Research report

Validation of an instrument to assess toddler feeding practices of Latino mothers☆

Virginia Chaidez *, Lucia L. Kaiser

Dept of Nutrition, UC Davis, One Shields Ave, Davis, CA 95616, United States

ABSTRACT

This paper describes qualitative and quantitative aspects of testing a 34-item Toddler-Feeding Questionnaire (TFQ), designed for use in Latino families, and the associations between feeding practices and toddler dietary outcomes. Qualitative methods included review by an expert panel for content validity and cognitive testing of the tool to assess face validity. Quantitative analyses included use of exploratory factor analysis for construct validity; Pearson's correlations for test–retest reliability; Cronbach's alpha (α) for internal reliability; and multivariate regression for investigating relationships between feeding practices and toddler diet and anthropometry. Interviews were conducted using a convenience sample of 94 Latino mother and toddler dyads obtained largely through the Supplemental Nutrition Program for Women, Infants and Children (WIC). Data collection included household characteristics, self-reported early-infant feeding practices, the toddler's dietary intake, and anthropometric measurements. Factor analysis suggests the TFQ contains three subscales: indulgent; authoritative; and environmental influences. The TFQ demonstrated acceptable reliability for most measures. As hypothesized, indulgent practices in Latino toddlers were associated with increased energy consumption and higher intakes of total fat, saturated fat, and sweetened beverages. This tool may be useful in future research exploring the relationship of toddler feeding practices to nutritional outcomes in Latino families.

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Introduction

Childhood obesity is a growing concern in the United States, particularly among minority groups. The National Survey of Children's Health (NSCH) estimates that 49.2% of African-American children and 44.0% of Hispanic children aged 5–18 years are overweight or obese compared to 32.3% of Caucasian children (Lutfiyya, Garcia, Dankwa, Young, & Lipsky, 2008). The etiology of childhood obesity is related to genetic, cultural, psychosocial, socioeconomic and environmental factors. More research and

effort for obesity prevention needs to take place beginning very early in life.

Self-regulation is an important phenomenon that may help maintain a healthy weight and prevent excessive energy intake. Young children are thought to be able to self-regulate or eat in response to internal cues of hunger and satiety (Birch & Fisher, 1998; Dewey, 2001). One study showed that younger children around 3 years old are able to stop eating when they are full, while older children around 5 years old eat more food when larger portions are presented to them (Rolls, Engell, & Birch, 2000). However, it is unclear at what point this ability to self-regulate may be overridden by environmental or social factors. More recent data suggest that decreased ability to self-regulate may already be occurring in toddlers (Fox, Devaney, Reidy, Razafindrakoto, & Ziegler, 2006). More research is required to understand what factors may impede self-regulation at such an early phase in life.

Research on parent feeding styles and practices has begun to provide some clues about the role parents play in the etiology of childhood obesity (Olvera, George, & Kaiser, in press). Parent feeding style refers to the structure and responsiveness of the parent to the child's cues of hunger or satiety as part of a general parenting style. The difference between general *parenting style* and parent *feeding style* is that the latter refers only to the domain of feeding children and not to other aspects of the parent-child relationship. *Feeding styles* have sometimes been inferred from

Table 1
Summary of the four parenting styles.

	High demandingness	Low demandingness
High responsiveness	Authoritative	Indulgent or permissive
	Provides structure and rule-setting, but is mindful of child's thoughts and feelings	Receptive to child's wants and needs but offers little or no structure, expectations & discipline
Low responsiveness	Authoritarian	Neglectful or uninvolved
	Controlling, restrictive & disciplinarian, without regard for child's input or needs	Emotionally uninvolved and does not set rules or expectations

feeding practices or behaviors portrayed by the parent (Birch et al., 2001), while still others have attempted to measure feeding styles more systematically (Hughes, Power, Fisher, Mueller, & Nicklas, 2005).

Much of Baumrind's work paved the way for which parenting styles are operationalized today (Baumrind, 1967, 1971a). Baumrind's authoritative–authoritative–permissive typology was used considerably in the field of child development research until Maccoby and Martin (1983) tweaked it a bit more to produce a framework used by nutrition researchers today. Maccoby and Martin operationalized parenting style based on two dimensions: *demandingness* and *responsiveness*. Demandingness refers to the number and types of control and expectations parents place on their children; while responsiveness refers to the extent to which the parent demonstrates consideration for the child's involvement and emotional needs. Based on these two dimensions, a four-fold typology emerged expanding on Baumrind's authoritative-authoritarian-permissive typology. This classification of parenting style is summarized in Table 1.

While parenting, and possibly feeding, styles are thought to remain consistent within a family, child-feeding practices can differ across children even within the same family, depending on the characteristics of the child (Ventura & Birch, 2008). Since parents may have different goals for their children's growth and development, their feeding practices might vary according to their perceptions of how well their children are doing. Child feeding practices include the level of control the parent exerts over the type and amount of food the child eats, role modeling of eating behaviors, feeding cues or prompts given to the child, and the actual mealtime environment and routines. Until recently, much of the research in this area has been conducted in white middle-class populations (Birch & Fisher, 2000; Birch, Fisher, & Davison, 2003; Carper, Fisher, & Birch, 2000; Fisher & Birch, 1999, 2002). Moreover, limited research on child-feeding practices in Hispanics and African-Americans suggest that the current child-feeding paradigm does not fit these ethnic groups (Hughes et al., 2006).

Hughes and colleagues have developed and validated the Caregiver's Feeding Styles Questionnaire (CFSQ) to examine the role of parent-feeding style to child nutrition in African-Americans and Hispanic families (Hughes et al., 2005). Their findings indicate that compared to African-American parents, Hispanic parents were more likely to be indulgent. They also found that children with indulgent parents had the highest body mass index *z*-scores. Furthermore, Hughes and colleagues results are consistent with a recent prospective study that reported Mexican-American children (ages 4–8 years) of parents with an *overall indulgent parenting style* are more likely to become overweight over a three year follow-up period (Olvera & Power, 2010). Other studies conducted in Latino populations have found that an authoritative feeding style is associated with a healthier dietary pattern (more vegetables and dairy), compared to the permissive, uninvolved, and authoritarian styles (Hoerr et al., 2009; Patrick, Nicklas, Hughes, & Morales, 2005)

Although the CFSQ was developed and validated for use in minority groups, the original version has some limitations. First, many of the questions attempting to address parental feeding practices are age-dependent, applying more to preschoolers than to toddlers. Most of the research on early child feeding practices in Latinos has been carried out in preschool and older children (Olvera et al., in press) while relatively little research on dietary intake and feeding practices has been conducted in toddlers. For example, the Feeding Infants and Toddlers Study (FITS) was a cross-sectional dietary intake survey of eating patterns in a random national sample of over 3000 infants and toddlers, describing many aspects of infant and toddler feeding such as nutrient intake and food patterns, but not feeding practices (Briefel, Ziegler, Novak, & Ponza, 2006). Because eating habits, attitudes, and food preferences begin much earlier in life, identifying emerging feeding practices in the food transition phase of toddlerhood is crucial.

Second, the CFSQ is not able to capture feeding practices outside of a meal, an omission that may be important where frequent, child-led snacking occurs. The CFSQ was designed to measure feeding practices across various ethnic groups. One may speculate that a "one size fits all" approach may have been the reason for choosing the dinner meal, where presumably most families eat together and demonstrate their feeding practices. Previous research in California suggests that child-led snacking is very common in Latino households (Kaiser, Melgar-Quinonez, Lamp, Johns, & Harwood, 2001). Therefore, we set out to develop a culturally relevant and age appropriate tool that would address these limitations.

The overall goal of this research is to examine validity and reliability of an instrument for characterizing toddler feeding practices in Latino families. Based on the literature and previous formative research, we hypothesized that, after controlling for confounders, higher maternal scores for indulgent feeding practices would be associated with:

1. Higher total energy intake;
2. Higher % of calories from carbohydrate and added sugar;
3. Higher consumption of energy-dense snack type foods (cookies, cakes, *pan dulce* (sweet bread), candy, chips, etc.), fruit juice and sweetened beverages; and
4. Greater *z*-scores for body mass index.

Methods

Study design and protocol

The study involved an observational cohort design, with baseline and 6-month follow-up data collection. In this paper, only the baseline data will be presented. The Institutional Review Board at University of California, Davis (UC Davis) approved the Human Subjects Protocol.

Study sample and recruitment

A convenience sample of Latino women was obtained largely through the Supplemental Nutrition Program for Women, Infants and Children (WIC), but recruitment efforts included the use of

various channels including community collaborative meetings, community health clinics and other service or resource agencies, childcare facilities, and migrant family housing centers. To recruit a relatively diverse group of Latino women, recruitment took place throughout Sacramento, Yolo, and Solano counties in northern California. This allowed for inclusion in the sample of families living in urban, suburban and semi-rural community settings. Study criteria were: (1) mother self-identified as Latino, and (2) family had a toddler child between the age of 12 and 24 months. All participants interviewed were the mothers of the toddlers. Informed written consent was obtained at the first scheduled interview.

The recruitment ran from April 2007 to September 2007 and relied heavily on staff in various settings to spread the word about the study. Agency staff invited the women to learn more about a nutrition study opportunity by filling out their contact information on the recruitment cards. Over 1900 invitation recruitment cards were dispersed throughout various community channels (WIC, community collaborative meetings, community health clinics, childcare facilities, and migrant family housing centers) by agency staff in an attempt to cast a wide net, but the total number of cards handed out is unknown. Of the 259 who completed and returned recruitment cards, 153 of these women were unable to participate because they did not meet eligibility criteria, largely the child's age requirement. Of the remaining 106 women, 12 were further excluded for the following reasons: 8 women did not show up for appointments and were unreachable by phone and 4 more children were identified outside the target age range. Thus, the final sample size was 94 mother and child pairs.

Construction of the survey instrument

Findings from earlier formative research were used to develop the Toddler-Feeding Questionnaire (TFQ) (Chaidez, Townsend, & Kaiser, in press). The final draft of the questionnaire contained 34 items and was set up similar to Hughes and colleagues' Caregiver's Feeding Style Questionnaire (Hughes et al., 2006, 2005). The TFQ included items that were expected to reflect indulgent and authoritative feeding practices; home environmental influences; and parental goals. Indulgent feeding reflects a caregiver style that caters to the child and offers little or no structure, guidance or limit-setting. In contrast, authoritative feeding reflects a caregiver style that offers structure, guidance and positive modeling of eating behaviors. Environmental influences included factors such as family eating cues and household food accessibility that might affect toddler's eating behaviors. Parental goals consisted of three items that measured how important and confident a mother felt in feeding her child foods that (1) prevent anemia; (2) maintain a healthy weight; and (3) make her child happy. Including measures of parental goals have been suggested to achieve a better understanding of the context relating child parenting practices to outcomes (Darling & Steinberg, 1993). Other data collected in the survey included household characteristics, early-infant feeding practices, the toddler's dietary intake and anthropometrics. All interviews and data collection were conducted in person in the participant's home, except for day two of the dietary recall which was conducted over the phone; and for a subset of participants, follow-up administration of the TFQ was also conducted over the phone.

Assessment of content and face validity

Content validity is related to sampling and asks the extent to which items in an instrument are reasonably representative of the larger domain or subject being measured (Contento, Randell, & Basch, 2002). Three nutrition professionals and one professional in

human development were asked to review the questionnaire and provide feedback. Face validity addresses how well the intended audience interprets the items and usually requires ongoing revision of the instrument through cognitive testing with participants. Cognitive testing included interviews to test the questions and response options in the target audience, with special attention to choice of wording, order of questions, and individual interpretations of questions or particular words. The first round of cognitive testing was conducted strictly in English-speakers ($n = 10$). The TFQ was then translated into Spanish by a bilingual graduate student (VC) and reviewed and revised by a native Spanish-speaking student. After translation to Spanish, the process was repeated in Spanish-speakers ($n = 6$).

Validation and reliability testing of the instrument

For construct validity, exploratory factor analysis was used to test the three hypothesized constructs: (1) indulgent practices; (2) authoritative practices; and (3) environmental influences. Some subjectivity is involved in interpreting results (Spector, 1992). Because factors were expected to correlate, factor analysis using oblique rotation (Proc Factor, rotation = promax) was used. Two, three (for three proposed constructs), four, and five predetermined factors were used for the factor analyses. Selection of the number of factors was in part based on having an eigenvalues greater than 1.0. Factors with less than three items loading and those with less meaningful constructs were also dropped. Items with factor loadings below 0.40 were deleted. The remaining items in each factor were used to define the subscales within the TFQ to be used for further analyses.

Test–retest reliability measures the stability of an instrument over time in the absence of an intervention. Thirty subjects were interviewed at two time points, one to two weeks apart to assess test–retest reliability. These 30 women were a subset of the 94 who were reachable by phone within the two-week window of the testing. Phone interviews were conducted for the second questionnaire administration.

Internal reliability refers to how well questions or items within a subscale relate to each other. Internal reliability was assessed using Cronbach's coefficient alpha. For each subscale only items that were supported by factor analysis were used to test for internal reliability. An alpha (α) of 0.70 or more was considered to indicate good internal reliability (Santos, 1999).

Anthropometric measurements and variables

Height and weight of mothers and length (or height if the child had reached 2 years of age), weight, and skinfolds (triceps and subscapular) of toddlers were measured (NHANES, 2002). Height/length was assessed using a portable and convertible stadiometer (Perspective Enterprises, Portage, Michigan) and weight was assessed using a calibrated scale (Tanita Digital Scale Model 1582, Arlington Heights, Illinois) measuring to the nearest 0.2 of a kilogram. Triceps and subscapular skinfolds were measured to the nearest 0.1 mm on cooperative toddlers using skinfold calipers (Holtain Ltd, Crosswell, Crymych, Dyfed SA41 3UF, U.K.). All measures were recorded by the same researcher (VC) who has received training in anthropometry. Since the 2006 World Health Organization (WHO) growth standards have recently been adopted for use in the United States for children 0–24 months, both the WHO standards and the Centers for Disease Control (CDC) growth reference (available at http://www.cdc.gov/growthcharts/) were used in this study (Grummer-Strawn, Reinold, & Krebs, 2010). Anthropometric outcome variables included z-scores for toddler weight-for-height (WHZ), weight-for-age (WAZ), height-for-age (HAZ), triceps skinfolds (TSFZ) and subscapular skinfolds (SSFZ).

Overweight was defined as a weight-for-length or height z-score (WHZ) above +2, while obesity was defined as above +3 (de Onis, Garza, Onyango, & Borghi, 2007).

Dietary assessment and variables

Dietary intake was collected twice (one weekday and one weekend day) for toddlers in the form of a 24-h recall, administered to the mothers. Methods for using two days of 24-h dietary recalls were recently described and used in the Feeding Infants and Toddlers Study and the Continuing Survey of Food Intakes by Individuals (CSFII) (Ziegler, Briefel, Clusen, & Devaney, 2006). Briefly, a registered dietitian (VC), fluent in Spanish, conducted the dietary recalls using food models and toddler size eating utensils to estimate portion sizes and probing to include all edible sources no matter the size or nutritional value. Dietary intake data were analyzed using Nutrition Data System for Research (NDS-R) software version 2007, developed by the Nutrition Coordinating Center (NCC), University of Minnesota, Minneapolis, MN. Early infant feeding practices and other variables such as maternal history of gestational diabetes and child birth weight were also reported since these are also known to influence child weight status later in life. Lastly, three short questions related to past and present food insufficiency were also used to control for this variable. These questions have been validated in other Latino populations (Kaiser et al., 2003; Kuyper et al., 2006).

Dietary outcome variables included total energy (kcal), total fat (grams), total protein (grams), total carbohydrate (grams), total dietary fiber (grams), added sugars (grams) and percentage of kilocalories from each of the macronutrients: protein, fat, carbohydrate and added sugar. Additional nutrients included for analysis were total saturated fat (grams) and percentage of calories (% kcal) from saturated fat.

The three food group variables of interest were fruit juice, sweetened beverages, and energy-dense snacks. These food groups are associated with poorer diet quality and weight gain (Melgar-Quinonez & Kaiser, 2004; Warner, Harley, Bradman, Vargas, & Eskenazi, 2006). Fruit juice included infant and adult fruit juices that were 100% juices, including those that were fortified with other nutrients. Sweetened beverages included all regular and diet carbonated drinks, lemonade, fruitades, fruit-flavored, and other sweetened beverages with less than 100% juice, sweetened teas, *aguas frescas* and sweetened flavored milk and milk powders. Energy-dense snacks included a broad range of foods that were generally sweet or salty. Sweets included candy, cakes, pastries, cookies, *pan dulce* or sweet bread, pudding, frozen yogurt, ice cream, popsicles, snack bars made with refined grains, syrups, preserves and sugar added to foods. Salty snacks included crackers made with refined grains, tortilla chips, corn chips, potato chips, cheese puffs, popcorn and other similar types of snacks. Nutrient Data System for Research (NDSR) software assigns foods a serving size based on recommendations made by the *Dietary Guidelines for Americans 2005* where applicable (DHHS/USDA, 2005). For foods not included among current recommendations, such as cookies and fruit drinks, NDSR assigns food portions based on Food and Drug Administration (FDA) serving sizes.

Statistical procedures

Descriptive statistics were analyzed for all variables. Normality was assessed for continuous variables. Median and range are reported for variables that are not normally distributed. To examine bivariate relationships the following procedures were used: Pearson's correlation; Spearman's Rank correlation for ordinal or non-transformable variables; t-tests; and Mann–Whitney U/Wilcoxon Rank-Sum test for variables not normally distributed. Forward stepwise multiple regression was used, with maternal education, toddler age (months) and toddler gender entered as covariates in all models. Additional covariates included maternal birthplace, maternal height, and income where a potentially confounding relationship for that regression model existed. Bivariate analyses were used for all demographic and other characteristic variables (listed below) to identify confounding variables.

Demographic, socioeconomic, acculturation and other variables included maternal age, maternal education, maternal body mass index (BMI), maternal history of gestational diabetes, participation in the WIC program, maternal years of residency in the U.S., proportion of maternal life in the U.S. (defined as maternal years of residency in the U.S. divided by maternal age × 100), maternal language, child gender, child age, child birth weight, premature birth and income. Child birth weight was also used as a categorical variable, where low birth weight < 2500 g and high birth weight ≥ 4000 g. For income, a monthly income variable was created based on participants' self-report of several sources of income in the last 30 days, including where applicable participant employment wages, estimated spousal income, value of food assistance (such as school lunch or WIC participation) and other relevant sources. All statistical analyses were conducted using SAS Version 9.1 (2002–2003, SAS Institute Inc., Cary, NC) with statistical significance designated at $P < 0.05$.

Results

Participant characteristics

Mothers (n = 94) had a mean age of 28 years (SD ± 6.56). Most were Spanish-speaking (81%); had the equivalent or less than a high school education (79%); were WIC participants (86%); and were currently unemployed or stay-at-home mothers (65%) (Table 2). Toddlers had a mean age of 21.5 months (SD ± 2.8).

About 75% of the mothers (Table 2) and many toddlers were overweight or obese. According to the WHO growth standards, approximately 25% of the toddlers were overweight and 7% were considered obese. Using the Centers for Disease Control growth reference, the prevalence of overweight and obesity in our toddlers is 16% and 6.4%, respectively. However, only 12.5% of mothers had been told their children were either at risk of overweight or overweight, despite the fact that 22–32% were overweight or obese based on NCHS or WHO growth references. The following represent mean z-scores for anthropometry in our sample of toddlers: WHZ 1.28 ± 1.09; HAZ −0.17 ± 1.17; and WAZ 0.90 ± 1.06. Mean z-scores for skinfold measurements are based on a smaller sample; triceps (n = 66), TSFZ 0.49 ± 0.98; subscapular (n = 56), SSFZ 0.81 ± 1.11.

Cognitive testing

The final version of the TFQ was reached through a series of progressive interviews, where the wording of questions was modified based on participants' feedback (Table 3). Definitions provided by the participants for the response options *Rarely, Sometimes, Most of the time* and *Always* were largely similar across individuals. Generally, there was also a good spread of responses for most questions, with a few exceptions. We have provided a few representative examples below.

Question "When I prepare dinner at home I include at least one vegetable" gave responses ranging from three (Sometimes) to five (Always), which initially seemed benign but a closer look unveiled a potentially flawed question. Only one person answered "Sometimes;" two said "Most of the time;" and the remaining said "Always." When individuals were probed to find out the kinds

Table 2
Characteristics of the sample (*n* = 94).

Maternal characteristics	*n* (%)
Education Level (maximum completed)	
No education	1 (1)
Grade school (up to 6th grade)	19 (20)
Middle school (up to 9th grade)	30 (32)
High school	25 (27)
College (4-year college or equivalent in Mexico)	9 (9)
Post graduate	2 (2)
Technical/Certificate Program	8 (8)
Birthplace	
United States	22 (23)
Mexico	67 (71)
Other (Colombia, Guatemala, Honduras)	5 (5)
Language Most Commonly Spoken at Home	
English	5 (5)
Spanish	75 (81)
Both	13 (14)
Employment	
Homemaker	61 (65)
Agriculture	8 (9)
Healthcare setting	8 (9)
Daycare or school setting	5 (6)
Janitorial/Housekeeping	5 (6)
Food service	2 (2)
Warehouse	2 (2)
Research	1 (1)
Receiving WIC benefits (current)	81 (86)
Maternal years in U.S. (*n* = 73)	
<10 years	46 (63)
10–20 years	22 (30)
≥20 years	5 (7)
Proportion of maternal life in U.S. (*n* = 73)	
<25%	34 (46)
25–50%	26 (36)
≥50%	13 (18)
Food sufficiency (past)	
Sufficient	65 (69)
Insufficient/hunger	29 (31)
Food sufficiency (present)	
Sufficient	85 (90)
Insufficient	9 (10)
Maternal body mass index, kg/m² (BMI)	
18–24.9 (normal)	24 (25.5)
25–29.9 (overweight)	31 (33)
>30 (obese)	39 (41.5)

of vegetables served, potatoes were consistently cited. To capture consumption of a wider variety, less commonly consumed vegetables, a probe was added to exclude potatoes for the question.

The parental goal items yielded a higher than expected frequency of fives. The response options included: one described as 'Not important;" two as "Important, but I don't know enough to make changes;" three as "Important, but I don't do anything differently;" four as "Important, and I have made some changes;" and five described as "Important, and I try to learn more to make necessary changes." Because most individuals reported "five" as their response, the response was changed to "Important, and I am confident that I do this well."

Validity and reliability testing

Construct validity

The results of the factor analysis suggested that three factors (Factor 1-Indulgent, 11 items; Factor 2-Authoritative, 7 items; Factor 3-Environmental, 7 items) gave the best fit for the hypothesized constructs (Table 3). For factors one, two and three, 60%, 66%, 37.5% of the hypothesized construct items were in agreement with the factor analysis loadings for the three respective factors. One item, "I let my child have a drink of soda if he/she sees others in the house drinking it and wants it", loaded on two factors: Indulgent and Environmental.

Test–retest reliability

All but three items (TFQ 21, 31, and 33) reached significance ($P < 0.05$) and met the criterion for reliability, so these items may be eliminated or revised with further testing. The three subscales yielded acceptable reliability with correlation values of 0.91, 0.70, and 0.82 for indulgent, authoritative and environmental influences subscales respectively.

Internal reliability

The Cronbach's alpha for the indulgent, authoritative and environmental influences subscales were 0.73, 0.68, and 0.63 respectively ($n = 94$). The indulgent construct reached acceptable internal reliability while the authoritative subscale approached the 0.70 cutoff for acceptability. Removal of individual variables in the environmental subscale did not improve Cronbach's alpha.

Bivariate relationships of feeding practices and nutrition measures

There were associations between the indulgent subscale and several dietary outcomes. The TFQ indulgent subscale (TFQIS) was positively correlated with total energy ($r = 0.21$, $P = 0.04$), total fat ($r = 0.23$, $P = 0.03$), total saturated fat ($r = 0.26$, $P = 0.01$), and % kcal from saturated fat ($r = 0.19$, $P = 0.06$) consumed by toddlers. Spearman correlation for food groups indicated an inverse association between authoritative scores (TFQAS) and sweetened beverages ($r = -0.29$, $P = 0.005$) and a positive correlation between indulgent scores (TFQIS) and sweetened beverages ($r = 0.21$, $P = 0.04$). There were no significant correlations found for either the indulgent or authoritative TFQ subscales or the anthropometric outcomes (WHZ, WAZ, HAZ, TSFZ, SSFZ) (data not shown).

Multiple regression

Stepwise regression models were run to assess the relationship of the Toddler-Feeding Questionnaire Indulgent subscale (TFQIS) to the toddler dietary variables where a bivariate relationship existed. These include total energy (calories), total fat (grams), total saturated fat (grams), % of kcal from saturated fat and sweetened beverage consumption. After controlling for other confounding variables, indulgent feeding remained positively related to dietary intake variables (Table 4). In stepwise regressions, variables with *P*-values < 0.15 were dropped from the model and only those that remained significant are reported.

A stepwise regression was also used to evaluate the relationship of the Toddler-Feeding Questionnaire Authoritative subscale (TFQAS) to sweetened beverage consumption. TFQAS remained significantly and negatively associated with sweetened beverage consumption. Male gender was also associated with increased sweetened beverage intake, while effects of income and toddler age disappeared.

Discussion

Based on the World Health Organization (WHO) growth standards, 32% of our sample is overweight or obese, compared to 22% based on the CDC's National Center for Health Statistics child growth reference. Results of regression analyses provide evidence that indulgent practices in Latino toddlers are associated with increased energy consumption. To our knowledge this is the first report suggesting that indulgent feeding practices are associated with increased caloric intake in toddlers.

The reason for this gap in the literature may be that many researchers have focused on the relationships between restriction and controlling feeding practices and obesity in preschoolers (Scaglioni, Salvioni, & Galimberti, 2008). However, research in Hispanic middle-class families suggests that permissiveness, not

Table 3
Factor loadings on three factors (indulgent, authoritative, & environmental) of the Toddler-Feeding Questionnaire (n = 94).

Toddler Feeding Questionnaire Item[a,b]	Indulgent	Authoritative	Environmental
1. I give my child foods that he/she likes.			0.49
2. I encourage my child to eat foods even if he/she does not like them.			
3. I let my child have something to eat whenever he/she asks.			0.46
4. I keep a regular snack schedule for my child.		0.40	
5. I keep a regular meal schedule for my child.		0.52	
6. I let my child drink soda.			0.60
7. I give my child fruit juice when he/she is thirsty.	0.57		
8. At mealtimes I offer my child a sweetened beverage like Kool Aid, Gatorade, or punch.	0.46		
9. I can calm my child with something to eat or drink when my child is upset.	0.50		
10. I give my child a small treat like cookies, candy or chips.	0.64		
11. My child eats the same foods prepared for the family.			0.41
12. My child sits with the family at mealtimes.			
13. At family mealtimes we watch television.	0.44		
14. If my child does not want what is prepared, I give him/her something else.	0.53		
15. I let my child have a snack such as chips, cookies or crackers if he/she sees a household member eating them.			
16. In my house grown-ups drink soda.			0.42
17. I let my child have a drink of soda if he/she sees others in the house drinking it and wants it.	0.41		0.48
18. When I prepare dinner at home I include at least two vegetables.		0.59	
19. I give my child a fruit or vegetable for snacks.		0.49	
20. My child eats food from a restaurant or fast food.			
21. During cold weather I let my child go outside to play.			
22. My child watches 2 or more hours of television daily.	0.41		
23. I watch 2 or more hours of television daily.			
24. I feed my child based on advice from family members such as my mother or mother-in-law.			
25. I feed my child based on advice from my husband or partner.	0.53		
26. I feed my child based on advice from my child's doctor or other healthcare workers.		0.67	
27. I feel bad if I do not give my child something he/she wants to eat or drink.	0.56		
28. It is difficult to offer healthy, balanced meals.			
29. I let my child eat or drink whatever he asks for between meals as long as he/she eats well at mealtimes.	0.55		
30. My child does not go outside to play if it is cold because I do not want him/her to get sick.			
31. I limit outside playtime because I worry about my child's safety.			0.46
32. I feed my child foods that prevent anemia.		0.58	
33. I feed my child foods that maintain a healthy weight.		0.53	
34. I feed my child foods that make him/her happy.			

[a] Response options for items 1–31: 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Most of the time, & 5 = Always. Response option for items 32–34: 1 = Not too important, 2 = Important, but I don't know enough to make changes, 3 = Important, but I don't do anything differently, 4 = Important, and I have made some changes, 5 = Important, and I am confident I do this well.

[b] TFQ items that did not load ≥ 0.40 are not reported.

Table 4
Multivariate relationships to assess relationships between toddler-feeding practices and toddler nutrition outcomes.

Outcome variable	Independent variables	β	P-value	SE	R^2, F, P
Total energy	Indulgent score	8.33	0.107	5.11	N = 94
	Maternal educ	ND	NS	ND	R^2 = 0.05
	Toddler age	ND	NS	ND	F = 3.46
	Toddler gender	ND	NS	ND	P = 0.036
	Maternal height	12.23	0.064	6.52	
Total fat	Indulgent score	0.59	0.015	0.24	N = 94
	Maternal educ	ND	NS	ND	R^2 = 0.09
	Toddler age	ND	NS	ND	F = 5.78
	Toddler gender	ND	NS	ND	P = 0.004
	Maternal birthplace	−10.54	0.007	3.84	
Total saturated fat	Indulgent score	0.31	0.005	0.11	N = 94
	Maternal educ	ND	NS	ND	R^2 = 0.07
	Toddler age	−0.47	0.076	0.26	F = 4.67
	Toddler gender	ND	NS	ND	P = 0.012
% kcal from saturated fat	Indulgent score	0.16	0.009	0.06	N = 94
	Maternal educ	ND	NS	ND	R^2 = 0.11
	Toddler age	−0.47	0.002	0.15	F = 6.79
	Toddler gender	ND	NS	ND	P = 0.002
Sweetened beverages	Indulgent score	0.016	0.028	0.007	N = 79
	Maternal educ	ND	NS	ND	R^2 = 0.04
	Toddler age	ND	NS	ND	F = 4.98
	Toddler gender	ND	NS	ND	P = 0.028
	Maternal height	ND	NS	ND	
Sweetened beverages	Authoritative score	−0.03	0.011	0.011	N = 79
	Maternal educ	ND	NS	ND	R^2 = 0.05
	Toddler age	ND	NS	ND	F = 2.86
	Toddler gender	0.18	0.10	0.109	P = 0.06
	Maternal height	ND	NS	ND	
	Household income	ND	NS	ND	

ND = not determined, NS = not significant.

restriction, may be an underlying parenting style related to obesity in school-aged children (Brewis, 2003; Hughes, Shewchuk, Baskin, Nicklas, & Qu, 2008; Olvera & Power, 2009). We did not find a link between indulgence and overweight in this study but our sample is much younger than those in the studies cited above. Follow-up studies are needed to determine whether indulgent feeding practices applied among toddlers predicts obesity in subsequent years.

It is interesting to note that one of the items on the TFQ loaded on both the indulgent practices and environmental influences factors. One interpretation is that feeding practices of an indulgent parent may be more influenced by household environmental factors than those of authoritative parents. For example, feeding behaviors of indulgent parents appear to be more influenced by the husband or partner's advice and family cues to eating, whereas authoritative parents rely more on health provider advice and internal goals. Many of the items (11, 16, 17) loading on the environmental factor are straightforward in suggesting the role of the family food environment on toddler dietary intake. However, other TFQ items, like "I give my child foods that he/she likes," and "I let my child have something to eat whenever he/she asks," were expected to load on the indulgent factor but instead loaded on the environmental factor. Previous formative research indicates that a toddler's request and attainment of food/drink frequently occurs after a family member's eating cue (Chaidez et al., 2011). These observations suggest that interventions targeting the home food environment may be especially critical for parents with indulgent feeding practices.

Results of regression analyses suggest that indulgent practices in Latino toddlers may contribute to increased energy consumption, namely through higher intakes of fat and saturated fat. Although we had expected indulgence to be associated with high energy intakes, we also expected this effect to be due to higher carbohydrate and added sugar intakes, as the FITS had previously reported higher intakes of carbohydrate in Hispanic compared to non-Hispanic toddlers (Briefel et al., 2006; Mennella, Ziegler, Briefel, & Novak, 2006). One possible explanation may be related to the demographic profile of this Latino group of women. Unlike the 2002 FITS study, the women in this study were largely Spanish-speaking and likely less-acculturated than the FITS sample. Higher consumption of fresh fruits and cultural foods like beans, rice, soups and tortillas was evident in Latino toddlers compared to non-Latino toddlers in the FITS (Mennella et al., 2006). It is possible that our less-acculturated sample retained cultural dietary habits reflecting a better quality nutrient profile through consumption of more traditional foods and less sugary foods. Another possible explanation for lower than expected reports of added sugar and related energy-dense foods is that these children, who often had free access to food, were consuming frequent, small, unsupervised quantities of various foods that simply go unnoticed or may be too cumbersome for a parent to consider reporting.

The only food group associated with feeding practices was sweetened beverages, where a more authoritative parent indicated lower toddler intake of sweetened beverages and indulgent practices were associated with increased intake. Authoritative feeding style has been associated with positive outcomes, namely increased exposure/intake of fruits, vegetables and dairy (Patrick et al., 2005). Sweetened beverages are usually defined as all beverages with added sugar, including those with less than 100% fruit juice and typically include beverages such as soda, fruit-flavored drinks and punches. However, even in the FITS where food-type comparisons were made between Latino and non-Latino infants and toddlers, this food group did not include (or at least did not specify) traditional Mexican beverages such as *aguas frescas* (fruit-flavored beverage) which were commonly cited in our sample (Mennella et al., 2006). Furthermore, sweetened flavored

milk and milk powders were included as a sweetened beverage in this study since adding sweetened flavored powders was common in this group. This may in part explain the positive relationship between indulgent practices and sweetened beverage intake in our sample of toddlers. Clearly the nutritional value of flavored milk is not the same as soda or fruit-flavored punches but was included to capture the practice of providing sweetened beverages at this crucial phase in life. It would be interesting to see how early practice of adding sweeteners and flavors affects beverage preferences later in life considering excessive consumption of sweetened beverages and even juice has been linked to obesity risk in young Mexican children (Melgar-Quinonez & Kaiser, 2004; Warner et al., 2006).

More research is needed to confirm the relationship between indulgent feeding and toddler dietary intake. Most research to date has focused on authoritarian feeding practices and childhood overweight. This study is among the first to offer insight on indulgent feeding practices and the potential adverse relationship with dietary intake in Latino toddlers. Generalization of results is considerably limited due to a small sample size, self-selection and focus on Latino women. Nonetheless, Latinos comprise a growing population subgroup in the US and attention to this group warrants further investigation. These preliminary findings suggest that Latino families tend to indulge their children while risking the unintended effects of overfeeding them. Longitudinal research in larger samples is needed to determine the effects of indulgent feeding, if any, on dietary intake and child growth. Our findings also suggest that many mothers may not be receiving timely and/or clear messages from health providers about their child's weight status. The implications of our work are that we may be missing a crucial opportunity for early childhood obesity prevention in a very high-risk population.

Limitations

There are several clarifications and limitations worth noting. First, while this study inquired about feeding practices that are presumably associated with an overall authoritative or indulgent style, feeding practices per se are not synonymous with feeding styles. Similar to parenting style, a *feeding style* would entail assessment of not only feeding practices but also the emotional relationship between parent and child and the parents' belief systems (Darling & Steinberg, 1993). Second, because the TFQ was developed specifically for caregivers of Latino toddlers, it may not be suitable for other ethnic groups and older children. Third, the TFQ does not measure other types of feeding practices, specifically those that stem from an authoritarian or neglectful feeding style. Mexican American parents in the US have been known to use authoritarian parenting strategies in older children (Varela et al., 2004). However, authoritarian and neglectful feeding practices may be less common among Mexican-American parents of toddlers, as our previous formative research suggested and therefore were not included in the TFQ (Chaidez et al., 2011). Test–retest reliability scores may have been compromised because the mode of administration (by phone or face-to-face interview) was not the same at baseline and follow-up. Finally, the sample size was relatively small.

Validity measures (face, content, and construct validity) of the TFQ provide support for use in English or Spanish-speaking Latino populations. Improving the TFQ depends on continued research using a larger sample size with more diverse Latino subgroups; innovative methods to establish other types of validity (including criterion validity); and statistical approaches (such as confirmatory factor analysis) to establish the most appropriate subscales to predict child outcomes. Using the TFQ, indulgent practices in Latino toddlers appear to be associated with increased energy

consumption, higher intakes of total fat, saturated fat and sweetened beverages at this early transition phase in life.

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