Research Article

Associations Between Sugar-Sweetened Beverage Consumption and Fast-Food Restaurant Frequency Among Adolescents and Their Friends

Meg Bruening, PhD, MPH, RD[1,†]; Richard MacLehose, PhD[2]; Marla E. Eisenberg, ScD, MPH[3]; Marilyn S. Nanney, PhD, MPH, RD[4]; Mary Story, PhD, RD[5,†]; Dianne Neumark-Sztainer, PhD, MPH, RD[2]

ABSTRACT

Objective: To assess associations between adolescents and their friends with regard to sugar-sweetened beverage (SSB)/diet soda intake and fast-food (FF) restaurant visits.

Design: Population-based, cross-sectional survey study with direct measures from friends.

Setting: Twenty Minneapolis/St Paul schools during 2009–2010.

Participants: Adolescents (n = 2,043; mean age, 14.2 ± 1.9 years; 46.2% female; 80% non-white).

Main Outcome Measures: Adolescent SSB/diet soda intake and FF visits.

Analysis: Generalized estimating equation logistic models were used to examine associations between adolescents' SSB/diet soda intake and FF visits and similar behaviors in nominated friends (friend groups and best friends). School-level (middle vs high school) interactions were assessed.

Results: Significant associations were found between adolescents and friends behaviors for each of the beverages assessed ($P < .05$), but they varied by friendship type and school level. Five of 6 models of FF visits (including all FF visits) were significantly associated ($P < .05$) among adolescents and their friends. Significant interactions by school level were present among adolescents' and friends' FF visits, with associations generally for high school participants compared with middle school participants ($P < .05$).

Conclusions and Implications: Findings suggest that for many beverages and FF restaurant types, friends' behaviors are associated, especially FF visits for older adolescents. Nutrition education efforts may benefit by integrating knowledge of the impact of adolescents' friends on FF visits.

Key Words: sugar-sweetened beverage, adolescent, restaurant, school (*J Nutr Educ Behav*. 2014;46:277-285.)

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INTRODUCTION

Given the high prevalence of poor dietary intakes during adolescence,[1] a clearer understanding is needed regarding factors involved in adolescents' eating behaviors, especially the role that friends have. Friends exert substantial influence on the development of lifelong behaviors and beliefs during adolescence,[2] including health behaviors.[3-5] Much of the literature to date has been on adolescents' perceptions of their friends' behaviors, which is clouded by their own attitudes.[3,6] Further research on how friends' behaviors are related to adolescents' behaviors is needed to elucidate friends' potential part in these relationships.

A small body of literature has examined associations between direct measures of nominated friends' eating behaviors and adolescents' eating behaviors[7-12]; findings from these studies have not been consistent. These studies generally focused on early adolescence, and with few exceptions[7,8] they drew from small, homogeneous samples. For example, de la Haye et al[9] found that boys' intake of unhealthy foods such as fast food (FF), but not sugar-sweetened beverages (SSBs), was associated among friends in 2 Australian middle schools. In another study involving mostly white youth in 5 moderate- to high-income middle schools, friends' snack food and SSB intake were associated with adolescent

[1]School of Nutrition and Health Promotion, Arizona State University, Phoenix, AZ
[2]Division of Epidemiology and Community Health, University of Minnesota, St. Paul/Minneapolis, MN
[3]Department of Pediatrics, Division of Adolescent Health and Medicine, University of Minnesota, St. Paul/Minneapolis, MN
[4]Department of Family Medicine and Community Health, Program in Health Disparities Research, University of Minnesota, St. Paul/Minneapolis, MN
[5]Global Health and Community and Family Medicine, Duke University, Durham, NC
[†]Dr Bruening was affiliated with the Department of Nutrition and Dr Story was affiliated with the Division of Epidemiology and Community Health, University of Minnesota, at the time this study was completed.
Address for correspondence: Meg Bruening, PhD, MPH, RD, School of Nutrition and Health Promotion, Arizona State University, 500 N 3rd St, Phoenix, AZ 85004; Phone: (602) 827-2266; Fax: (602) 827-2253; E-mail: meg.bruening@asu.edu
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intake of snack food and SSBs.[10] Research has shown an association among high school friends' FF restaurant usage, but not for eating breakfast, intake of fruits and vegetables, or high-calorie snacks.[8]

Adolescence is a critical time in the establishment of lifelong eating patterns.[11,12] Dietary practices of adolescents shift as youth mature, with older youth reporting poorer overall nutritional quality compared with younger adolescents.[12,13] According to adolescent development theory,[14,15] as adolescents transition into high school they become increasingly independent of their parents; with this independence, youth spend more time with their friends, who may have an impact on their eating behaviors.[7] However, it is not apparent that adolescent developmental stage (middle vs high school) has been examined in studies assessing nominated friends' relationship to adolescent eating behaviors.

This study examined associations between adolescents' and friends' frequency of SSB intake and FF restaurant visits from a large, diverse sample. The authors selected frequency of SSB intake and FF restaurant visits because intake of SSBs and FF have been found to predict obesity, generally result in higher-calorie intake, and are of lower nutrition quality.[16,17] Friendship type (friend groups and best friends) and 2 stages of adolescence (middle vs high school) were examined so that the findings would have more utility for intervention development. Given the developmental changes throughout adolescence, the authors hypothesized that friends would have greater effects on behaviors during high school than middle school.

METHODS

Study Design and Participants

Data were drawn from surveys that were part of Eating and Activity among Teens–2010 (EAT-2010), a multilevel investigation of adolescents' (n = 2,793) eating behaviors, physical activity patterns, and weight-related outcomes,[18] integrating an ecological perspective[19] with Social Cognitive Theory.[20] Because of the importance of friends during adolescence, the current study focused on interpersonal (friend) level of the ecological model and how friends' behaviors are associated with adolescents' behaviors. Youth (mean age, 14.4 ± 2.0 years) from 20 Minneapolis/St. Paul middle schools and high schools completed in-class nutrition, physical activity, and nominated friend surveys. Trained research staff administered surveys in 106 required health, gym, or science classes. Parental consent for study participation was received by students under 18 years of age at least 10 days before data collection. All participating students provided assent and received a $10 gift card. The University of Minnesota's Institutional Review Board Human Subjects Committee and the research boards of the participating school districts approved all study protocols. Overall, the sample was 46% female, 80% non-white, and 83% US-born; and over 50% were from low- to low–middle–socioeconomic status (SES) groups (Table 1).

Instruments

Eating and Activity among Teens–2010 student survey. The student survey was a 235-item self-report instrument assessing factors of relevance to weight-related behaviors among adolescents. Survey development was guided by a review of previous Project EAT surveys[21,22]; it underwent expert review for content validity and was pilot-tested with adolescents (n = 129) for reliability.[18]

Food frequency questionnaire. The researchers assessed dietary intake with the 152-item Youth/Adolescent Food Frequency Questionnaire (YAQ), which has undergone extensive testing for validation and reproducibility.[23,24] This instrument offered the most suitable mechanism for examining dietary intake in a large and diverse population of adolescents.

Friend nomination. Participants nominated up to 6 of their fellow students as their friends[25,26] from a roster of all enrolled students at their school. Generic codes were used to indicate having no friends or having friends who did not attend their school. Nominated friends who were ranked first in either gender category were identified as "best friends." Participants nominated an average of 5.2 ± 1.3 friends, and an average of 2.1 ± 1.7 of those friends also participated in EAT-2010 themselves. Friends' survey data were linked for analyses. Overall, 77% of the original sample of adolescents had at least 1 friend in the dataset (n = 2,126). Because students were sampled from required classes, inclusion in the sample was presumed to be random, and any friend who was nominated was also expected to be a random sample of any individual's nominated friends. A sensitivity analysis was conducted and results indicated that using all participants with at least 1 friend provided substantively similar results to analyses using a more stringent inclusion criterion (eg, a majority of nominated friends). Some students were absent or were unable to complete the YAQ and/or reported biologically implausible caloric intake (n = 83); thus, the analytic sample for this study was slightly smaller (n = 2,043).

Measures

Frequency of beverage intake. Five variables assessed SSB and diet soda intake among adolescents and their friends, to examine relatively low-nutrient beverages. Participants were asked to report on their past-year intake of regular soda and diet soda on the YAQ. Response items ranged from "never/< 1 glass/mo" to "≥ 3 glasses/d." On the EAT-2010 student survey, students were asked to report past-year consumption of "energy drinks such as Red Bull, Full Throttle, Rockstar, etc" and "sports drinks such as Gatorade, Powerade, etc" Response options ranged from "never" to "> 2/d." The category of all SSBs was created as an aggregate of regular soda, sports drinks, and energy drinks. Based on the distribution of these variables, intake of each beverage type was dichotomized to "≥ 1 serving/wk" and "< 1 serving/wk."

Frequency of FF restaurant visits. Participants reported their frequency of FF restaurant visits with the following question in the student survey: "In the past month, how often did you eat something from the following types of restaurants (include takeout and delivery)?" Participants selected 1 of 6 response

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