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Research report

Development of the responsiveness to child feeding cues scale ☆

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ABSTRACT

Parent–child feeding interactions during the first 2 years of life are thought to shape child appetite and obesity risk, but remain poorly studied. This research was designed to develop and assess the Responsiveness to Child Feeding Cues Scale (RCFCS), an observational measure of caregiver responsiveness to child feeding cues relevant to obesity. General responsiveness during feeding as well as maternal responsiveness to child hunger and fullness were rated during mid-morning feeding occasions by three trained coders using digital-recordings. Initial inter-rater reliability and criterion validity were evaluated in a sample of 144 ethnically-diverse mothers of healthy 7- to 24-month-old children. Maternal self-report of demographics and measurements of maternal/child anthropometrics were obtained. Inter-rater agreement for most variables was excellent (ICC > 0.80). Mothers tended to be more responsive to child hunger than fullness cues ($p < 0.001$). Feeding responsiveness dimensions were associated with demographics, including maternal education, maternal body mass index, child age, and aspects of child feeding, including breastfeeding duration, and self-feeding. The RCFCS is a reliable observational measure of responsive feeding for children <2 years of age that is relevant to obesity.

Introduction

Obesity is a pressing threat to both US adults and children, where increasing numbers of the youngest segment of the population are being affected. Nationally representative data indicate that in 2009–2010, 9.7% of children aged 0–2 years were obese (⩾95th% weight-for-length), with Hispanics having the highest prevalence at 14.8% and non-Hispanic Whites having the lowest at 8.4% (Ogden, Carroll, Kit, & Flegal, 2012). Many obese infants will not "grow out of it". Heavy infants and those who show rapid weight gain are at increased risk for obesity in later periods of development (Brisbois, Farmer, & McCargar, 2012). For example, in a retrospective study of 184 older overweight children (⩾85th% Body Mass Index (BMI)), the median age of overweight onset was 15 months, with 25% overweight by 3 months (Harrington et al., 2010). Thus, the first 2 years of life are increasingly recognized as an important target for prevention efforts (Committee on Obesity Prevention Policies for Young Children, 2011; Paul et al., 2009).

The first few years of life involve major transitions in children's eating skills as they move from complete dependence on the caregiver during infancy to relatively autonomous eating by toddlerhood. Throughout this time, however, children are dependent on their caregivers for adequate and appropriate nutrition. Caregiver feeding patterns that are unresponsive to infant hunger and/or fullness cues are thought to contribute to over-nutrition by promoting eating in the absence of hunger and/or eating beyond fullness, respectively (Bruch, 1981; Costanzo & Woody, 1985; DiSantis, Hodges, Johnson, & Fisher, 2011; Hurley, Cross, & Hughes, 2011; Wright, 1981, 1987). Alternatively, child-centered feeding approaches that are responsive to a child's hunger and fullness cues are thought to support developing control of appetite, and specifically the ability to attend to internal biologically-driven cues or sensations when eating (DiSantis et al., 2011; Hurley et al., 2011). This view of parental responsiveness to child feeding draws

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on broader developmental definitions of parental responsiveness and sensitivity (Ainsworth & Bell, 1969; Ainsworth, Bell, & Stayton, 1974; Bornstein, 1989; Lamb & Easterbrooks, 1981), and has three components: (1) perception of the child's cue, (2) accurate interpretation of the cue, and (3) appropriate response to the cue. Responsiveness to child feeding cues is also part of a broader definition of responsive feeding which considers the structure, routine, and emotional context provided by the caregiver (Black & Aboud, 2011; Engle, Bentley, & Pelto, 2000).

To date, much of the work linking responsive parenting to child obesity has been conducted with preschool aged children (Hurley et al., 2011) and has relied on parental self-reports of child feeding styles and practices (Birch et al., 2001; Hughes, Power, Orlet Fisher, Mueller, & Nicklas, 2005; Musher-Eizenman & Holub, 2007; Wardle, Sanderson, Guthrie, Rapoport, & Plomin, 2002). In general, unresponsive feeding practices appear to have counterproductive effects on dimensions of eating behavior (Ventura & Birch, 2008) and have been modestly associated with obesity among preschool aged children in middle-to-high income countries (Hurley et al., 2011). Responsiveness to feeding cues is implicit in this body of research as well as in a more limited number of studies of children under 2 years of age. For example, higher level of maternal control during feeding, when assessed through self-report (Brown & Lee, 2011a), has been positively associated with infant weight gain. The same relationship has been found when assessing maternal control during feeding through observation (Farrow & Blissett, 2006), but only for those infants with high weight gain in the first 6 months of life. However, maternal pressure to eat and restriction at 1 year predicted lower weight at 2 years when controlling for weight at 1 year (Farrow & Blissett, 2008). In other work, baby-led weaning, in which infants are allowed to self-feed complementary foods from the outset of introduction (as opposed to being spoon fed by a caregiver) has been associated with lower maternal control during feeding (Brown & Lee, 2011b) and, alternatively, greater food acceptance and lower weight (Townsend & Pitchford, 2012). The findings of these studies are certainly consistent with those in older children and suggest a role of responsive feeding in infant over-nutrition. However, to date, few studies have explicitly assessed child feeding cues and the responsiveness of feeding initiation and termination to those cues, particularly in the first 2 years of life (Agras et al., 2012; DiSantis et al., 2011).

This paper reports the development and initial psychometric evaluation of an observational measure of caregiver responsiveness to child hunger and fullness cues during the first 2 years of life. An observational approach was taken because caregiver self-reports of feeding behavior have been found to differ from observed feeding behaviors (Lewis & Worobey, 2011; Sacco, Bentley, Carby-Shields, Borja, & Goldman, 2007), and the latter are thought to capture behaviors that may not be reported or considered salient in self-reports of feeding interactions, but that may nonetheless have an important influence on children's eating development. There are a number of existing observational measures of feeding interactions in early development, including the Nurse Child Assessment Feeding Scale (NCAFS; (Sumner & Spietz, 1994), the Feeding Scale (Chatoor et al., 1997), and the Parent Child Early Relational Assessment (PCERA; (Clark, 1999)), and the Feeding Interaction Scale (FIS; (Wolke, Sumner, McDermott, & Skuse, 1987)). These measures have primarily been used clinically to evaluate eating pathology in the case of growth faltering (The Feeding Scale, FIS) or to study broader interaction quality (NCAFS, PCERA, FIS) rather than to examine specific feeding behaviors and interactions around child hunger and fullness cues. In addition, the use of the NCAFS and PCERA is limited to the first year of life. Thus, the aim of this research was to develop the Responsiveness to Child Feeding Cues Scale (RCFCS), an observational measure of dyadic feeding interactions with relevance for developing controls of appetite and obesity for caregivers of children under 2 years of age. A provisional coding scheme of the RCFCS was piloted and refined. A study of ethnically-diverse mothers of healthy infants and toddlers was then conducted to evaluate inter-rater agreement and preliminary criterion validity associations of the RCFCS with child/maternal anthropometrics and family demographics.

Methods

Participants

Participants in the main development study were ethnically diverse mothers and their healthy 7- to 24-month-old children who were taking part in a larger study of dietary assessment methods (Fisher et al., 2008). Reflecting the design of the larger study, recruitment was blocked on maternal ethnicity/race and child age to provide roughly equal numbers of mothers who self-identified as non-Hispanic White, non-Hispanic Black, and Hispanic, and who reported primary feeding responsibility for an infant (7–11 months) or a toddler (12–24 months). Other child inclusion criteria included term birth (37–42 weeks), feeding problems, and chronic medical conditions or medication use. Additionally, to minimize social desirability, mothers who reported having a degree in nutrition and/or psychology were excluded from the feeding observation.

Convenience sampling was employed to recruit mothers from the greater metropolitan Houston area using a volunteer database, flyers, on-site recruiting at childcare classes, city-wide festivals and expositions attracting families, doctors' offices, retail stores, and churches. One child was surveyed per household. Mothers provided consent for their own and their child's participation. All procedures were approved by and executed according to the standards of the Baylor College of Medicine Institutional Review Board.

Procedures

Data were collected at the USDA/ARS Children's Nutrition Research Center, Houston, TX. Feeding sessions were recorded for 2 h during a mid-morning feed. Mothers were instructed to abstain from feeding the child immediately before the observation. Mothers were then instructed to feed as little or often as desired during the observation and asked to feed their child in a highchair if feeding solid foods or seated in a comfortable chair if breast- or bottle-feeding. Observations were made in a private, observation room on the Metabolic Research Unit floor of the Center. The room housed a high chair, rocker, crib, changing table, TV, and private bathroom. Feeding sessions were digitally recorded using two pan-tilt-zoom cameras (Kalatel Cyberdome 400 Series, General Electric Interlogix, Corvallis, OR, USA) that were ceiling-mounted to capture different angles; standard filming protocols were established based on these views.

Feeds were defined as involving the ingestion of solids or liquids, including water. Feeds eligible for coding were those in which mother and child were filmed without obstruction for 10 min prior to the feed until 1 min after the last food to mouth contact or until the child/food was moved from the feeding location – whichever came first. Feeds that occurred within 2 min of one another were considered part of the same feed.

Measures

Demographics

Demographic information obtained included household income, marital status, maternal education, maternal employment, and breastfeeding status.