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The association between acculturation and parental feeding practices in families with overweight and obese Hispanic/Latino children

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BACKGROUND

Latinos/Hispanics are the fastest-growing minority group in the United States, accounting for 18% of the U.S. population.¹ Latino youth account for 25% of the K-12 student population² and have the highest rates of obesity, defined as body mass index at or above the 95th percentile for height and weight³, in the U.S. Recent data find that 26% of Latino/Hispanic youth (aged 2 to 19) are obese, compared to 22% of non-Hispanic black and 15% of non-Hispanic white (15%) youth.⁴ Given that obese children are likely to become obese adults, and be at increased risk for a host of chronic diseases, including type 2 diabetes and cardiovascular disease, it is imperative that we continue developing interventions to address childhood obesity. Research has found that the home environment, including parental feeding practices, is a predictor of children's weight gain.^{5, 6} Data also shows that parents may modify their behavior based on their child's weight.⁷ Research focused on Latino families, however, is limited. A recent review of the literature found only 7 studies of parental influence, including parental feeding practices, and children's weight among Latino families.⁸ In general, Latino parents often pressure their children to eat (Ochoa et al 2017), do less monitoring of their child's diet when the child is overweight⁹, and offer sweets or TV/video time in exchange for eating healthy and may use punishment, such as taking away a favorite toy or play time, when a child refuses to eat.^{10, 11} Another area which has received less attention and that can be a potential target for intervention is the role of acculturation on

parental feeding practices and dietary and sedentary behavior. Studies have found that less acculturated (Spanish-speaking) mothers of pre-school aged children engage in more controlling feeding practices, such as pressuring child to eat, using food as a reward, and limiting less-healthy foods,^{12, 13} and use food to calm their child¹³ than more acculturated (English-speaking) mothers. In regards to dietary behavior, studies have reported a negative association between acculturation and fruit and vegetable intake among children^{14, 15}, whereas others reported no significant relationship.^{16, 17} Similarly, there is no clear association between acculturation and sedentary behavior among children. Shi et al. (2012) found higher levels of recreational screen time among more acculturated Latino teens¹⁸ whereas Singh et al. (2016) found "...higher levels of inactivity and sedentary behavior among less acculturated Hispanic children (ages 6–18) with foreign-born parents."¹⁹

In general, acculturation has a negative effect on Latino health behaviors and health outcomes. Higher levels of acculturation among Latino adults in the U.S. are associated with substance abuse behaviors, less nutritious diets, low birth weight, and obesity among adults.^{20, 21} Findings from Hispanic adults suggest that as individuals acculturate to the host culture, they may lose protective behaviors that they bring with them.^{22, 23} The loss of protective behaviors may transfer to the child, as parents are no longer modeling the healthy behaviors and are likely to adopt feeding practices that have been associated with excess weight status in children. Nevertheless, the effects of acculturation on Latino behaviors and health are not well understood. This study examines the relationship among acculturation, parental feeding practices, and children's dietary and sedentary behaviors among a mixed acculturation, largely Mexican-American population.

METHODS

Participants and Data Collection

Data were collected from March 2010 to April 2011 as part of a randomized trial testing a family-based educational intervention on children's weight maintenance.²⁴ We enrolled parent-child dyads attending a certified Center for Medicaid and Medicare Services rural pediatric health clinic in Comal County, Texas. Participants were identified through the clinic's electronic medical record system and physician referrals.

Eligible study participants were Latino/Hispanic children ages 5–14 who attended a clinic visit in the past four months (beginning September 30, 2009) who were overweight (body mass index between the 85th and 94th percentile for age and gender) or obese (body mass index ≥ 95th percentile for age and gender). Overweight and obese children were identified by the following ICD-9 diagnosis codes: 783.1 (weight gain, abnormal, excessive); 701.2 (acanthosis nigricans); 278.01 (overweight/obesity); V85.53 (BMI 85–94%); V85.54 (≥ 95%). Exclusion criteria consisted of a child with a: (a) mental, emotional, or physical handicap identified by a parent or provider that would interfere with study participation; (b) diagnosis of cardiovascular, pulmonary, or digestive disease, including severe asthma, insulin dependent diabetes (type 1), thyroid problems, Prader-Willi syndrome, severe heart conditions, and severe liver or kidney disease; (c) family who was moving from the local area within six months; or (d) sibling already enrolled in the study (only the first identified child was enrolled, all other siblings were excluded). The protocol was approved by the

Institutional Review Board at The University of Texas Health Science Center at San Antonio. Informed consent was obtained from all individual participants included in this study.

Measures

All measures—parent and children demographics and dietary and sedentary behaviors--were self-reported and collected at baseline upon enrollment.

Parent socio-demographics included age, race/ethnicity (Latino vs. non-Latino), country of birth, marital status (married vs. not married), education (less than high school, high school graduate, more than high school), employment (employed full- or part-time, not employed), annual family income (<\$10K, \$10,001 to \$30K, more than \$30K). Data on children included age, gender, and health insurance.

Parental acculturation was measured by the proxy of language use and categorized as follows: Mostly Spanish (Spanish only + Spanish better than English), Mostly English (English only + English better than Spanish), and both equally.

Dietary and sedentary behaviors were measured by the Family/Child Nutrition and Physical Activity Survey from the 2009 Texas Pediatric Society's Obesity Toolkit. The survey was designed to assist clinicians in making recommendations for behavior change. Variables of interest included consumption of 100% fruit juice, sweetened beverages, fruit and vegetables; presence of TV in bedroom; and screen time.

Parents were asked about the number of times in the past 7 days that their child drank 100% fruit juice (not including punch, Kool-Aid, sports drinks, or other fruit-flavored drinks) and sweetened beverages (soda, energy drinks, sweet tea, and sports drinks combined). Response categories were coded as 1 time per day vs. 1 time per day.

Fruit and vegetable consumption was measured by asking parents to report how frequently (i.e., number of times per week) their child consumed ten specific fruits and nine vegetables. The frequency of consumption was summed for fruits and vegetables separately and the sum was divided by 7 to determine the number of times per day the child consumed fruits and vegetables.

Parents also were asked about the presence of TV in the bedroom and screen time (i.e., number of hours per day of TV/video/computer time). Screen time was calculated by asking: (a) On an average school day, how many hours per day does your child usually spend watching TV or videos away from school?; (b) On an average school day, how many hours per day does your child usually spend on the computer or video games away from school?²⁵ The two items were combined and dichotomized into 2 hours per day vs. <2 hours per day.

Parental feeding practices in the home were measured using the Parenting Strategies for Eating and Activity Scale, a valid and reliable scale for use with Latino parents.²⁶ To decrease participant burden, we used three of five subscales: limit setting (n=6 items); control (n=6 items); and reinforcement (n=2 items). The other two subscales were discipline (n=5 items) and monitoring (n=7 items). Response options included strength of agreement

(1_ *strongly disagree* to 5_ *strongly agree*) and frequency (1_ *never* to 5_ *always*) options. A mean score for each subscale was calculated. Limit setting refers to limiting the amount of time the child plays video games or plays on the computer, watches TV or videos during the week and weekend, and to limiting soda and snacks. Control is regulating how much the child eats and offering TV, video games, videos, and sweets as rewards for good behavior. Reinforcement refers to praising the child for healthy eating or being physically active.

Statistical analyses

Descriptive statistics were used to summarize the measures of interest (i.e., participant characteristics, dietary measures, sedentary measures, and PEAS score) for all study participants, and by acculturation or language (mostly Spanish, both Spanish and English, mostly English). Differences among the acculturation groups were evaluated using the Chi-square test or Fisher's exact test for categorical variables, and the ANOVA F test or Kruskal-Wallis test for continuous variables as appropriate. Pairwise comparisons with Bonferroni or Scheffe's adjustment were performed as needed. Multiple linear regression was used to examine the association between acculturation and outcomes of interest while adjusting for confounding variables. All statistical tests were conducted at a two-sided significance level of 0.05, and using SAS (Version 9.3).

RESULTS

Baseline characteristics

The study randomized 117 parent-child dyads. Table 1 displays demographic characteristics of parents and children enrolled in the study. The children's adult caregivers were mostly Latino (92%) and married (73%). Caregivers were of lower socio-economic status: 67% reported < \$30,000 for annual family income, 47% had less than a high school education, and 49% were unemployed. The parents' mean age was 36.2 (SD = 11.3) and 50% were born in the United States. Most children were female (58%) and had Medicaid/CHIP (81%). Children were a mean age of 9.7 ± 2.7 years, and caregivers were mostly female (92.3%) and mothers (86.3%) (data not shown).

Table 2 shows data on parental perceptions of weight by acculturation, as measured by language use. Overall, 82.5% of parents reported that their child had a weight problem whereas 17.5% thought their child was at a normal weight. Most parents (92.3%) reported that weight problems in children are unhealthy, and on a scale of 1 to 10, with 10 being very important and 1 being not important, the mean was 9.94 (SD=0.36) for parents saying a healthy weight is important. There was a significant difference by acculturation for "how important is it to you that your child have a healthy weight." The less acculturated parents (speak mostly Spanish) and the most acculturated (speak mostly English) differed significantly from the group of parents who spoke both English and Spanish, $p=.011$ and $p=.012$, respectively.

Table 3 displays the results of dietary and sedentary behavior measures by acculturation, as measured by language use. In general, parents reported that children are drinking less than one serving (0.36 ± 0.48) of 100% juice per day and about one serving (1.02 ± 1.25) of

sweetened beverage per day. Also, children are not eating the recommended five servings of fruits and vegetables per day. Parents reported 1.53 ± 1.13 servings of fruit and 1.27 ± 0.94 servings of vegetables per day. The most and least commonly consumed fruits and vegetables are listed in Table 4. There were no significant differences by acculturation for any dietary and sedentary behavior measure.

Table 5 shows the results of PEAS scores by acculturation. The only noted significant difference between groups was seen in the PEAS control scale, with control increasing from the less acculturated to the most acculturated, that is from “mostly Spanish” to “both” to “mostly English.” Pairwise comparisons show that the less acculturated (mostly Spanish) parents and the most acculturated (mostly English) differ significantly from each other on the control scale ($p < .001$). A multilinear regression of the PEAS control variable and acculturation, controlling for education and parental perception of whether their child had a weight problem, found that acculturation continued to be strongly associated with PEAS control. Specifically, compared with the less acculturated parents (mostly Spanish), those who are more acculturated (mostly English) had a significantly higher score on the PEAS control scale ($p = 0.04$). We also conducted a multilinear regression of PEAS control and parental perception of their child’s weight, adjusting for education and acculturation, and found parental perception of child having a weight problem was associated with a higher score on the PEAS control scale than parents who reported their child did not have a weight problem ($p = 0.02$).

DISCUSSION

Our findings suggest that as parents become more acculturated, as measured by language use, they assert greater control over their children’s feeding practices. Also, parents who thought their child had a weight problem exhibited greater control over their child’s feeding practices compared to parents who did not think their child had a weight problem. Similarly, we found a significant difference among acculturation groups with respect to the importance placed on weight. Parental acculturation was not associated with any other dietary and sedentary behavior measure, such as servings of juice/sweetened beverages, servings of fruits/vegetables, TV in the bedroom, and number of TV hours/day viewed.

Our PEAS control variable reflects that as parents become more acculturated, they pressure their children to eat, even when not hungry, and to finish all the food on their plate, as well as offer sweets and TV/video privileges as rewards for good behavior. Studies have shown that pressuring children to eat all their food even when not hungry and offering snacks and TV/video privileges as rewards for good behavior disrupts a child’s ability to self-regulate their internal cues of hunger and satiety and often leads to children disliking the foods they are pressured to eat.²⁷ Thus, children are likely to develop unhealthy feeding practices, such as eating more unhealthy foods²⁸ and fewer fruits/vegetables.²⁹

With respect to acculturation, we found the opposite of Arredondo et al. (2006) who found that less acculturation was associated with more controlling feeding practices.²⁸ There were two major differences between the Arredondo study and ours: first, they used a different measure of acculturation (a 30-item scale and a composite score); and second, they

examined a majority healthy weight population in contrast to this study which examined children who were overweight or obese. A study by Powers et al. (2015) also found that less acculturated mothers (i.e., immigrants) exhibited greater control over their child's food intake, pressured their children to eat, and offered food as rewards for good behavior.¹² This study also used an acculturation scale and over half of their sample was normal weight. More controlling practices for overweight or obese children may reflect a greater effort on behalf of parents to implement behavioral change, and so the association in this study may reflect a greater recognition of a problem^{30, 31} since our participants were all overweight and obese. Indeed, our study found that parents who recognized their child had a weight problem exerted greater control over their child's feeding practices. And other studies have found that increased control is associated with higher BMI z-scores.^{9, 26, 32} However, we found that biculturalism, that is, acculturating less to the host culture and retaining more of one's original culture, is protective against controlling feeding practices. Bicultural parents in our study reported more controlling strategies compared to less acculturated parents and but less controlling strategies compared to more acculturated parents. Thus, as parents acculturate to living in the U.S., their attitudes and practicing change and they start adopting more controlling parenting strategies. Although we found only one study examining the protective effect of biculturalism on obesity, it was among Asian Americans.³³ Our results, however, reflect the general notion that there is a protective effect of biculturalism on social and physical health.²³

Another important aspect of preventing childhood obesity is the importance that parents place on healthy weight. Importance of a healthy weight has been found to be higher among the more acculturated, as measured by language, at least among obese Hispanic adults (New, Xiao, and Ma 2013). This valuation of healthy weight status has not been assessed in Hispanic parents directly; however, the available evidence suggests a complicated perception with both the belief that children will "grow out of it" and simultaneously that being obese carries an increased risk of developing serious medical complications.³⁴ One challenge in determining how parents value weight lies in the definition of a healthy weight, with most Hispanic parents underestimating their child's weight.^{35, 36} Our data reveal statistically significant differences in perception of healthy weight by acculturation. However, the differences may not be clinically significant – all groups had a mean above 9 on a scale of 1 to 10. Most parents place a high importance on their children having a healthy weight. However, the confusion on what constitutes a healthy weight is highlighted by the finding that almost 20% of these parents (who all had children above the 95% for BMI) did not acknowledge that their child might have a weight problem. This finding is similar to another systematic review of parental perception of child's body weight. In 10 out of 13 articles, over 40% of parents of overweight and obese children underestimated their child's weight.³⁷ In a study of Hispanic children, 58% of parents incorrectly classified their child's weight.³⁸

The limitations of this study include the identification of overweight or obese children by billing codes rather than by anthropometrics, and the method of dietary assessment is subject to potential recall bias by the parent. Finally, the assessment of acculturation using self-reported language carries some risk of misclassification, though language has been shown to explain much of the variation in other acculturation scales.³⁹ Nonetheless, our findings have implications for delivering interventions and can inform daily practice and clinical obesity

management. Control in this study measured parental regulation of how much and when the child should eat (even if not hungry) to offering sweets and allowing children to watch TV/video/games as rewards for good behavior. This data elucidates the need to fine-tune our approach to childhood obesity prevention among Latinos. Level of acculturation and parent's perception of their child's weight is important and considering them when assessing a family in a clinical setting has value. Parents are likely not aware of how much they influence their children's feeding practices.

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Table 1.

Characteristics of study participants by acculturation (language)

Question	Acculturation			Total	P-value
	Low (mostly Spanish)	Bicultural (both Spanish and English)	High (mostly English)		
Age ¹					0.68
N	54	18	45	117	
Mean (SD)	36.2 (12.9)	38.1 (13.7)	35.4 (7.6)	36.2(11.3)	
Marriage Status ²					0.001
Married/Living together	48 (88.9)	10 (55.6)	27 (60.0)	85 (72.6)	
Not married	6 (11.1)	8 (44.4)	18 (40.0)	32 (27.4)	
Pairwise Comparisons	•	•			0.004
	•		•		0.001
			•		0.783
Less than high school	40 (74.1)	7 (38.9)	8 (17.8)	55 (47.0)	p<.001
High school graduate/GED	10 (18.5)	6 (33.3)	19 (42.2)	35 (29.9)	
More than high school	4 (7.4)	5 (27.8)	18 (40.0)	27 (23.1)	
Total	54	18	45	117	
Pairwise Comparisons	•	•			0.015
	•		•		<0.001
		•	•		0.224
Employment Status ²					<0.001
Employed (full-time or part-time)	17 (31.5)	9 (50.0)	34 (75.6)	60 (51.3)	
Unemployed	37 (68.5)	9 (50.0)	11 (24.4)	57 (48.7)	
Total	54	18	45	117	
Pairwise Comparisons	•	•			0.170
	•		•		<0.001
		•	•		0.072
US born ²					<0.001
Yes	3 (5.6)	13 (72.2)	43 (95.6)	59 (50.4)	
No	51 (94.4)	5 (27.8)	2 (4.4)	58 (49.6)	
Total	54	18	45	117	
Pairwise Comparisons	•	•			<0.001
	•		•		<0.001
		•	•		0.017
Annual Family Income ²					0.021
<\$10,000	7 (17.1)	2 (12.5)	7 (15.9)	16 (15.8)	
\$10,001 - \$30,000	25 (61.0)	9 (56.2)	18 (40.9)	52 (51.5)	
>\$30,000	9 (21.9)	5 (31.3)	19 (43.2)	33 (32.7)	
Total	41	16	44	101	

Question	Acculturation			Total	P-value
	Low (mostly Spanish)	Bicultural (both Spanish and English)	High (mostly English)		
Pairwise Comparisons	•	•			0.565
	•		•		0.002
		•	•		0.337
Race/Ethnicity ²					0.017
Latino	52 (100.0)	17 (94.4)	35 (81.4)	104 (92.1)	
Non-Latino	0 (0)	1 (5.6)	8 (18.6)	9 (7.9)	
Total	52	18	43	113	
Pairwise Comparisons	•	•			0.296
	•		•		0.002
		•	•		0.385
Child's Insurance ²					0.001
Medicaid/CHIP	49 (90.7)	16 (88.9)	30 (66.7)	95 (81.2)	
Private insurance/Employer Insurance	2 (3.7)	2 (11.1)	15 (33.3)	19 (16.2)	
No insurance	3 (5.6)	0 (0)	0 (0)	3 (2.6)	
Total	54	18	45	117	
Pairwise Comparisons	•	•			0.377
	•		•		<0.001
		•	•		0.116
Child's Gender ²					0.13
Male	28 (51.9)	6 (33.3)	15 (33.3)	49 (41.9)	
Female	26 (48.1)	12 (66.7)	30 (66.7)	68 (58.1)	
Total	54	18	45	117	

¹. ANOVA test/ t test for pairwise comparisons.

². Chi-squared test/Fisher's exact test.

Table 2.

Parental perceptions of weight by acculturation (language)

	Acculturation			Total	P-value
	Low (mostly Spanish)	Bicultural (both Spanish and English)	High (mostly English)		
Aware that your child might have a weight problem? ²					0.058
Yes	34 (70.8)	15 (88.2)	36 (94.7)	85 (82.5)	
No	14 (29.2)	2 (11.8)	2 (5.3)	18 (17.5)	
Total	48	17	38	103	
Weight problems in children are unhealthy? ²					0.06
Yes	42 (85.7)	18 (100)	36 (97.3)	96 (92.3)	
No	7 (14.3)	0 (0)	1 (2.7)	8 (7.7)	
Total	49	18	37	104	
Important that your child have a healthy weight? ¹					0.002
N	52	18	42	112	
Mean (SD)	9.98 (0.14)	9.67 (0.84)	10 (0)	9.94 (0.36)	
Pairwise Comparisons	•	•			0.011
	•		•		0.372
		•	•		0.012
Confident that your child can maintain a healthy weight? ¹					0.55
N	52	18	42	112	
Mean (SD)	8.27 (2.36)	8.22 (1.9)	7.81 (1.77)	8.09 (2.08)	

¹.ANOVA test/ t test for pairwise comparisons.².Chi-squared test/Fisher's exact test.

Table 3.

Dietary and sedentary measures by acculturation (language)

	Acculturation			Total	P-value ^{1,2}
	Low (mostly Spanish)	Bicultural (both Spanish and English)	High (mostly English)		
100% juice, servings/day					0.06 ¹
Mean±SD	0.34±0.41	0.44±0.24	0.36±0.61	0.36±0.48	
N	54	18	45	117	
Sweetened beverages, servings/day					0.1 ¹
Mean±SD	0.86±1.01	1.31±1.21	1.1±1.49	1.02±1.25	
N	54	18	45	117	
Fruits, servings/day					0.22 ¹
Mean±SD	1.75±1.16	1.38±0.72	1.37±1.2	1.53±1.13	
N	45	17	43	105	
Vegetables, servings/day					0.65 ¹
Mean±SD	1.29±0.81	1.3±0.79	1.25±1.11	1.27±0.94	
N	45	17	43	105	
TV in bedroom	11 (21.6)	5 (27.8)	16 (36.4)	32 (28.32)	0.29 ²
No					
Yes	40 (78.4)	13 (72.2)	28 (63.6)	81 (71.68)	
Total	51	18	44	113	
TV/video/computer >2 hrs/day					1 ²
No	41 (75.9)	14 (77.8)	34 (75.6)	89 (76.07)	
Yes	13 (24.1)	4 (22.2)	11 (24.4)	28 (23.93)	
Total	54	18	45	117	

¹. Kruskal-Wallis Test.². Fisher's Exact Test.

Table 4.

Fruit and Vegetable Consumption

Most commonly consumed (>1 per day)	Least commonly consumed (<1 per day)
<i>Fruits</i> Apples Oranges Grapes Bananas <i>Vegetables</i> Potatoes Tomatoes Green salad Carrots	<i>Fruits</i> Grapefruit Pears Melon Peaches Raisins <i>Vegetables</i> Corn Peas Collards-Spinach Broccoli Green beans Cauliflower

Table 5.

PEAS scores by acculturation (language), N=102

	Acculturation			Total	P-value ^{1,2}
	Low (mostly Spanish) n=47	Bicultural (both Spanish and English) n=13	High (mostly English) n=42		
PEAS: Limit Setting					0.83 ¹
Mean±SD	3.91±1.2	4.32±0.63	4.18±0.71	4.07±0.97	
PEAS: Reinforcement					0.71 ¹
Mean±SD	3.7±1.19	3.73±1.03	3.94±0.96	3.8±1.08	
PEAS: Control					< 0.001 ¹
Mean±SD	3.13±1.01	3.63±1.19	4.08±0.69	3.59±1.01	
		•	•		0.298 ²
	•	•			0.234 ²
	•		•		<0.001 ²

¹.Kruskal-Wallis Test.².Pairwise comparison with Scheffe's adjustment.