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Development and validation of a scale to measure Latino parenting strategies related to children's obesogenic behaviors: The Parenting strategies for Eating and Activity Scale (PEAS)

Sandra E Larios, MS, MPH¹, Guadalupe X. Ayala, PhD, MPH², Elva M. Arredondo, PhD², Barbara Baquero, MPH², and John P. Elder, PhD, MPH²

¹ SDSU/UCSD Joint Doctoral Program in Clinical Psychology, 6363 Alvarado Court, Suite 103, San Diego, CA 92120

² Center for Behavioral and Community Health Studies, San Diego State University Research Foundation and the Graduate School of Public Health, San Diego State University, 9245 Sky Park Court, Suite 221, San Diego, CA 92123, United States of America

Abstract

Research has shown that children's dietary and activity-related behaviors are shaped by the family environment and parenting behaviors. The present study describes the development and validation of a bilingual (Spanish and English) scale assessing parenting strategies associated with children's dietary and activity-related behaviors in the home. Items were generated from focus groups with Latina mothers and a review of the literature, and two different samples were used to assess the scale's psychometric properties, including an examination of predictive validity using measured child body mass index. Factor analysis of the first sample (N=91) yielded a 5-factor solution (Limit Setting, Monitoring, Discipline, Control, Concern) and accounted for 65% of the variance. Confirmatory factor analyses on a second sample of Latina mothers recruited into a childhood obesity prevention study (N=714) showed that a 26-item 5-factor solution (Limit Setting, Monitoring, Discipline, Control, Reinforcement) provided the best fit for the data. Parenting strategies characterized as controlling were associated with a lower BMI among children. After using multiple samples and establishing its validity, the Parenting strategies for Eating and Activity Scale (PEAS) was found to be valid and reliable in measuring Latino parenting strategies related to children's dietary and activity-related behaviors.

Keywords

Parenting strategies; childhood obesity; scale development; Hispanic; parental control

INTRODUCTION

Family influences play an important role in the formation of children's dietary and activity-related behaviors. With respect to dietary behaviors, parents model food preferences, dietary

Corresponding author: Guadalupe X. Ayala, PhD, MPH, Graduate School of Public Health, San Diego State University, 9245 Sky Park Court, Suite 221, San Diego, CA 92123, ayala@mail.sdsu.edu, 619-594-6686 (telephone), 619-594-2998 (fax).

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restraint and possibly dietary disinhibition (Birch & Fisher, 1998). Maternal control and restriction have been shown to play a role in the development of children's food preferences. For example, some child-feeding strategies that encourage children to consume a particular food increase children's dislike of that food (Birch, Marlin, & Rotter, 1984). On the other hand, maternal restriction of foods has been shown to increase girls' consumption of those same foods in an unrestricted setting (Fisher & Birch, 1999). Among Mexican-Americans in the U.S., acculturation influences the development of these feeding strategies. Kaiser and colleagues found that when compared with more acculturated mothers, less acculturated mothers were more likely to offer their children other foods when they refused to eat, to view bribes, threats, and punishment as effective ways to encourage eating, and to take their children out to eat as a reward for good behavior (Kaiser, Melgar Quinonez, Lamp, Johns, & Harwood, 2001). Costanzo and Woody (1985) developed a model to explain how excessive parental control in feeding can result when (1) parents are particularly invested in their children's eating, (2) children are perceived as being at risk for developing eating problems, weight problems or both, and (3) parents have trouble controlling their own food intake and therefore assume that their children will have difficulty as well.

In examining the relationship between maternal feeding practices and obesity, studies have found that a high degree of maternal control over the feeding interaction of children from middle to upper class White families increased the child's risk for obesity (Satter, 1996). Research also has found that the relative weight of preschool children is greater when parents report more restriction of children's access to snack foods (Fisher & Birch, 1999). Among Mexican-American children, Sherman and colleagues (1995) found that adult over- or under-involvement in the child's eating and more persons involved in feeding the child were risk factors for childhood obesity. Greater maternal involvement was observed in the Mexican-American versus Anglo sample, and greater family involvement was associated with a higher skin-fold ratio (Sherman, Alexander, Dean, & Kim, 1995). This type of parental control may prevent the child from developing the ability to regulate his/her own food intake and appetite when left alone and may leave him/her at greater risk for obesity. Interestingly, Sherman and colleagues (1995) did not find a significant relationship between the child's BMI and mother's overall score on the Maternal Feeding Practices questionnaire. Clearly, more research is needed to determine the prevalence of controlling or restrictive feeding practices in diverse populations and the extent to which these feeding practices are related to the risk for obesity. This research requires the use of validated measures of these constructs, particularly measures that are relevant to minority populations.

The family also plays an influential role in fostering children's physical activity. Research on the relationship between physical activity in children and parental behavior has focused on the direct effects of parental physical activity and support for physical activity (Davison, Cutting, & Birch, 2003; Jeffery, Baxter, McGuire, & Linde, 2006; Sallis, Prochaska, & Taylor, 2000; Strauss, Rodzilisky, Burack, & Colin, 2001). One study examining parenting styles and their influence on health behaviors found that mothers who demonstrated an authoritative parenting style (e.g., being responsive while having the ability to communicate and enforce expectations of behavior with appropriate levels of parental control) have children who report higher levels of physical activity and lower levels of sedentary behavior (Jackson, Henriksen, & Forshee, 1998; Schmitz, Lytle, Phillips, Murray, Birnbaum, & Kubik, 2002). Broader aspects of parental influences such as parental monitoring remain understudied perhaps due to a paucity of measurement tools that have been developed to assess this construct. This is important given that time spent viewing TV and playing video games are associated with the prevalence of child overweight as defined by a BMI above the 85th percentile (Dennison, Erb, & Jenkins, 2002). Having the ability to monitor and assess changes in parental influences on children's weight status is essential for the development and implementation of family-focused interventions targeting physical activity, and ultimately to prevent obesity in children.

Little research has focused on the systematic measurement of general patterns of feeding among ethnically diverse populations. Hughes and colleagues (2005) developed the Caregivers' Feeding Styles Questionnaire (CFSQ) to determine the parental feeding style (authoritarian, authoritative, indulgent, and uninvolved) of African-American and Hispanic caregivers. Hispanic parents were more indulgent than their African-American counterparts, and indulgent parents were found to have children with higher BMI measures (Hughes, Power, Fisher, Mueller, & Nicklas, 2005). The Child Feeding Questionnaire (CFQ) has been used to measure parental attitudes, beliefs, and behaviors related to child feeding in Hispanic and African-American parents (Anderson, Hughes, Fisher, & Nicklas, 2005). Anderson and colleagues (2005) explored the cross-cultural equivalence of the CFQ in low-income African-American and Hispanic parents. Preliminary results showed poor model fit of the original CFQ factor structure resulting in the deletion of several items and constructs. The modified scale functioned adequately in both groups and demonstrated the differential influence of parent education and perceived responsibility for feeding among Hispanic and African-American parents. Furthermore, although previous studies with predominantly White samples have found positive correlations between restriction of foods and concern about weight, the findings of Anderson and colleagues (2005) showed that high ratings on the restriction subscale were related to lower concern about child's weight in the African-American sample but not in the Hispanic sample. These results highlight the influence of the socio-cultural context on parental feeding behaviors. Parental motives for restriction may vary across cultures and having English and Spanish-language instruments that consider these cultural factors are vital to advance the field and gain knowledge about how culture informs parental feeding behaviors.

The present study describes the development of a culturally appropriate scale measuring Latino parenting strategies related to children's diet and physical activity, the Parenting strategies for Eating and Activity Scale (PEAS). Specifically, the study focuses on Latina mothers' parenting strategies given traditional gender roles related to child rearing. Measurement development and validation of the scale were completed in three phases. Phase One involved the use of focus group methodology to identify the types of culturally specific parenting strategies that mothers use in the home pertaining to their children's diet and activity-related behaviors. Phase Two consisted of a small pilot study to assess the scale's initial validity, reliability, and factor structure. Phase Three involved administration of the scale to parents recruited to participate in a randomized controlled trial examining the efficacy of an environmentally centered obesity prevention intervention for Latino children and their families. The San Diego State University Institutional Review Board approved all study protocols.

METHODS

Recruitment of Participants

Phase One participants consisted of Latina mothers recruited from parent-teacher associations affiliated with several schools in South San Diego County to participate in a focus group. Thirty women (mean age = 36 years, 63% married, 43% homemakers, mean number of years living in United States = 15) participated in one of five focus groups, three of which were moderated in Spanish. The women who participated in the focus groups had an average of three children under the age of 18 living in their household (mean age = 7 years). Women were asked to imagine a 5 to 8 year old child when answering the focus group questions. No formal acculturation measure was administered during the focus groups, but self-reported place of birth and language preference were used to assess acculturation consistent with previous research (Abraido-Lanza, Armbrister, Florez, & Aguirre, 2006). In this study, 76.7% of the women were born in Mexico versus the US and 70% of the women participated in Spanish-versus English-language focus groups. In addition, only four (13.3%) participants reported

speaking English exclusively with their children at home. The women received food and drinks during the focus groups, as well as a \$10 incentive, for their participation.

Phase Two participants consisted of Latina mothers who were recruited from several community centers and elementary schools in South San Diego County using active (direct solicitation) and passive (posting flyers) methods to complete a one-time survey. Women were eligible to participate if they were at least 18 years of age, able to read and write in either Spanish or English, and had a child in kindergarten to second grade given our target population for Phase Three. Ninety-one Latina mothers were recruited and 75% of the women completed the survey in Spanish. Table 1 presents this sample's demographic characteristics.

Phase Three participants consisted of parent-child dyads recruited to participate in a childhood obesity prevention intervention – *Aventuras para Niños*. This study was a 2×2 factorial intervention designed to test the efficacy of a *promotora*-mediated intervention to effect change within participants' homes, schools, and communities. Parents whose children attended one of thirteen public elementary schools in three Southern California communities received flyers, phone calls, or were approached in-person on school grounds by bilingual-bicultural research assistants. The communities in which these schools are located are predominantly Latino and situated an average of six miles from the U.S.-Mexico border. Schools were eligible for the study if they met the following criteria: (1) at least 70% Latino student enrollment, (2) a defined attendance boundary (i.e., not a charter or magnet school), and, (3) no other obesity-related programs or special physical education training occurred at the school within the past four years. Parent-child dyads were eligible to participate in the program if: (1) the child was in kindergarten through 2nd grade, (2) the family lived within the school attendance boundaries, (3) the child had no major health problems, (4) the parent completing the assessment protocol was able to read in Spanish or English, and, (5) the family intended to stay in the study area within a year of enrollment. Table 1 provides descriptive information on this sample.

Procedures

Phase One procedures consisted of focus groups facilitated by a bilingual community member and a bilingual research staff member. Prior to each focus group, participants completed a survey assessing demographic characteristics and current parenting practices. A focus group guide was used to facilitate the focus group discussions, which were audio-recorded and transcribed. Sample focus group questions included, "Tell me about the strictest mother you know, what kinds of rules does she have about eating and nutrition in her house? What about the most relaxed mother? What kinds of rules should parents have about outside activities?" The intent of the focus group questions was to elicit the types of parenting strategies used in participant homes that may be related to child feeding and activity. The two hypothetical extremes were used to generate a discussion of the full range of parenting strategies and to elicit how the participants felt about their strategies compared to other parents they have known. Other focus group questions included: "What do you think are good rules to have about watching television or playing video games? Should every household have rules about exercising?" Transcribed focus group discussions were analyzed by hand by two independent reviewers, themes identified independently, and then consensus reached on all themes and all codes. Participant responses were coded for any mention of parenting strategies associated with feeding or activity.

During Phase Two, we administered a 64-item questionnaire to 91 Latino mothers in the language of their choice (Spanish $n=68$ or English $n=23$). In addition to the new parenting strategies scale, the Child Feeding Questionnaire (CFQ; Birch, Fisher, Grimm-Thomas, Markey, Sawyer, & Johnson, 2001) was administered along with the following demographic questions: age, marital status, household size, employment status, length of residence in the United States, and years of formal education. The CFQ was selected to examine the construct

validity of the parenting strategies scale given that it assesses constructs such as parental concern, restriction and monitoring. Birch and colleagues reported the following coefficient alphas for the CFQ subscales: 0.88 (Responsibility), 0.71 (Parent weight), 0.83 (Child weight), 0.75 (Concern), 0.70 (Pressure to eat), 0.73 (Restriction), and 0.92 (Monitoring). Most of the mothers completed the survey while seated at their child's school lunch table and each mother received \$5 for completing the questionnaire.

Data analyses of Phase Two results began with an examination of the psychometric properties of the scale and construct validity. Construct validation is concerned with the extent to which a particular scale is believed to truly measure what it purports to measure and can be evaluated by factor analysis or correlations with other measures of a similar construct (Carmine & Zeller, 1979). To assess for construct validity, factor analysis was used to identify the subscales and correlation analyses were used to examine the relationship between our subscales and those found in the CFQ (Birch et al., 2001). Although previous research has found that principal components analyses (PCA) and exploratory factor analyses (EFA) will lead to similar substantive conclusions (Wilkinson, Blank, & Gruber, 1996), both PCA and EFA were run with a Varimax rotation to compare their factor loadings, percentage of variance accounted for, and eigenvalues. According to Tabachnik and Fidell (2001), only factor loadings greater than or equal to .32 are interpretable but are nevertheless considered poor since they only explain 10% of the variance, while factor loading above .45 are fair and those above .55 are good. Based on this rationale, the present study used a cut-off of .45 to determine item loadings. The eigenvalue greater than one criterion was used as a guideline to determine the appropriate number of factors and was used in conjunction with the proportion of variance accounted for by each factor. Positive correlations were hypothesized for the following study-developed and CFQ subscale pairs: (1) Control-CFQ Restriction, (2) Concern-CFQ Concern, (3) Limit Setting-CFQ Restriction, and (4) Limit Setting-CFQ Monitoring. Given that monitoring is related to perceived responsibility in parental feeding practices (Blisset, Meyer, & Haycraft, 2006), positive correlations were also hypothesized between Monitoring and the CFQ Perceived Responsibility and Monitoring subscales.

Phase Three procedures consisted of administration of a 22-page survey to 714 Latina mothers in the language of their choice (Spanish or English). In addition to the parenting strategies scale, two other sections of the survey are relevant to the present analyses. Mothers were asked the following demographic questions: age, marital status, household size, employment status and household income, length of residence in the United States, and years of formal education. Mothers also were asked to complete a 30-item scale designed to assess dietary behavioral strategies to reduce the family's fat intake and increase their fiber intake. The 20-item fat subscale and the 10-item fiber subscale use a response option ranging from 1=never to 4=usually. The scale was developed and validated in a previous study with 357 Latina women involved in a dietary change intervention (Elder et al., 2005). It was hypothesized that women who engaged in healthier dietary behavioral strategies for reducing fat intake and increasing fiber in their family's diet would be more aware of their child's eating and thus would engage in more parenting strategies to prevent childhood overweight. Specifically, we hypothesized that the Control, Limit setting, Monitoring, and Discipline subscales would be positively related to behavioral strategies for both fat and fiber.

Following administration of the questionnaire, parent and child height and weight were measured and then used to calculate body mass index [BMI] using the Quetelet index (kg/m^2), the standard approach for assessing BMI (CDC, 2000). Child BMI was standardized and z-scores were used to examine the predictive validity of the parenting strategies scale. Based on previous research, it was hypothesized that both the Control and Concern subscales would be positively related to child BMI (Fisher & Birch, 1995; Satter, 1996). All assessments occurred

at the child's school and the parent-child dyad received a \$20 incentive for completing the assessment protocol.

In the initial data analysis of Phase Three results, a series of confirmatory models were specified and estimated using AMOS v. 4 (Arbuckle & Wothke, 1997). The parameters were estimated by robust maximum likelihood. Following the guidelines suggested by Holye and Panter (1995), the goodness of fit for each model was assessed using the Incremental Fit Index (IFI: Bollen, 1989a) and the Comparative Fit Index (CFI: Bentler, 1990). Values greater than .90 for the IFI and CFI are considered to reflect acceptable model fit. The Root Mean Square Error of Approximation (RMSEA; Steiger, 1990) takes into account the error of approximation in the population and values up to .08 are an indication of acceptable model fit (Joreskog, 1993). To correct for non-normality, a bootstrap procedure was conducted with the number of bootstrap samples set to 200. Because the bootstrap procedure in AMOS requires complete datasets, analysis on 617 participants with complete data was carried out. Findings showed no socio-demographic differences between the 617 participants included in the analyses and those excluded ($n=97$) on age, education, or employment status. Following specification of the model, concurrent and predictive validity were examined by assessing the association between the parenting strategies subscales and behavioral strategies and child BMI z-score respectively.

RESULTS

Item Generation using Qualitative Methods – Phase One results

Results from the focus groups showed that Latina mothers set limits on their children's dietary intake and sedentary behaviors, and that these practices vary depending on the day of the week (weekend vs. weekday). These expectations are generally communicated verbally to the children. Primary themes identified included: (1) parental restriction of snacks and other foods, (2) day of the week effects on rules for sedentary behaviors, and (3) discipline strategies used in the home. Thirty-two items were generated and then reviewed by the team to determine readability and appropriateness for inclusion into the scale. Seven items were eliminated from the outset because they addressed computer use, and were deemed inappropriate given the age of our Phase Three target population. This yielded a final sample of 25 items for pilot testing representing the following five dimensions of parenting strategies: Limit Setting, Discipline, Control, Concern, and Monitoring.

A 5-point Likert-type response style was chosen for the scale to maximize measurement variance in degree and frequency of the behavior, yet recognizing limitations in ease of use by diverse populations (Warnecke et al., 1997). However, the wording of the response options differed based on the subscale. The Limit Setting and Control subscales used response options ranging from 1=disagree to 5=agree. The Concern subscale employed response options ranging from 1=not at all concerned to 5=very concerned. The Monitoring and Discipline subscales used response options ranging from 1=never to 5=always. The scale was translated into Spanish by a professional translation service and then back translated by bilingual/bicultural members of the research team. A bilingual/bicultural member of the research team then assessed semantic equivalence, a process concerned with the transfer of meaning across languages and with obtaining a similar effect on respondents in different languages (Herdman, Fox-Rushgy, & Badia, 1998), to ensure that respondents would understand the meaning behind the language used in the scale.

Initial Validation - Phase Two results

Although PCA and EFA were performed, three items from the EFA exhibited weak cross-loadings (factor loadings < 0.45), therefore only the results from the PCA are presented. Based on our hypothesized factor structure, we specified a 5-factor solution that included Limit

Setting, Discipline, Control, Concern, and Monitoring. Results showed a good fit with the data, explaining 65% of the variance (Table 2). Of the original 25 items, five items cross-loaded on multiple factors and were cut from subsequent analyses because they did not meet the minimum required factor loading of .45 (see Table 2 for the final scale). The items that were deleted included three items related to sedentary behavior and two items related to television watching. The 5-factor solution was further supported using the recommended cut-offs requiring factors to have an eigenvalue greater than one and account for at least 50% of the total variance (Dunteman, 1989). Cronbach's coefficient alphas for each factor ranged from .81–.82. (Table 2) and the complete 20-item scale was shown to have high reliability with a coefficient alpha of .81.

Consistent with our hypothesis and demonstrating good construct validity, positive correlations were observed between the PEAS subscales and subscales on the CFQ (see Table 3). Small to moderate correlations were observed between Control-CFQ Restriction ($r = .51, p < .001$), Concern and CFQ Concern ($r = .65, p < .001$), Limit Setting and CFQ Restriction ($r = .26, p < .01$), Limit Setting and CFQ Monitoring ($r = .23, p < .05$), Monitoring and CFQ Perceived Responsibility ($r = .30, p < .001$), and Monitoring and CFQ Monitoring ($r = .62, p < .001$). Thus, Phase Two results found that the theoretically derived 5-factor solution was supported by the data. This process, however, also identified a number of limitations in the scale. These limitations were addressed in Phase Three.

Final Validation using Confirmatory Factor Analysis – Phase Three results

In Phase Two, we found that although several questions assessed parental use of positive reinforcement with unhealthy rewards (sweets and television viewing), no item assessed positive reinforcement using healthy rewards. To remedy this omission, two questions were added to the scale that assessed the use of praise as a form of positive reinforcement. It was hypothesized that these items would load on a separate factor labeled Reinforcement. In addition, in developing the PEAS, we sought to include items assessing parenting strategies for both feeding behaviors and activity that have been shown to contribute to the obesogenic home environment. Thus, eleven items were added from Birch's CFQ (Birch et al., 2001) to represent Parental Concern (3 items), Parental Control (5 items) and Parental Monitoring (3 items) in order to supplement the physical activity Concern, Control, and Monitoring questions. See Table 5 for CFQ items that were added to the final scale. These modifications yielded a six-factor scale with 33 items for examination during Phase Three.

The first model included a 6-factor structure with the following factors: Limit Setting, Monitoring, Discipline, Control, Concern, and Reinforcement. All 33 items loaded significantly at the $p < .001$; however, the model provided less than adequate fit ($\chi^2 = 2242.81, df = 449, CFI = .80, IFI = .80, RMSEA = .08$). With the exception of Concern, all of the factors were correlated with each other at $p < .10$. The seven Concern items (Your child having to diet to maintain a desirable weight; Your child becoming overweight; Your child eating too much when you are not around him/her; Your child not getting enough fruits and vegetables; Your child watching too much TV/video games; Your child not getting enough exercise; If I did not regulate my child's TV watching he/she would watch too much) were dropped after the CFA showed that the Concern scale reduced overall model fit. A second factor model, excluding Concern, was then tested examining the factor loadings and correlations of Limit Setting, Monitoring, Discipline, and Control. The model provided less than adequate fit ($\chi^2 = 1766.54, df = 289, CFI = .79, IFI = .79, RMSEA = .09$). Examination of the content of the items and the modification indexes related to these data identified a few excessively large correlated errors between items that were adjacent to each other (24/25, 12/13, 20/21, 31/32, 26/27, 15/16) in the survey. These correlated errors may be due to a systematic measurement bias reported in Latino communities (Marin, Gamba, & Marin, 1992; Marin & Marin, 1991; Brown, 2006, pg.

46). Thus, the model was re-estimated with the correlated errors. The re-estimated and final model provided good fit. See Table 4 for fit indices and standardized factor loadings. All factors were significantly correlated, with strong correlations found between Monitoring and both Discipline and Reinforcement (see Table 5).

To examine the concurrent validity of the final PEAS, we examined the correlations between the PEAS and the behavioral strategies for fat and fiber scales (see Table 6). Behavioral strategies for reducing fat was positively associated with Limit Setting, Monitoring, Discipline and Reinforcement. In other words, a woman who reported engaging in behaviors to reduce fat in her family's diets was also more likely to report using parenting strategies characterized by Limit Setting, Monitoring, Discipline and Reinforcement. However, behavioral strategies related to fat was negatively associated with Control, such that a woman who reported using more controlling strategies engaged in fewer behaviors to reduce fat in her family's diet. Although surprising, it is possible that women who use a more controlling style do not feel the need to engage in behavioral strategies to reduce their family's fat intake. Results using the behavioral strategies to increase fiber intake were similar with one exception: Control was not associated with behavioral strategies to increase fiber. These correlations moderately support the construct validity of our measure by showing that women who use behavioral strategies for fat and fiber are also more likely to use parenting strategies that promote a healthy lifestyle.

To examine the predictive validity of the scale, the relationship between the five parenting subscales and child BMI z-scores were tested (Table 6). A significant negative correlation was observed between Control and child BMI ($r=-0.21$). Parents who used fewer controlling strategies had children with larger BMIs.

DISCUSSION

This paper describes the development and validation of a 26-item scale assessing parenting strategies associated with children's dietary and physical activity behaviors. The survey was developed in three phases and showed strong content, construct, and concurrent validity and high reliability. The PEAS was developed based on previous literature examining the relationship between child feeding strategies and childhood obesity. Following initial scale development, confirmatory factor analyses revealed that a 5-factor solution fit the data well across two language versions (Spanish-English) of the scale. A limitation of our final 5-factor scale is that the Reinforcement subscale consisted of only two items and may not adequately represent the construct it purports to measure. Although previous research has found that two items may sufficiently identify a factor (Bollen, 1989b), future research should develop additional items to assess this construct as it relates to childhood obesity.

Parenting strategies influence the development of overweight and obesity in various ways at different stages of a child's development. However, critical gaps still exist in understanding the influence of family relationships and parenting strategies on obesity in children and assessment with culturally appropriate tools is necessary to further the knowledge in this area. In the present study, parents who use more controlling strategies had children with lower BMIs. Contrary to the hypothesized relationship, these parents might be concerned about their children not eating enough food rather than eating too much and as a result exhibited "controlling" behaviors so that their children eat more.

There are several applied uses of the PEAS. Previous research has shown that family influences, specifically maternal feeding practices, are important in the development of child food preferences and dietary habits (Birch & Fisher, 1998; Birch, Marlin, & Rotter, 1984). The PEAS expands on this research by measuring parenting strategies related to both children's dietary behaviors and physical activity. Parents may be justifiably confused as to how to keep

the obesity epidemic from affecting their own children, attempting to choose the most effective balance between strict and lax controls. This validated and reliable measure of Latino parenting strategies can be useful for not only researchers interested in examining these behaviors and their association with childhood obesity, but also for the development of effective prevention interventions that attempt to help parents understand the nuances of effective parenting.

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Table 1

Socio-demographic characteristics of Phase Two and Three participants

Variables	Phase Two N=91	Phase Three N=714
Mean age (SD)	37.6 (9.8)	34.2 (7.4)
Median number of children in home	2.00	3.00
	Count (percent)	
First generation immigrant	71 (78%)	550 (77%)
Married or cohabitating	71 (78%)	556 (78%)
Employed full-time or part-time	29 (32%)	210 (29%)
Completed less than a high school education	37 (41%)	267 (37%)
Homeowner	n/a	184 (26%)
Monthly HH income ≤ \$1500	n/a	264 (37%)

(SD) = Standard Deviation

n/a = not assessed

HH = Household

Table 2
Phase Two test results on factor structure, percent variance accounted for by each factor and reliability coefficient

Item wording	Limit setting	Discipline	Concern	Monitoring	Control
I limit the amount of time my child plays video games or is on the computer during the week.	0.88				
I limit the amount of time my child plays video games or is on the computer during the weekend.	0.85				
I limit the amount of time my child watches TV/videos during the weekend.	0.79				
I limit the amount of time my child watches TV/videos during the week.	0.74				
I limit the amount of soda my child drinks.	0.53				
I limit the number of snacks by child eats.	0.54				
How often do you discipline your child for playing video games without permission?		0.39			0.79
How often do you discipline your child for watching TV/videos without permission?		0.31			0.81
How often do you discipline your child for drinking a soda without permission?		0.72			
My child must ask permission before getting a snack.		0.73			
My child must ask permission before drinking a soda.		0.60			
How often do you discipline your child for getting a snack without permission?		0.84			
If I do not guide or regulate my child's TV watching, he would watch too much.	0.31		0.49		
I offer TV, videos or video games as a reward for good behavior.			0.44		
How concerned are you about your child is not getting enough fruits and vegetables?			0.87		
How concerned are you about your child is watching too much TV/video games?			0.81		
How concerned are you about your child is not getting enough exercise?			0.75		
How much do you keep track of the number of fruits and vegetables your child is eating?				0.78	
How much do you keep track of the exercise your child is getting?				0.77	
How much do you keep track of the amount of TV/videos your child is watching?				0.61	0.36
eigenvalues	4.91	2.54	2.37	1.70	1.40
% of variance accounted for	24.56	12.72	11.87	8.52	7.01
Cronbach coefficient alpha	0.81	0.82	0.81	0.82	0.82

Factor loading less than .30 are not reported.

Only items with factor loadings greater than .45 were included in computing Cronbach's coefficient alpha.

Table 3
Correlations between parenting strategies and Child Feeding Questionnaire (CFQ) subscales

	Control	Concern	Limit Setting	Monitoring
CFQ Concern	-.06	.65***	-.08	-.09
CFQ Restriction	.51***	.10	.26**	.20*
CFQ Responsibility	-.02	-.09	.16^	.30***
CFQ Monitoring	.10	.01	.23*	.62***

p≤.001
**
, p≤.01,
*
p≤.05,
^
p≤.10

Table 4
Standardized factor loadings of each item on the full Parenting strategies for Eating and Activity Scale (PEAS)

Item wording	Limit setting	Monitoring	Discipline	Control	Reinforcement
I limit the amount of time my child plays video games or is on the computer during the week	0.90				
I limit the amount of time my child plays video games or is on the computer during the weekend	0.79				
I limit the amount of time my child watches TV or Videos during the week	0.77				
I limit amount of time my child watches TV or Videos during the weekend	0.77				
I limit the amount of soda my child drinks	0.47				
I limit the number of snacks my child eats	0.46				
How much do you keep track of amount of TV or videos your child is watching		0.73			
How much do you keep track of the high fat foods your child eats		0.71			
How much do you keep track of the salty snack food your child eats		0.70			
How much do you keep track of sweets that your child eats		0.69			
How much do keep track of the amount of exercise your child is getting		0.61			
How much do you keep track of the servings of fruits and vegetables your child is eating		0.59			
My child must ask permission before getting a snack		0.26			
How often do you discipline your child if she/he plays video games without my permission			0.86		
How often do you discipline your child if she/he watches TV without my permission			0.85		
How often do you discipline your child if she/he gets a snack without my permission			0.66		
How often do you discipline your child if she/he drinks soda without my permission			0.64		
My child must ask permission before drinking a soda			0.21		
If I don't regulate my child's eating he/she would eat much less				0.73	
I have to make sure my child eats enough				0.72	
If my child say's I'm not hungry I try to get them to eat anyway				0.69	
My child should always eat all the food on his/her plate				0.53	
I offer TV, video games, videos as a reward for good behavior				0.31	
I offer sweets as a reward for good behavior				0.21	
How often do you praise your child for being physically active					0.77
How often do you praise your child for eating a healthy snack					0.75

Model fit: $\chi^2=1030.81$, $df=282$; CFI=.89, IFI=.90, RMSEA=.06

Child Feeding Questionnaire items that were added are in bold.

Table 5
Correlations for the five-factor model of the Parenting strategies for Eating and Activity Scale (PEAS)

	Control	Discipline	Limit Setting	Monitoring	Reinforcement
Reinforcement	.15**	.40***	.26***	.56***	
Monitoring	.14*	.52***	.42***		
Limit Setting	.30***	.36***			
Discipline	.17**				

p≤.001
**
p≤.01,
*
p≤.05

Table 6

Phase Three results: Correlations between Parenting strategies for Eating and Activity subscales (PEAS), behavioral strategies, and child Body Mass Index (BMI) z-score

	Behavioral Strategies for Fat	Behavioral Strategies for Fiber	Child BMI z-score
Limit Setting	.16***	.12***	-.03
Monitoring	.33***	.30***	.04
Discipline	.14***	.14***	.02
Control	-.14***	-.06	-.21**
Reinforcement	.24***	.33***	-.04

p≤.001,

**
p<.01