



Confirmatory factor analysis of the Infant Feeding Styles Questionnaire in Latino families



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ABSTRACT

Background: Parent feeding practices affect risk of obesity in children. Latino children are at higher risk of obesity than the general population, yet valid measure of feeding practices, one of which is the Infant Feeding Styles Questionnaire (IFSQ), have not been formally validated in Spanish.

Objective: To validate the IFSQ among Latino families, we conducted confirmatory factor analysis of pressuring, restrictive, and responsive feeding constructs from the IFSQ.

Design/Methods: The IFSQ was administered at the 12-month visit in the Greenlight study, a multi-center cluster randomized trial to prevent obesity. Parents were included if they were of Latino origin ($n = 303$) and completed an English or Spanish language modified IFSQ (without the indulgence construct). Scores from nine sub-constructs of the IFSQ were compared between English and Spanish language versions. We tested reliability with Cronbach's alpha coefficients and performed confirmatory factor analysis to examine factor loadings and goodness of fit characteristics, modifying constructs to achieve best fit.

Results: Of 303 parents completing the IFSQ, 84% were born outside the US, and 74% completed the IFSQ in Spanish. Reliability coefficients ranged from 0.28 to 0.61 for the laissez-faire sub-constructs and from 0.58 to 0.83 for the pressuring, restrictive, and responsive sub-constructs. Results for all coefficients were similar between participants responding to an English and Spanish version of the IFSQ. Goodness of fit indices ranged from CFI 0.82–1 and RMSEA 0.00–0.31, and the model performed best in pressuring-soothing (CFI 1.0, RMSEA 0.00) and restrictive-amount (CFI 0.98, RMSEA 0.1) sub-constructs.

Conclusions: In a sample of Latino families, pressuring, restrictive, and responsive constructs performed well. The modified IFSQ in both English and Spanish-speaking Latino families may be used to assess parenting behaviors related to early obesity risk in this at-risk population.

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Abbreviations: IFSQ, Infant Feeding Styles Questionnaire; CFI, Comparative Fit Index; RMSEA, Root Mean Square Error of Approximation; CDC, Centers for Disease Control and Prevention; CFQ, Child Feeding Questionnaire; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; WHO, World Health Organization; SASH, Short Acculturation Scale for Hispanics; BIC, Bayesian Information Criteria.

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1. Introduction

Compared with non-Hispanic infants, Hispanic infants have a higher prevalence of weight-for-recumbent length greater than the 95th percentile. Additionally, obesity risk factors in infancy, such as the quality of infant diet and behaviors related to feeding, differ by race/ethnicity (Perrin et al., 2014; Thompson & Bentley, 2013; Wen, Kong, Eiden, Sharma, & Xie, 2014). When these risk factors are adjusted for, racial/ethnic disparities in childhood obesity are

attenuated or disappear (Taveras, Gillman, Kleinman, Rich-Edwards, & Rifas-Shiman, 2013). With an increasing focus on preventing obesity, it is important to understand modifiable risk factors for the development of obesity in Latinos, the largest minority population in the United States. One such risk factor is rapid infant weight gain, defined as upward crossing of weight percentiles in the first two years of life, which increases obesity risk in childhood and adulthood, increases cardiovascular, respiratory, and metabolic risk, and may contribute to increases in body fat percentage compared to infants who do not exhibit rapid infant weight gain (Belfort, Rifas-Shiman, Rich-Edwards, Kleinman, & Gillman, 2007; Ben-Shlomo et al., 2008; Dennison, Edmunds, Stratton, & Pruzek, 2006; Eid, 1970; Leunissen, Kerkhof, Stijnen, & Hokken-Koelega, 2009; Ong & Loos, 2006; Skilton et al., 2013; Stettler, Kumanyika, Katz, Zemel, & Stallings, 2003; Sonnenschein-van der Voort et al. et al.).

Although mechanisms that contribute to rapid infant weight gain and subsequent obesity remain unclear, decisions about the primary mode of feeding (i.e. breastfeeding or bottle feeding) and parental perception of infant hunger likely influence early growth trajectories (Burton et al., 2011; Dewey, Heinig, Nommsen, Pearson, & Lonnerdal, 1992), and parental feeding practices are a critical component to infant and child growth, and might help explain the intergenerational transmission of obesity (Baughcum et al., 2001; Hughes, Power, Fisher, Mueller, & Nicklas, 2005; Wardle, Sanderson, Guthrie, Rapoport, & Plomin, 2002). Theoretical and experimental work to identify, describe, and validate parental feeding practices has led to the development of the Child Feeding Questionnaire (CFQ) (Birch et al., 2001; Johnson & Birch, 1994). The CFQ and other valid measures have demonstrated associations between feeding practices and child food intake and weight status, particularly with “restrictive” behaviors that prohibit and control access to certain foods (Faith, Scanlon, Birch, Francis, & Sherry, 2004). Older children appear to be acutely aware of previous food restrictions and when in a more permissive environment, may routinely request foods that are being restricted (Fisher & Birch, 1999).

The environment of feeding shaping parent–infant interaction likely differs significantly from later childhood by schedule, dietary content, perception of hunger and satiety cues, and the development of desires and demands as children grow. Consideration of the development of feeding practices may be particularly important in early life, as parents habituate feeding practices, which may or may not be dependent on infant hunger and satiety cues (Hodges, Hughes, Hopkinson, & Fisher, 2008; Wasser et al., 2011). Some aspects of parental feeding practices are likely established in the first months to year of life and may have influences on weight gain in the first year of life or later childhood outcomes (Blissett & Farrow, 2007; Duke, Bryson, Hammer, & Agras, 2004; Farrow & Blissett, 2006). For example, highly controlling feeding practices at one year of life are predictive of difficulty with internal cues related to eating behaviors later in life (Blissett & Farrow, 2007).

Early and reliable identification and modification of parental feeding practices, and parental feeding styles underlying these practices, could contribute to obesity prevention within a critical period during which behavior modification might be more amenable (Gillman & Ludwig, 2013; Paul et al., 2009). Studying these behaviors in diverse populations is challenging, as much of the initial experimental work and validation occurred among mostly non-Hispanic white, middle- and upper-income families. A few studies have examined low-income African American mothers (Powers, Chamberlin, van Schaick, Sherman, & Whitaker, 2006) and Latina mothers (Gross et al., 2010), with data suggesting Latinos may be more likely to pressure their infants to finish feeds and less likely to be responsive to feeding cues (Gross et al., 2010). As

cultural influences differ and play variable roles in parental feeding styles and practices, more routine study of these beliefs and behaviors in Latino populations requires a valid and reliable measure.

Development of the Infant Feeding Styles Questionnaire (IFSQ) (Thompson et al., 2009) was in part a result of the search for a valid and reliable measure of parent feeding beliefs and practices in infancy and early childhood. The IFSQ was initially developed through formative ethnographic research (Bentley, Gavin, Black, & Teti, 1999; Sacco, Bentley, Carby-Shields, Borja, & Goldman, 2007) and then assessed for construct validity in two samples of African-American mothers attending WIC clinics. The IFSQ assesses beliefs and practices within five parental feeding styles: “laissez-faire” (with sub-constructs of diet quality and attention); “pressuring” (with sub-constructs of pressuring to feed, pressuring with cereal, and pressuring as soothing); “restrictive” (with sub-constructs of diet quality and amount); “responsive” (with sub-constructs of satiety and attention); and “indulgence” (with sub-constructs permissive, coaxing, soothing, and pampering) (Table 1). Indulging and uninvolved feeding styles have been associated with unhealthy nutrient intake in low-income children (Hoerr et al., 2009), and restrictive and pressuring feeding practices were more likely seen in a group of low-income Hispanic infants at high risk for obesity (Gross, Mendelsohn, Fierman, Hauser, & Messito, 2014). In a sample of low-income African-American mothers, restrictive feeding style was associated with larger infant size but better infant nutrition, while pressuring style was associated with smaller infant size and more age-inappropriate feeding (Thompson, Adair, & Bentley, 2013).

The IFSQ has been used in multiple settings (Paul et al., 2014; Sanders, Perrin, Yin, Bronaugh, & Rothman, 2014; Stifter, Anzman-Frasca, Birch, & Voegtline, 2011; Taveras et al., 2011) and has the advantage of assessing parental beliefs and practices, yet whether these constructs are adequately represented or can be reliably measured in English- and in Spanish-speaking Latino families remains unknown. Given potential misinterpretation of questions related to feeding (Jain, Sherman, Chamberlin, & Whitaker, 2004) and the documented importance of culture-specific influences on feeding styles among African-Americans (Bentley et al., 1999; Bronner et al., 1999; Corbett, 2000), we aimed to validate model fit of the IFSQ in a large population of low-income, English- and Spanish-speaking Latino families so that we may begin to fill a critical gap in knowledge of this understudied and rapidly growing segment of the US population.

2. Methods

2.1. Sample

The IFSQ was administered to caregivers of children enrolled in the Greenlight study, a cluster-randomized trial of an obesity prevention intervention focused on the first two years of life (Sanders et al., 2014). The Greenlight study uses a literacy and numeracy-sensitive intervention based on social cognitive theory to target adult caregivers at their child’s preventive office visits in the first 2 years of life. Two university clinics were randomized to implement the obesity prevention intervention, which included a series of picture-based low-literacy toolkits to encourage recommended behaviors and a health-communication curriculum for the child’s health care provider. Two “active control” sites implemented The Injury Prevention Program (TIPP) curriculum designed by the American Academy of Pediatrics (Krassner, 1984).

The methods of the Greenlight study have been published previously (Sanders et al., 2014). Briefly, caregivers were eligible to enroll if their infant was between 6 and 16 weeks old at the 2 month baseline visit, had a weight-for-length greater than the 3rd

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