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## The Influence of Parental Education on Dietary Intake in Latino Youth

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### Abstract

Acculturation to the US culture is associated with suboptimal dietary choices in Latino youth. The role of parental education in shaping children's nutrition is less clear. The purpose of this study was to examine the relationships between parental education, acculturation and dietary intake in 96 Latino youth ages 8–18 years. Parental education was assessed using a seven-category variable. Acculturation was assessed using the Acculturation, Habits, and Interests Multicultural Scale for Adolescents questionnaire. Dietary intake was assessed via 24-h dietary recalls using the multiple pass technique. Parental education was associated with lower fat intake ( $\beta = -0.115$ ,  $p = 0.02$ ) and lower fiber intake ( $\beta = 0.144$ ,  $p = 0.03$ ); these associations remained significant after controlling for age, sex, BMI and acculturation. There were no significant associations between acculturation and dietary variables (all  $p$ 's  $>0.05$ ). This data suggests parental education may play an important role in shaping dietary intake in Latino youth.

### Keywords

Acculturation; Hispanic; Adolescents; Nutrition; Obesity

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Conflict of interest

The authors declare that they have no conflict of interest.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the Ethical Standards of the Institutional and/or National Research Committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

## Introduction

Obesity remains a significant problem in Latino children and adolescents with the most recent National Health and Nutrition Examination Survey (NHANES) estimates from 2011 to 2012 suggesting higher levels of obesity in this ethnic minority group (22%) compared with non-Latino whites (14%) [1]. Because Latinos currently represent 15% of the US population, and are projected to represent 25% of the US population by 2050, it is important to understand the predictors of obesity in Latino youth [2].

Suboptimal dietary choices have been consistently linked to obesity in Mexican-American and other Latino children and adolescents. Cross-sectional data from the NHANES (years 2003–2006) indicated more than 40% of total calories consumed by Mexican-American youth were from fat and added sugars [3]. Major sources of these “empty” calories included whole milk, soda and grain desserts (cakes, cookies, donuts, pies, crisps, cobblers and granola bars) [3]. Acculturation to the US culture has been implicated as a risk factor for “empty” calorie consumption [4], with children shifting from traditional diets of vegetables and whole grains (e.g., carbohydrates with higher fiber content) to more processed, high fat, and sugary foods (e.g., carbohydrates with higher added sugar content) that are popular and easily available in the US [5]. Less is known about socioeconomic factors such as parental education and its impact on dietary outcomes in Latino youth [6].

Children’s dietary attitudes, beliefs and behaviors are heavily influenced by their parent(s) level of education. Having more education can lead to both general and specific health-related knowledge and better problem-solving skills to make more informed decisions about dietary choices [7]. Parental education is also closely linked with employment opportunities and family income, which in turn can influence children’s dietary options. Whereas family income provides parents with the ability to purchase health-related goods, parents’ education informs purchasing decisions such as guiding their children’s choices on where to eat outside of the home and which menu options are healthier [6]. Thus parental education is an important predictor of children’s nutrition and may play an equal if not larger role than acculturation in shaping dietary choices in Latino youth.

The purpose of this study was to examine the relationships between parental education, acculturation and dietary intake in Latino children and adolescents. Based on our previous findings [8] and those of others [6], we hypothesized that lower levels of educational attainment would be associated with negative dietary intake patterns increased total energy intake, fat intake, lower protein intake. Educational attainment would also be inversely associated with carbohydrate quality (high carbohydrate intake with high added sugar intake and low fiber intake). These relationships would persist after accounting for the effects of acculturation and other biological factors in Latino youth.

## Materials and Methods

Baseline data from 96 Latino youth from the Insulin Resistance and Declining Physical Activity Levels in African-American and Latina Girls Study (Transitions; n = 40) and the Strength and Nutrition Outcomes in Latino Adolescents (SANO; n = 56) studies were

included in this analysis [8]. The Transitions study was a longitudinal assessment of physical activity in African-American and Latina girls through adolescence. SANO examined the effect of a randomized control trial, including the combination of nutrition modification and strength training, on metabolic and adiposity parameters in overweight/obese Latina teenagers. All participants included in this analysis met the following inclusion criteria: Latino ethnicity (based on self-report) between the ages of 8–18 years. Prior to the initiation of study procedures, informed written consent and assent were obtained from the child participants and parents. The University of Southern California Institutional Review Board approved both studies.

During the outpatient visit, child participants arrived at the Clinical Trials Unit at approximately 0730 h where a licensed pediatric health care provider conducted a medical/family history, physical examination and anthropometric measurements. Dietary intake was assessed via 24-h dietary recalls using the multiple pass technique. Recalls were done in person or over the phone by research staff that were trained and supervised by a Registered Dietitian. Parents or caretakers were available to assist child participants answer questions when needed. A minimum of two dietary recalls (one weekend and one weekday) was required to count as valid recall data. Dietary intake variables from each call were averaged to calculate a person-average. Data were analyzed with the Nutrition Data System for Research software (NDS-R, 2009, Minneapolis, MN). To screen for outliers (i.e., extremely high or low kilocalories), we used the recommended criteria of <500 and >3500 kcal/day. Two participants were excluded because of extremely high kilocalorie values. Secondly, the dietary data were examined for plausibility of caloric intake by assessing the distribution of the residuals of the linear regression of caloric intake by body weight. There were four participants excluded because of residuals that were >2 SDs from the mean. Thus, 96 (out of 102) participants were included in the present analyses.

Parental education was assessed using a seven-category variable: (1) less than 7th grade, (2) 7th–9th grade, (3) some high school, (4) high school graduate/GED, (5) some college or vocational school (at least 1 year), (6) college graduate, or (7) graduate or professional training. For families with multiple caretakers (n = 74), the highest education score was used. Acculturation was assessed using an eight-item Acculturation, Habits, and Interests Multicultural Scale for Adolescents (AHIMSAs) questionnaire, a measure developed for and validated in racially/ethnically diverse adolescent populations [9]. Responses were categorized into four cultural orientation scales organized by level of acculturation: (0) marginalization, (1) separation, (2) integration, (3) assimilation. A detailed description of the methods and protocol used in the Transitions and SANO studies have been previously reported [8].

Regression models were used to explore the relationships between the independent variables (i.e., parental education, acculturation) and dependent variables (i.e., total energy intake, fat, protein, carbohydrate, added sugar and fiber intake). A priori covariates included age, sex, body mass index, and total energy intake (for macronutrient variables). A priori significance level was set at  $p < 0.05$ . All assumptions of linear regression were satisfied. All analyses were performed using SPSS 22.0 (Chicago, IL) with significance level set at  $\alpha < 0.05$ .

## Results

Table 1 shows the demographic characteristics of the child participants. The average age of child participants was 13 years with 86% classified as overweight or obese. Sixty percent of child participants reported the majority of their cultural beliefs, behaviors, and attitudes came from both the US and their families' culture (i.e., integration). Approximately 13% of the parents of child participants reported having at least a college degree. Consistent with national averages for Mexican-American children and adolescents, dietary fat intake and added sugar intake accounted for 33 and 15% of daily kilocalorie intake in the present sample of Latino youth [10]. Dietary fiber intake however, was higher in the present sample compared to national averages (30 vs. 15 g/day).

Table 2 shows the standardized  $\beta$  coefficients for the associations between parental education, acculturation and dietary intake. Total energy intake was positively associated with all dietary variables (all  $p$ 's  $<0.0001$ ) and female gender was associated with lower total energy intake ( $\beta = -0.328$ ,  $p = 0.005$ ) and lower fat intake ( $\beta = -0.110$ ,  $p = 0.06$ ). Parental education was significantly associated with lower dietary fat intake ( $\beta = -0.115$ ,  $p = 0.02$ ) and higher dietary fiber intake ( $\beta = 0.144$ ,  $p = 0.03$ ), these associations persisted even after controlling for age, sex, BMI and acculturation. There were no significant associations between parental education and total energy, protein, and added sugar intake (all  $p$ 's  $>0.05$ ). There were also no significant associations between acculturation and dietary variables (all  $p$ 's  $>0.05$ ).

## Discussion

With the rapid increase in cultural diversity of the US, Latino cultures have quickly become a part of mainstream American culture, evolving within the US, while simultaneously integrating aspects of different Latin American cultures [5, 8]. Consequently, Latino youth who come of age in the US, a multicultural society, interact with people from different cultural backgrounds that can lead to an interchange of cultural attitudes, beliefs and behaviors [5, 8]. Acculturation to the US, or the adaptive cultural style of replacing traditional cultural practices with that of mainstream America has also been implicated as a risk factor for suboptimal dietary choices among Latinos [4, 5]. In the present study, culture was not associated with any of the dietary variables in our sample Latino youth. Rather, parental education (the most stable indicator of socioeconomic status), was inversely associated with fat intake and positively associated with fiber intake. These findings are consistent with previous literature examining the association between generational status, family socioeconomic status and children's nutrition [6]. Pooling data from NHANES (1999–2009), Martin et al. tested whether the association between generational status and Mexican-origin children's nutrition varies by household socioeconomic status (i.e., income and education) [6]. When predicting children's overall dietary quality using the healthy eating index (2010) and predicting unhealthy dietary patterns, household socioeconomic status was associated with better diets across generations of Mexican-origin children [6]. Third generation families with greater educational attainment and more income were able to buffer their children against generational dietary declines previously documented in the

acculturation literature. Taken together, these findings provide preliminary support for parental education playing an important role in shaping dietary choices in Latino youth.

Several limitations of this study should be noted. First, data limitations precluded analysis of other indicators of socioeconomic status known to influence dietary intake in this analysis including parental income, income/poverty ratio and marital status. Similarly, proxy indicators of acculturation such as language use, nativity, and time in the US were not available for our child and parent participants [6]. Second, although prior research suggests that parental education and acculturation are predictors rather than consequences of dietary intake, the cross-sectional nature of this study impeded our ability to make causal inferences. Third, the current analyses which included six outcome variables and six regression analyses did not adjust for multiple comparisons. Fourth, these findings in a small sample of predominantly overweight/obese Latino children and adolescents living in the Greater Los Angeles Area cannot necessarily be generalized to all Latino youth living in the US. Nevertheless, these findings are consistent with previous literature using NHANES [6], a nationally representative, repeated cross-sectional study conducted by the Centers for Disease Control.

In summary, our findings suggest parental education may play an important role in shaping dietary choices in Latino children and adolescents. We have confirmed a continuing need for culturally-responsive nutrition education programs focused on decreasing fat intake and increasing quality carbohydrate intake for Latino youth residing in lower socioeconomic households. Future research can also benefit from more qualitative research to better understand how specific dimensions of parental education (e.g., health-related knowledge, problem-solving skills and informed decision making) inform children's dietary choices in this growing ethnic minority population within the US.

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**Table 1**

Participant characteristics

	n	Mean ± SD	Percentage
Sex	96	-	100.0
Female	73	-	76.0
Male	23	-	24.0
Age (years)	96	12.9 ± 3.2	-
Weight (kg)	96	70.9 ± 29.0	-
BMI (kg/m <sup>2</sup> )	96	28.8 ± 7.7	-
BMI Z-score	96	1.7 ± 0.8	-
BMI percentile	96	91.3 ± 15.5	-
Energy (kcal/day)	96	1882.7 ± 573.4	-
Carbohydrate (g/day)	96	248.9 ± 81.2	-
Protein (g/day)	96	73.4 ± 26.1	-
Fat (g/day)	96	68.5 ± 24.2	-
Added sugar (g/day)	96	72.9 ± 40.3	-
Fiber (g/day)	96	31.9 ± 23.1	-
Acculturation of child participant	96	-	100.0
Marginalization	4	-	4.2
Separation	8	-	8.3
Integration	59	-	61.5
Assimilation	25	-	26.0
Parental education	96	-	100.0
Less than 7th grade	11	-	11.4
7th-9th grade	10	-	10.4
Some high school	10	-	10.4
High school graduate/GED	30	-	31.3
Some college or vocational school ( < 1 year)	23	-	24.0
College graduate	7	-	7.3
Graduate or professional training	5	-	5.2

**Table 2**

Associations between parental education, acculturation and dietary intake

Predictors	Energy (g/day)		Carbohydrate (g/day)		Protein (g/day)		Fat (g/day)		Added sugar (g/day)		Fiber (g/day)	
	$\beta$	p	$\beta$	p	$\beta$	p	$\beta$	p	$\beta$	p	$\beta$	p
Age	-0.066	0.67	-0.034	0.58	-0.042	0.61	0.071	0.34	-0.039	0.78	0.050	0.61
Female (vs. male)	<b>-0.328</b>	<b>0.005</b>	0.075	0.11	-0.003	0.96	-0.110	0.06	-0.005	0.96	0.070	0.36
Body mass index	-0.059	0.69	0.034	0.56	0.015	0.85	-0.062	0.39	0.118	0.35	-0.055	0.55
Energy	-	-	0.944	<0.0001	0.866	<0.0001	0.834	<0.0001	0.585	<0.0001	0.808	<0.0001
Parental education	-0.045	0.67	0.051	0.21	0.080	0.14	<b>-0.115</b>	<b>0.02</b>	-0.060	0.49	<b>0.144</b>	<b>0.03</b>
Acculturation	-0.013	0.91	0.068	0.11	-0.033	0.56	-0.080	0.12	-0.039	0.67	-0.023	0.74

Standardized  $\beta$  coefficients are shown; bold symbols represent significance at  $p < 0.05$ . Parental education was assessed using a seven-category variable: (1) less than 7th grade, (2) 7th–9th grade, (3) some high school, (4) high school graduate/GED, (5) some college or vocational school (at least 1 year), (6) college graduate, or (7) graduate or professional training. Acculturation was assessed using the eight-item Acculturation, Habits, and Interests Multicultural Scale for Adolescents (AHIMSAs) questionnaire. Responses were categorized into four cultural orientation scales: (0) marginalization, (1) separation, (2) integration, (3) assimilation