The Effects of Acculturation on Healthy Lifestyle Characteristics among Hispanic 4th Grade Children in Texas Public Schools, 2004-2005

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Abstract

BACKGROUND—Childhood obesity is a national epidemic that disproportionately affects Hispanic children. Evidence suggests that increased acculturation among this population adversely affects diet and other healthy lifestyle characteristics, leading to higher rates of overweight and obesity. Healthy lifestyle characteristics must be understood in order to prevent or decrease overweight and obesity among Hispanic children.

METHODS—Using the School Physical Activity and Nutrition (SPAN) study, we examined cross-sectional data on healthy lifestyle characteristics collected in Texas public schools from Hispanic 4th grade children in 2004-2005. We calculated adjusted odds ratios and associated confidence intervals using multivariate logistic regression analyses to analyze the association between acculturation and healthy lifestyle characteristics among Spanish-speaking Hispanic children compared to English-speaking Hispanic children.

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RESULTS—Spanish-speaking Hispanic boys consumed more milk and fruit than English-speaking Hispanic boys (milk: AOR: 1.7, p = 0.02; fruit: AOR: 2.5, p = .0001). The likelihood that Spanish-speaking Hispanic boys and girls did not know that there is a relationship between overweight and health problems were two times greater (boys: AOR: 1.7, p = .03; girls: AOR: 2.2, p = .006) than their English-speaking Hispanic counterparts. Likelihood of weight loss attempts was greater among Spanish-speaking Hispanic boys than English-speaking Hispanic boys (AOR: 1.9, p = .04).

CONCLUSIONS—Results are mixed. Lower levels of acculturation appear to be associated with both positive and negative healthy lifestyle characteristics, depending on sex. These findings have important implications for school health policies and programs and should be distributed to school administrators.

Keywords

acculturation; childhood obesity; nutrition; weight loss; meal patterns

Obesity and overweight have tripled in the last 3 decades among children ages 6-11.[1] Despite the *Healthy People 2010* overweight prevalence target for children in this age group of 5%,[2] almost 35% are considered overweight or obese and 19.6% are considered obese.[3] It is important to prevent and treat obesity among children as it is a significant predictor of certain chronic conditions, some of which can begin before adulthood, including hypertension, metabolic syndrome, diabetes, orthopedic problems,[4] cardiovascular disease, certain cancers,[5] joint degeneration, heart disease, stroke, and decreased self-esteem.[6] It is also necessary to decrease childhood overweight and obesity prevalence as they are also associated with adult overweight and obesity[5] and research has demonstrated that it is more difficult for adults to lose and maintain a healthy weight than children.[6]

Hispanic children are disproportionately affected by overweight and obesity. Data from the National Health and Nutrition Examination Survey (NHANES) 2007-2008 demonstrate that 25.1% of Hispanic children ages 6 to 11 years are obese, compared with 19% of non-Hispanic White children and 19.4% of non-Hispanic Black children.[3] Because Hispanics currently represent 15% of the US population, and are projected to represent 25% of the US population by 2050,[7,8] it is particularly important to understand predictors of overweight and obesity in Hispanic children.

There is evidence that increased acculturation contributes to childhood overweight and obesity among Hispanics.[9] Research has demonstrated that acculturation, defined as "the degree to which individuals adopt the values, behaviors, lifestyle, and language of the mainstream culture,"[10] has led to both positive and negative health outcomes among Hispanic adults and children in the US.[11] Evidence has indicated that more acculturated Hispanic adults have worse dietary practices[11,12] and are more likely to be obese[6] than less acculturated Hispanic adults. In addition, research has shown that children of more acculturated Hispanic adults tend to have higher rates of overweight and obesity.[4,5] This rise in overweight and obesity among children of more acculturated Hispanics may be due to changes in healthy lifestyle characteristics, including worsening dietary habits.[13] Because more Hispanic children are disproportionately affected by overweight and obesity than their counterparts, it is important to investigate how mediating factors, such as acculturation and its effect on healthy lifestyle characteristics, affect this population.

Most research on health acculturation has focused on adolescents or adults, but because childhood obesity has been directly associated with an increased risk of adult obesity,[5] it is important to study healthy lifestyle characteristics among children. In addition, most research conducted on health outcomes and acculturation has focused on diet and physical

activity, but few studies have addressed nutrition knowledge or weight loss behaviors. Using a sample of 4th grade children in Texas public schools, the objective of this study was to investigate differences in calcium intake, fruit consumption, meal patterns, nutrition knowledge, and weight loss behaviors among Spanish-speaking and English-speaking Hispanic children.

METHODS

Study Population and Design

SPAN is a cross-sectional, school-based, statewide-representative survey used to assess dietary habits, sedentary behaviors, physical activity, and health and nutrition knowledge of public school children in Texas.[14] The SPAN survey was self-administered by 4th, 8th, and 11th graders in the 2000-2001, 2001-2002, and 2004-2005 school years. Questions for assessing nutrition knowledge, attitudes and behavior from the previously validated School-Based Nutrition Monitoring (SBNM) survey were incorporated into the 4th grade SPAN questionnaire.[14] These SBNM questions have been assessed for reproducibility with a test-retest method.[15] The SPAN survey was offered in both English and Spanish. Questions were read aloud and children received additional assistance if necessary. Participating children filled out an assent form; parents gave active or passive consent depending on the school district's parental consent procedures.[16] The overall response rate was 80.1%.[14]

Sampling

SPAN uses a 2-stage stratified cluster sampling design. A list of enrollment from independent school districts obtained from the Texas Education Agency (TEA) constituted the sampling frame.[14] In the first stratification stage, the state of Texas was stratified into the 8 Health Service Regions (HSRs), which are administrative subdivisions used to administer public health services in Texas. The schools in each HSR were then further stratified into 3 categories based on population size of the independent school districts (ISDs), of which the schools were part. Schools located in the largest ISDs were designated as urban. Schools in ISDs in counties with 25,000-650,000 population were designated as suburban, and schools in ISDS in counties with less than 25,000 population were designated as rural. Then, elementary schools in each stratum were randomly selected. Twelve schools (with four from each of 4th, 8th and 11th grades) were randomly chosen from the urban stratum within each HSR. Within the suburban and rural strata, five ISDs were chosen with probability proportional to size (PPS) of the total number of schools in each ISD. From each of these selected ISDs, one school from each of the 3 grades was randomly selected using PPS. At least 2 classes were selected at each school, for a total target of 50 students per school. Additional SPAN study methods are described elsewhere.[14]

Measures

The full survey included 56 questions, including questions that asked children how many times they ate specified foods the day before survey administration. For this study, we selected 2 indicators of dietary intake. One question assessed dairy food intake, a proxy of dietary calcium intake: "Yesterday, did you drink any kind of milk? Count chocolate or other flavored milk, milk on cereal, or drinks made with milk" and one question assessed fruit intake: "Yesterday, did you eat fruit?" The dietary intake questions offered the following response options for consumption during the previous day: 0, 1, 2, and 3 or more times.

We also assessed meal patterns using 2 measures. One question asked, "Yesterday, how many meals did you eat? Meals include breakfast, lunch, dinner or supper", and "Yesterday,

did you have a snack? A snack is food or drink that you eat or drink before, after, or between meals." Response options for both questions included 0, 1, 2, and 3 or more times.

In addition, we examined children's weight loss behaviors by asking, "Are you trying to lose weight now?" We also looked at two nutrition attitude and belief questions, including: "What you eat can make a difference in your chances of getting heart disease or cancer", and "People who weigh much more than they should have more health problems than other people". These 3 measures were dichotomized so that presence or absence of an attitudinal or belief healthy lifestyle characteristic was measured.

Individual sociodemographic characteristics included race/ethnicity, language spoken at home (acculturation proxy), and age. Children self-identified their race/ethnicity. School-level sociodemographic characteristics included percentage of economically-disadvantaged students in the school, percentage of Hispanic children in the school, Texas-Mexico border proximity and degree of urbanization of the county in which the school was located.

The final analyses were limited to Hispanic children, adjusting for sub-group analyses with complex sample surveys in SAS. The acculturation variable was combined with race/ethnicity if the child identified him/herself as Hispanic to form the 2 categories, Hispanics who speak Spanish at home and Hispanics who speak English at home. Acculturation was based on language use. The survey asked children which language they used with their parents most of the time. Response options included English, Spanish, Vietnamese, Chinese, and other, but we examined only Hispanic children who spoke English or Spanish with their parents. This question, which is the most common and strongest unidimensional acculturation proxy,[17] may represent increased assimilation into mainstream American society among those who chose English.[10] We assumed that children who responded that they speak Spanish with their parents most of the time are less acculturated than those who answered English.[18]

We used TEA data from the school year 2004-2005 to determine the percentage of economically disadvantaged students in each school as a proxy for socioeconomic status (SES) at the school-level. TEA considers a student to be economically disadvantaged if he/she qualifies for either free or reduced-cost meals under the National School Lunch and Child Nutrition Program or if the student's family has an annual income at or below the US Federal Poverty Line.[18,19] We categorized SES into 3 categories to represent children attending schools of high economic disadvantage, medium economic disadvantage, and low economic disadvantage. To determine border proximity status, we identified schools that were geographically located in one of the 32 Texas counties within 100 kilometers of the US-Mexico border as a border school and schools that were geographically located in Texas counties more than 100 kilometers from the US-Mexico border as non-border schools. In order to ascertain degree of urbanization, we categorized school districts as urban, suburban, or rural as previously stated.

Data Analysis

All analyses were conducted using the statistical software package SAS (SAS Institute, Inc., Cary, North Carolina, version 9.2). "SURVEY" commands were used to account for the complex sampling design and to adjust variance estimates due to the clustered nature of the data. All analyses were conducted on weighted data, using sample weights to approximate the population which the survey was designed to represent. More detail regarding sampling weights used and adjustments made is reported elsewhere.[14] We conducted univariate analysis for sociodemographic characteristics and calculated prevalence estimates in the form of weighted frequencies and proportions with associated confidence intervals for food choices, meal patterns, nutrition knowledge, and weight loss behavior, stratifying results by

sex. Multivariate logistic regression analyses were conducted to analyze associations between acculturation status and healthy lifestyle characteristics. For each healthy lifestyle characteristic, we calculated adjusted odds ratios (AOR) and associated 95% confidence intervals (95% CIs) accounting for the complex sample survey design and taking into account sample weights, using English-speaking Hispanic children as the reference group. Analyses for all outcomes were also adjusted for age, percent economically-disadvantaged children in each school, percent of Hispanic children in each school, degree of urbanization, and Texas-Mexico border proximity of the school due to the high prevalence of overweight and obesity in some border communities.[20,21] We decided to stratify by sex after testing for interaction and observing significant differences between boys and girls.

RESULTS

Demographic Characteristics

The population for the present study included 3,507 Hispanic 4th graders from which all proportions were weighted (51% boys, 49% girls). The sample was derived from 157 elementary schools in Texas as part of the School Physical Activity and Nutrition (SPAN) survey. The mean age of the children was 9.8 years. The majority of children in our sample lived in suburban areas (83.4%) and resided in non-border counties (69%). Of the children who participated in the study, about 51% attended high economically disadvantaged schools.

Food Choices

Spanish-speaking Hispanic boys reported drinking more milk (90%) compared to English-speaking Hispanic boys (84%) (Table 2). More Spanish-speaking Hispanic boys and girls reported eating fruit, as 83% of Spanish-speaking Hispanic boys and 77% of Spanish-speaking Hispanic girls ate fruit compared to approximately 66% of both English-speaking Hispanic boys and girls.

Using English-speaking Hispanic children as a reference group, the likelihood of milk consumption among Spanish-speaking Hispanic boys was 1.7 times greater than English-speaking Hispanic boys (AOR: 1.7, 95% CI: 1.1-2.8). The likelihood of fruit consumption was over two times greater among Spanish-speaking Hispanic boys as compared to English-speaking Hispanic boys (AOR: 2.5, 95% CI: 1.6-4.0). There were not significant differences among the girls.

Meal Patterns

Approximately 25% of Spanish-speaking Hispanic boys and girls had eaten 0 or 1 meal the previous day compared to 11% and 8% of English-speaking Hispanic boys and girls, respectively. In addition, fewer Spanish-speaking Hispanic boys and girls ate snacks than their English-speaking Hispanic counterparts.

The likelihood that Spanish-speaking Hispanic boys and girls had eaten either none or one meal on the previous day was 2 and 3 times greater than their English-speaking counterparts, respectively (boys: AOR: 2.4, 95% CI: 1.5-3.8; girls: AOR: 3.1, 95% CI: 1.8-5.4). Spanish-speaking Hispanic children were also more likely to have not eaten any snacks the day before (boys: AOR: 1.4; 95% CI: 1.0-2.1; girls: AOR: 1.4; 95% CI: 1.0-2.1).

Nutrition Knowledge

Fewer Spanish-speaking Hispanic children had nutrition knowledge; 77% of boys and 86% of girls did not know that food affects one's chances of heart disease or cancer compared to approximately 60% of both English-speaking Hispanic boys and girls. Similarly, approximately 65% of Spanish-speaking Hispanic boys and girls did not know that that

overweight people tend to have more health problems compared to 48% of both English-speaking Hispanic boys and girls.

The likelihood of not knowing that there is a relationship between overweight and health problems among Spanish-speaking Hispanic children were two times greater (boys: AOR: 1.7, 95% CI: 1.0-2.6; girls: AOR: 2.2, 95% CI: 1.2-4.0) than their English-speaking Hispanic counterparts. The likelihood that Spanish-speaking Hispanic girls did not know that food could affect one's chances of getting heart disease or cancer later in life was almost four times greater than English-speaking Hispanic girls (AOR: 3.6; 95% CI: 2.1-6.2).

Weight Loss Behavior

Among Spanish-speaking Hispanic boys, 63% reported trying to lose weight at the time of the survey. Less than half (47%) of English-speaking Hispanic boys were trying to lose weight at the time of the survey.

Spanish-speaking Hispanic boys had greater likelihood of weight loss attempts at the time of the survey than English-speaking Hispanic boys (AOR: 1.9, CI: 1.0-3.6).

DISCUSSION

Our findings suggest that acculturation both positively and negatively affects healthy lifestyle characteristics among 4th grade Hispanic children and that these relationships differ by sex. The greater likelihood of milk and fruit consumption among Spanish-speaking Hispanic boys as compared to English-speaking Hispanic boys indicates that the Spanish-speaking Hispanic boys were closer to following the USDA recommendations of three servings per day.[22] Because, as some studies have indicated, milk and fruit consumption tends to decrease with acculturation,[6,10] the Spanish-speaking Hispanic boys appeared to be following a more "traditional" diet. Additional dietary information would be needed to verify this. It is also interesting to note that the prevalence of milk consumption among Spanish-speaking Hispanic boys was greater than the prevalence of milk consumption among Spanish-speaking Hispanic girls. This might be due to the fact that girls usually drop off in milk consumption as they approach puberty, often because they have greater awareness of overweight.[23] Another explanation could be that girls' intake of soda tends to increase as they get older, while milk consumption decreases.[24]

We found that Spanish-speaking Hispanic children were more likely to report eating only 0 or 1 meal/day, a possible sign of food insecurity. This is of concern because, as research has demonstrated, less acculturated Hispanic families in the US are disproportionately affected by poverty and food insecurity than their more acculturated counterparts.[25-27] Poverty and food insecurity can result in greater rates of overweight, obesity, and poorer health.[28]

Our results also demonstrate that Spanish-speaking Hispanic children had less nutrition knowledge than their counterparts. This could indicate that public health nutrition messages are reaching more acculturated Hispanic children more than they are reaching less acculturated Hispanic children, possibly due to language barriers, although there is not research to date that documents this. Additionally, messages aimed toward the Spanish-speaking population may not always be culturally appropriate. Evaluation of public health messages across acculturation levels would be an important research area to explore.

Additionally, Spanish-speaking Hispanic boys were also more likely to try to lose weight than English-speaking Hispanic boys. There could be several reasons for this. It is possible that the English-speaking Hispanic boys had greater self-perceptions of health and even better body images, which give them fewer reasons to try to lose weight. Research has

demonstrated that more acculturated Hispanics tend to have better self-esteem in regards to their weight than their less acculturated Hispanic counterparts.[11] In this particular study population, however, the Spanish-speaking Hispanic boys had greater BMIs than the English-speaking Hispanic boys; the results from this question could indicate that Spanish-speaking Hispanic boys were more concerned about their weight.

Limitations

There were several limitations in our study. Acculturation was measured by language use at home. Whereas past research has shown this single-item measure to be a reliable determinant of acculturation,[29] using multiple measures of acculturation such as length of residence in the US, percentage of foreign-born neighbors, and birthplace may provide a more robust measure.[10,11] Additionally, given the cross-sectional study design, we only measured what children ate the previous day. Furthermore, SPAN data are self-reported which could result in recall bias and affect results, although we expect that this does not have a great impact as validity and reliability were good based on previous testing of the survey questions.[14] Moreover, although food intake frequencies were measured, portion sizes were not, which could also have had an impact on our results. We also do not know the actual nutrient profile of the foods. For example, we do not know if greater milk consumption is positive or negative because we do not know if the children were drinking whole milk or 2% or nonfat milk, which is what the USDA (MyPyramid) recommends for children of this age group.[22] The scope of the questions in this study was also limited. For example, the study examined two questions for diet, two questions for meal patterns, one question for weight loss behavior, and two questions for nutrition knowledge. It would be worth investigating each of these areas further as it is not possible to generalize using only 1 or 2 questions. Examining screen time behaviors and certain energy-dense snack foods may have also strengthened the analysis because as research has demonstrated, they may lead to overweight and obesity.[30-32] Lastly, the responses could have been biased due to social desirability.

Although there were some limitations, the relatively large statewide sample provided a useful insight for nutrition and lifestyle behaviors in this group of Hispanic youth in Texas. Other strengths include good reliability and validity of the survey questions as well as the complex sample survey design that allows these results to be generalizable to all Hispanic 4th grade children in Texas. In addition, this study has examined the effect of acculturation among children, which is still a new area of research.

Conclusion

Thus far no other study has reported the relationships between acculturation and weight loss behavior or nutrition knowledge in Hispanic children. To have a more fundamental understanding of how acculturation affects overweight and obesity, it is necessary to have a grasp on mediating factors such as weight loss behavior and nutrition knowledge. This is of particular importance for Hispanic youth, who represent a growing portion of the population[33] and who are disproportionately affected by overweight and obesity.[3] Further research needs to be conducted to explore why Spanish-speaking Hispanic boys are more likely to try to lose weight than their English-speaking counterparts, and to understand if this is a reflection of either actual overweight status or dissatisfaction with their weight. Our study also demonstrates that less acculturation is associated with less knowledge of the relationship between diet and disease, indicating that public health nutrition interventions directed at the Spanish-speaking population in a culturally sensitive manner need to be created, most likely at all age levels. These public health messages need to include the importance of maintaining the traditional Hispanic diet. It is also important to distribute this information to childcare providers, primary care providers, and the Special Supplemental

Nutrition Program for Women, Infants, and Children (WIC) program as they have direct contact with many Hispanic families and are able to have a direct positive impact on their lives. This will help ensure that as Hispanic children become more acculturated in US society, they continue to consume the traditional diet that provides protective health benefits. Food insecurity among less acculturated Hispanic families also needs to be addressed as it can lead to overall poorer health such as less nutritious dietary habits and overweight and obesity. Because of the inconsistencies in the literature and to fully understand the level of acculturation and child and adult health status, it is important to continue to research the effects of acculturation on healthy lifestyle characteristics and, if possible, to take acculturation into account when designing public health interventions.

IMPLICATIONS FOR SCHOOL HEALTH

Our findings suggest that acculturation levels in children may have both a positive and a negative impact on health. It is important for information and services to be provided in both languages, particularly in schools with both Spanish-speaking and English-speaking Hispanic children. If health information and services are already offered in Spanish, school officials must ensure that the messages are delivered in a culturally appropriate way to ensure their effectiveness among Spanish-speaking Hispanic children. Healthy traditional meals should be offered and encouraged during school breakfasts and lunches to not only promote good nutrition, but also good cognitive functioning.[34] Additionally, school officials should consider incorporating nutrition into the curriculum in early grades in both languages, if it is not already, in order to improve nutrition knowledge among all Hispanic children. Additionally, school health professionals must be aware of body image issues and weight loss efforts among young Hispanic students in order to prevent eating disorders and promote healthy behaviors. Schools are an opportune place for public health interventions targeting Hispanic families and their children. School officials can play a vital role in helping Hispanic families maintain healthy traditions while introducing new healthy practices. Additionally, results should be shared with school administrators, parents, and/or parent-teacher associations for interpretations, insight, and policy/program changes.

Human Subjects Approval Statement

The Texas Department of State Health Services Institutional Review Board and the Committee for the Protection of Human Subjects at the University of Texas Health Science Center at Houston authorized the study. Participating school districts inspected study protocols to ensure compliance with human subjects and research regulations.[14] The University of Illinois at Chicago Institutional Review Board approved use of secondary data.

Acknowledgments

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Table 1

Demographic Characteristics of Texas Hispanic 4th Grade Children, School Physical Activity and Nutrition (SPAN) Monitoring System, 2004-2005

	Male (n=1646)	Female (n=1861)	Chi-square p-value
	Weighted N=56688	Weighted N=54348	
Age (mean)	9.8	9.7	
Race/Ethnicity	Percent (95% CI)	Percent (95% CI)	0.5
Spanish-Speaking Hispanic	50.8 (40.3-61.2)	52.9 (41.6-64.2)	
English-Speaking Hispanic	49.2 (38.8-59.7)	47.1 (35.8-58.4)	
Socioeconomic Status			0.003
High	23.4 (9.3-37.4)	17.3 (7.1-27.5)	
Medium	29.0 (17.0-40.9)	28.4 (16.3-40.5)	
Low	47.7 (31.7-63.6)	54.3 (39.3-69.3)	
Urbanicity			1.0
Urban	12.7 (8.3-17.1)	12.5 (8.1-17.0)	
Suburban	83.3 (78.7-87.9)	83.5 (78.7-88.4)	
Rural	4.0 (2.9-5.2)	3.9 (2.8-5.0)	
Border Status			0.7
Non-border	69.7 (63.4-76.1)	68.5 (60.6-76.4)	
Border	30.3 (23.9-36.6)	31.5 (23.6-39.4)	
Body Mass Index			0.03
Normal	43.9 (36.0-51.8)	58.5 (54.5-62.6)	
Overweight	21.3 (15.4-27.3)	17.6 (11.4-23.7)	
Obese	34.7 (30.7-38.8)	23.9 (20.0-27.8)	

Table 2

...estyle Characteristics by Sex, School Physical Activity and Nutrition (SPAN) Monitoring System,

	Fruit and Vegetable Consumption:		Meal Patterns:				Weight Loss Behavior:		Nutrition Knowledge:			
	Any fruit?		Only 0-1 meal? (Boys N=1646)		No snacks? (Girls N=1861)		Kids who are trying to lose weight now:		Kids who do NOT know food affects chances of heart disease or cancer:		Kids who do NOT think overweight people may have more health problems:	
	Boys (N=1633 / 56412)	Girls (N=1853 / 54226)	Boys (N=1620 / 56315)	Girls (N=1836 / 53768)	Boys (N=1624 / 55724)	Girls (N=1837 / 53693)	Boys (N=1627 / 56221)	Girls (N=1841 / 53566)	Boys (N=1593 / 54629)	Girls (N=1804 / 53063)	Boys (N=1618 / 56084)	Girls (N=1832 / 53594)
	68.3 (63.3-73.3)	74.8 (69.8-79.7)	21.5 (16.8-26.3)	15.6 (10.6-20.7)	38.3 (33.7-42.9)	32.7 (28.0-37.4)	50.0 (44.9-55.1)	45.8 (41.0-50.7)	76.5 (72.3-80.7)	75.8 (71.5-80.1)	52.0 (46.1-57.8)	49.9 (46.1-53.7)
	66.3 (61.7, 70.8)	68.0 (61.8, 74.3)	10.8 (7.5-14.2)	7.6 (5.2-10.0)	31.1 (24.6-37.6)	18.0 (13.1-23.0)	47.3 (37.3, 57.3)	43.9 (38.4, 49.4)	61.7 (53.1-70.2)	58.7 (51.8-65.6)	47.8 (37.5-58.1)	47.8 (42.6-52.9)
	82.6 (76.1, 89.4)	77.2 (70.0, 84.5)	28.8 (18.5-39.1)	23.9 (17.6-30.2)	42.6 (36.4-48.7)	24.2 (13.4-35.0)	63.3 (50.4, 76.3)	49.5 (39.8, 59.1)	77.1 (65.5-88.7)	85.5 (79.1-92.0)	63.6 (51.7-75.4)	66.6 (51.7-81.6)
	70.1 (62.3-77.9)	71.2 (58.9-83.4)	8.8 (2.6-15.1)	9.5 (0.0-19.3)	32.9 (25.4-40.5)	20.2 (13.1-27.3)	46.6 (36.4-56.7)	40.7 (32.4-49.0)	44.5 (29.6-59.4)	59.0 (47.9-70.0)	48.9 (31.0-66.8)	56.4 (48.2-64.5)
	72.5 (64.1-80.8)	65.2 (55.6-74.8)	13.9 (7.0-20.8)	9.0 (4.9-13.1)	29.7 (22.2-37.2)	19.3 (11.1-27.5)	57.8 (42.9-72.7)	48.9 (44.7-53.1)	37.0 (22.2-51.7)	65.9 (59.8-72.0)	47.9 (41.6-54.2)	50.0 (45.5-54.9)
	77.7 (69.2-86.2)	77.6 (70.2-84.4)	29.6 (20.3-38.9)	22.4 (16.0-28.7)	43.7 (38.4-49.1)	23.5 (12.9-34.2)	57.4 (42.8-72.0)	49.0 (39.2-58.8)	20.0 (12.9-27.0)	80.4 (72.4-88.3)	64.7 (52.0-77.4)	59.9 (44.0-75.8)
	75.9 (66.1-85.7)	78.7 (74.9-82.6)	38.0 (24.5-51.5)	25.7 (17.4-34.1)	38.1 (29.0-47.1)	22.6 (18.5-26.7)	53.2 (44.6-61.8)	52.9 (44.6-61.2)	65.5 (59.1-71.9)	67.7 (60.4-75.0)	63.1 (48.8-77.5)	50.4 (44.3-56.4)
	74.3 (68.0-80.7)	72.2 (66.0-78.3)	17.4 (9.7-25.1)	15.0 (9.0-21.0)	37.1 (31.8-42.4)	21.1 (14.0-28.2)	55.6 (44.3-66.8)	46.4 (40.0-52.9)	69.7 (58.0-81.3)	73.4 (64.7-82.1)	54.8 (43.6-66.0)	57.7 (46.9-68.5)
	71.0 (66.6-75.4)	71.3 (65.4-77.3)	22.7 (17.5-28.0)	15.0 (10.2-19.9)	35.5 (27.9-43.1)	33.0 (27.6-38.4)	48.0 (37.5-58.5)	53.2 (47.7-58.6)	78.8 (72.2-85.4)	67.2 (61.3-73.2)	62.0 (56.2-67.7)	50.2 (43.8-56.5)

Table 3

style Characteristics and Acculturation—by Sex, School Physical Activity and Nutrition (SPAN) Monitoring System,

| | Fruit and Vegetable Consumption: | | | | Meal Patterns: Boys N=1646 Girls N=1861 | | | | Weight Loss Behaviors: | | Nutrition Knowledge: | | | |
| | Any milk? | | Any fruit? | | 0-1 meal? | | No snacks? | | Kids who are trying to lose weight now: | | Kids who do NOT know food affects chances of heart disease or cancer: | | Kids who do NOT know that overweight people may have more health problems: | |
	Boys (N=1634 / …6188)	Girls (N=1858 / 54109)	Boys (N=1633 / 56412)	Girls (N=1853 / 54226)	Boys (N=1620 / 56315)	Girls (N=1836 / 53768)	Boys (N=1624 / 55724)	Girls (N=1837 / 53693)	Boys (N=1627 / 56221)	Girls (N=1841 / 53566)	Boys (N=1593 / 54629)	Girls (N=1804 / 53063)	Boys (N=1618 / 56084)	Girls (N=1832 / 53594)
	(0.3-1.8)	1.5 (0.8-3…)	0.5* (0.2-0.9)	1.0 (0.5-2.0)	1.0 (0.5-2.0)	0.7 (0.4-1.3)	0.7 (0.4-1.1)	2.6 (0.8-8.7)	0.6 (0.3-1.5)	0.6 (0.3-1.0)	0.8 (0.3-1.8)	0.9 (0.5-1.8)	0.5 (0.2-1.3)	0.5 (0.2-1.3)
	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref
	(1.1-2.8)	0.9 (0.6-1…)	2.5*** (1.6-4.0)	1.4 (0.9-1.9)	2.4*** (1.5-3.8)	3.1*** (1.8-5.4)	1.4 (1.0-2.1)	1.4 (1.0-2.1)	1.9* (1.0-3.6)	1.2 (0.8-1.7)	1.7 (0.9-3.0)	3.6*** (2.1-6.2)	1.7* (1.0-2.6)	2.2** (1.2-4.0)
	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref
	(0.6-3.1)	0.7 (0.4-1…)	1.0 (0.6-1.5)	0.8 (0.4-1.8)	1.6 (0.6-4.6)	0.7 (0.2-2.6)	0.7 (0.4-1.3)	0.9 (0.4-1.7)	1.4 (0.6-3.3)	1.4* (1.0-2.1)	1.0 (0.4-2.4)	1.1 (0.7-2.0)	0.9 (0.4-2.1)	0.6* (0.4-0.9)
	(0.6-3.2)	0.7 (0.3-1…)	1.1 (0.6-2.0)	1.4 (0.6-3.2)	2.2 (0.8-6.4)	1.0 (0.2-4.3)	0.9 (0.5-1.5)	1.0 (0.5-2.0)	1.3 (0.6-2.8)	0.9 (0.6-1.4)	1.4 (0.6-3.4)	1.7* (1.0-3.0)	1.4 (0.6-3.5)	0.7 (0.4-1.2)
	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref
	(0.7-3.0)	1.0 (0.5-1…)	1.3 (0.7-2.6)	0.7 (0.4-1.2)	0.4 (0.2-0.8)	0.7 (0.4-1.3)	1.0 (0.7-1.7)	0.9 (0.4-1.8)	1.3 (0.6-2.4)	0.7 (0.4-1.1)	2.0* (1.1-3.6)	2.2** (1.3-3.8)	1.0 (0.5-2.2)	1.6 (0.8-3.2)
	(0.4-2.0)	0.8 (0.5-1…)	1.2 (0.6-2.2)	0.8 (0.5-1.5)	0.6 (0.3-1.3)	1.2 (0.6-2.5)	1.2 (0.6-2.3)	2.4** (1.3-4.7)	0.9 (0.4-1.7)	1.0 (0.6-1.6)	4.4*** (2.1-9.2)	2.2** (1.3-3.8)	1.7 (0.8-3.4)	1.3 (0.7-2.5)

Hispanic children in each school.