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Dietary and Physical Activity Behaviors of New York City Children from Different Ethnic Minority Subgroups

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Abstract

Objective—To examine racial/ethnic differences in diet and physical activity behaviors in ethnic minority New York City children.

Methods—Cross-sectional data from a community-based study of 486 6–8 year old children were used. Race/ethnicity was derived using caregiver report of child's race and Hispanic ancestry. Dietary intake was obtained by 24-hour diet recalls using the Nutrition Data System for Research. Physical activity was assessed with pedometers and caregiver interviews. We compared diet and activity measures across racial/ethnic subgroups using Chi Square and ANOVA tests. Multivariate analyses adjusted for age, gender, BMI, and caregiver education (with breastfeeding history and total energy intake included in diet models).

Results—Participants (n=486) were categorized as Mexican (29.4%), Dominican (8.4%), Puerto Rican (20.6%), other/mixed Hispanic (14.0%) or non-Hispanic Black (27.6%). Obesity rates were lower in non-Hispanic Blacks (18%) than in Hispanics (31%). Mexicans had the lowest obesity prevalence among Hispanic subgroups (25%) and Dominicans had the highest (39%). There were differences in mean daily servings of food groups with Mexicans having healthier diets and Puerto Ricans and non-Hispanic Blacks having less healthy diets. Sedentary time was lower in Mexicans than in other groups in adjusted models. Examination of additional models including home language did not show significant differences in the estimates.

Conclusion—Diet and activity behaviors varied across racial/ethnic subgroups. Specifically, Mexican children had healthier diets, the least amount of sedentary time and the lowest rates of obesity among the Hispanic subgroups examined. Targeted interventions in ethnic subgroups may be warranted to address specific behaviors.

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What's New: Our study is the first to examine differences in dietary and physical activity behaviors in children from different racial/ethnic groups, including Hispanic subgroups. A better understanding of these differences may inform strategies to address disparities in obesity and related conditions.

Keywords

race; ethnicity; diet; physical activity; obesity

Introduction

Childhood obesity affects approximately 17% of children and adolescents in the United States, and there are significant racial/ethnic disparities in obesity rates on a national level.¹ Data from New York City public elementary school children demonstrates that overall, the prevalence of obesity in grades K-8 decreased 5.5%, from 21.9% in 2006–07 to 20.7% in 2010–11. However, the decrease was smaller among Black (1.9%) and Hispanic (3.4%) children than among Asian/Pacific Islander (7.6%) and white (12.5%) children.² Studies have found similar racial/ethnic disparities in metabolic syndrome³ and diabetes⁴ in children.

As obesity often is seen as an imbalance between energy intake and expenditure, differences in diet and physical activity behaviors likely impact racial/ethnic disparities in the prevalence of obesity and related conditions.⁵ Previous comparative studies examining differences in dietary intake in children from different racial/ethnic groups have included broad racial/ethnic categories.^{6–11} These studies have generally shown that children from racial/ethnic minorities have less healthy diets than White children. Hispanic diet is likely influenced by traditional dietary patterns in different countries, as well as by the dietary practices of adopted communities. However, there have been few studies describing dietary patterns in non-Mexican Hispanic American children^{12, 13} and no studies comparing intake among children from different Hispanic subgroups. Similarly, studies of differences in physical and sedentary activity behaviors have also included children in broad racial/ethnic categories.^{14–19} Thus the primary objective of our study was to examine racial/ethnic differences in diet and physical activity behaviors in mixed ethnic minority New York City (NYC) children, including Hispanic subgroups. A secondary objective was to examine how children's behaviors compared to current diet and physical activity recommendations.

Methods

Study Design and Participants

The study was a cross-sectional analysis of data collected for “Growing Up Healthy”, a community-based epidemiologic study including six to eight year old Black and Hispanic New York City children enrolled in 2004–2007. Boys and girls who resided in East Harlem, New York City or attended local schools or clinics, were enrolled to examine the effects of neighborhood characteristics and chemical exposures on growth and development.²⁰ There were more girls because additional funding was provided for a study of puberty in girls.²¹ Identical dietary and physical activity measures were collected among all children (384 girls and 102 boys). English and Spanish speaking children were recruited as per a Mount Sinai School of Medicine institutional review board–approved protocol. Written consent was obtained from parents and witnessed assent was obtained from children.

Measurements

Main predictor variable—The main predictor variables in this study were race and ethnicity, which were further broken down into subgroups. We measured race by asking “What race do you consider (CHILD’S NAME) to be?” Hispanic ethnicity was ascertained by asking “Do you consider (CHILD’S NAME) to be Hispanic/Latino(a)?” Children who were not identified as Hispanic and were identified as Black were categorized as “non-

Hispanic Black". A detailed assessment of ancestry was completed for Hispanic children (available for 352 out of a total of 370 Hispanic children). In this study, only data for non-Hispanic Black children and Hispanic children with ancestry information were included. Children were categorized as Mexican, Dominican, or Puerto Rican if ancestors from both sides of the child's family were from the same country. Children with ancestors from Spanish speaking countries other than Mexico, the Dominican Republic or Puerto Rico, or with Hispanic ancestors who were not born in the same country were categorized as "other/mixed Hispanic".

Outcome Measurements—The main outcome variables were dietary intake as measured by 24-hour diet recalls and physical activity as measured by pedometers and questionnaires.

Trained dietitians conducted 24-hour diet recalls by telephone with parents in English or Spanish using the Nutrition Data System for Research (NDSR) to obtain type and quantity of all foods consumed.²² Multiple dietary recalls (n =2–4) were conducted over a 12-month period to account for daily and seasonal variation in diet. Data from two or more dietary recalls were available for 437 children out of 486 total children. We quantified number of daily servings from different food groups based on standard serving sizes as outlined by NDSR.²² Dietary intake for study children was compared to recommendations from the United States Department of Agriculture (USDA) with recommended number of food group servings for children ages 4–8 years with less than 30 minutes per day of moderate physical activity, beyond normal daily activities.²³ Low activity levels were assumed because most children did not achieve the 60 minutes/day of activity recommended in national physical activity guidelines.

Pedometers were utilized as activity monitors to provide measures of movement due to their low cost and ease of use. Research assistants demonstrated the proper use of the pedometer and provided detailed in-person instructions to participants and caregivers. Caregivers were asked to record the child's activity each evening for seven consecutive days to capture information for both weekdays and weekend days. The mean number of pedometer steps per day was calculated for children with at least four days of steps recorded in a personal diary. Participation in structured activities (hours per week and months per year) and time spent each day in sedentary activities was reported in a questionnaire.

Covariates—The main covariates of interest included age, gender, weight status, socioeconomic status, and whether the child had breastfed. In addition, we examined whether differences in diet and physical activity were mediated by language spoken in the home (English, Spanish or both).

Interviewers were trained and certified to measure weight and standing height using standardized protocols.²⁴ The SAS program from the U.S. Centers for Disease Control and Prevention was used to calculate body mass index (BMI) percentiles based on the 2000 CDC growth charts for children 0 to 20 years of age.²⁵ Children with BMI 5th and <85th percentile were classified as "normal weight", with BMI 85th and <95th percentiles were classified as "overweight" and with BMI 95th percentile were classified as "obese". Socioeconomic status was measured using highest level of caregiver education in the home. Breastfeeding history was reported and classified as ever/never breastfed.

Statistical analyses

Analyses were performed using SPSS, version 19.0 software (SPSS Inc, Chicago, Ill). We compared dietary and activity measures among non-Hispanic Black children and children from different Hispanic subgroups (Mexican, Dominican, Puerto Rican, other/mixed Hispanic) using ANOVA tests with Tukey's HSD post hoc testing for homogeneous subsets.

Physical activity and sedentary activity were compared across race/ethnicity groups using Chi-Squared tests for categorized variables and ANOVA tests for normally distributed variables. For dietary and physical activity behaviors that varied significantly across these subgroups, multivariate analyses were performed. Variables in the multivariate models were chosen a priori based on reported relationships in the literature between these variables and the main predictor (race/ethnicity) and outcomes (dietary and physical activity measures). For dietary measures, these multivariate analyses adjusted for age, gender, BMI percentile, highest level of caregiver education, whether the child had breastfed and total energy intake. For physical and sedentary activity measures, multivariate analyses adjusted for age, gender, BMI percentile and highest level of caregiver education. Additional models included language spoken in the home (English, Spanish or both) to assess for possible mediation of racial/ethnic differences.

Results

Overall, almost 80% of the 486 participants were girls, and there were almost equal numbers of children at ages 6, 7, and 8 years (Table 1). On the whole, 27.6% described themselves as non-Hispanic Black (n=134), and the Hispanics (72.4%) were categorized as Mexican (n=143), Dominican (n=41), Puerto Rican (n=100), or as other/mixed Hispanic (n=68). In terms of socioeconomic status, most caregivers reported an education level of high school or less. In addition, most families had government health insurance and had a household income of less than \$50,000 per year (with 54% reporting incomes below \$25,000 per year). About half the families spoke English in the home, with the remaining speaking Spanish or both English and Spanish. In the overall group, the combined rates of overweight and obesity was 42.9%.

Age and sex distribution were similar across racial/ethnic groups. Obesity rates were lowest in non-Hispanic Black children (18%), and among Hispanics, rates were lowest in Mexicans (25%) followed by other/mixed Hispanics (31%), Puerto Ricans (35%), and Dominicans (39%).

Diet

Diet data including information from the average of two to four dietary recalls per child was available for 437 children (Table 2).

Overview of Dietary Intake Compared to Current Recommendations—Study children did not eat the recommended 5 servings per day of fruits and vegetables with mean (sd) intake for all children of 3.3 (1.7) servings per day. Although children did consume the recommended five servings of grains per day, they ate mostly refined grains (mean of 4.1 servings per day out of 5.1 total servings). Children did not eat the recommended minimum of 2.5 servings per day of whole grains with mean intake among study participants of only 0.8 servings per day. Children consumed close to recommended total servings of dairy products and proteins. However, current recommendations include consumption of low fat dairy and lean proteins. In our study, only about half of the total dairy intake was low fat dairy, and similarly, only about half of the total protein intake was lean proteins. On average, children drank about 0.9 servings of sugary beverages and essentially no servings of diet beverages.

Racial Ethnic Differences in Diet—In adjusted models, among racial/ethnic subgroups including Hispanic subgroups, Mexican children generally had healthier diets while Puerto Rican and non-Hispanic Black children had less healthy diets. For example, Mexican and Dominican children ate more fruits and vegetables than Puerto Rican and non-Hispanic

Black children (Table 3). Intake of whole grains was higher in Mexican children compared to all other groups while intake of refined grains was highest in Puerto Rican children. Overall, dairy and water intake was highest in Mexican children with significantly higher total dairy, whole fat dairy, low fat dairy and water intake in Mexican children compared to Puerto Rican and non-Hispanic Black children. Mexican and Dominican children also had significantly lower intake of regular fat meats, nuts and eggs than non-Hispanic Black children. Finally, intake of sugar sweetened beverages was significantly lower in Mexican children than in Puerto Rican children.

Physical and Sedentary Activity

Overview—Almost 70% of children did not participate in any organized recreational activities. Average time spent in gym class per week was one hour. Almost half of all children (46.7%) had more than two hours per day of screen time (television, video game and computer time combined). Mean pedometer steps for all children with available data (n=394) was 10,375 (sd 5,062). The number of steps was higher in boys (mean 12,052, sd 5,790) than girls (mean 9,907, sd 4,744).

Racial/ethnic Differences in Physical Activity—While Mexican children were less likely to participate in organized recreational activities compared to all other racial/ethnic subgroups, these differences were no longer significant in adjusted models (Table 4). There were no racial/ethnic differences in time spent in physical education each week (data not shown, Chi sq p=0.23). Mean pedometer steps did not differ significantly across all racial/ethnic groups when including both boys and girls (Table 5). Puerto Rican girls had fewer mean steps (8,348) than Mexican girls (10,349) and other/mixed Hispanic girls (11,308), p<0.05. On the other hand, Puerto Rican boys had the highest mean steps (15,887) while other/mixed Hispanic boys had the lowest mean steps (8,270), p<0.05.

Racial/ethnic Differences in Sedentary Activity—Mexican children generally spent the least amount of time in sedentary activities. Compared to Mexican children, Puerto Rican and non-Hispanic Black children were more likely to play video games >1 hour per day and to watch television >2 hours per day, and all other racial/ethnic groups were more likely to use the computer daily outside of school (Table 4). Mexican children also had the lowest mean total sedentary hours (television, video game, computer and working/sitting time combined) and the lowest mean screen time hours (television, video game and computer time combined), while Puerto Rican and Black children had the highest (Table 5). Hours spent sleeping was significantly higher in other/mixed Hispanic children compared to Puerto Rican and non-Hispanic Black children (Table 5). Stratified analyses by gender for sedentary activity showed the same trends across racial/ethnic subgroups though not all differences were significant, likely due to smaller numbers.

Addition of Home Language

Examination of additional models with inclusion of language spoken in the home did not show significant differences in the estimates.

Discussion

We found several differences in diet, physical activity and sedentary behaviors among children from different racial/ethnic subgroups including Hispanic subgroups. Mexican children specifically had healthier diets (higher intake of fruits, low fat dairy and water and lower intake of refined grains, regular fat meats and sugar sweetened beverages) while Puerto Rican and non-Hispanic Black children generally had less healthy diets. In terms of physical activity, there were no differences in average number of daily pedometer steps

across groups, and adjusted analyses did not find differences in participation in structured activities. However, Mexican children were less likely than children in other racial/ethnic groups to take part in sedentary activities such as playing video games, watching television and using a computer outside of school.

Like most Americans, urban, ethnic minority children in our study did not meet current diet and physical activity recommendations. They had inadequate intake of fruits and vegetables, whole grains, low fat dairy products, and lean meats/legumes. Neither boys nor girls met optimal age- and sex-specific standards for steps/day related to healthy body composition for 6–12 year old children (12,000+ steps in girls and 15,000+steps in boys).²⁶ Almost 70% of children reported not taking part in any structured physical activity and <50% spent >1 hour per week in physical education. Children also had excessive sedentary activity; about half had>2 hours per day of screen time.

Previous studies of racial/ethnic differences in lifestyle behaviors have included children from broad racial/ethnic categories. These studies have generally reported poor dietary quality in racial/ethnic minority children. For example, studies have shown higher intake of calories and fat in Hispanic⁹ and Black youth^{10, 11} compared to other groups, lower consumption of milk and higher consumption of fruit drinks in Black children compared to White and Mexican children,^{6, 8} and more dark green vegetable and less deep yellow vegetable intake in Black children compared to Mexican-American children.⁷ In our study, non-Hispanic Black children generally had less healthy diets than Hispanic children. However, among Hispanic subgroups, we found that Mexican children had healthier diets, while Puerto Rican children, like non-Hispanic Black children, had the least healthy diets.

Previous findings related to racial/ethnic differences in physical and sedentary activity behaviors have also been mixed. Hispanic children have the lowest levels of moderate to vigorous physical activity and participation in physical education.^{9, 15, 16, 19} Studies have found both low and high activity levels in Black children but almost uniformly have found that Black children have the highest levels of sedentary activity, particularly television watching.^{14, 15, 17, 18} We found that Hispanic children had lower participation in structured physical activity and less television watching than non-Hispanic Black children. We did not, however, find differences in time spent in physical education. We were also able to demonstrate important differences among children from different racial/ethnic subgroups, especially varying levels of different types of sedentary activities.

As obesity often is seen as an imbalance between energy intake and expenditure, dietary and physical activity behaviors likely have an impact on obesity prevalence.⁵ In our study, Hispanic children had higher obesity rates than non-Hispanic Black children, which is consistent with overall obesity trends in New York City children² and also with studies demonstrating that Hispanic children are more at risk for early childhood obesity, while Black children are more at risk for developing obesity later.²⁷ More detailed comparisons among Hispanic subgroups in our study found that Mexican children seemed to have healthier dietary practices, the least time in sedentary activities and the lowest rates of obesity. Thus differences in lifestyle behaviors may at least partially explain disparities in obesity rates among Hispanic children.

Many potential factors may account for differences in diet and physical activity behaviors across racial/ethnic minority subgroups. One factor is length of time in the United States and degree of acculturation to American lifestyles. For example, studies have found that acculturation to the United States is associated with unhealthy diets.^{28, 29} Recent immigrants and non-English speaking youth have less structured physical activity but also less sedentary activity time.^{30, 31} In our study, statistical models additionally adjusted for language spoken

in the home did not result in significantly altered estimates. Thus, there was no evidence of mediation of racial/ethnic differences in behaviors by home language. Most published measures of acculturation do rely heavily on language and related factors.³² However, more detailed measurements of acculturation are needed to fully explore its role in these differences.

There are many other potential mediators of racial/ethnic differences in lifestyle behaviors. Home and neighborhood environments may play a role in disparities due to differential access to foods and activity resources.²⁰ In addition, food insecurity (lack of access to enough nutritious food) may be associated with poorer dietary quality.³³ Studies also support the role of differences in parenting practices and styles on disparities in lifestyle behaviors.³⁴ Finally, social support for certain dietary and physical activity behaviors may also vary by race/ethnicity.²⁹

Limitations of this study include its cross sectional nature and use of parent reported diet and activity measures. However, the NDSR has been validated in several studies, including use of parental report about child's diet.²² In addition, both objective (pedometer) and reported activity measures were used to measure physical activity levels. While other types of activity monitors (such as accelerometers) have become more common in research studies, pedometer measurements in children have been found to correlate highly in terms of both criterion (direct observation) and convergent validity (heart-rate monitor, accelerometer) and also have consistently high intra- and inter-unit reliability.³⁵ Another study limitation is lack of White children to include in racial/ethnic comparisons of diet and physical activity. As described above, there may also be several potential mediators or confounders which were unmeasured in this study including degree of acculturation, differences in home and neighborhood environments, level of food insecurity, and differences in parenting practices and social support for behaviors. While we unfortunately did not collect detailed data about these factors in the present study, future studies including children from different Hispanic subgroups should explore the role of such factors on these differences.

In conclusion, childhood obesity is increasingly common and disproportionately affects ethnic minority children. We found several differences in dietary and physical and sedentary activity behaviors among children from different racial/ethnic minority subgroups that may partially account for differences in obesity rates. Targeted interventions in different ethnic subgroups (such as more focus on physical activity in Mexican children and on diet and limiting sedentary activity in non-Hispanic Black and non-Mexican Hispanic children) may be warranted to address specific differences in behaviors and reduce obesity disparities.

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Table 1

Descriptive Characteristics for 6–8 year old Ethnic Minority NYC Children in the Growing Up Healthy Study, 2004–2007

Characteristic (Total N)	N (%)
Sex (N=486)	
Girls	384 (79.0%)
Boys	102 (21.0%)
Age (N=486)	
6 years	187 (38.5%)
7 years	154 (31.7%)
8 years	145 (29.8%)
Race/Ethnicity (N=486)	
Mexican	143 (29.4%)
Dominican	41 (8.4%)
Puerto Rican	100 (20.6%)
Other/Mixed Hispanic	68 (14.0%)
NonHispanic Black	134 (27.6%)
Caregiver Education (N=478)	
Less than high school	175 (36.6%)
High school or GED	117 (24.5%)
Some college or higher	186 (38.9%)
Language Spoken in the Home (N=481)	
English	228 (47.4%)
Spanish	177 (36.8%)
English and Spanish	76 (15.8%)
Weight Status (N=485)	
Under/normal weight (<85 th percentile)	277 (57.1%)
Overweight (85 th to <95 th percentile)	76 (15.7%)
Obese (≥ 95 th percentile)	132 (27.2%)
Ever Breastfed (N=483)	
Yes	342 (70.8%)
No	141 (29.2%)

Table 2

Mean Dietary Intake for 6–8 year old Ethnic Minority NYC Children in the Growing Up Healthy Study 2004–2007 Compared to USDA Recommendations

Food Group Category	Growing Up Healthy (n=437) Daily Servings of Food Groups (mean, sd)	Recommended (USDA) Daily Servings of Food Groups*
Fruits (no juice)	0.9 (0.9)	2–3
Fruit Juice	1.3 (1.0)	
Vegetables (no fried vegetables or legume)	1.0 (0.7)	2–3
Total Fruits and Vegetables	1.9 (1.2)	5–9
“5 a Day”	3.3 (1.7)	>5
Total Grains	5.1 (1.8)	5
Whole Grains	0.8 (0.8)	2.5
Refined Grains	4.1 (1.8)	Limited
Total Dairy	1.9 (0.8)	2.5
Whole Fat Dairy	0.6 (0.6)	0
Low Fat Dairy	1.1 (0.7)	2.5
Total Proteins (Meats, Eggs, Nuts, Legumes)	3.7 (1.6)	4
Regular Meats, Eggs, Nuts	2.1 (1.4)	0
Lean Meats and Legumes	1.7 (1.1)	4
Regular Oils	1.8 (1.4)	Limited
Sweets	1.2 (1.1)	Limited
Regular Soda	0.3 (0.5)	0
Total SSB (regular soda and sweetened fruit drinks)	0.9 (0.8)	0
Total Diet Beverages	0.1 (0.3)	N/A
Water	1.6 (1.2)	

* Recommendations for children ages 4–8 years with <30 minutes per day of moderate physical activity, beyond normal daily activities. 23<http://www.choosemyplate.gov/foodgroups/index.html>

2–3 servings of fruits (including fruit juice) and 2–3 servings of vegetables for a total of at least 5 servings of fruits and vegetables combined per day (“5 a day”). In general, 1/2 cup of fruit or 100% fruit juice, or 1/4 cup of dried fruit can be considered as 1/2 cup or 1 serving of fruit. In general, 1/2 cup of raw or cooked vegetables or vegetable juice, or 1 cup of raw leafy greens can be considered as 1/2 cup or 1 serving of vegetable. 5 ounce equivalents (servings) of grains with half as whole grains (In general, 1 slice of bread, 1 cup of ready-to-eat cereal, or 1/2 cup of cooked rice, cooked pasta, or cooked cereal can be considered as 1 ounce equivalent from the Grains Group.) 2.5 cups (servings) of dairy (1 cup of milk or yogurt, 1 1/2 ounces of natural cheese, or 2 ounces of processed cheese). Use fat free and 1% milk. 4 ounce equivalents of proteins (In general, 1 ounce of meat, poultry or fish, 1/4 cup cooked beans, 1 egg, 1 tablespoon of peanut butter, or 1/2 ounce of nuts or seeds can be considered as 1 ounce equivalent from the Protein Foods Group. 1 small lean hamburger, 1 small chicken breast, 1 can of tuna and 3/4 cups of beans all have about 3 ounce equivalents of proteins) 1 serving of oil is about 1 teaspoon of margarine or oil

Table 3
Adjusted Mean Daily Servings of Food Groups in Racial/ethnic Subgroups from the Growing Up Healthy Study 2004–2007 (N=426)*

	Mexican	Dominican	Puerto Rican	Other/mixed Hispanic	Black	P value for F statistic
Total N	131	37	87	63	108	
Fruits and Vegetables						
Fruits (no juice)	1.3 (1.1–1.5)	1.3 (1.0–1.6)	0.5 (0.3–0.7)	0.9 (0.7–1.1)	0.6 (0.4–0.8)	<0.001
Fruit juice	1.4 (1.1–1.6)	1.1 (0.7–1.4)	1.0 (0.7–1.2)	1.4 (1.1–1.7)	1.2 (1.0–1.4)	0.07
Vegetables (no fried vegetables or legume)	1.2 (1.0–1.3)	1.2 (1.0–1.5)	0.9 (0.7–1.1)	1.0 (0.8–1.2)	1.1 (0.9–1.2)	0.09
Total Fruits and Vegetables	2.5 (2.2–2.8)	2.5 (2.1–2.9)	1.4 (1.1–1.7)	1.9 (1.6–2.2)	1.7 (1.4–1.9)	<0.001
“5 a Day”	4.0 (3.6–4.4)	3.7 (3.1–4.2)	2.6 (2.2–3.0)	3.5 (3.0–3.9)	2.9 (2.6–3.3)	<0.001
Grains						
Total Grains	5.2 (4.9–5.5)	4.9 (4.5–5.3)	5.4 (5.1–5.7)	4.9 (4.6–5.2)	5.1 (4.9–5.4)	0.09
Whole Grains	1.2 (1.0–1.4)	0.5 (0.2–0.7)	0.5 (0.4–0.7)	0.7 (0.5–0.9)	0.6 (0.5–0.8)	<0.001
Refined Grains	3.8 (3.6–4.1)	4.2 (3.8–4.6)	4.7 (4.4–5.0)	4.0 (3.7–4.3)	4.2 (4.0–4.4)	<0.001
Dairy						
Total Dairy	2.3 (2.1–2.4)	1.9 (1.7–2.2)	1.6 (1.5–1.8)	1.8 (1.6–2.0)	1.6 (1.4–1.7)	<0.001
Whole Fat Dairy	0.8 (0.6–0.9)	0.6 (0.4–0.8)	0.5 (0.3–0.6)	0.7 (0.5–0.8)	0.5 (0.4–0.6)	0.004
Low Fat Dairy	1.4 (1.3–1.6)	1.3 (1.0–1.5)	1.1 (0.9–1.2)	1.0 (0.8–1.2)	1.0 (0.8–1.1)	<0.001
Proteins						
Total Proteins (Meats, Eggs, Nuts, Legumes)	3.4 (3.1–3.8)	3.5 (3.0–3.9)	4.0 (3.7–4.3)	4.0 (3.6–4.3)	3.9 (3.7–4.2)	0.017
Regular Meats, Eggs, Nuts	1.7 (1.5–2.0)	1.7 (1.3–2.1)	2.3 (2.0–2.5)	2.2 (1.9–2.5)	2.5 (2.3–2.8)	<0.001
Lean Meats and Legumes	1.7 (1.4–2.0)	1.8 (1.4–2.2)	1.8 (1.5–2.0)	1.8 (1.5–2.1)	1.4 (1.2–1.7)	0.197
Other						
Regular Oils, Fats and Spreads	1.6 (1.3–1.9)	1.6 (1.2–2.0)	1.8 (1.5–2.1)	1.7 (1.4–2.0)	1.8 (1.5–2.0)	0.888
Sweets	1.6 (1.3–1.8)	1.0 (0.6–1.3)	1.0 (0.8–1.2)	1.2 (0.9–1.4)	1.0 (0.8–1.2)	0.005
Beverages						
Regular Soda	0.2 (0.1–0.3)	0.1 (0–0.3)	0.3 (0.2–0.4)	0.3 (0.1–0.4)	0.2 (0.1–0.3)	0.519
Total SSB (regular soda and sweetened fruit drinks)	0.6 (0.4–0.8)	0.7 (0.5–0.9)	1.0 (0.8–1.2)	0.9 (0.8–1.1)	0.9 (0.8–1.1)	0.005
Total Diet Beverages	0.1 (0–0.2)	0.1 (0–0.2)	0.2 (0.1–0.3)	0.1 (0–0.2)	0.1 (0–0.2)	0.139

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	Mexican	Dominican	Puerto Rican	Other/mixed Hispanic	Black	P value for F statistic
Water	2.1 (1.8–2.4)	1.6 (1.2–2.0)	1.4 (1.1–1.6)	1.6 (1.3–1.9)	1.4 (1.1–1.6)	0.001

* Adjusted means and confidence limits are presented for each racial/ethnic subgroup.
Means were adjusted for age, sex, BMI percentile (age and sex specific), highest level of caregiver education, whether child ever breastfed and mean energy intake.
Groups with non overlapping confidence limits for the means are significantly different

Table 4
Association of Race/Ethnicity with Physical and Sedentary Activity Measures in the Growing Up Healthy Study 2004–2007 *

Racial/Ethnic Subgroup							
Mexican		Dominican		Puerto Rican	Other/mixed Hispanic	Non-Hispanic Black	P value Chi Square
Physical/Sedentary Activity							
Participation in Organized Recreational Activities (n=484)							
N=484	N Yes (%)	31 (21.7)	13 (31.7)	35 (35.0)	28 (41.8)	52 (39.1)	0.01
	OR (CI)	1 (Ref)	1.7 (0.8–3.6)	1.9(1.1–3.4)	2.6 (1.4–4.9)	2.3 (1.4–3.9)	
N=475	adj OR (CI)	1 (Ref)	0.8 (0.3–2.0)	1.3 (0.7–2.5)	1.5 (0.7–3.0)	1.3 (0.7–2.4)	
Playing Video Games >1 hour Daily (n=483)							
N=483	N Yes (%)	9 (6.3)	2 (4.9)	18 (18.2)	2 (3.0)	13 (9.7)	0.004
	OR (CI)	1 (Ref)	0.8 (0.2–3.7)	3.3 (1.4–7.7)	0.5 (0.1–2.2)	1.6 (0.7–3.8)	
N=474	adj OR (CI)	1 (Ref)	1.9 (0.3–10.5)	5.6 (2.2–14.4)	0.8 (0.2–4.0)	3.1 (1.1–8.8)	
Daily Computer Use Outside School (n=434)							
N=434	N Yes (%)	16 (12.4)	15 (39.5)	24 (27.9)	19 (31.7)	36 (29.8)	0.001
	OR (CI)	1 (Ref)	4.6 (2.0–10.6)	2.7 (1.4–5.5)	3.3 (1.5–7.0)	3.0 (1.6–5.7)	
N=425	adj OR (CI)	1 (Ref)	4.3 (1.7–11.0)	2.6 (1.2–5.5)	3.0 (1.3–6.9)	3.3 (1.5–7.0)	
Watching >2 Hours Television Daily (n=483)							
N=483	N Yes (%)	38 (26.8)	13 (31.7)	38 (38.4)	16 (23.9)	52 (38.8)	0.08
	OR (CI)	1 (Ref)	1.3 (0.6–2.7)	1.7 (1.0–3.0)	0.9 (0.4–1.7)	1.7 (1.0–2.9)	
N=474	adj OR (CI)	1 (Ref)	2.0 (0.9–4.6)	2.3 (1.3–4.1)	1.3 (0.6–2.7)	2.6 (1.4–4.7)	

* Mexican children were the reference group in all models. Final models adjusted for age, sex, BMI percentile (age and sex specific) and highest level of caregiver education

Table 5

Adjusted Mean Pedometer Steps, Sedentary Hours, Screen Time and Sleep Time by Race/Ethnicity in the Growing Up Healthy Study 2004–2007*

	Mexican	Dominican	Puerto Rican	Other/mixed Hispanic	Black	P value
Mean Pedometer Steps per Day (mean, conf limits) (N=387)	11,304 (10,189–12,419)	10,913 (9,065–12,761)	10,220 (8,939–11,502)	11,169 (9,814–12,525)	10,753 (9,683–11,824)	0.709
Total Sedentary Hours per Day (television, video games, computer, homework/sitting) (mean, sd) (N=423)	2.9 (2.3–3.4)	4.6 (3.7–5.5)	4.7 (4.1–5.3)	4.2 (3.5–4.9)	5.0 (4.5–5.5)	<0.001
Screen time Hours per Day (mean, sd) (N=424)	1.7 (1.2–2.1)	3.0 (2.3–3.8)	3.3 (2.8–3.8)	2.4 (1.9–3.0)	3.3 (2.9–3.7)	<0.001
Sleeping Hours per Day (mean, sd) (N=472)	10.2 (9.9–10.4)	9.9 (9.4–10.3)	9.9 (9.6–10.2)	10.5 (10.2–10.9)	9.7 (9.4–9.9)	<0.001

* Adjusted means and confidence limits are presented for each racial/ethnic subgroup. Final models adjusted for age, sex, BMI percentile (age and sex specific) and highest level of caregiver education. Groups with non overlapping confidence limits for the means are significantly different.