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Behaviors Related to Physical Activity and Nutrition Among U.S. High School Students

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Abstract

Purpose—National data related to physical activity (PA) and nutrition among adolescents are needed to help develop effective obesity prevention programs. The 2010 National Youth Physical Activity and Nutrition Study (NYPANS) was conducted to provide nationally representative data on behaviors and behavioral correlates related to healthy eating and PA.

Methods—NYPANS used a three-stage cluster sample design to obtain data representative of public- and private-school students in grades 9 through 12 in the United States (n = 11,429). Students completed an anonymous, self-administered questionnaire in their classrooms during a regular class period. Trained data collectors directly measured the students' height and weight at school using a standard protocol.

Results—Analyses revealed that 19.0% of students were obese and 17.8% were overweight. Students participated in a range of physical activities during the 12 months before the survey; prevalence ranged from 5.0% for ice hockey to 83.9% for walking. In addition, 52.5% of students enjoyed the physical education classes they took at school. During the 7 days before the survey, 74.8% of students ate at least one meal or snack from a fast food restaurant, with black students more likely than white and Hispanic students to have done so. Forty-one percent of students always or most of the time have a TV on while eating dinner at home.

Conclusions—These and other NYPANS results can be used to develop obesity prevention programs that address specific behaviors and behavioral correlates, and target subgroups in which behaviors and behavioral correlates related to obesity are most prevalent.

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Keywords

Physical activity; Dietary behaviors; High school students

The prevalence of obesity among children and adolescents has tripled since 1980, and in 2009–2010, 18% of 12–19-year-olds in the United States were obese [1]. Obesity among adolescents has immediate effects on health and well-being, and also increases the risk of developing health problems in adulthood [2]. Healthy eating and physical activity (PA) can lower the risk of becoming obese [2]. To effectively promote and influence healthy eating and PA behaviors among adolescents, it is critical to determine the prevalence of these behaviors in this population, as well as the prevalence of attitudes and environmental factors that research has shown to be correlated with these behaviors.

Several studies have examined behaviors related to nutrition and PA among nationally representative samples of adolescents [3–6]. These studies, however, generally assess multiple categories of health behaviors, such as substance use and behaviors related to violence, and therefore are limited in their ability to provide data on a large number of specific behaviors related to PA and nutrition. Other studies have assessed a larger number of behaviors related to nutrition and/or PA, but these have been conducted among national convenience samples [7], girls only [8], or adolescents in particular states or local areas [9,10], and do not always provide data on both behaviors and behavioral correlates. Studies that have examined both behaviors and behavioral correlates have focused on either healthy eating [9] or PA [10–13] but not on both. Only one of these studies used a nationally representative sample [11].

To address the need for nationally representative data on behaviors and behavioral correlates related to both healthy eating and PA, the Centers for Disease Control and Prevention (CDC) conducted the National Youth Physical Activity and Nutrition Study (NYPANS) in 2010. To determine which behaviors and behavioral correlates were most critical to assess, CDC conducted extensive literature reviews and consulted with nutrition, PA, and obesity experts from CDC, other federal agencies, and academic institutions. This consultation included a 2-day expert panel meeting and multiple reviews of draft questionnaires. This report is one of several publications reporting NYPANS results. Although other manuscripts describe the relationships between the behaviors, their correlates, and body mass index (BMI) [14,15], this report gives an overview of NYPANS data by providing national prevalence estimates for both healthy eating and PA behaviors not reported elsewhere [5,16–18]. This report also includes prevalence estimates for correlates of these behaviors. Because previous studies have demonstrated subgroup differences in these behaviors and behavioral correlates, this report presents results for students overall and by sex and racial/ethnic subgroups.

Methods

The data reported here are derived from (1) a survey assessing behaviors and behavioral correlates related to PA and nutrition among a nationally representative sample of high school students; and (2) direct measurements of height and weight using a standard protocol

among students participating in the survey. An institutional review board at the study contractor approved the study protocol.

Survey

A three-stage cluster sample design that oversampled African-American/black and Hispanic/Latino students was used to obtain a nationally representative sample of public- and private-school students in grades 9 through 12. In each participating school, one or two classrooms in each grade from either a required subject (e.g., English) or a required period (e.g., second period) were randomly selected. All students in selected classes were eligible to participate. The school response rate was 82%, the student response rate was 89%, and the overall response rate was 73%. Data from 11,429 students were available for analysis. A weighting factor was applied to each student record to adjust for nonresponse and oversampling of black and Hispanic students.

Following local procedures, parental permission was obtained before survey administration. Participation in the survey was voluntary. Trained data collectors visited each selected classroom, where students completed an anonymous, self-administered questionnaire during a regular class period during the spring of 2010. Students recorded responses directly on computer-scannable booklets.

The questionnaire contained 120 items. Those developed specifically for this study were subjected to cognitive testing, which resulted in the revision or deletion of problematic questions. The NYPANS questionnaire is available at http://www.cdc.gov/healthyYouth/yrbs/pdf/nypans/2010nypans_questionnaire.pdf

Height/weight measurement

Data collectors were trained to use a standard protocol to weigh and directly measure the students' standing height and weight. Before measurements were taken, students were asked to remove outer clothing (e.g., coats), purses, shoes, hats, and any removable hair accessories, and to remove personal items from their pockets. The data collectors measured height to the nearest inch using a weighted measuring tape attached to the wall. Students placed their backs and heels against the wall, and the data collectors then placed a measuring triangle on the student's head to form a right angle with the wall. The height measurement was taken from the lower edge of the triangle. Data collectors measured students' weight to the nearest pound using an electronic scale (Tanita, Arlington Heights, IL) placed on an uncarpeted floor. The scale was zero balanced before each student was weighed. Data collectors entered height and weight measurements on a computer-scannable form that was linked to the survey questionnaire by a unique identification number.

The student response rate for the height and weight measurements was 80%. Height and weight data were set to missing if they exceeded plausible values for age and sex subgroups (see www.cdc.gov/healthyouth/yrbs/pdf/nypans/nypans_data_users_manual.pdf). After editing, height and weight data from 10,007 forms (88% of the analytic sample from the survey) were available for analysis.

Data analysis

Students were classified as obese or overweight based on their BMI (kg/m^2), which was calculated from the directly measured height and weight. BMI values were compared with sex- and age-specific reference data from the 2000 CDC growth charts [19]. Obese was defined as a BMI of ≥ 95 th percentile for age and sex. Overweight was defined as a BMI of ≥ 85 th percentile and < 95 th percentile for age and sex.

Variables were dichotomized to measure the presence versus absence of each behavior, or by using cutoffs used in previous surveys [5]. Statistical analyses for all variables were conducted on weighted data using SUDAAN software (RTI International, Research Triangle Park, NC), which accounted for the complex sampling design. Prevalence estimates and 95% confidence intervals were computed for all variables, and *t*-tests were used to determine pairwise differences between sex and racial/ethnic subpopulations. Differences between prevalence estimates were considered statistically significant if the *t*-test *p* value was $< .05$. Prevalence estimates by race/ethnicity are presented only for non-Hispanic black, non-Hispanic white, and Hispanic students (who might be of any race); the numbers of students from other racial/ ethnic groups were too small for meaningful analysis.

Results

Approximately half of students (49.4%) were female, 57.7% were white, 14.9% were black, 18.9% Hispanic, and 8.5% other. Fifty percent of students were 16 or 17 years old, 35.7% were 15 years or younger, and 14.3% were 18 years or older, with 27.8% in 9th grade, 25.9% in 10th grade, 23.8% in 11th grade, and 22.5% in 12th grade.

Nationwide, 19.0% (95% CI: 17.5%–21.0%) of students were obese and 17.8% (95% CI: 16.8%–18.9%) were overweight. Female students (20.5%, 95% CI: 18.0%–23.2%) were more likely than male (17.6%, 95% CI: 15.9%–19.5%) students, and black (23.1%, 95% CI: 20.2%–26.3%) and Hispanic (22.8%, 95% CI: 20.2%–25.7%) students were more likely than white (17.1%, 95% CI: 14.5%–20.2%) students to be obese. No subgroup differences were detected in the prevalence of overweight.

The prevalence of PA and sedentary behaviors are shown in Table 1. Results revealed differences by subgroup. For example, female students were less likely than male students to engage in each of the PA behaviors. Compared with black and Hispanic students, white students were more likely to have been physically active for at least 60 minutes on the day before the survey and to have engaged in vigorous PA, but were less likely to walk or ride their bike to or from school.

The correlates of these PA and sedentary behaviors also varied by subgroup (Tables 1 and 2). For example, male students and black students were more likely than their peers to have three or more TVs in their home and to have a TV in their bedroom. In addition, more than half of students strongly agree or agree with statements that they enjoy physical education classes, and more than three fourths strongly agree or agree with statements that reflect enjoyment of PA, but male students were more likely than female students to strongly agree or agree with such statements (Table 2).

The percentage of students who participated in 35 specific physical activities during the 12 months before the survey are shown in Table 3. Walking was the most common activity and ice hockey the least common. Results for the percentage of students who participated in these same activities during the 7 days before the survey were similar (data not shown). For most activities, the prevalence of participation during the 12 months versus the 7 days before the survey did not vary by more than 10 percentage points.

The prevalence of dietary behaviors are shown in Table 4. Again, significant subgroup differences were found. For example, male students were more likely than female students, and black students were more likely than white and Hispanic students, to have eaten fast food and French fries or other fried potatoes.

More than three fourths of students ate dinner or an evening meal on each of the 7 days before the survey (i.e., daily); daily lunch and breakfast consumption were less common (Table 4). Nationwide, 7.1% (95% CI: 5.9%–8.4%) of students never eat lunch at school (Table 4). About half (49.9%) of all students usually get a complete school lunch (defined as a meal sold at school that costs the same price every day); 10.1% (95% CI: 8.1%–12.6%) usually get an a la carte selection of items from the school cafeteria (defined as items sold separately from a complete school lunch); 4.7% (95% CI: 3.8%–5.8%) usually get food from a salad bar in the school cafeteria; 4.0% (95% CI: 2.5%–6.5%) usually get fast food from the school cafeteria; and 4.3% (95% CI: 3.4%–5.4%) usually get food from a school vending machine, school canteen, or school store when they get lunch at school.

Correlates of dietary behavior also are shown in Table 4. During the 7 days before the survey, 36.9% of students ate dinner at home with at least one parent or guardian on all 7 days (i.e., daily); 10.1% (95% CI: 9.1%–11.2%) did so on 6 of the 7 days; and 13.6% (95% CI: 12.6%–14.8%) did so on 5 of the 7 days. Differences by race/ethnic subgroup were common for these variables. For example, black students were less likely than white and Hispanic students to usually eat dinner at home on school days and to have eaten dinner at home with at least one parent or guardian daily.

The percentage of high school students engaging in various weight control practices are shown in Table 5. With the exception of smoking cigarettes, female students were more likely than male students to engage in each of these weight control practices. Some racial/ethnic differences also were found.

Discussion

The results from this nationally representative study showed that high school students do engage in behaviors related to PA and healthy eating, but efforts are needed to increase the prevalence of some of these behaviors, such as walking/biking to school and breakfast consumption, and decrease the prevalence of sedentary behaviors and behaviors that may contribute to a less healthy diet, such as regular consumption of fast food, fried potatoes, and pizza.

According to NYPANS, female and black students engaged in less PA and spent more time watching DVDs or videos than did male and white students. Gordon-Larsen et al. [4] used a

composite sedentary behavior variable that included TV and video viewing plus video or computer game use and found racial/ ethnic differences similar to those found here, but also found that male students were more likely than female students to engage in these sedentary behaviors overall. This finding is consistent with other national study results, which found that male students are more likely than female students to play video or computer games or use a computer for something that is not school work, but did not show sex differences in TV viewing [5]. Taken together, these results suggest that sex differences in sedentary behaviors vary by the particular type of behavior.

Having three or more TVs in the home and a TV in the bedroom was highly prevalent among high school students, especially among male and black students. This high prevalence is concerning, because adolescents with a TV in their bedroom have been shown to spend more time watching TV, less time engaged in PA, and to have poorer dietary habits, fewer family meals, and poorer school performance [20].

NYPANS found that few students walk or bike to or from school. The low prevalence of walking or biking to or from school indicates a missed opportunity where walking or biking to school is feasible, because active travel can increase levels of PA [21]. Indeed, recent studies have found that adolescents who walked or biked to school were significantly less likely to be overweight than those who used nonactive transportation [22].

A unique contribution of NYPANS is data on the percentage of high school students engaging in specific physical activities. Sex and race/ethnic differences in these activities were common. Not surprisingly, the activities in which students most commonly engaged are those that do not require much equipment (e.g., jogging, walking).

NYPANS found that weekly consumption of meals or snacks from fast food restaurants, including French fries or other fried potatoes and pizza, was very common among high school students. Consumption of French fries and fast-food meals or snacks was especially high among male and black students. This high level of consumption is of concern, because frequent fast-food meals have been shown to be associated with fewer vegetable servings [23], lower calcium intake [24], and increased weight gain [25] among adolescents.

Daily breakfast consumption was not common among high school students, but daily lunch consumption was somewhat more likely and daily dinner consumption even more likely. Eating regular meals is associated with lower BMI among girls [26]. Increasing the percentage of students who eat breakfast regularly also might have positive effects on reducing obesity prevalence, because more frequent breakfast consumption has been shown to be associated with lower BMI among girls [8] and among both male and female adolescents [27]; and breakfast skipping has been associated with increased weight gain between adolescence and adulthood [25].

It is encouraging that most students ate dinner daily and that students usually ate dinner at home on school days, although the percentage of students who ate dinner at home with at least one parent/guardian daily was about half as much. Efforts to increase the percentage of students regularly eating family meals are needed; multiple studies have shown that such meals are positively associated with lower BMI and healthy dietary intake [28,29]. Further,

there may be a benefit to reducing the percentage of students with a TV on while eating dinner, as this behavior is associated with lower intakes of vegetables, calcium-rich foods, and grains, and with higher soft drink intake, although students who watch TV during dinner eat a more healthful diet than those not eating regular family meals [30].

Environmental factors have been shown to play an important role in food choices [31], so healthful foods should be made available to adolescents both at home and at school. The availability of fruits and vegetables in the home was shown to be better than the availability of less healthful snack foods, a positive finding given that availability of fruits and vegetables in the home is associated with higher fruit and vegetable intake [32]. NYPANS also showed, however, that students have access to less healthful foods and beverages at school in vending machines. Although fruits and vegetables are likely available through the school meal programs, they are not readily available in vending machines. Because NYPANS found that most students obtain the foods and beverages they consume for lunch at school, it is important to improve the school nutrition environment.

Results from NYPANS are subject to at least three limitations. First, because the study is school-based, the results are representative only of high school students. Nationwide, in 2008, approximately 4% of persons aged 16–17 years were not enrolled in a high school program or did not have a high school diploma or equivalent credential [33]. Second, the survey data are self-reported, and students might over-report or under-report some behaviors [34]. Third, the survey did not include all possible behaviors and behavioral correlates related to obesity.

NYPANS provides valuable information on the prevalence of multiple behaviors related to obesity. Understanding the specific behaviors that need to be addressed can help inform interventions. For example, the low prevalence of breakfast consumption found in this study suggests the need for interventions geared toward increasing the percentage of high school students who eat breakfast regularly. Such an intervention might include the implementation of a communication and marketing plan to promote participation in school breakfast programs and making breakfast available to students at school through methods besides traditional cafeteria service, such as breakfast carts, “grab-and-go” breakfasts, and breakfast in the classroom [35]. Similarly, the low prevalence of active travel to and from school suggests that interventions are needed to increase the percentage of students walking or biking to and from school. For some communities, environmental changes that improve neighborhood walkability may help ensure students’ safety, thereby increasing the prevalence of active travel [36].

This analysis also shows that some behavioral correlates shown to be associated with PA and healthy eating, such as parental support for PA and availability of fruits and vegetables in the home, appear to be common among high school students. Those that are less common, such as regular family meals, suggest areas for intervention. Interventions to increase family meal frequency might include materials to assist with meal planning, simple recipes, and videos that model families eating meals together [37].

In addition to informing interventions that address specific behaviors and behavioral correlates, results from this study also reveal subgroups in which behaviors and behavioral correlates related to obesity are most prevalent. Targeting interventions toward these subgroups may increase the impact of these interventions in preventing obesity. For example, media campaigns to decrease sedentary activities and promote PA may be especially effective if they are targeted toward black students, who were shown in this study to watch more DVDs and videos, have greater access to television, and engage in less PA than their white counterparts.

Schools play a particularly critical role in preventing obesity among adolescents. Young people spend many of their waking hours at school, so it is important for schools to establish a safe and supportive environment with policies and practices that support healthy behaviors. Schools also provide multiple opportunities, both during and outside of school hours, for students to learn about and practice healthy eating and PA behaviors. To assist schools in developing effective policies and programs, CDC has developed *School Health Guidelines to Promote Healthy Eating and Physical Activity* [35]. Schools are not the only avenue for intervention, however. CDC also provides guidance on community strategies to increase access to fruits and vegetables, drinking water and other healthy beverages, and PA [38–40]. In addition, the Youth Physical Activity Guidelines Toolkit provides specific strategies that can be used to support youth physical activity (<http://www.cdc.gov/healthyyouth/physicalactivity/guidelines.htm#1>). For example, families can set a positive example by incorporating PA into daily routines; and communities, through infrastructure improvements and joint use agreements, can improve access to places to be physically active. By working together, schools, families, and other institutions can reduce the prevalence of obesity among adolescents in the United States.

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IMPLICATIONS AND CONTRIBUTION

NYPANS provides current nationally representative data on physical activity and healthy eating among high school students. Results can be used to develop obesity prevention programs that address specific behaviors and behavioral correlates, and target subgroups in which behaviors and behavioral correlates related to obesity are most prevalent.

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Table 1

Physical activity and sedentary behaviors and correlates of these behaviors, by sex and race/ethnicity—U.S. high school students, 2010

Behavior	Total % and 95% CI	Female % and 95% CI	Male % and 95% CI	White, non-Hispanic % and 95% CI	Black, non-Hispanic % and 95% CI	Hispanic % and 95% CI
Engaged in physical activity for at least 60 minutes ^d	61.2 (58.5–63.8)	52.3* (49.3–55.2)	69.9 (66.4–73.2)	63.5 ^{†,‡} (60.6–66.2)	59.2 (55.8–62.5)	57.5 (51.5–63.2)
Engaged in vigorous physical activity for 20 minutes ^b	69.7 (67.6–71.7)	61.2* (58.1–64.2)	78.1 (76.1–80.0)	72.3 ^{†,‡} (70.0–74.5)	65.1 (61.7–68.4)	66.8 (62.4–70.9)
Engaged in muscle strengthening activities ^c	50.7 (48.3–53.0)	36.6* (34.1–39.1)	64.4 (60.8–67.9)	51.3 (48.4–54.3)	47.5 (44.3–50.6)	52.2 (48.2–56.2)
Walked or rode bike to school ^d	17.7 (14.4–21.5)	15.1* (12.1–18.7)	20.2 (16.4–24.5)	11.3 ^{†,‡} (8.8–14.4)	23.5 (18.0–30.0)	29.9 (22.7–38.3)
Walked or rode bike home from school ^d	24.5 (20.5–29.1)	22.3* (18.7–26.5)	26.7 (21.8–32.3)	18.3 ^{†,‡} (14.7–22.6)	28.1 [§] (21.8–32.3)	37.5 (31.5–43.9)
Watched DVDs or videos 3 hours/day ^e	20.8 (18.6–23.2)	22.9* (20.4–25.6)	18.8 (16.3–21.7)	13.9 ^{†,‡} (12.1–15.8)	40.1 [§] (37.1–43.2)	26.1 (24.4–27.9)
Correlate						
Have three or more TVs in home	79.9 (77.8–81.8)	77.1* (74.2–79.8)	82.5 (80.7–84.3)	78.8 [†] (76.0–81.3)	86.1 [§] (83.5–88.4)	79.9 (76.9–82.7)
Have a TV in bedroom	70.2 (66.5–73.6)	65.0* (60.9–68.8)	75.3 (71.6–78.6)	66.0 ^{†,‡} (61.8–69.9)	83.4 [§] (80.9–85.7)	75.9 (73.3–78.3)
Adult in household:						
Encourages student to do PA or play sports ^f	73.9 (72.6–75.1)	74.3 (72.2–76.3)	73.4 (71.9–74.9)	74.1 (72.1–76.0)	71.0 [§] (68.3–73.6)	75.0 (73.5–76.4)
Does PA or plays sports with student ^f	48.5 (47.5–49.6)	46.9 (44.9–48.8)	50.1 (48.9–51.4)	49.2 (47.5–50.9)	46.3 [§] (43.6–49.0)	50.9 (49.2–52.6)
Provides transportation to place where student can do PA or play sports ^f	67.8 (66.1–69.5)	67.2 (64.0–70.3)	68.4 (66.9–70.0)	68.4 (66.1–70.5)	66.0 (62.8–69.1)	67.9 (65.1–70.6)
Watches student participate in PA or sports ^f	61.8 (59.4–64.0)	59.8* (56.3–63.2)	63.6 (61.7–65.5)	65.0 ^{†,‡} (61.8–68.0)	60.2 (56.7–63.6)	56.4 (53.4–59.3)

CI = confidence interval.

^a On the day before the survey.^b Exercised or participated in physical activities that made students sweat and breathe hard for 20 minutes on 3 of the 7 days before the survey (e.g., basketball, soccer, running, swimming laps, fast bicycling, fast dancing, or similar aerobic activities).^c Did exercises to strengthen or tone their muscles on 3 of the 7 days before the survey (e.g., push-ups, sit-ups, or weight lifting).^d On 1 or more days in an average school week when the weather allows.

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^e On an average school day.
^f One or more times in an average week.

* Significant difference between female and male students ($p < .05$).

[†] Significant difference between white and black students ($p < .05$).

[‡] Significant difference between white and Hispanic students ($p < .05$).

[§] Significant difference between black and Hispanic students ($p < .05$).

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Table 2

High school students who strongly agree or agree with the following statements related to physical education and physical activity, by sex and race/ethnicity—United States, 2010

Statement	Total % and 95% CI	Female % and 95% CI	Male % and 95% CI	White, non-Hispanic % and 95% CI	Black, non-Hispanic % and 95% CI	Hispanic % and 95% CI
I enjoyed the physical education classes I took at school during the past 12 months.	52.5 (49.9–55.1)	42.8* (40.1–45.6)	62.0 (58.9–65.0)	51.9 (48.7–55.1)	52.1 (49.2–54.9)	53.3 (48.1–58.5)
When I am physically active...						
I enjoy it.	82.5 (81.0–83.8)	77.9* (75.9–79.8)	87.0 (85.4–88.5)	83.2 (81.2–85.1)	81.5 (79.4–83.3)	82.5 (80.1–84.6)
I find it fun.	78.1 (76.6–79.6)	72.7* (70.4–74.8)	83.6 (81.6–83.5)	78.1 (75.6–80.3)	78.3 (76.0–80.5)	79.3 (76.7–81.6)
It gives me energy.	75.6 (74.1–77.0)	74.2* (72.0–76.3)	77.0 (75.3–78.6)	76.0 ^{†,‡} (73.9–78.0)	70.9 [§] (68.1–73.5)	79.4 (77.6–81.2)
My body feels good.	78.2 (76.5–79.8)	76.6* (74.2–78.7)	79.8 (77.6–81.8)	80.6 [†] (78.5–82.5)	70.3 [§] (67.8–72.6)	78.5 (76.4–80.5)
It gives me a strong feeling of success.	77.6 (76.4–78.8)	76.3* (74.7–77.9)	78.9 (77.0–80.6)	77.6 (75.8–79.3)	77.1 (74.4–79.6)	77.8 (75.5–80.0)
At home there are enough pieces of sports equipment ^a to use for physical activity.	70.7 (68.2–73.1)	66.8* (64.0–69.5)	74.5 (71.8–77.0)	76.7 ^{†,‡} (74.4–78.9)	60.9 (57.5–64.1)	62.6 (56.2–68.5)
There are playgrounds, parks, or gyms close to my home.	68.4 (65.0–71.6)	68.1 (64.5–71.5)	68.8 (65.3–72.1)	67.9 (62.7–72.7)	68.3 (64.2–72.2)	68.6 (65.3–71.7)
It is safe to be physically active by myself in my neighborhood.	73.5 (70.5–76.4)	67.4* (63.5–71.1)	79.5 (77.0–81.8)	80.2 ^{†,‡} (77.0–83.0)	64.6 (60.5–68.4)	62.3 (56.2–68.1)

CI = confidence interval.

^aSuch as balls, bicycles, or skates.

* Significant difference between female and male students ($p < .05$).

[†] Significant difference between white and black students ($p < .05$).

[‡] Significant difference between white and Hispanic students ($p < .05$).

[§] Significant difference between black and Hispanic students ($p < .05$).

Table 3

Participation in physical activities during the past 12 months, by sex and race/ethnicity—U.S. high school students, 2010

Activity	Total % and 95% CI	Female % and 95% CI	Male % and 95% CI	White, non-Hispanic % and 95% CI	Black, non-Hispanic % and 95% CI	Hispanic % and 95% CI
Active video games (e.g., Wii, Dance Dance Revolution)	63.0 (60.6–65.3)	64.3 (60.8–67.6)	61.7 (59.4–63.9)	67.4 [†] (64.5–70.2)	60.0 [§] (56.7–63.3)	50.2 (47.0–53.3)
Aerobics	32.3 (29.3–35.5)	39.0* (34.8–43.3)	25.7 (23.3–28.4)	36.4 [†] (32.9–40.0)	21.5 [§] (18.1–25.2)	28.0 (24.0–32.3)
Baseball/softball	33.7 (30.9–36.7)	28.0* (25.1–31.0)	39.4 (35.6–43.3)	37.8 [†] (34.4–41.4)	21.9 [§] (18.9–25.3)	31.9 (28.2–35.8)
Basketball	57.9 (56.1–59.7)	45.1* (42.7–47.6)	70.5 (68.2–72.8)	57.0 [†] (54.1–59.8)	62.8 [§] (59.8–65.7)	54.7 (51.8–57.6)
Bike riding	47.6 (44.0–51.2)	42.7* (39.1–46.4)	52.5 (48.6–56.3)	54.0 [†] (49.4–58.5)	31.7 [§] (28.3–35.4)	40.0 (38.1–41.9)
Cheerleading	7.9 (7.2–8.8)	14.0* (12.2–16.0)	2.0 (1.5–2.6)	7.6 [†] (6.5–8.8)	10.6 (9.1–12.5)	7.4 (6.1–12.5)
Dance	40.3 (38.2–42.4)	59.0* (56.3–61.6)	21.5 (19.0–24.4)	34.4 [†] (32.0–36.8)	52.0 (48.8–55.2)	48.3 (45.6–51.1)
Field hockey/street hockey	10.5 (8.1–13.7)	7.6* (5.7–10.2)	13.4 (9.9–17.9)	13.2 [†] (10.0–17.2)	4.8 (2.8–8.0)	7.6 (5.1–11.0)
Football	43.6 (41.5–45.7)	23.3* (21.0–25.7)	63.4 (61.2–65.6)	44.2 (41.0–47.8)	44.4 (41.0–47.8)	42.1 (39.6–44.7)
Frisbee	22.5 (20.1–25.0)	18.4* (15.9–21.3)	26.5 (23.9–29.2)	28.1 [†] (25.4–31.0)	8.9 [§] (7.0–11.3)	15.0 (12.6–17.9)
Golf	16.4 (14.4–18.5)	9.0* (7.8–10.5)	23.7 (20.7–26.9)	21.7 [†] (19.3–24.5)	6.5 [§] (5.1–8.3)	8.8 (7.2–10.6)
Gymnastics/tumbling	10.8 (9.8–12.0)	15.6* (13.9–17.4)	6.2 (5.2–7.3)	10.9 (9.4–12.6)	10.7 (8.7–13.1)	9.7 (7.8–11.8)
Hiking	32.5 (27.9–37.5)	30.8* (26.7–35.1)	34.2 (28.8–40.0)	41.4 [†] (36.0–47.1)	7.7 [§] (6.0–9.8)	24.2 (17.2–33.0)
Horseback riding	11.7 (10.3–13.3)	15.1* (12.9–17.6)	8.4 (6.9–10.2)	14.5 [†] (12.4–16.8)	6.1 (3.2–11.5)	8.7 (6.5–11.4)
Ice hockey	5.0 (3.4–7.3)	3.0* (2.0–4.4)	7.0 (4.6–10.6)	7.1 [†] (4.5–11.0)	1.0 [§] (.6–1.7)	2.7 (1.7–4.2)
Ice skating	16.8 (14.0–20.1)	20.6* (17.0–24.7)	13.2 (10.9–15.8)	20.6 [†] (16.4–25.5)	7.9 [§] (5.9–10.4)	11.0 (8.8–13.7)
Jumping rope	34.1 (31.5–36.8)	38.1* (34.8–41.4)	30.0 (27.4–32.6)	35.6 [†] (32.9–38.3)	30.7 (27.1–34.5)	30.4 (25.7–35.5)
Lacrosse	6.4 (4.8–8.6)	4.5* (3.0–6.7)	8.3 (6.4–10.8)	8.2 [†] (6.0–11.2)	3.1 (1.9–4.8)	4.0 (2.7–5.8)
Marching band	6.8 (5.4–8.7)	6.8 (5.1–9.0)	6.9 (5.4–8.7)	7.5 (5.4–10.2)	5.7 (4.4–7.3)	5.9 (4.0–8.5)
Martial arts	11.4 (10.2–12.7)	6.6* (5.5–7.9)	16.1 (14.3–18.1)	11.2 [†] (9.6–13.0)	7.4 [§] (6.3–8.6)	12.2 (10.8–13.8)
Racquetball	9.9 (7.7–12.7)	7.5* (5.8–9.2)	12.5 (9.1–16.9)	11.1 [†] (8.6–14.3)	3.9 [§] (2.9–5.2)	10.4 (7.2–14.8)
Roller blading/roller skating	21.3 (18.7–24.1)	24.6* (21.4–28.1)	18.1 (15.7–20.7)	22.6 [†] (19.5–26.1)	20.7 [§] (17.7–24.0)	16.3 (13.4–19.7)
Running/jogging	78.2 (76.3–80.1)	77.4 (74.9–79.8)	79.0 (76.9–81.0)	82.3 [†] (80.2–84.3)	65.1 [§] (62.1–67.9)	74.5 (71.4–77.3)

Activity	Total % and 95% CI	Female % and 95% CI	Male % and 95% CI	White, non-Hispanic % and 95% CI	Black, non-Hispanic % and 95% CI	Hispanic % and 95% CI
Skateboarding	18.6 (16.6–20.6)	13.7* (11.9–15.7)	23.4 (21.1–25.9)	19.0 [†] (16.4–21.9)	11.4 [§] (9.2–14.0)	21.2 (19.2–23.3)
Soccer	32.8 (29.6–36.1)	29.2* (26.7–31.9)	36.2 (32.0–40.6)	33.4 ^{†,‡} (29.6–37.4)	12.5 [§] (10.4–15.1)	46.6 (41.7–51.6)
Surfing	5.6 (4.3–7.3)	4.9* (3.4–7.0)	6.3 (5.0–7.9)	6.7 [†] (4.7–9.4)	2.6 [§] (1.9–3.6)	4.9 (3.5–6.7)
Swimming	53.5 (50.3–56.7)	55.5* (51.5–59.4)	51.5 (47.9–55.1)	62.6 ^{†,‡} (58.8–66.4)	33.6 [§] (30.2–37.2)	41.8 (38.6–45.1)
Tennis	24.9 (21.7–28.3)	25.0 (21.6–28.6)	24.9 (21.6–28.4)	29.0 ^{†,‡} (24.9–33.3)	11.0 [§] (8.9–13.6)	19.9 (16.5–23.8)
Track and field	19.8 (18.1–21.6)	19.0 (16.7–21.5)	20.6 (18.7–22.7)	18.5 [†] (16.4–22.0)	25.0 [§] (21.3–29.2)	19.0 (16.4–22.0)
Volleyball	33.1 (30.0–36.2)	38.9* (35.8–42.1)	27.2 (23.5–31.2)	36.3 ^{†,‡} (32.7–40.0)	18.9 [§] (15.3–23.2)	31.2 (28.3–34.4)
Waterskiing	8.7 (7.3–10.3)	7.7 (5.9–10.1)	9.7 (8.3–11.2)	12.2 ^{†,‡} (10.3–14.5)	2.0 [§] (1.4–2.9)	4.0 (2.0–5.4)
Walking	83.9 (82.6–85.1)	86.5* (85.2–87.8)	81.4 (79.2–83.4)	85.6 [†] (84.0–87.1)	76.6 [§] (74.0–78.9)	84.0 (82.2–85.7)
Weightlifting	55.0 (52.7–57.2)	38.5* (35.2–42.0)	70.9 (69.0–72.8)	58.6 ^{†,‡} (55.7–61.5)	47.6 (45.2–50.0)	50.4 (46.6–54.2)
Wrestling	16.4 (14.7–18.3)	9.3* (7.7–11.1)	23.5 (21.1–26.0)	15.9 [†] (13.9–18.1)	16.1 [§] (13.8–18.6)	19.4 (16.4–22.8)
Yoga	20.1 (17.8–22.6)	31.3* (27.2–35.7)	8.9 (8.0–9.9)	23.7 ^{†,‡} (20.5–27.1)	12.0 (9.4–15.4)	14.9 (12.5–17.8)

CI = confidence interval.

* Significant difference between female and male students ($p < .05$).

[†] Significant difference between white and black students ($p < .05$).

[‡] Significant difference between white and Hispanic students ($p < .05$).

[§] Significant difference between black and Hispanic students ($p < .05$).

Table 4
Selected dietary behaviors and their correlates, by sex and race/ethnicity—U.S. high school students, 2010

Behavior	Total % and 95% CI	Female % and 95% CI	Male % and 95% CI	White, non-Hispanic % and 95% CI	Black, non-Hispanic % and 95% CI	Hispanic % and 95% CI
Ate at least one meal or snack from a fast food restaurant ^d	74.8 (71.5–77.9)	72.6* (68.2–76.6)	77.1 (74.3–79.7)	71.6 ^{†,‡} (66.7–76.1)	82.7 [§] (80.6–84.6)	79.3 (77.3–81.1)
Ate French fries or other fried potatoes ^a	79.4 (77.5–81.1)	77.8* (75.1–80.2)	81.1 (79.5–82.6)	79.3 [†] (76.8–81.5)	83.0 [§] (80.0–85.6)	78.3 (74.7–81.5)
Ate pizza ^b	73.0 (71.3–74.6)	69.4* (67.2–71.6)	76.3 (74.7–77.9)	74.9 ^{†,‡} (73.0–76.8)	70.2 (66.7–73.5)	70.6 (68.2–73.0)
Ate breakfast or a morning meal daily ^c	36.9 (34.9–39.0)	34.0* (31.1–37.1)	39.6 (37.7–41.6)	40.7 ^{†,‡} (38.0–43.3)	26.8 [§] (23.5–30.5)	32.6 (29.6–35.7)
Ate lunch daily ^c	61.8 (59.3–64.2)	56.9* (53.9–59.9)	66.5 (63.8–69.1)	66.1 ^{†,‡} (63.0–69.1)	51.7 (48.4–55.0)	56.1 (52.8–59.3)
Ate dinner or an evening meal daily ^c	76.8 (74.6–78.8)	72.5* (69.8–75.0)	81.1 (78.9–83.0)	79.7 ^{†,‡} (77.2–82.1)	68.2 (65.1–71.1)	71.9 (67.9–75.5)
Usually get lunch from somewhere at school	64.3 (59.4–68.8)	60.7* (55.6–65.4)	67.8 (62.5–72.6)	59.7 ^{†,‡} (53.4–65.7)	73.0 (69.1–76.7)	72.8 (67.7–77.4)
Usually get a complete school lunch from the school cafeteria	49.9 (45.7–54.2)	44.4* (39.4–49.6)	55.4 (51.1–59.6)	48.2 [‡] (42.1–54.2)	50.6 (45.8–55.3)	54.6 (51.0–58.3)
Eat all or part of a complete school lunch daily ^d	38.6 (35.8–41.4)	30.7* (27.8–33.7)	46.2 (42.8–49.5)	39.9 [†] (36.5–43.4)	28.8 [§] (26.3–31.5)	38.2 (32.7–44.0)
Bring their own lunch to school from home daily ^d	14.8 (11.8–18.4)	17.8* (14.2–22.0)	11.9 (9.1–15.4)	19.0 ^{†,‡} (14–23.8)	6.3 (4.8–8.1)	7.4 (4.4–9.9)
Correlate						
Usually eat dinner at home on school days	88.8 (87.6–89.8)	89.0 (87.4–90.4)	88.5 (87.3–89.7)	90.1 [†] (88.7–91.4)	82.1 [§] (79.6–84.4)	88.4 (86.1–90.3)
Ate dinner at home with at least one parent/guardian daily ^c	36.9 (35.5–38.4)	33.6* (31.5–35.8)	40.3 (38.2–42.4)	37.8 [†] (35.7–39.8)	30.3 [§] (26.5–34.4)	38.1 (36.2–40.0)
Always or most of the time have a TV on while eating dinner at home	41.0 (38.2–43.9)	40.7 (37.2–44.2)	41.6 (38.7–44.5)	36.3 [†] (32.7–40.1)	62.0 [§] (58.2–65.7)	40.8 (37.5–44.1)
Always or most of the time have fruits or vegetables ^e to snack on in home	69.3 (66.2–72.3)	70.1 (66.8–73.2)	68.7 (65.0–72.1)	74.6 ^{†,‡} (70.7–78.1)	48.9 [§] (46.0–51.8)	68.5 (65.0–71.7)
Always or most of the time have foods such as chips, cookies, or cakes to snack on in home	49.1 (46.8–51.5)	49.9 (47.0–52.8)	48.5 (46.1–51.0)	52.8 [†] (50.4–55.3)	51.6 [§] (49.1–54.1)	38.7 (34.9–42.6)
School has vending machines students can use to purchase soda or pop, sports drinks, or fruit drinks ^f	71.8 (67.0–76.2)	71.4 (65.8–76.4)	72.3 (67.9–76.3)	74.9 [†] (68.9–80.1)	69.9 (62.7–76.2)	64.3 (55.6–72.1)
School has vending machines students can use to purchase snacks ^g	62.9 (52.3–72.4)	61.1* (50.1–71.1)	64.8 (54.5–73.9)	64.2 (52.2–74.7)	59.9 (47.3–71.3)	59.5 (42.4–74.7)
School has vending machines students can use to purchase fruits or vegetables ^h	7.8 (5.9–10.3)	6.1* (4.2–8.8)	9.5 (7.3–12.3)	8.1 (5.8–11.2)	8.9 (7.0–11.3)	7.0 (4.3–11.2)

CI = confidence interval.

^a On 1 or more days during the 7 days before the survey.

^b One or more times during the 7 days before the survey.

^c On all 7 days before the survey.

^d On all 5 days in an average week when in school.

^e Such as carrots, celery, apples, bananas, or melon.

^f That are not 100% juice.

^g Such as chips, cookies, crackers, cakes, pastries, chocolate candy, or other kinds of candy.

^h Including dried fruit, such as raisins.

* Significant difference between female and male students ($p < .05$).

[†] Significant difference between white and black students ($p < .05$).

[‡] Significant difference between white and Hispanic students ($p < .05$).

[§] Significant difference between black and Hispanic students ($p < .05$).

Practices to lose weight or keep from gaining weight, by sex and race/ethnicity—U.S. high school students, 2010

Table 5

Practice during the 30 days before the survey	Total % and 95% CI	Female % and 95% CI	Male % and 95% CI	White, non-Hispanic % and 95% CI	Black, non-Hispanic % and 95% CI	Hispanic % and 95% CI
Ate more fruits and vegetables	34.5 (32.8–36.2)	40.9* (38.3–43.5)	28.1 (26.1–30.3)	33.1 [‡] (30.9–35.4)	33.3 (29.3–37.6)	38.0 (35.2–40.8)
Ate fewer calories	32.8 (31.3–34.3)	40.8* (38.6–43.0)	24.8 (22.7–27.0)	32.7 (30.5–34.9)	29.8 [§] (25.4–34.5)	36.4 (34.0–38.9)
Skipped meals	22.1 (20.6–23.7)	28.3* (26.1–30.5)	16.0 (14.3–17.9)	19.4 [‡] (17.7–21.2)	25.9 (23.7–28.3)	27.5 (24.9–30.2)
Drank more water	41.2 (39.1–43.3)	49.4* (47.1–51.7)	33.0 (30.6–35.6)	38.5 [‡] (36.0–41.0)	43.1 [§] (39.1–47.1)	50.0 (46.9–53.1)
Smoked cigarettes	5.2 (4.3–6.1)	4.9 (3.9–6.0)	5.4 (4.5–6.6)	5.5 (4.3–7.1)	5.0 (3.7–6.7)	4.7 (3.7–6.0)

* Significant difference between female and male students ($p < .05$).

[‡] Significant difference between white and black students ($p < .05$).

[‡] Significant difference between white and Hispanic students ($p < .05$).

[§] Significant difference between black and Hispanic students ($p < .05$).