



Research report

Development and validation of the Infant Feeding Style Questionnaire

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ABSTRACT

This study describes and validates the Infant Feeding Style Questionnaire (IFSQ), a self-report instrument designed to measure feeding beliefs and behaviors among mothers of infants and young children. Categorical confirmatory factor analysis was used to estimate latent factors for five feeding styles, laissez-faire, restrictive, pressuring, responsive and indulgent, and to validate that items hypothesized *a priori* as measures of each style yielded well-fitting models. Models were tested and iteratively modified to determine the best fitting model for each of 13 feeding style sub-constructs, using a sample of 154 low-income African-American mothers of infants aged 3–20 months in North Carolina. With minor changes, models were confirmed in an independent sample of 150 African-American first-time mothers, yielding a final instrument with 39 questions on maternal beliefs, 24 questions on behaviors and an additional 20 behavioral items pertaining to solid feeding for infants over 6 months of age. Internal reliability measures for the sub-constructs ranged from 0.75 to 0.95. Several sub-constructs, responsive to satiety cues, pressuring with cereal, indulgent pampering and indulgent soothing, were inversely related to infant weight-for-length z-score, providing initial support for the validity of this instrument for assessing maternal feeding beliefs and behaviors that may influence infant weight outcomes.

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Introduction

Rates of overweight and obesity among children and adolescents in the United States have tripled over the past 20 years and recent data indicate that more than one-third of children aged 2–19 are overweight or at risk of overweight (Ogden et al., 2006; Ogden, Flegal, Carroll, & Johnson, 2002). This problem is particularly acute in disadvantaged populations. Among African-American children, the prevalence of overweight increased by nearly 10% from the late 1980s to the late 1990s, a period during which increases among White children were small and non-significant (Mei et al., 1998; Ogden et al., 2006; Strauss & Pollack, 2001). These alarming increases and the seemingly refractory nature of childhood obesity (Dietz, 1998; Whitaker, Wright, Pepe, Seidel, & Dietz, 1997) have highlighted the importance of identifying factors contributing to early excess weight gain, particularly in high-risk groups.

Parental feeding practices and styles, the attitudes and behaviors that characterize parental approaches to maintaining or modifying children's eating behavior (Birch & Fisher, 1995; Golan & Crow, 2004; Patrick, Nicklas, Hughes, & Morales, 2005), shape the early feeding environment and, consequently, may be an important environmental factor in the intergenerational transmission of obesity (Birch & Fisher, 2000; Faith, Scanlon, Birch, Francis, & Sherry, 2004; Parsons, Power, Logan, & Summerbell, 1999; Powers, Chamberlin, van Schaick, Sherman, & Whitaker, 2006). Following Costanzo and Woody's (1979) suggestion that parents may adopt feeding domain-specific parenting styles and that these may be associated with child obesity, researchers have defined several feeding styles based on the degree to which parents are demanding or responsive during feeding.

Instruments such as the Child Feeding Questionnaire (CFQ) developed by Birch and colleagues (Birch et al., 2001; Johnson & Birch, 1994) have been used to illustrate that more restrictive, controlling feeding styles are associated with potentially obesogenic eating patterns (Birch & Fisher, 2000; Cutting, Fisher, Grimm-Thomas, & Birch, 1999; Fisher & Birch, 1999a, 1999b). These feeding styles, through their effects on inappropriate eating, are associated with higher child weight (Birch & Fisher, 2000; Johnson & Birch, 1994) and adiposity (Spruijt-Metz, Lindquist, Birch, Fisher,

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& Goran, 2002). While most research has focused on restrictive feeding styles, a more limited body of literature suggests that other feeding styles, including emotional or “indulgent” feeding, using food as a reward, and controlling feeding in the form of excess prompting or pressuring to eat, may also increase the risk of child overweight (Faith et al., 2004; Hurlley, Black, Papas, & Caufield, 2008; Klesges et al., 1983; Patrick et al., 2005; Wardle, Sanderson, Guthrie, Rapoport, & Plomin, 2002).

Despite the higher incidence of pediatric obesity among minority groups (Ogden et al., 2006; Strauss & Pollack, 2001), the majority of studies exploring the association between feeding styles and overweight have been conducted among middle-class, White children and parents. Problematically, the relationship between controlling feeding styles and child overweight has not been as strongly replicated in more ethnically diverse samples (Baughcum et al., 2001; May et al., 2007; Robinson, Kiernan, Matheson, & Haydel, 2001; Spruijt-Metz et al., 2002). Robinson et al. (2001), for example, found in a sample of third graders from varied ethnic and socioeconomic backgrounds, that BMI and adiposity were inversely, albeit weakly, related to maternal control. Similarly, African-American preschoolers with authoritarian, restrictive parents had lower BMI z-scores than children with indulgent parents (Hughes, Power, Fisher, Mueller, & Nicklas, 2005). These seemingly contradictory results may be due at least in part to measurement issues. Ethnographic and epidemiological research suggests that predominant feeding styles may differ by ethnicity and socioeconomic status, with higher levels of uninvolved and indulgent feeding styles described in African-American parents (Bentley, Gavin, Black, & Teti, 1999; Hughes et al., 2005; Sacco, Bentley, Carby-Shields, Borja, & Goldman, 2007; Sherry et al., 2004). Feeding style questionnaires may need to be adapted to more fully capture these other feeding styles, particularly if these styles are more relevant for the development of overweight and adiposity in ethnically diverse populations. Such a need is highlighted in validation studies of the CFQ, where items measuring pressuring and restrictive styles did not perform as well among Hispanic (Anderson, Hughes, Fisher, & Nicklas, 2005; Birch et al., 2001) or African-American mothers (Anderson et al., 2005).

Studies of the association between feeding styles and overweight have focused primarily on preschool and school-aged children. However, both pediatric overweight and parental feeding styles may be established much earlier (Blissett & Farrow, 2007; Duke, Bryson, Hammer, & Agras, 2004). The prevalence of infant overweight, defined as a weight for length z-score >95th percentile, also appears to be increasing, particularly among minority infants. According to the most recently released figures from the Pediatric Nutrition Surveillance Study (Polhamus et al., 2009), 10.4% of African-American infants aged 0–11 months and 15.8% of those aged 12–23 months had weight for length z-scores greater than the 95th percentile. Feeding styles manifested in infancy may also be an important contributor to overweight risk both in infancy and later life. Maternal control of feeding as early as 6 months of age has been shown to influence rates of weight gain from 6 to 12 months among British infants (Farrow & Blissett, 2006). Using observational data collected during infant feeding episodes, Black et al. (2001) found that initially undernourished African-American children who were overweight at age 8 were more likely to have mothers who were assessed as being controlling during mealtimes when the children were infants. Further, the importance of the early feeding environment in shaping later overweight is strongly supported by recent studies showing that rapid weight gain in infancy is associated with later adiposity and overweight (Cameron, Pettifor, De Wet, & Norris, 2003; Monteiro, Victora, Barros, & Monteiro, 2003; Stettler, Kumanyika, Katz, Zemel, & Stallings, 2003; Stettler, Zemel, Kumanyika, & Stallings, 2002; Toschke, Grote, Koletzko, & von

Kries, 2004) and that breastfeeding, a factor associated with greater infant control of feeding (Taveras et al., 2004), may be protective (Dewey, 2003; Dietz, 2001; Gillman et al., 2001; Owen, Martin, Whincup, Smith, & Cook, 2005). This association has been observed in several settings and ethnic groups, including African-Americans (Stettler et al., 2003).

Although the CFQ has been widely used to study child-feeding practices, few instruments exist to explore caregiver-feeding styles for infants and toddlers. Baughcum et al. (2001) developed a questionnaire to retrospectively measure feeding behaviors and beliefs in the first year of life among a multi-ethnic sample of mothers of toddlers 11–24 months of age. However, this instrument focused predominantly on controlling and restrictive feeding styles and did not find strong evidence that these particular styles were related to prevalent overweight. A follow-up qualitative study suggested that low-income, African-American mothers might have interpreted the questions differently than intended and that salient beliefs about child feeding may not have been captured adequately by the instrument (Jain, Sherman, Chamberlin, & Whitaker, 2004). This and other qualitative studies indicate that ethnotheories (culture-specific beliefs and norms) may be an important influence on customary infant feeding styles in African-Americans (Bentley et al., 1999; Bronner et al., 1999; Corbett, 2000); yet, little is known about how infant feeding styles may influence overfeeding or the development of other inappropriate feeding behaviors in this high-risk population.

The present study describes the development and validation of the Infant Feeding Style Questionnaire (IFSQ), a comprehensive instrument measuring feeding beliefs and behaviors among low-income African-American mothers of infants and young children. Developed based on formative ethnographic research (Bentley et al., 1999; Sacco et al., 2007) and work by Birch et al. (2001) among older children, the IFSQ includes items that assess parental beliefs and behaviors in five feeding style domains: (1) *laissez-faire*, in which the parent does not limit infant diet quality or quantity and shows little interaction with the infant during feeding; (2) *pressuring/controlling*, in which the parent is concerned with increasing the amount of food the infant consumes and uses food to soothe the infant; (3) *restrictive/controlling*, in which the parent limits the infant to healthful foods and limits the quantity of food consumed; (4) *responsive*, in which the parent is attentive to child hunger and satiety cues and monitors the quality of the child's diet; and (5) *indulgent*, in which the parent does not set limits on the quantity or quality of food consumed. The aims of the present study were to: (1) test the *a priori* structure of the IFSQ, using confirmatory factor analysis, (2) validate the resulting structure in an independent sample of low-income African-American mothers, and (3) explore the relevance of the IFSQ for the risk of overweight in infancy and early childhood.

Methods

Participants

Sample 1-IFSQ pretest sample: The IFSQ was administered to a cross-sectional sample of 154 African-American mothers with children younger than 24 months. Women were recruited from Women, Infants and Children (WIC) clinics in central North Carolina from August through October 2003 and interviewed in a private area of the clinic or, later, in the participants' homes. Eligible women had a singleton infant aged 3–24 months, were aged 18–35 at the birth of the index child and had primary responsibility for infant feeding. Mothers were excluded if they had children with Down Syndrome, epilepsy, cleft lip or palate, cerebral palsy, failure to thrive, mental retardation, severe food allergies or any condition that might affect appetite, feeding or

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