, sports drinks, and fruit-

flavored drinks, are key contributors to obesity among youth.<sup>4</sup> For example, an observational longitudinal study indicated that even 1 additional serving per day of SSBs is associated with a greater risk of increased body mass index (BMI) among youth.<sup>5</sup> SSBs, the primary source of added sugars in US youths' diets,<sup>6</sup> 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 (ie, a failure to reduce calories in subsequent meals).<sup>7</sup> Youth consumption of calories from beverages decreased from 2001 to 2010, although calories from beverages still account for over 20% of energy intake among US youth in the form of added sugars.<sup>8</sup> 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 to 2009 among white youth

than Latino youth, who showed higher levels of SSB consumption overall.<sup>9</sup> Children of lower socioeconomic status also show a higher likelihood of heavy SSB consumption.<sup>10</sup>

SSBs provide a specific, modifiable intervention target whose reduction has the potential to have a large impact on health.<sup>11</sup> Indeed, reduced SSB consumption alone has been associated with a reduction in BMI among adolescents and adults.<sup>12,13</sup> 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.<sup>14</sup> 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 (eg, 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.<sup>15–19</sup> Factors in the home environment in particular may be a key influence on youths' SSB consumption.<sup>15,18,20</sup> 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 SSB calories ingested by US youth were consumed in the home environment, compared with 7% to 15% in schools.<sup>20</sup>

Interventions targeting reduction in access to SSBs among adolescents aged 12 to 19 are primarily school-based and have had mixed results at lowering long-term SSB intake.<sup>12,21</sup> 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.<sup>22</sup> 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<sup>23,24</sup> and SSBs.<sup>15,18,25–29</sup> For example, research has found correlations between availability of soft drinks at home and adolescent SSB consumption.<sup>15,26</sup> Qualitative interviews with Latino adolescents and their parents corroborate these findings, with youth citing home availability as a key factor in their SSB consumption.<sup>18</sup> In another study, youth whose parents regularly drank soft drinks were about 3 times more likely to regularly drink soft drinks, compared to youth whose parents did not drink soft drinks.<sup>28</sup> Parental attitudes about soft drinks (eg, as enjoyable/not enjoyable or good/bad) have also been associated with youth consumption of soft drinks.<sup>25</sup>

In the present study, we surveyed a general school-based sample of adolescents to investigate the associations of consumption of each of 3 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 United States. 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 to 2011.<sup>30,31</sup> For the present analysis, we analyzed data from student–parent dyads who were surveyed before the intervention. Students were drawn from 7th grade classes from 9 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 7th graders to bring to parents. Parents provided informed consent for children; children provided assent. Of the 4022 eligible students, 91% had parental consent for surveys (Fig. 1). A total of 3211 students completed baseline surveys in class.

Parents or guardians (subsequently called parents) were invited to complete a 30-minute computer-assisted telephone interview if they agreed on their 7th grader's parent permission form to be contacted. Parents consented verbally to participate. A total of 1985 parents completed interviews, and there were 1724 complete parent–child dyads at baseline. We excluded 269 dyads from 2 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 before the survey and was skipped out of questions regarding SSB consumption on the previous day. Our analysis therefore included 1313 dyads. Among the 1313 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 noncash gifts for students (eg, 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.

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