



Published in final edited form as:

J Acad Nutr Diet. 2014 March ; 114(3): 375–383. doi:10.1016/j.jand.2013.11.019.

Dietary and weight-related behaviors and body mass index among Hispanic, Hmong, Somali, and white adolescents

Chrisa Arcan¹, Nicole Larson¹, Kate Bauer³, Jerica Berge², Mary Story¹, and Dianne Neumark-Sztainer¹

¹Division of Epidemiology and Community Health, School of Public Health, University of Minnesota, MN, USA, 55454

²Family Medicine and Community Health, University of Minnesota, Minneapolis, MN 55455

³College of Health Professions and Social Work, Department of Public Health, Temple University, Philadelphia, PA 19122

Abstract

Background—The population of the United States is becoming increasingly ethnically and racially diverse, much of it due to immigration patterns. However little is known about dietary intake and weight-related concerns and behaviors of youth from some ethnic-minority groups, especially Hispanic, Hmong, and Somali adolescents.

Objective—To describe dietary intake and weight-related concerns and behaviors among Hispanic, Hmong, and Somali adolescents and compare them to white adolescents.

Design—Cross-sectional analysis of data from EAT 2010 (Eating and Activity in Teens), a population-based study in the Minneapolis/St. Paul metropolitan area.

Participants/Setting—Current analysis includes 1,672 adolescents (Hispanic: n=562(33.6%); Hmong: n=477(28.5%); Somali: n=113(6.8%); White: n=520 (31.1%); mean age=15.0).

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Corresponding Author: Chrisa Arcan, PhD, MHS, MBA, RD, Research Associate, University of Minnesota, School of Public Health, Division of Epidemiology and Community Health, 1300 South 2nd Street, Suite 300, Minneapolis, MN 55454, USA, USA, Phone: 202-468-2447, Fax: 612-624-9328, arca0021@umn.edu.

Nicole Larson, PhD, MPH, RD, Research Associate, University of Minnesota, School of Public Health, Division of Epidemiology and Community Health, Minneapolis, MN 55454, USA, USA, (612) 625-5881, larsonn@umn.edu

Katherine W. Bauer, Ph.D., M.S., Previous: University of Minnesota, School of Public Health, Division of Epidemiology and Community Health, Minneapolis, MN 55454, USA

Current: Assistant Professor, Temple University, Department of Public Health, College of Health Professions and Social Work, 1301 Cecil B. Moore Avenue, Ritter Annex, 9th floor (004-09), Philadelphia, PA 19122, (215) 204-1683 Office, (215) 204-1854 Fax

Jerica Berge, PhD, Assistant Professor, University of Minnesota, Family Medicine and Community Health, Minneapolis, MN 55455, USA, 612-624-1818, mohl0009@umn.edu

Mary Story, PhD, RD, Professor, University of Minnesota, School of Public Health, Division of Epidemiology and Community Health, Minneapolis, MN 55454, USA, USA, Phone: 612- 626-8801, Fax: 612-624-9328, story001@umn.edu

Dianne Neumark-Sztainer, PhD, MPH, RD, Professor, University of Minnesota, School of Public Health, Division of Epidemiology and Community Health, Minneapolis, MN 55454, USA, USA, (612) 624-0880, neuma011@umn.edu

The authors declare no conflicts of interest.

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Adolescents completed classroom surveys and had their height/weight measured during the 2009–2010 academic year.

Statistical Analysis—Multivariable regression models, adjusted for socioeconomic status, age, and school as a random effect were used to examine racial/ethnic differences for each outcome variable for boys and girls.

Results—There are numerous differences in the behaviors of Hispanic, Hmong, and Somali adolescents as compared to whites. Hispanic and Somali youth consumed fruit and fast food more frequently. Hmong adolescents consumed sugar-sweetened beverages less frequently, while Somali boys consumed energy and sports drinks more frequently than whites. Compared to white boys, overweight/obesity was higher among Hispanic and Hmong. A higher percentage of Hmong and Somali adolescents engaged in unhealthy weight control behaviors. Body satisfaction was lower for all Hmong adolescents compared to whites.

Conclusions—There were varying areas of concern in dietary intake, weight, and weight-related concerns and behaviors among adolescents in all ethnic groups. Future nutrition and physical activity interventions that include adolescents from these ethnic and cultural groups may benefit from, for example, modifying intervention strategies to the specific priority behaviors within the target population.

Keywords

adolescents; ethnic minorities; dietary intake; overweight and obesity; weight-related concerns

INTRODUCTION

The population of the United States (US) is becoming increasingly ethnically and racially diverse, much of it due to immigration patterns.¹ According to 2010 US Census data, in the last ten years Hispanic and Asian populations experienced the fastest growth, together representing about 21% of the total population.² In 2008, more than 1 in 5 US children had at least one foreign-born parent and 3.5% of children were foreign-born.³ It is projected that by 2030 the majority of US children will be of non-white racial background.⁴ While Hispanic and Asian ethnic groups are the fastest growing, there have been large increases in populations from African nations. In the Midwest, the three fastest growing ethnic groups are Hispanic, Hmong, and Somali.⁵ More specifically, Minnesota is home to the second largest Hmong population and the largest Somali population in the nation, although Hispanics represent the largest non-white group.⁶

The majority of studies have shown that as the length of stay in the US increases, the prevalence of obesity and other health outcomes of foreign-born ethnic minorities more closely resemble those of their native-born American counterparts.^{7,8} However, there is limited research on dietary behaviors, obesity prevalence and weight-related behaviors of ethnic-minority youth, and the few studies conducted have found diet and weight disparities.^{9–14} Most studies have focused on Hispanic youth,^{9,11,15,16} with only a few on Hmong youth,^{14,17–19} and none on Somali youth. Studies have shown that Hispanic adolescents have high rates of overweight/obesity and have diets similar to whites, which are low in fruit, vegetables, and milk intake, and high in consumption of sugar-sweetened

beverages (SSB).^{20,21} Previous findings indicate that Hmong adolescents have high intakes of unhealthful foods similar to whites and lower than recommended intakes of fruit, vegetables and milk.^{14,19} It is important to note that the migratory experience to the US has not been the same for each group. For example, the Hmong and Somalis have arrived to the US as refugees, having previously lived in refugee camps and/or war-torn areas. These experiences, which are likely qualitatively different than the Latino immigration experience, may influence their adjustment to the US food environment.^{22,23}

Weight-related concerns and behaviors are prevalent among adolescents and can have negative health effects including excess weight gain over time.^{24–27} Ethnic/racial differences in weight-related concerns and behaviors have been observed in previous studies, with some studies showing that Hispanic and Asian American boys and girls more frequently report engaging in these behaviors than white adolescents.^{11,28} In qualitative studies, Hmong adolescents report being dissatisfied with their bodies and embracing American body ideals that are different from their traditional ones.¹⁷ Cultures that have experienced food scarcity and food insecurity often idealize a larger body size as a sign of wealth and food security. However, traditional ideals of body shape change as people migrate to Western regions that embrace thinner bodies for women and more muscular body shapes for men.^{29,30}

The purpose of this study is to examine dietary behaviors, weight status, body satisfaction, and unhealthy weight control behaviors among an urban community-based sample of Hispanic, Hmong, and Somali adolescent boys and girls, and compare them to white youth. This study seeks to address the knowledge gap in dietary intake and weight-related concerns and behaviors among specific ethnic- minority groups of adolescents, and assess unique differences in these behaviors in order to guide health and nutrition interventions to meet the needs of these youth.

METHODS

Study Design and Population

EAT 2010 (Eating and Activity in Teens) is a population-based study designed to examine weight-related variables in adolescents. During the 2009–2010 academic year, surveys and anthropometric measures were completed by 2,793 adolescents from 20 public middle and high schools in metropolitan Minneapolis/St. Paul, Minnesota. Further details about the design of the EAT 2010 study can be found elsewhere.^{31,32} For the current study, data from 1,672 adolescents (Hispanic (33.6%), Hmong (28.5%), Somali (6.8%), and White (31.1%)) were used. This sample was approximately equally distributed by gender (48% male) and had a mean age of 15.0 years (SD=2.0); 45.4% were in middle school (6th–8th grades) and 54.6% were in high school (9th–12th grades). There were no appreciable differences between the current sample of adolescents and the entire sample with respect to gender, age, weight status, and socioeconomic status. Trained research staff administered surveys in school classrooms and measured adolescents' height and weight. All study procedures were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee and by the research boards of the participating school districts. Adolescents were given the opportunity to assent only if their parent/guardian did not return a signed consent form indicating their refusal to have their child participate. Among adolescents who were at

school on the days of survey administration, 96.3% had parental consent and chose to participate.

The EAT 2010 survey is a 235-item, self-report instrument assessing a range of factors of potential relevance to weight status and weight-related behaviors among adolescents. Survey development was initially guided by a review of previous Project EAT surveys^{11,33} to identify the most salient items and a theoretical framework, which integrates an ecological perspective with Social Cognitive Theory.^{34,35} The survey was initially pilot tested with 56 adolescents with diverse backgrounds for clarity, readability and relevance of the survey items. After additional revisions, the survey was further pilot tested with a different sample of 129 middle school and high school students to examine the test-retest reliability of measures over a one-week period. The psychometric properties of scales provided in the text below were assessed in the EAT 2010 population sample.

Measures

Dietary Intake and Meal Patterns—Past year usual daily intakes of fruit (excluding juice), vegetables (excluding potatoes), milk, and SSB (regular soda, punch, lemonade, Koolaid, or other non-carbonated fruit drinks) were assessed with the semi-quantitative Youth and Adolescent Questionnaire (YAQ). Previous studies have examined and reported on the reliability and validity of intake estimates based on the YAQ.^{36,37} A daily serving was defined as the equivalent of one-half cup for fruit and vegetables and one cup for milk. A serving of SSB was defined as the equivalent of one glass, bottle, or can. Responses to the YAQ were excluded for 123 participants that reported a biologically implausible level of total energy intake (<400 kcal/day or >7,000 kcal/day).

Consumption of sports drinks, energy drinks, fast food, and breakfast were measured with questions on the accompanying EAT 2010 survey. Consumption of sports and energy drinks in the past year was assessed with the question: “In the past year, how many times did you usually drink ...1) an energy drink, 2) a sports drink. Popular brand name examples were given for both drinks (Red Bull, Full Throttle, and Rockstar for energy drinks, and Gatorade and Powerade for sports drinks). Responses ranged from “Never or less than once per month” to “two or more per day” and were dichotomized to “less than one per week” and “one or more per week.” Fast food was assessed with the question: “In the past month, how often did you eat something from the following types of restaurants (include take-out and delivery)?” Types of restaurants included: traditional burger-and-fries, Mexican fast food, fried chicken, sandwich or sub shop, pizza place. Responses ranged from never/rarely to one or more times a day and were summed to derive monthly fast food eating occasions; the score was converted to weekly intake (test-retest $r = 0.49$). Responses were restricted to 90 times per month (i.e. 3 fast food meals per day). This measure was adapted from a screener previously developed to assess restaurant use among adolescents.³⁸ Breakfast consumption was measured with the question: “During the past week, how many days did you eat breakfast?” Five response options ranged from never to every day (test-retest $r = 0.76$).

Weight Status—Trained research staff measured participants’ height and weight using standardized equipment and procedures.³⁹ Height was measured to the nearest 0.1 cm and

weight to the nearest 0.5 lb. Body mass index (BMI) values were calculated and sex- and age-specific cutoff points, based on reference data from the 2000 Centers for Disease Control and Prevention growth tables, were used to classify respondents as overweight (> 85th percentile) or not overweight (<85th percentile).⁴⁰

Body Satisfaction—Using a modified form of the Body Shape Satisfaction Scale included on the EAT 2010 survey, participants reported satisfaction with 13 body parts including height, weight, body shape, and overall body fat.⁴¹ Five Likert response categories ranged from ‘very dissatisfied’ to ‘very satisfied.’ Item responses were summed such that higher scores were indicative of greater satisfaction (Score range: 13–65, Cronbach’s alpha=0.94; test-retest $r = 0.66$).

Dieting to Lose Weight—Dieting frequency was assessed on the EAT 2010 survey by asking “How often have you gone on a diet during the last year? By ‘diet’ we mean changing the way you eat so you can lose weight.” Five response categories ranged from “Never” to “I’m always dieting” (test-retest $r = 0.76$). Responses were dichotomized to “Never” vs. “Ever” having dieted to lose weight.¹¹

Unhealthy Weight Control Behaviors—Unhealthy weight control behaviors were measured on the EAT 2010 survey with the question: “Have you done any of the following things in order to lose weight or keep from gaining weight during the past year?” Behaviors that were assessed included, 1) fasting, 2) eating very little food, 3) taking diet pills, 4) vomiting, 5) using laxatives, 6) using diuretics, 7) using a food substitute, 8) skipping meals, and 9) smoking more cigarettes (test-retest agreement = 76%). Responses included “Yes” or “No” and adolescents answering “Yes” to at least one behavior were classified as engaging in unhealthy weight control behaviors.¹¹

Sociodemographic Characteristics—Sociodemographic characteristics of adolescents were also self-reported on the EAT 2010 survey. Age was assessed by asking “What is your birthdate” and calculated from survey completion date. Race/ethnicity was assessed with two survey items. The first item included “Do you think of yourself as ... (you may choose more than one) 1) White, 2) Black or African American, 3) Hispanic or Latino, 4) Asian American, 5) Native Hawaiian or Pacific Islander, 6) American Indian or Native American, and 7) Other. The second item referred to specific ethnicities: “Is your background any of the following?” Response categories included Hmong, Cambodian, Vietnamese, Laotian, Somali, Ethiopian, Other (asked to specify), and none of the above. Socioeconomic status (SES) was determined primarily using the higher education level of either parent. Additional variables taken into account included family eligibility for public assistance, eligibility for free or reduced-cost school meals, and maternal and paternal employment status^{42,43} An algorithm was developed using classification and regression trees, in which a missing variable is replaced by a correlated surrogate variable. Algorithmic classification scores were reduced by two levels if the family received public assistance and by one level if the child was eligible for free or reduced-cost school meals or had two unemployed parents.⁴⁴ Nativity status was assessed with the item “Were you born in the United States?” (test-retest = 0.93). In addition, participants were asked how long they had lived in the US and were

asked to select from one of five response categories ranging from “less than 1 year” to “always.” The categories were collapsed to “Less than 10 years,” “10 years or more,” and “Always” (Table 1).

Statistical Analysis

All analyses were completed using SAS 9.2 (SAS Institute, Cary, NC, USA). Mixed model analysis of variance (PROC MIXED for continuous and PROC GLIMMIX for categorical outcome variables) were used to examine differences across ethnic groups while adjusting for SES and student age and stratifying on gender. Intakes of vegetables fruit, milk and SSB were positively skewed, thus they were adjusted with square root transformations when testing for differences between groups. The square-root transformed variables were approximately Gaussian distributed, and hence P-values which depend on the tails of the distribution were more reliable. The school variable was included in all the models as a random effect, accounting for the additional component of variance associated with a cluster sampling design where observations from students from the same schools may be correlated.⁴⁵ We collapsed the overweight and obesity categories in the analysis due to small numbers of Somali adolescents in each of the two categories. The models examining ethnic differences in body satisfaction, dieting to lose weight, and unhealthy weight control behaviors were examined with and without adjustment for adolescent BMI, however since no appreciable differences were observed in the results between the adjusted and unadjusted models, only the unadjusted outcomes were presented. The variable measuring years lived in the US, which is usually used as a proxy for acculturation, was initially entered into the models as a potential confounder; however, since it did not significantly change the outcomes, it was not included in the final models.

RESULTS

Dietary Intake and Meal Patterns

Overall, across ethnic groups, adolescents reported low intakes of vegetables, fruit, and milk, and high intakes of fast food and sports drinks. Unadjusted results indicate that on average, adolescents consumed 1.5 servings of vegetables, 1.3 servings of fruit, and 1.0 servings of milk per day (data not shown).

However, there were statistically significant differences across ethnic groups in the intakes of healthful and unhealthful foods. In summary, Hispanic, Hmong, and Somali girls had lower milk consumption compared to white girls. Both Hispanic and Somali boys and girls, on average, consumed more servings of fruit and more fast food than whites. Furthermore, Somali boys had significantly higher breakfast consumption, but they also had higher consumption of energy and sports drinks than white boys. While Hmong boys and girls had lower consumption of SSBs, the boys had lower breakfast intake and the girls had lower vegetable intake compared to whites. Among girls, there were no significant differences for consumption of energy drinks and breakfast intake across ethnic groups (Table 2, 3).

Overweight and Weight-Related Concerns and Behaviors

The prevalence of overweight/obesity and weight-related concerns and behaviors was high across all ethnic groups. Overweight or obesity was higher among Hispanic and Hmong boys than white boys. Body satisfaction was lower among all Hmong adolescents and a higher percentage of them dieted to lose weight and engaged in unhealthy weight control behaviors than their white counterparts. A higher percentage of Somali boys and girls engaged in unhealthy weight control behaviors than white adolescents. There were no significant differences for weight status or weight-related behaviors between white and Hispanic girls. (Tables 2, 3).

DISCUSSION

This study examined differences in dietary intake, weight status, and weight-related concerns and behaviors among Hispanic, Hmong, Somali, and white adolescents in Minnesota. Overall the diets of all youth were low in fruit, vegetables and milk and high in SSB and fast food; however, ethnic differences were found in the magnitude of the intake of these foods. Similarly, there was a high prevalence of overweight/obesity, body dissatisfaction and unhealthy weight control behaviors across ethnic groups. Understanding similarities and differences in these outcomes across ethnic groups that represent a growing proportion of the US population will help guide the development of suitable nutrition interventions and health messages that could lower ethnic disparities in unhealthy eating and weight-related concerns and behaviors.

On average, both Hispanic boys and girls consumed fast food more than three times per week, which was higher than that of whites. Our findings are consistent with other studies examining dietary behaviors and weight status among Hispanic youth.^{11,16,21,42,46} Using nationally representative data, studies have found an increase in the prevalence of obesity among second generation (US-born with at least one parent non-US born) Hispanic youth compared to their first generation counterparts.¹⁶ Although our study did not examine intake or weight by generational status, the majority (85%) of Hispanic adolescents reported having lived in the US longer than 10 years, and more than two-thirds were born in the US. Therefore the dietary behaviors of the Hispanic population in this study may closely resemble that of second generation youth. These findings suggest that Hispanic adolescents are engaging in unhealthful dietary behaviors that may impact their weight and health. Since Hispanic adolescents are a diverse group and their generational status varies, more research is needed to understand how the process of assimilation to the local culture may affect their weight.

There were positive aspects, but also areas of concern, in the dietary patterns of Hmong adolescents. Overall, Hmong and white adolescents had the lowest frequency of fast food consumption. However, Hmong boys and girls had low milk consumption and Hmong boys along with whites had the lowest breakfast intake. The few studies examining Hmong adolescents' dietary behaviors found results that are similar to ours, indicating low intakes of healthful foods⁴⁷ and breakfast, and fast food intake similar to white adolescents.¹⁴ The low frequency of milk intake among Hmong adolescents may be due to perceived and actual high lactose intolerance among Asian populations.⁴⁸ Cultural norms may also play a role in

low milk intake since the traditional Hmong breakfast is similar to other meals that do not include milk.³⁰ Breakfast is associated with healthy dietary intake, better cognitive functioning and maintenance of a healthy weight, therefore conveying this message to all adolescents is important.⁴⁹

With respect to weight status and weight-related behaviors, Hispanic and Hmong boys had the highest prevalence of overweight and obesity and Hmong and white girls the lowest; however, both Hmong boys and girls had the lowest body satisfaction. In addition, a higher percentage of Hmong girls compared to white and Hispanic girls dieted to lose weight and engaged in unhealthy weight control behaviors. Our findings are consistent with other studies among adolescents indicating lower body satisfaction and more frequent unhealthy weight control behaviors among Hmong and Asian American adolescents compared to whites.^{11,14,50}

The weight-related disparities among Hispanic and Hmong adolescents that were found in this study may indicate that, to date, health and nutrition-related interventions and messages may not have reached ethnic minority youth or they may not have been culturally appropriate to influence their weight status or weight-related behaviors. Although the majority of Hispanic and Hmong adolescents in this study reported being born in the US, family and cultural beliefs may have influenced their body image and weight-related behaviors. In qualitative studies, Hmong adolescents reported that while the traditional body ideal for women was to be 'plumper' as a sign of wealth and food security, Hmong parents and grandparents were aware that in the US the preferred body shape is to be 'skinny' and 'taller.'¹⁷ It is possible that family communication on weight-related issues and broader social environmental factors may contribute to negative body image and unhealthy weight control behaviors in Hmong youth.¹⁷

Census data indicate that the Somali population is one of the most recent immigrant groups to the US.^{51,52} This was also reflected in the sample of adolescents in our study, with the majority of Somali youth reporting they were born outside the US and had lived in the US for less than 10 years. Given their short duration in the US, the stark differences in their dietary intake and weight control behaviors compared to the other ethnic groups were notable. Specifically of great concern are the high intake of unhealthful foods and beverages and high prevalence of unhealthy weight control behaviors among Somali boys and girls, and the high prevalence of overweight/obesity among girls.

To our knowledge, this is the first study examining dietary intake, weight status, and weight-related behaviors of Somali youth living in the US. The high frequency of fast food intake among Somali youth may be due to other factors that have not been accounted for in our study. Since Somalis are recent immigrants to the US, it is likely that many have limited financial resources therefore fast food is a low-cost food choice.⁵¹ Our findings suggest the need for more qualitative studies with Somali youth and those from other East African nations to understand factors influencing their eating behaviors, such as experience prior to arriving in the US and cultural norms and challenges they face in trying to navigate the food environment in the US. Furthermore, family-focused health interventions should incorporate healthful adaptations of traditional recipes, and information on local healthful food choices.

Strengths of this study included going beyond broad racial differences to examine disparities by specific ethnic groups and simultaneously assessing dietary intake, weight status, and weight-related behaviors. The large sample size further enhanced our ability to detect ethnic differences. Having measured height and weight eliminated the potential for self-report bias. However the study also had limitations. Adolescents self-reported their dietary intake and weight control behaviors, and it is possible that there was differential bias in self-reports across ethnicity. Furthermore, although inclusion of a measure of acculturation (years lived in the US) did not significantly change the results in this study (data not shown), a more complete measure of acculturation may be more appropriate. The question referring to fast food intake likely captured a large majority of fast food restaurants that adolescents often visit, however certain types of restaurants such as Asian or African that specific ethnic groups may frequent were not included in this measure. Lastly, caution should be used when trying to generalize the results of this study, as the social norms of the local environment may differentially influence the attitudes and behaviors of ethnic groups.¹¹

CONCLUSION

The results of this study point to the disparities in dietary intake and weight-related concerns and behaviors among ethnic minority youth. Factors unique to these youth and their families, such as cultural and family norms, place of birth, past food-related experiences, and differences between the local and traditional habits may be contributing to these behaviors.^{12,51,53} Therefore, it is important to develop novel nutrition interventions and messages that are suitable to priority behaviors among specific immigrant and ethnic minority groups. To date, there have not been any such programs, especially among Hmong and Somali youth.⁵⁴ As ethnic minority populations are rapidly growing through immigration and natural growth worldwide, it is important for future studies to explore the underlying mechanisms and mediating factors that uniquely contribute to behavioral changes that occur among the various ethnic populations. The findings of this study can build awareness among practitioners about ethnic differences on dietary and weight-related behaviors and guide them in focusing their health messages to specific ethnic-minority youth. A second notable finding in this study was that weight-related concerns and behaviors were more prevalent among non-white youth, pointing to a need for interventions aimed at preventing a broad spectrum of weight-related problems in adolescents from diverse backgrounds.

Acknowledgments

CA conceptualized the project, analyzed and interpreted the data, and led the writing and revisions of the manuscript; NL assisted with analysis, interpretation of data, and critically edited the manuscript; JB critically edited the manuscript; KB critically edited the manuscript; MS assisted with data interpretation and critically reviewed and edited the manuscript; and DNS conceptualized the Project EAT study, assisted with interpretation of data and critically edited the manuscript. Thanks are expressed to the many school administrators, teachers, and staff.

FUNDING SOURCE

This study was supported by Grant Number R01HL084064 from the National Heart, Lung, and Blood Institute. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Heart, Lung, and Blood Institute or the National Institutes of Health.

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Table 1
 Sociodemographic characteristics and body mass index of adolescents by race/ethnicity (N = 1672)*

	Total #	White	Hispanic	Hmong	Somali
Gender N (%)					
Boys	803 (48.0%)	275 (52.9%)	252 (44.8%)	217 (45.5%)	59 (52.2%)
Girls	869 (52.0%)	245 (47.1%)	310 (55.2%)	260 (54.5%)	54 (47.8%)
Age (mean years)	14.5	14.5	14.5	14.2	15.5
Socioeconomic Status N(%) ‡					
Low	624 (38.7%)	72 (14.0%)	267 (48.8%)	229 (51.8%)	56 (51.4%)
Low-middle	360 (22.3%)	88 (17.1%)	142 (26.0%)	108 (24.4%)	22 (20.2%)
Middle	267 (16.5%)	98 (19.0%)	89 (16.3%)	62 (14.0%)	18 (16.5%)
High-middle	223 (13.6%)	153 (29.7%)	29 (5.3%)	32 (7.2%)	9 (8.3%)
High	139 (8.6%)	104 (20.2%)	20 (3.7%)	11 (2.5%)	4 (3.7%)
Body Mass Index (BMI) N(%)					
85 th to <95 th percentile	270 (16.3%)	69 (13.4%)	105 (18.8%)	80 (17.0%)	16 (14.4%)
95 th percentile	373 (22.5%)	85 (16.5%)	154 (27.6%)	113 (24.0%)	21 (19.0%)
Born in the US N (%)					
Yes	1302 (78.0%)	512 (98.5%)	375 (67.0%)	394 (82.6%)	21 (18.8%)
No	367 (22.0%)	8 (1.5%)	185 (33.0%)	83 (17.4%)	91 (81.3%)
Years lived in the USA N(%)					
< 5 years	111 (6.7%)	3 (0.6%)	41 (7.3%)	30 (6.3%)	37 (33.0%)
5 to less than 10 years	145 (8.6%)	4 (0.8%)	87 (15.5%)	23 (4.8%)	31 (27.7%)
10 years or always	1412 (84.7%)	513 (98.7%)	432 (77.1%)	423 (88.9%)	44 (39.3%)

* In his study only Hispanic, Hmong, Somali, and white adolescents were included.

Sample size varies due to incidental missing

‡ SES was determined primarily using the higher education level of either parent. Additional variables taken into account included family eligibility for public assistance, eligibility for free or reduced-price school meals, and parental employment status

Table 2

Boys: Dietary intake, meal patterns, weight-related behaviors, and BMI by race/ethnicity (reported in means, times per week, or percentages) (n=803)

	White n=275 [#]	Hispanic n=252 [#]	Hmong n=217 [#]	Somali n=59 [#]	P-value
Dietary Behaviors[§]					
Fruits and Vegetables					
Vegetables (without potatoes) (mean servings/day, SE)	1.4 (0.09) ^{ab}	1.6 (0.09) ^a	1.3 (0.1) ^b	1.4 (0.2) ^{ab}	0.025
Fruit (no juice) (mean servings/day, SE)	1.1 (0.07) ^a	1.4 (0.07) ^b	1.1 (0.07) ^a	1.4 (0.1) ^b	<.0001
Beverages					
Milk (mean servings/day, SE)	1.5 (0.09) ^a	1.0 (0.09) ^b	0.7 (0.10) ^c	1.3 (0.20) ^{ab}	<.0001
Sugar-sweetened beverages (mean servings/day, SE)	0.8 (0.05) ^a	0.8 (0.06) ^a	0.5 (0.06) ^b	0.8 (0.1) ^a	0.0002
Energy drinks (< 1 times/week) (% , SE)	16.7% (0.02) ^a	13.7% (0.02) ^a	14.7% (0.02) ^a	30.2% (0.06) ^b	0.025
Sports drinks (< 1 times/week) (% , SE)	36.9% (0.03) ^{ab}	46.8% (0.04) ^a	36.0% (0.04) ^b	64.2% (0.07) ^c	0.001
Meal patterns					
Fast food (mean times/week, SE)	2.7 (0.23) ^a	3.4 (0.23) ^b	2.7 (0.25) ^a	6.3 (0.48) ^c	<.0001
Breakfast intake (mean days/week, SE)	4.6 (0.20) ^a	4.2 (0.20) ^{ab}	3.9 (0.22) ^b	5.5 (0.37) ^c	0.0004
Weight related behaviors and BMI[§]					
Body satisfaction (Mean, SE) [±]	45.8 (0.81) ^a	44.1 (0.80) ^a	38.6 (0.88) ^b	46.8 (1.65) ^a	<.0001
Dieted to lose weight (% , SE)	21.8% (0.02) ^a	32.9% (0.03) ^b	41.9% (0.03) ^b	34.2% (0.06) ^{ab}	0.0006
Unhealthy weight control behaviors in the past year (% , SE) [∞]	31.4% (0.03) ^a	34.3% (0.03) ^{ab}	47.5% (0.04) ^c	54.7% (0.07) ^c	0.0009
Overweight Status (< 85 th percentile)	32.9% (0.03) ^a	46.6% (0.03) ^b	50.7% (0.03) ^b	22.8% (0.06) ^a	<.0001

[#] Sample size varies due to incidental missing

^{*} Different superscripts indicate statistical differences between groups

[§] Models are adjusted for SES, age, and school as a random effect

[±] Score Mean 44.7 (SD 13.1); range 13–65; higher score indicates higher level of body satisfaction

[∞] Unhealthy weight control behaviors include fasting, eating very little food, taking diet pills, vomiting, using laxatives, diuretic, using food substitute, skipping meals, and smoking more cigarettes to lose weight.

Girls: Dietary intake, meal patterns, weight-related behaviors, and BMI by race/ethnicity (reported in means, times per week, or percentages) (n=869)

Table 3

	White n=245 [#]	Hispanic n=310 [#]	Hmong n=260 [#]	Somali n=54 [#]	P-value
Dietary Behaviors[§]					
Fruits and Vegetables					
Vegetables (without potatoes) (mean servings/day, SE)	1.6 (0.1) ^a	1.7 (0.1) ^a	1.3 (0.1) ^b	1.9 (0.2) ^a	0.003
Fruit (without juice) (mean servings/day, SE)	1.2 (0.08) ^a	1.5 (0.07) ^b	1.2 (0.08) ^a	1.9 (0.1) ^c	<0001
Beverages					
Milk (mean servings/day, SE)	1.2 (0.07) ^a	0.9 (0.06) ^b	0.5 (0.06) ^c	1.0 (0.1) ^b	<0001
Sugar-sweetened beverages (mean servings/day, SE)	0.8 (0.06) ^a	0.7 (0.05) ^a	0.4 (0.06) ^b	0.6 (0.1) ^{ab}	<0001
Energy drinks (1 times/week) (% , SE)	8.6% (0.02)	12.5% (0.02)	8.6% (0.02)	19.8% (0.06)	0.070
Sports drinks (1 times/week) (% , SE)	20.2% (0.03) ^a	34.5% (0.03) ^b	25.6% (0.03) ^a	25.0% (0.06) ^{ab}	0.007
Meal Patterns					
Fast food (mean times/week, SE)	2.3 (0.26) ^a	3.6 (0.22) ^b	2.3 (0.25) ^a	4.9 (0.50) ^b	<0001
Breakfast intake (mean days/week, SE)	4.3 (0.19)	4.0 (0.16)	3.7 (0.18)	4.3 (0.37)	0.175
Weight related behaviors and BMI[§]					
Body satisfaction (Mean, SE) [±]	41.3 (0.88) ^a	42.1 (0.74) ^a	38.4 (0.82) ^b	43.8 (1.73) ^a	0.002
Dieted to lose weight (% , SE)	44.4% (0.03) ^a	45.6% (0.03) ^{ab}	60.9% (0.03) ^c	54.4% (0.07)	0.001
Unhealthy weight control behaviors in the past year (% , SE) [∞]	46.5% (0.03) ^a	45.5% (0.03) ^a	65.5% (0.03) ^b	63.0% (0.07) ^b	<0001
Overweight Status (85 th percentile) (% , SE)	32.8% (0.03) ^{ac}	41.0% (0.03) ^{ab}	28.5% (0.03) ^c	41.3% (0.07) ^b	0.018

[#] Sample size varies due to incidental missing

^{*} Different superscripts indicate statistical differences between groups.

[§] Models are adjusted for SES, age, and school as a random effect

[±] Score Mean 42.9 (SD 13.1); range 13–65; higher score indicates higher level of body satisfaction

[∞] Unhealthy weight control behaviors include fasting, eating very little food, taking diet pills, vomiting, using laxatives, diuretic, skipping meals, and smoking more cigarettes to lose weight.