



Research report

Sibling feeding behavior: Mothers as role models during mealtimes

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ABSTRACT

Siblings may act as caregivers and role models during mealtimes, and develop caregiving skills by observing and imitating the behavior of their mothers. The objective of this study was to examine the association between maternal feeding behaviors and encouragements to eat delivered from the sibling to the index child during mealtimes. Index children aged 4–8 years ($n = 69$) were videotaped while eating a routine evening meal at home with one sibling present. Encouragements to eat delivered from the sibling to the index child were coded from the videotapes. Mothers completed the Child Feeding Questionnaire and the Caregiver's Feeding Styles Questionnaire. Poisson regression was used to examine the association of maternal Pressure to Eat, Restriction, Monitoring, Verbal Direction, and Coercion with number of encouragements to eat delivered from the sibling to the index child. Models were adjusted for index child's age, sex, and race/ethnicity, and maternal education. Results showed that maternal Pressure to Eat (Rate Ratio (RR): 1.39, 95% confidence interval (CI): 1.19, 1.69), Restriction (RR: 1.31, 95% CI: 1.07, 1.60), Verbal Direction (RR: 2.04, 95% CI: 1.68, 2.47), and Coercion (RR: 1.58, 95% CI: 1.29, 1.92) were each positively associated with the number of encouragements to eat delivered from the sibling to the index child. Maternal Monitoring was not associated with the number of encouragements to eat delivered from the sibling to the index child (RR: 0.92, 97% CI: 0.78, 1.09). Findings suggest that maternal behavior during mealtimes may affect the index child indirectly by shaping the behavior of siblings. Since controlling feeding behaviors have been associated with greater child obesity risk, future studies may evaluate the compounded effect of experiencing controlling feeding behaviors from both mothers and siblings.

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1. Introduction

The family mealtime environment is considered an important venue for examining underlying causes of childhood obesity. Maternal feeding practices during mealtimes, such as restriction and pressure to eat, have been associated with child eating behaviors and obesity risk (Faith, Scanlon, Birch, Francis, & Sherry,

2004; Moens, Braet, & Soetens, 2007; Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2006). One pathway by which controlling feeding behaviors may be associated with obesity risk is the child's self-regulation of energy intake; excessive maternal control may alter the child's ability to respond to internal satiety cues, leading to overeating and weight gain (Birch & Fisher, 1998; Drucker, Hammer, Agras, & Bryson, 1999; Fisher & Birch, 1999, 2002; Johnson & Birch, 1994).

In addition to the direct implications of maternal behavior for child behavior and weight status, maternal behavior can have indirect effects by shaping the behavior of other family members who may influence the child's behavioral development (e.g., mother—child interactions may predict sibling aggression and sibling caregiving behavior towards the child) (Howe, Fiorentino, & Gariépy, 2003; Zukow-Goldring, 2008). Siblings are family members who

Abbreviations: United States, (US); Bob and Tom's Method of Assessing Nutrition, (BATMAN); Child Feeding Questionnaire, (CFQ); Caregiver's Feeding Styles Questionnaire, (CFSQ); Rate ratio, (RR); Confidence interval, (CI).

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are likely to influence the child's behavioral development. Specifically, siblings may act as caregivers and role models (Dunn, 1983; Harrist et al., 2014). In the context of mealtimes, siblings may contribute to pressuring the child to eat by delivering many of the encouragements to eat during the meal (Mosli, Miller, et al., 2015).

Since siblings develop caregiving skills by observing and imitating their mothers (Zukow-Goldring, 2008), the way that mothers interact with children may shape caregiving behaviors of siblings during mealtimes. For example, if pressuring the child to eat is a behavior in which mothers frequently engage in during mealtimes, siblings may imitate this behavior and also pressure the child to eat. A previous report found that parental mealtime presence is associated with child obesity risk (Jacobs & Fiese, 2007), but no prior study has examined how specific maternal behaviors may relate to sibling behavior towards the child during mealtimes. Specifically, it is unknown whether controlling feeding behaviors by mothers, such as pressure to eat, have indirect implications by affecting siblings' caregiving behaviors, such as encouraging the child to eat. Establishing these associations can inform the design of novel obesity intervention and prevention strategies that account for the co-occurring influence of maternal behavior during mealtimes. The goal of this study was to test the hypothesis that maternal feeding behaviors that are highly controlling are associated with more encouragements to eat delivered from sibling to child during mealtimes.

2. Methods

2.1. Participants and procedures

The study sample included 301 index children and their mothers. Participants were recruited from Head Start facilities in South Central Michigan. Head Start is a federally subsidized preschool program for low-income, high-risk families residing in the United States (US). Participants were drawn from a longitudinal cohort initiated in 2009 to investigate associations between stress and eating behavior among low-income children. Index children ranged in age from 4 to 8 years at the time of data collection. Inclusion criteria included that the caregiver was fluent in English and did not have a college degree; and child was born at ≥ 35 weeks gestation without significant perinatal or neonatal complications, was not in foster care, and had no serious medical problems or history of food allergies. For this analysis we only considered children who were living with their biological mothers, who were living with only one sibling who was at least two years old (age of included siblings therefore ranged from 2 to 16), and who had complete data on all variables ($n = 86$). Mothers provided written informed consent for themselves and for their children. The University of Michigan Institutional Review Board approved this study.

During two study visits, mothers completed interviewer-administered questionnaires that assessed demographic characteristics and maternal feeding behaviors. At home, each family completed three family mealtime observations; mothers were loaned a camera and instructed to videotape three routine dinner meals for the index child within a single week. These videos followed standard procedures, and mothers were asked to set up the camera so that the child's torso, plate, and drink were always in view (Goulding et al., 2014). Research assistants collected information regarding individuals present by calling the mothers after each meal.

Because mothers were instructed to videotape the index child as he/she normally ate at dinnertime, some of the videos included only the index child eating alone while others included the index child eating with his/her sibling and/or with parents and other family members. For this analysis, we selected only the videotapes

on which the sibling was present during dinnertime regardless of the presence of parents. We did not include videotapes on which children other than the index child and sibling were also present. We systematically selected one of the three videos for each index child. First, we assessed the second video for each index child because we expected families to be more acclimated to the camera by the second home observation, and we were also able to maximize our sample size. If the second video did not meet the selection criteria (based on individuals present during the meal), we then assessed the third video; if the third video did not meet the selection criteria, we assessed the first video. A final sample of 69 index children was identified, 7 from the first video, 51 from the second video, and 11 from the third video. The analytic sample included in this analysis ($n = 69$) did not differ from the sample not included ($n = 232$) with regard to index child sex, age or race/ethnicity, or maternal education.

2.2. Measures

2.2.1. Primary outcome: encouragements to eat delivered by sibling to index child

We evaluated the sibling's behavior during the meal by developing a coding scheme based on Bob and Tom's Method of Assessing Nutrition (BATMAN) (Klesges et al., 1983). The BATMAN is an observational assessment used to evaluate mealtime behaviors, such as encouraging the child to eat (Klesges et al., 1983). We defined verbal encouragements to eat as suggesting, demanding, directing, making positive statements about food, and offering food (Mosli, Miller, et al., 2015). We did not observe restrictive or physical feeding behaviors to occur with meaningful frequency between siblings. Therefore, we focused our coding scheme on verbal encouragements to eat. Encouragements to eat delivered by the sibling and directed to the index child were coded in 5-min intervals from the videos (e.g., a 20-min long video has 4 intervals). Ten percent of the videos were double coded. Inter-rater reliability by intraclass correlation coefficient exceeded 0.80. Number of encouragements was summed across intervals to create the variable "total encouragements delivered by sibling to index child".

2.2.2. Primary predictors: maternal feeding behaviors

To assess maternal feeding behaviors, mothers completed the Child Feeding Questionnaire (CFQ) and the Caregiver's Feeding Styles Questionnaire (CFSQ). The CFQ is a valid and reliable 31-item questionnaire, with 5-point Likert response scales ranging from 1 to 5 (Birch et al., 2001; Kaur et al., 2006). The CFQ assesses parents' beliefs, attitudes and practices regarding child feeding (Birch et al., 2001). Variables generated from the CFQ that are included in this analysis are: Pressure to Eat (4 items, Cronbach's $\alpha = 0.62$), Restriction (8 items, Cronbach's $\alpha = 0.75$), and Monitoring (3 items, Cronbach's $\alpha = 0.86$). Scores were calculated as the mean of contributing items, with higher scores reflecting more of the given behavior. The Caregiver's Feeding Styles Questionnaire (CFSQ) is a valid and reliable 19-item questionnaire, specifically developed to assess feeding styles among low-income families (Hughes, Power, & Fisher, 2005). The CFSQ has 5-point Likert response scales ranging from 1 = never to 5 = always. For the purposes of the current study, we sought to examine specific feeding behaviors that may be associated with sibling behavior. Thus, we conducted a factor analysis that generated 2 subscales reflecting specific dimensions of maternal feeding behavior: Verbal Direction and Coercion. Scores were calculated as the mean of contributing items, with higher scores reflecting more of the given behavior. The Verbal Direction score consisted of 4 items (Cronbach's $\alpha = 0.74$) concerning how often mothers verbally suggest or command the child

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