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Validity of the toddler feeding questionnaire for measuring parent authoritative and indulgent feeding practices which are associated with stress and health literacy among Latino parents of preschool children

William J. Heerman*, Julie Lounds-Taylor, Stephanie Mitchell, and Shari L. Barkin

Department of Pediatrics, Division of General Pediatrics, Vanderbilt University Medical Center, 2200 Children's Way, 8232 Doctors' Office Tower, Nashville, TN 37232-9225

Abstract

Understanding the contribution of parental feeding practices to childhood obesity among Latino children is a solution-oriented approach that can lead to interventions supporting healthy childhood growth and lowering rates of obesity. The purpose of this study was to confirm the reliability and validity of the Toddler Feeding Questionnaire (TFQ) to measure parental feeding practices among a sample of Spanish-speaking parent-preschool child pairs ($n = 529$), and to test the hypothesis that parent characteristics of body mass index (BMI), stress, and health literacy are associated with more indulgent and less authoritative feeding practices. Standardized parent-report questionnaires were completed during baseline interviews in a randomized controlled trial of an obesity prevention intervention. The TFQ includes subscales for indulgent practices (11 items), authoritative practices (7 items), and environmental influences (6 items) with response options scored on a 5-point Likert scale and averaged. Factor analysis confirmed a three-factor structure. Internal consistency was good for indulgent ($\alpha = 0.66$) and authoritative ($\alpha = 0.65$) practices but lower for environmental ($\alpha = 0.48$). Spearman correlation showed indulgent practices and environmental influences were associated with unhealthy child diet patterns, whereas authoritative practices were associated with a healthier child diet. Multivariate linear regression showed higher parent stress was associated with higher indulgent and lower authoritative scores; higher parent health literacy was positively associated with indulgent scores. These results indicate the TFQ is a valid measure of authoritative and indulgent parent feeding practices among Spanish-speaking parents of preschool-age children and that stress and health literacy, potentially modifiable parent characteristics, could be targeted to support healthy feeding practices.

Keywords

Childhood Obesity; Parent feeding practices; Toddler feeding; Latinos

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*Corresponding author at: 2146 Belcourt Ave, 2nd Floor, Nashville, TN 37209. Bill.Heerman@vanderbilt.edu (W.J. Heerman).

1. Introduction

Parents play a critical role in determining whether a child will struggle with a life-long predilection towards obesity [1]. In particular, parental feeding practices during early childhood are an important contributor to a child's growth trajectory, not only because parents are responsible for providing food and feeding young children, but also because a child's personal food preferences and eating habits are established during this phase [2–5]. This is particularly salient for children from the U.S. Latino community, who have disproportionately high rates of childhood obesity. Understanding their unique challenges to healthy growth may lead to solutions to improve the overall health of the fastest growing minority population in the United States [6].

Feeding practices include degree of parental control over what and how much food the child eats, role modeling of eating behaviors, feeding cues or prompts given to the child, and the mealtime environment and routines [7]. Parental feeding styles encapsulate the constellation of feeding practices parents employ, are defined by demandingness and responsiveness of the parent to the child's cues of hunger or satiety, and create an emotional climate in the parent–child eating relationship [3,8]. According to the parental feeding styles framework developed by Hughes et al., [9] authoritative parents see themselves as responsible for the nutritional choices of their children (high demandingness) and show sensitivity towards their child's needs (high responsiveness), which is associated with healthier diet patterns [10], whereas indulgent parents let their children dictate much of the food choices (low demandingness with high responsiveness), which has been linked with increased likelihood of Latino children becoming overweight [8,11].

The Toddler Feeding Questionnaire (TFQ) was developed to be a culturally-appropriate measure of parental feeding practices for Latino families, unique in its (a) focus on parental practices related to authoritative and indulgent feeding styles as well as environmental influences on child eating, and its (b) assessment of feeding practices during snack in addition to meal times, which is salient because child-led snacking is very common in Latino households [7,12,13]. Initial psychometric testing of the TFQ demonstrated good reliability and validity in a small ($N = 94$) convenience sample of Latino mothers of toddlers (12–24 months old), yet more evidence is necessary to confirm its appropriateness in preschool-age children (ages 3–5 years), who are at elevated risk for obesity, as well as for larger scale and program evaluation research.

Previous literature points to several modifiable parental characteristics that may be associated with parental feeding practices, though these associations have not been tested in the Latino population. Specifically parent body mass index (BMI) was associated with greater engagement in restrictive feeding practices with school-age children [14]; parent stress was associated with more forceful and uninvolved feeding styles employed by low-income mothers of infants; [15] lower health literacy was associated with obesogenic feeding practices [16].

Thus, the objectives of this study were to (1) confirm the reliability and validity of the TFQ in a large sample of Latino parent-preschool pairs; and (2) test the hypothesis that parent

characteristics of BMI, stress, and health literacy are associated with more indulgent and less authoritative feeding practices.

2. Methods and materials

We conducted a cross-sectional analysis of baseline data collected from parent–child pairs enrolled in the Growing Right Onto Wellness (GROW) randomized controlled trial ([clinicaltrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT01316653) identifier NCT01316653) of a 3-year family-centered behavioral intervention delivered in local community centers [17]. This study was approved by the Vanderbilt Institutional Review Board, and all adult participants signed informed consent prior to participating [18].

GROW enrolled 610 parent–child pairs from under-served Latino and African American communities in Nashville, TN from January 2013 to June 2014 (Fig. 1). Full eligibility criteria have been published elsewhere [17] but included (1) 3–5 year old child; (2) child's BMI >50th percentile and <95th percentile on standardized Center for Disease Control growth curves; (3) parent age ≥ 18 years; (4) parent commitment to participate in the duration of the 3-year study; (5) parent and child completion of baseline data collection; and (6) family must reside or frequently pass through one of two geographic regions in Nashville that is contiguous with a community center designated for the intervention. We included in this study only the 555 Latino parent–child pairs. Participants were excluded from the final analytic sample if they did not respond to more than 1 item on any of the TFQ subscales ($n = 3$; 0.5% missing) or if they did not have complete data on the parent characteristics of interest (BMI, stress, or health literacy, $n = 19$; 3%).

Community liaisons (e.g., local pastors, directors of public daycare/pre-K programs) helped recruit participants from various community sites (eg, daycares, doctors' offices, community service programs) serving the target population. Trained bilingual research staff screened interested families for eligibility and conducted informed consent with those who were eligible in the parent's language of choice, which was Spanish for all participants in this analysis [18]. Demographics and other self-reported measures were collected by guided verbal administration because of the low literacy rate of the population.

2.1. Dependent variable: parent feeding practices

The Toddler Feeding Questionnaire consists of three subscales: indulgent practices (11 items; e.g., "I can calm my child with something to eat or drink when my child is upset." "If my child does not want what is prepared, I give him/her something else."), authoritative practices (7 items; e.g., "I feed my child foods that maintain a healthy weight."), and environmental influences (6 items; "My child eats the same foods prepared for the family."). Response options for each of these items were scored on a 5-point Likert scale from Never to Always, and subscale scores were computed by averaging across items.

2.2. Construct validity: Child dietary patterns

Child dietary intake was assessed by 24-hour recall conducted with parent participants on two weekdays and one weekend day using Nutrition Data System for Research software. Dietary recalls were collected by telephone in Spanish. The data from diet recalls is

presented in two ways. First we compared the subscales of the TFQ to total kilocalories (kcal)/day, total grams of fat/day, as well as the average number of servings per day from 7 food groups: fruits, vegetables, grains and cereals, meat, milk, sugary beverages, and desserts. We also compared the subscales of the TFQ to the 2010 Healthy Eating Index (HEI-2010) score derived from the diet recall information by trained coders [19]. The HEI is a validated measure of diet quality that references nutritional intake against the 2010 USDA dietary recommendations. The HEI-2010 is scored on a scale from 0 to 100, with 80 to 100 representing good adherence to United States Department of Agriculture (USDA) recommendations. One advantage of examining HEI-2010 scores instead of specific nutrients and/or food groups is that it reflects real world dietary practices, accounting for potential healthy or unhealthy patterns of diet quality that could be overlooked by using the 12 individual component food groups.

2.3. Independent variables: parent characteristics

Parent BMI was calculated from height and weight measurements that were collected by certified research assistants using research caliber scales and stadiometers. Parent health literacy was assessed using the Newest Vital Sign (range, 0–6), which is a 6-item yes/no instrument that asks participants to answer questions about an accompanying food label [20]. Higher values on the Newest Vital Sign represent higher health literacy. Parent stress was assessed using the Perceived Stress Scale (range, 0–50), which measures global stress using a 10-item instrument scored on a 5-point Likert scale [21,22].

Potential covariates included parent report of own age, sex and acculturation, measured using the Brief Acculturation Scale for Hispanics (BASH; possible range, 4–20) [23,24]. Parents also reported child age, sex, and household participation in the Supplemental Nutrition Assistance Program (SNAP).

2.4. Statistical analyses

Descriptive statistics (medians and interquartile ranges or percentages) were used to summarize variables of interest. To confirm the reliability of the TFQ, we first conducted a factor analysis using both orthogonal and oblique rotations to determine whether the same three subscales would be evident in this sample of slightly older children. In addition, for each of the original subscales, Cronbach's alphas were computed to assess the internal consistency. To assess construct validity, Spearman correlations (ρ) were calculated between each subscale of the TFQ and each of the 10 variables assessing child diet.

To examine potential parent correlates of feeding practices, adjusted multivariable linear regression models were conducted with the TFQ subscales as dependent variables, and key independent variables were parent BMI, stress and health literacy. Models controlled for: parent characteristics of age, sex, and acculturation; child characteristics of age, sex, and BMI; as well as the household characteristic of SNAP participation. For all covariates, group means were substituted for missing continuous variables and the most frequent category was substituted for missing categorical variables [25]. Data were analyzed using SPSS version 22. For all analyses, a 2-tailed $P < .05$ was considered statistically significant.

3. Results

Among the 529 Latino parent–child pairs included in this analysis, the median child age was 4.3 (IQR 3.5–5.0) years, and 51.0% of children were girls. The median child BMI was 16.6 (IQR 16.1–17.3). The median parent age was 31.4 (IQR 27.6–35.8) years, and 99.1% were women. Acculturation was very low, with minimal variation: median BASH was 4 (IQR 4–6). Household SNAP participation was 75.6%.

The median score on the perceived stress scale for parents was 13 (IQR 8–18). The median score on the Newest Vital Sign for parents was 1 (IQR 0–2), and 88% of respondents met previous cut-points for low health literacy (score <4). The median parental BMI was 28.6 (IQR 25.6–32.0). The median HEI-2010 score for children was 56.5 (IQR 47.9–64.5) with over 98% of children not meeting previously established cut points for adherence to USDA recommendations (HEI-2010 score >80). The median scores for each of the subscales of the TFQ were as follows: indulgent 2.6 (IQR 2.2–3.1); authoritative 3.9 (IQR 3.3–4.3); and environmental 3.2 (IQR 2.8–3.5).

3.1. Toddler feeding questionnaire reliability and validity

We confirmed a three-factor solution to the items on the TFQ with similar factor loadings to those originally reported by Chaidez and Kaiser [7]. Cronbach's alphas for each of the subscales were as follows: indulgent ($\alpha = 0.66$), authoritative ($\alpha = 0.65$) and environmental ($\alpha = 0.48$).

Fig. 2 shows higher scores on the indulgent subscale were correlated with: lower scores on the HEI-2010 ($\rho = -0.22$; $P < .001$), higher kcal/d ($\rho = 0.11$; $P = .011$), higher grams of fat/day ($\rho = 0.12$; $P = .008$), fewer servings of vegetables ($\rho = -0.11$; $P = .01$), more servings of desserts ($\rho = 0.13$; $P = .002$), and more servings of sugary drinks ($\rho = 0.23$; $P < .001$). Higher scores on the authoritative subscale were correlated with: higher scores on the HEI-2010 ($\rho = 0.15$; $P < .001$), more servings of vegetables ($\rho = 0.11$; $P = .011$), fewer servings of desserts ($\rho = -0.15$; $P < .001$), and fewer servings of sugary drinks ($\rho = -0.09$; $P < .039$). Higher scores on the environmental subscale were correlated with: lower scores on the HEI-2010 ($\rho = -0.12$; $P = .004$), higher Kcals/day ($\rho = 0.12$; $P = .007$), higher grams of fat/day ($\rho = 0.14$; $P = .001$), more servings of desserts ($\rho = 0.13$; $P = .003$), and more servings of sugary drinks ($\rho = 0.22$; $P < .001$).

3.2. Associations between toddler feeding questionnaire and parent characteristics

In adjusted multivariable regression models (Table 1), higher levels of stress were associated with higher indulgent scores and lower authoritative scores. Higher health literacy was associated with lower indulgent scores and lower environmental scores, but not the authoritative subscale.

4. Discussion

Results from this study are consistent with our hypotheses and indicate the authoritative and indulgent subscales of the Toddler Feeding Questionnaire are internally consistent and valid for assessing parental feeding practices among Latino parents of preschool age children. All

subscale of the TFQ were associated in the hypothesized directions with healthy and unhealthy dietary patterns, as measured by 24-hour diet recall. Specifically, children of parents who had higher scores on the environmental or indulgent scores also had higher daily energy intake and unhealthy dietary patterns (eg, lower HEI-2010 index score, more desserts and sugary drinks, fewer vegetables). This aligns with the original scale validity testing among Latino mothers and toddlers as well as other literature documenting associations between indulgent feeding style and lower intake of fruits and vegetables among low-income, minority preschoolers [10]. Conversely, children of parents who had higher scores on the authoritative subscale of the TFQ had healthier overall dietary patterns, which expands the literature by documenting a link between authoritative feeding styles and healthier eating patterns among Latino parents and preschool-age children, a group at high-risk of obesity. These findings suggest that encouraging authoritative feeding practices and discouraging indulgent feeding practices during this important developmental stage may be effective targets for preventing obesity among this high-risk population.

When comparing the factor structure and internal consistency of the subscales of the TFQ to the initial validation study conducted by Chaidez and Kaiser, we found similar results [7]. In our sample, the internal consistency for the environmental subscale was slightly lower than previously published data ($\alpha = 0.48$ vs. 0.63). Given the low alpha, overlap between indulgent and environmental subscales factor loadings noted by the scale developers, and the lack of theoretical justification for a subscale that does not map onto Hughes' parental feeding style framework, we contend that the utility of the environmental subscale is limited. However, our confirmation of the psychometric properties of the TFQ authoritative and indulgent subscales in an extended age range with such a large sample provides confidence that this questionnaire can be used in other populations who are Spanish-speaking and in large-scale program evaluation studies. The large sample size and inclusion criteria for this study limited the population surveyed to low-income families from the Latino community, suggesting that the validity of this scale would translate to other Spanish-speaking populations in the United States. Future studies could specifically evaluate how factors like acculturation, birth country, and native Spanish language affect the validity of this scale.

With regard to the second study objective, multivariate regression models indicated the parent characteristics of stress and health literacy, but not BMI, were associated with the subscales of the TFQ in the hypothesized directions. Higher parent-perceived stress was associated with a higher score on the indulgent subscale and a lower score on the authoritative subscale. Higher parent health literacy was associated with lower scores on the indulgent subscale. There was no relationship between parent BMI and parent feeding practices. To our knowledge this is the first evaluation of parental determinants of the TFQ, but these findings are similar to previous work looking at parental determinants of infant feeding styles [15,16]. The value of these findings is two-fold. First, these data add a measure of construct validity to the TFQ, as the associations are in the hypothesized direction. Second, these data provide some suggestion of parental characteristics that could be amenable to intervention and ultimately improve their child's diet.

There may be several reasons why the TFQ sub-scales were not related to BMI. The inclusion criteria limited the study sample to children at-risk for obesity, excluding children

with obesity. This may have limited variation in the child BMI to sufficiently capture a relationship, which may have been present in children with obesity. Alternatively, it may be that parent feeding practices are up-stream in a multi-factorial causal pathway of obesity, and despite our large sample size, we may not have been able to detect an association because the association was diluted by other factors. Future research should focus specifically on whether parent feeding practices as measured by the TFQ are associated with childhood obesity in longitudinal studies, to better characterize this potential causal pathway.

There are several limitations to this study. The data in this study were measured cross-sectionally, limiting our ability to draw causal inference about parent characteristics' influence on parental feeding practices. The measures of toddler feeding practices, parent stress, and child diet quality were all self-report, which makes them susceptible to recall and social desirability bias. Also, the developers of the TFQ acknowledge it does not adequately assess parenting styles because items ask about behaviors not emotional climate and do not assess authoritarian or neglectful feeding styles; thus it may not have captured all the variation in Latino parents' feeding styles that could be influenced by parental characteristics or be implicated in children's growth trajectories [7]. Finally, because the inclusion criteria of the initial study excluded obese children, it may have limited our ability to detect meaningful associations by limiting the variability of some of the measures.

In conclusion, the Toddler Feeding Questionnaire is an internally consistent and valid measure to assess authoritative and indulgent parent feeding practices among Latino parents of preschool-age children. Also stress and health literacy, two potentially modifiable parent characteristics, are associated with unhealthy parent feeding practices among this population at high risk for childhood obesity. By appropriately measuring modifiable determinants of childhood obesity, such as parental feeding practices with the TFQ, we can develop more effective strategies to support healthy childhood growth among the most vulnerable populations.

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Abbreviations:

TFQ	Toddler Feeding Questionnaire
BMI	Body Mass Index

GROW	Growing Right Onto Wellness
HEI-2010	2010 Healthy Eating Index
USDA	United States Department of Agriculture

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Fig. 1 -

Consort Diagram. The larger randomized controlled trial from which our analytic sample was drawn included 610 minority parent–child pairs. The study sample included 555 Latino parent–child pairs. Participants were excluded from the analysis if they were English speaking ($N = 55$), if they did not respond to more than 1 item on any of the Toddler Feeding Questionnaire subscales ($N = 3$; 0.5% missing) or if they did not have complete data on the parent characteristics of interest (BMI, stress, or health literacy, $N = 19$; 3%).

Fig. 2 -

Correlations between Subscales of the Toddler Feeding Questionnaire and Measures of Healthy and Unhealthy Child Dietary Patterns. The pattern of Spearman Correlations indicates Environmental Influences and Indulgent Practices are associated with mostly unhealthy child diet indicators, whereas Authoritative Practices are mostly associated with healthy diet indicators. R⁺ items were reverse coded so that unhealthy behaviors (i.e., higher fat, higher kcals, more dessert, and more sugary drinks) had negative correlations with the Toddler Feeding Questionnaire subscales; * $P < .05$; ** $P < .001$.

Table 1 -

Associations between parent characteristics and subscales of the toddler feeding questionnaire in multivariate linear regressions

	<i>Toddler Feeding Questionnaire Subscales</i>		
	Indulgent	Environmental	Authoritative
	β	β	β
<i>Parent characteristics</i>			
Parent BMI	−0.05	0.05	−0.05
Parent stress	0.23^{**}	0.08	−0.27^{**}
Parent health literacy	−0.12[*]	−0.11[*]	0.03

Note: Models control for parent characteristics of age, sex, and acculturation; child characteristics of age, sex, and body mass index; as well as the household characteristic of Supplemental Nutrition Assistance Program (SNAP) participation.

^{*}
P < .05;

^{**}
P < .001.