Which adaptive maternal eating behaviors predict child feeding practices? An examination with mothers of 2- to 5-year-old children

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Abstract

Researchers have started to explore the detrimental impact of maladaptive maternal eating behaviors on child feeding practices. However, identifying which adaptive maternal eating behaviors contribute to lower use of negative and higher use of positive child feeding practices remains unexamined. The present study explored this link with 180 mothers of 2- to 5-year-old children. Hierarchical regression analyses (controlling for recruitment venue and maternal demographic characteristics, i.e., age, education, ethnicity, and body mass index) examined mothers' intuitive eating and eating competence as predictors of four feeding practices (restriction, monitoring, pressure to eat, and dividing feeding responsibilities with their child). Mothers who gave themselves unconditional permission to eat were less likely to restrict their child's food intake. Mothers who ate for physical (rather than emotional) reasons and had eating-related contextual skills (e.g., mindfulness when eating, planning regular and nutritious eating opportunities for themselves) were more likely to monitor their child's food intake. Mothers who

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had eating-related contextual skills were more likely to divide feeding responsibilities with their child. No maternal eating behavior predicted pressure to eat. Interventions to help mothers develop their eating-related contextual skills and eat intuitively, in particular, may translate into a more positive feeding environment for their young children.

Keywords

Child feeding practices; Maternal eating behavior; Young children; Intuitive eating; Eating competence; Caregiver/child division of feeding; responsibility

1. Introduction

A substantial body of research indicates that child feeding practices are instrumental in shaping young children's eating behavior, food intake, and weight (e.g., Carper, Fisher, & Birch, 2000; Drucker, Hammer, Agras, & Bryson, 1999; Fisher & Birch, 1999; Galloway, Fiorito, Francis, & Birch, 2006; Patrick, Nicklas, Hughes, & Morales, 2005; Powers, Chamberlin, van Schaick, Sherman, & Whitaker, 2006). It is imperative, then, to study variables that may direct caregivers' choice and use of their feeding practices, which could further improve professionals' understanding of factors that facilitate and hinder children's physical health and psychological well-being (Ventura & Birch, 2008).

1.1. Child feeding practices

Researchers have identified a number of both harmful and helpful child feeding practices. Two child feeding practices, open restriction of children's food intake and pressuring children to eat, have been identified as harmful. When caregivers openly restrict palatable foods, children become preoccupied with these foods, eat them in the absence of hunger, and experience weight gain over time (Fisher & Birch, 1999, 2002; Francis & Birch, 2005). When caregivers pressure children to eat nutrient-dense foods, children consume higher amounts of fat and eat in the absence of hunger (Galloway et al., 2006; Lee, Mitchell, Smiciklas-Wright, & Birch, 2001). Other child feeding practices, such as division of feeding responsibility and monitoring food intake, are considered helpful for children. Division of feeding responsibility entails caregivers being responsible for determining how, when, where, and what to feed their children (i.e., providing regular, pleasant, and distraction-free family meals and snacks that contain a variety of healthy choices), and children being responsible for attending to their internal hunger and satiety cues to determine how much of the presented foods to eat (Eneli, Crum, & Tylka, 2008; Satter, 1995, 2005). This division of feeding responsibility is linked to children consuming fewer unhealthy snacks and eating more fruits and vegetables (Kremers, Brug, de Vries, & Engels, 2003; Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003; Patrick et al., 2005). Also, caregiver monitoring of children's food intake has been found to help children avoid emotional eating (Farrow, 2012) and make healthier food selections (Brown, Ogden, Vögele, & Gibson, 2008; Klesges, Stein, Eck, Isbell, & Klesges, 1991).

1.2. Maladaptive maternal eating behaviors as predictors of feeding practices

Given the instrumental role of child feeding practices in shaping children's health and psychological well-being, it is important to identify factors that predict these practices (Ventura & Birch, 2008). Research has identified maladaptive maternal eating behaviors as an important caregiver characteristic that guides their feeding practices (Coulthard, Blissett, & Harris, 2004). For instance, mothers who restricted their own food intake and ate in the absence of hunger were more likely to restrict their young child's food intake (Birch & Fisher, 2000; Brown & Lee, 2011). Mothers with more severe eating pathology have also

been found to use more harmful feeding practices. Specifically, mothers with eating disorders were less likely to feed their young children regularly or eat with them, and were more likely to use food for nonnutritive purposes, such as rewarding, comforting, or punishing their children (Agras, Hammer, & McNicholas, 1999). Mothers with bulimia and binge eating disorder reported more restrictive feeding behaviors than mothers without eating disorders (Reba-Harrelson et al., 2010; Stein & Fairburn, 1989). Finally, there have been case reports of mothers with anorexia underfeeding their children (Russell, Treasure, & Eisler, 1998), although another study failed to replicate this finding (Reba-Harrelson et al., 2010).

1.3. Adaptive maternal eating behaviors as potential predictors of feeding practices

While these studies provide insight into how mothers' maladaptive eating behaviors are connected to their use of detrimental child feeding practices and may help professionals understand factors that could hinder children's well-being, they do not identify factors that may promote children's well-being. Mothers' adaptive eating behaviors may be one such factor. Uncovering which adaptive maternal eating behaviors are beneficially linked to child feeding practices could be used to guide professionals' ability to promote the health and well-being of mothers as well as their children. In the field of eating behavior, scholars have emphasized the need to define adaptive eating as more than the absence of disordered eating symptoms because its dimensions, benefits, and protective ability cannot be inferred by conceptualizing it as the lack of pathology (Striegel-Moore & Cachelin, 1999; Tylka & Wilcox, 2006).

To this end, researchers have described two styles of adaptive eating: intuitive eating and eating competence. *Intuitive eating* is defined as eating in response to physiological hunger and satiety cues rather than emotional (e.g., stress, anxiety) or situational (e.g., availability of palatable foods) cues (Tylka, 2006). It has three interdependent components: unconditional permission to eat, eating for physical rather than emotional reasons, and reliance on internal hunger and satiety cues to guide eating behavior. Intuitive eating is positively related to psychological well-being, such as life satisfaction, and inversely related to eating disorder symptomatology (Tylka & Wilcox, 2006). *Eating competence* is characterized by being comfortable and relaxed while eating regularly-scheduled meals and snacks (Satter, 2007). It contains four interdependent components: positive attitudes toward eating (e.g., being relaxed and trusting the self to manage food and eating), food acceptance (e.g., trying new foods, eating a wide variety of food, being calm in the presence of all types of food), internal regulation (e.g., eating until satisfied, ability to tolerate hunger until the next available meal or snack), and contextual skills (e.g., structuring regular meals, mindfulness when eating, choosing foods that are nutritious). Eating competence is inversely linked to disordered, disinhibited, and restrained eating, and positively linked to consuming nutritious foods (Lohse, Satter, Horacek, Gebreselassie, & Oakland, 2007).

1.4. Aim of the present study

The purpose of the current study was to identify the adaptive maternal eating behaviors that contribute incrementally to their child feeding practices. We hypothesized that adaptive maternal eating behaviors, such as the components of intuitive eating and eating competence, would predict unique variance in both harmful and helpful child feeding practices. Additionally, we examined maternal demographic variables because researchers have found that mothers' feeding behaviors are connected to their education level (Hendricks, Briefel, Novak, & Ziegler, 2006), body mass index (BMI; Powers et al., 2006), age (Hendricks et al., 2006), and ethnicity (Anderson, Hughes, Fisher, & Nicklas, 2005; Hendricks et al., 2006), as well as their perceptions of their child's weight (Francis, Hofer, & Birch, 2001). If these variables were significantly related to maternal feeding practices,

they were controlled in the analyses to ensure that the links between mothers' eating behaviors and their feeding practices were not contaminated by other maternal characteristics.

2. Materials and methods

2.1. Participants and procedure

Mothers of 2- to 5-year-old children were recruited from four childcare centers (n=117) and a primary care clinic (n=63) in an urban Midwestern U.S. city. Mothers of children within this age range were targeted because they are typically the parent responsible for grocery shopping and meal preparation (Blissett, Meyer, & Haycraft, 2006) and children within this age range are physically able to join family meals. The study was approved by the Institutional Review Board at Nationwide Children's Hospital.

At childcare centers, staff distributed the survey to all mothers of children in the toddler and preschool classrooms. Centers were selected to increase participant diversity: one center was located on a large university campus, the second center was in an urban setting, the third center was situated in a low income area and offered subsidized childcare, and the fourth center was located in a semirural area. In the waiting room at the primary care clinic, every eligible mother with a young child was approached and invited to complete the survey.

Participants completed the survey at their convenience and mailed it back to the experimenters in the provided stamped, addressed envelope. They had the opportunity to provide their name and address on a separate sheet to receive a $10 grocery gift card. Mothers were assured all personal information would be kept confidential. Over a 30-day time period, 297 survey packets were distributed, and 188 were returned, yielding a response rate of 63%. Eight participants were excluded; two with children older or younger than the age criterion and six who did not respond to at least 80% of each survey. We also decided a priori to exclude mothers who had children with congenital or metabolic abnormalities or serious food allergies because these conditions may have affected their feeding practices. On our demographic form, we asked whether their children had these conditions. No mother reported these conditions for their child.

Thus, responses from 180 mothers (M_{age} =34.31, SD=6.05, range=20–48) were entered into the data set. Of the 162 mothers who reported their height and weight, their average BMI (kg/m^2) was 26.41 (SD=6.74); 1.7% were underweight (BMI<18.5), 46.7% were normal weight (BMI=18.5–24.9), 20.6% were overweight (BMI= 25.0–29.9), and 21.1% were obese (BMI at or above 30.0; Centers for Disease Control and Prevention, 2010). Participants identified as Caucasian (70.6%), African American (16.7%), Asian (8.3%), Latina (2.2%), or Native American (1.7%); one participant (0.6%) did not indicate an ethnicity. In terms of education, 2.2% did not finish high school, 12.8% completed high school, 21.2% completed some college, 27.8% graduated college, 4.6% completed some graduate education, and 31.7% completed graduate school. Mothers spent an average of 19.19 years (SD=4.71, range=11–25) in education. Most women reported that they worked full time (64.4%) or part time (21.1%), while 2.8% were on leave, and 11.7% did not hold paid employment. Most women (63.3%) were married, 21.1% were single, 5.6% were divorced, 6.1% lived with their significant other but were not married, 2.8% were separated, and one woman (0.6%) was widowed. Their child was, on average, 3.40 years old (SD= 0.98).

2.2. Measures

2.2.1. Adaptive maternal eating behaviors—The three subscales of the Intuitive Eating Scale (IES; Tylka, 2006) were used. Unconditional Permission to Eat (UPE; nine

items) measures the tendency to allow oneself to eat enjoyable foods (e.g., "If I am craving a certain food, I allow myself to have it"). Eating for Physical Rather than Emotional Reasons (EPR; six items) assesses the tendency to use food to satisfy physical hunger and not to cope with emotional fluctuations and distress (e.g., "I use food to help me soothe my negative emotions" [reverse scored]). Reliance on Internal Hunger/Satiety Cues (RHSC; six items) gauges awareness of and trust in hunger and satiety cues to guide eating (e.g., "I trust my body to tell me when to eat"). Items are rated on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), and subscale items are averaged. Among women aged 26–39, the IES demonstrated internally consistent scores (α=.89) and was positively associated with psychological well-being and body appreciation and inversely associated with the likelihood of being overweight (Augustus-Horvath & Tylka, 2011; Tylka, 2006). In the present study, Cronbach's alphas were .76 for UPE, .88 for EPR, and .76 for RHSC.

The four ecSatter Inventory (ecSI; Lohse et al., 2007) subscales were used to measure additional positive maternal eating behaviors. Eating Attitudes (EA; five items) measures relaxation when eating and enjoyment of eating (e.g., "I am relaxed about eating"). Food Acceptance (FA; three items) assesses the tendency to eat a variety of foods (e.g., "I experiment with new food and learn to like it"). Internal Regulation (IR; three items) measures the use of internal hunger and satiety cues to direct when and how much to eat (e.g., "I eat as much as I am hungry for"). Contextual Skills (CS; five items) include mindfulness when eating, planning regular eating opportunities, and eating nutritious meals (e.g., "I tune in to food and pay attention to myself when I eat"). Each ecSI item is rated along a 5-point scale; *never* and *rarely* are scored as 0, *sometimes* is scored as 1, *often* is scored as 2, and *always* is scored as 3. Subscale items are averaged. Research has supported the ecSI's factor structure (Lohse et al., 2007). In a sample of mothers, Cronbach's alphas have ranged from .66 to .80, and test–retest reliability estimates have ranged from .52 to .70 over a 2-to 6-week period (Stotts & Lohse, 2007). Further, ecSI scores have been found to be positively linked to high density lipoprotein cholesterol levels and inversely associated with systolic and diastolic blood pressure and total cholesterol levels (Psota, Lohse, & West, 2007), supporting its concurrent validity. In the present study, Cronbach's alphas were .84 for EA, .70 for FA, .72 for IR, and .78 for CS.

2.2.2. Maternal feeding practices—Participants' responses to four Child Feeding Questionnaire (CFQ; Birch et al., 2001) subscales were used. Restriction assesses the degree to which the child's intake of sweets and fats is limited (eight items, such as "I have to be sure my child does not eat too many high fat foods," rated 1 = *disagree* to 5 = *agree*). Pressure to Eat measures parents' belief that they have to ensure their child eats enough food (four items, such as "I have to be especially careful to make sure my child eats enough," rated 1 = *disagree* to 5 = *agree*). Monitoring assesses the extent to which parents keep track of their child's intake of sweets, snack foods, and high fat foods (three items, such as "How much do you keep track of the snack food [potato chips, Doritos, cheese puffs] that your child eats?," rated 1 = *never* to 5 = *always*). Perceived Feeding Responsibility was also assessed to ensure that mothers were the primary adult who fed their child (three items, such as "When your child is at home, how often are you responsible for feeding her?," rated 1 = *never* to 5 = *always*). The CFQ's factor structure was supported among ethnically diverse caregivers (Anderson et al., 2005) as well as predominantly Caucasian caregivers (Birch et al., 2001), and its subscales have yielded evidence of internal consistency reliability (αs=.70 to .92) and construct validity via their relationship to child weight status (Birch et al., 2001). In this study, alphas were .73 for Restriction, .73 for Pressure to Eat, .82 for Monitoring, and .73 for Perceived Feeding Responsibility.

The 10-item Caregiver Division of Feeding Responsibility Scale (CFRS; Tylka, Kroon Van Diest, Williams, Lumeng, & Eneli, 2010) measures an optimal feeding practice as proposed

by Satter (1995), defined by clear and divided feeding responsibilities between caregivers and children. Specifically, items ask participants the extent to which they perform their responsibilities (e.g., feed their child at regular times, serve meals with a variety of foods, ensure that the family eats together without distractions such as TV) and allow their child to perform their responsibilities (i.e., follow their internal hunger and satiety cues to determine how much to eat). Items (e.g., "I feed my child at regular times instead of waiting until she/ he asks for food") are rated along a scale ranging from 1 (*never*) to 5 (*always*) and are averaged, with higher scores indicating more optimal feeding via division of feeding responsibility. Research has supported the unidimensionality of the CFRS's factor structure, its internal consistency reliability (α=.70), test–retest reliability over a 5-week period (r=. 80), and construct validity via its negative relationships with restriction and pressuring children to eat among a sample of predominantly Caucasian mothers (Tylka et al., 2010). Its alpha was .72 in the current study.

2.2.3. Mothers' perception of their child's current weight status—The CFQ

Perceived Child Overweight subscale (Birch et al., 2001) asks participants, "Please indicate how you would classify your child's weight" at three life stages: as a toddler, preschooler, and kindergartener. Anchors for these items were: 1 (*markedly or very underweight*), 2 (*underweight*), 3 (*average*), 4 (*overweight*), and 5 (*markedly or very overweight*). We chose to assess maternal perceptions of their child's weight status using these verbal descriptors in lieu of numerical estimations of their child's BMI because of potential inaccuracy with reporting the child's height and weight during times of rapid growth. The child's age at the time of the study guided which of the three subscale items we chose to interpret. Most mothers perceived their child to be normal weight (77.8%), followed by underweight (11.7%), overweight (7.2%), very underweight (0.6%), and very overweight (0.6%).

2.2.4. Demographic form—Participants were asked to report their age, child's age,

ethnicity, highest level of education, height, weight, work status, relationship status, and whether their child had any food allergies or disorders that help determine how she or he is fed.

2.3. Data analysis

SPSS 19.0 was used to conduct all analyses. The proportion of missing data across assessments ranged from 0 to 2%. The few missing item values were handled by substituting participants' mean subscale score for the missing value. Skewness and kurtosis were evaluated for each measure, and data were screened using Mahalanobis distance.

First, we examined bivariate Pearson r correlations between mothers' feeding practices (i.e., restriction and monitoring of food intake, pressuring their child to eat, and dividing feeding responsibility) and demographic variables such as mothers' years of education, age, and BMI, as well as their perceptions of their child's weight status. We conducted ANOVAs between mothers' feeding practices and ethnicity; we coded ethnicity as 1 = Caucasian, 2 = African American, and 3 = Asian American. Due to the low numbers of Latina (n=4) and Native American (n=3) mothers and one participant not indicating her ethnicity, we did not consider data from these eight participants in analyses that included ethnicity as a variable. If ethnicity and feeding practices were associated, we conducted Scheffé tests to determine which groups differed from one another and compared means to determine the direction of difference. We controlled for these variables in the regression analyses if they were significantly associated with a feeding practice.

Second, we examined whether mothers recruited from childcare centers (coded as 0) differed from mothers recruited from the primary care clinic (coded as 1) on demographic

variables and the study measures. For continuous variables (i.e., the study measures, age, maternal BMI, years of education, perceptions of child weight status), we conducted a series of t-tests to examine whether group differences existed. For ethnicity, we conducted a chi-square analysis to examine group patterns, and examined standardized residuals (the difference between the observed and expected frequency) if this analysis was significant. We controlled for recruitment venue in the regression analyses if it was significantly associated with a feeding practice.

Third, we conducted four hierarchical regression analyses to investigate whether mothers' eating behaviors predicted (a) restricting their child's food intake, (b) pressuring their child to eat, (c) monitoring their child's intake of fats and sweets, and (d) their willingness to divide feeding responsibility between themselves and their children. For each of these four analyses, maternal characteristics (i.e., demographic variables, perceptions of child weight status) that were significantly related to the particular feeding practice were entered into Step 1, and maternal eating behaviors that were significantly related to the particular feeding practice were entered into Step 2. This allowed us to determine which maternal eating behaviors predicted unique variance in maternal feeding practices. Due to its categorical nature, ethnicity was dummy coded, with Caucasian women serving as the reference group because it was the largest.

3. Results

The IES, ecSI, and CFQ subscales and the CFRS total scale had acceptable skewness (range=−1.03 to 0.19) and kurtosis (range=−0.71 to 0.54) values (Kline, 2005), suggesting multivariate normality. Therefore, no measure was transformed. No outliers were detected via Mahalanobis distance. Mothers reported being the one primarily responsible for feeding their child ($M_{\text{CFQ Feeding Responsibility Subscale}}$ =4.51, SD =0.63, possible subscale range 1–5). Variable means, standard deviations, and intercorrelations are presented in Table 1.

3.1. Relationships between maternal demographic variables and feeding practices

Number of years of education was significantly related to pressuring their child to eat (r=−.19, p=.01), monitoring their child's food intake (r=.21, p=.004), and dividing feeding responsibility (r=.31, p<.001), but not restricting their child's food intake (r=−.05, p=.526). Maternal age was related to pressuring their child to eat (r=−.32, p<.001) and dividing feeding responsibility (r=.25, p=.001), but not restricting (r=−.10, p=.201) or monitoring (r=.15, p=.054) their child's food intake. When comparing Caucasian, African American, and Asian American women, ethnic differences were noted for restriction, F(2, 169)=4.85, p=.002, and pressure to eat, F(2, 169)=10.29, p=.002. Specifically, Caucasian women scored lower than Asian women on restriction (p=.012) and pressure to eat (p=.002), and scored lower than African American women on pressure to eat (p<.001). No other ethnic differences on feeding practices were noted (all ps>.05). Mothers' BMI was related to dividing feeding responsibility (r=−.22, p=.005), but not restricting (r=.06, p=.424) or monitoring (r=−.06, p=.414) their child's food intake or pressuring their child to eat (r=−.06, p=.474).

3.2. Relationships between maternal perceptions of child weight and feeding practices

We also examined whether mothers' perception of their child's weight status was associated with their feeding practices. Perception of their child's weight status as a toddler/ preschooler/kindergartener was not related to any feeding practice (all ps>.05), and therefore was not considered in the regression analyses.

3.3. Differences in study variables between childcare centers and the primary care clinic

Mothers recruited from childcare centers were older (M_{age} = 35.10, SD_{age} =5.87) than mothers recruited from the primary care clinic (M_{age} =32.85, SD_{age} =6.14), t(179)=2.34, p =.023. Mothers recruited from childcare centers also reported restricting their child's food intake (M=2.87, SD=0.65) and pressuring their child to eat (M=2.63, SD=0.88) to a lower extent than mothers recruited from the primary care clinic ($M_{restriction}$=3.09, SD =0.55; $M_{pressure}$= 3.07, SD=0.94), $t_{restriction}$(179)= −2.22, p=.028, $t_{pressure}$(179)= 3.11, p=.002. Ethnicity was significantly linked to recruitment venue, χ^2(2, N=172)=15.60, p<.001; mothers who were Asian were over-represented at primary care clinics, z=2.00, p=.005. No other group differences in recruitment venue were noted for the remaining study variables.

3.4. Adaptive maternal eating behaviors as predictors of feeding practices

3.4.1. Restricting child's food intake—Results of this analysis and the next three analyses are presented in Table 2. Ethnicity was the only demographic variable that was linked to mothers' restriction of their child's food intake; therefore, we entered mothers' ethnicity into Step 1 of the regression analysis predicting their restrictive feeding. We also entered recruitment venue into Step 1 of this analysis because a significant difference in restrictive feeding was observed between mothers recruited from the childcare centers and mothers recruited from the primary care clinic. Unconditional permission to eat was then entered into Step 2 of this analysis given that it was the only maternal eating behavior that was related to mothers' use of restrictive feeding practices (see Table 1). After controlling for ethnicity and recruitment venue, mothers' unconditional permission to eat accounted for unique variance in their restrictive feeding, and this link was negative. Ethnicity also remained significant at Step 2, with Asian American mothers reporting that they restricted their child's food intake more so than Caucasian mothers.

3.4.2. Monitoring of child's food intake—Number of years of education was the only demographic variable related to mothers' monitoring of their child's food intake and thus was entered into Step 1 of the second analysis. Eating for physical rather than emotional reasons, reliance on internal hunger and satiety cues, positive eating attitudes, food acceptance, and contextual skills were entered into Step 2 because they were related to mothers' reports of monitoring their child's food intake (see Table 1). After controlling for maternal education, mothers' eating for physical rather than emotional reasons and contextual skills each uniquely and positively contributed to monitoring their child's food intake.

3.4.3. Pressuring child to eat—Years of education, age, ethnicity, and recruitment venue were each related to mothers' pressuring their child to eat. Yet, no maternal eating behavior was directly related to pressuring their child to eat (see Table 1). Therefore, we examined only the unique contributions of the above demographic variables and recruitment venue on mothers pressuring their child to eat (i.e., these variables were entered into a single step of the analysis). Maternal age and ethnicity emerged as unique predictors of mothers' tendency to pressure their child to eat. Younger mothers, as well as Asian and African American mothers, were more likely to report pressuring their children to eat.

3.4.4. Mothers' dividing feeding responsibility with their child—Demographic variables related to mothers' dividing feeding responsibility with their child (i.e., years of education, age, and BMI) were entered at Step 1 of the final analysis. Eating for physical rather than emotional reasons, reliance on internal hunger and satiety cues, positive attitudes about eating, food acceptance, internal regulation, and contextual skills were entered at Step 2 of this analysis, given their significant relationships to the CFRS (see Table 1). Years of education and maternal BMI emerged as significant predictors at Step 1. After controlling

for the variables at Step 1, only contextual skills uniquely predicted division of feeding responsibility at Step 2, and this link was positive.

4. Discussion

Previous research exploring the link between maternal eating behaviors and child feeding practices has been quite lopsided — it has focused on maladaptive maternal eating behavior in this equation. The current study, with its focus on identifying which adaptive maternal eating behaviors predict child feeding practices, therefore both expands and balances this research. While disordered maternal eating behaviors are important to child feeding behaviors (Coulthard et al., 2004), we found that certain facets of adaptive maternal eating behavior appear to be important as well. Specifically, mothers with higher intuitive eating behaviors and eating competence restricted their child's food intake less, monitored their child's food intake more, and allowed their child to share some of the feeding responsibilities. Notably, these relationships between maternal adaptive eating behaviors and optimal child feeding practices existed even when controlling for associated maternal demographic variables.

This study highlights the specific components of intuitive eating and eating competence linked to maternal feeding practices, providing potentially important implications for increasing positive eating and well-being in both mothers and children. First, mothers who give themselves unconditional permission to eat are less likely to restrict their child's food intake, which balances extant research that suggests that mothers' restrictive eating predicts their use of restrictive feeding with their child (Birch & Fisher, 2000; Brown & Lee, 2011). Given that restriction is detrimental to children and can actually promote weight gain and preoccupation with the restricted food over time (Birch et al., 2001; Carper et al., 2000; Fisher & Birch, 1999, 2002), professionals may want to encourage healthy eating and weight in children by helping their mothers understand the value in granting themselves unconditional permission to eat. Because women who grant themselves unconditional permission to eat are less likely to be overweight and are more likely to have higher life satisfaction than women who do not, perhaps because of lower preoccupation with food and eating (Tylka, 2006), adopting this style could facilitate their and their child's well-being.

Second, mothers who eat to satisfy their hunger rather than to cope with emotional distress are more likely to monitor their child's food intake. Mothers who predominantly eat for physical reasons may value food for its nutritional value rather than for its soothing and comforting ability. Therefore, these mothers may include more opportunities for their children to eat nutritious foods and fewer opportunities for them to eat less nutritious foods. Moreover, parental monitoring of food intake may protect impulsive children from eating in response to emotions (Farrow, 2012). Interventions to reduce emotional eating in mothers, then, may translate into more opportunities for access to nutritious foods and lower emotional eating for children.

Third, mothers who use contextual skills, such as ensuring that they eat regular meals and choosing foods that are nutritious, are also more likely to structure these opportunities for their child. Further, these mothers eat in a mindful manner, which could help them see the benefits of this practice for their children, and therefore allow their children to follow their hunger and satiety cues to determine how much to eat. These feeding practices reflect mothers' willingness to divide feeding responsibilities between themselves and their child. This finding complements and expands on research which indicates that mothers with eating disorders are less likely to feed children regularly and eat with them (Agras et al., 1999). Mindful eating programs, such as Mindfulness-Based Eating Awareness Training (Kristeller & Wolever, 2010), and programs designed to educate mothers on their own eating behaviors

as well as optimal child feeding practices, such as feeding dynamics interventions (Eneli et al., 2008), could translate into healthy lifestyle behaviors and skills for mothers and their children.

Interestingly, while some demographic variables were related to mothers pressuring their child to eat (e.g., age, ethnicity, education level), no maternal eating behavior directly predicted this feeding practice. Of the demographic variables that were significantly related to maternal pressures to eat, only age and ethnicity were found to predict unique variance in this variable. Specifically, younger mothers as well as African American and Asian American mothers reported using more pressure to eat practices. It may be beneficial to target these groups when implementing interventions designed to prevent mothers' use of pressure to eat feeding practices. While maternal positive eating behaviors increase the use of optimal feeding practices, they do not appear to be linked to mothers pressuring their child to eat.

Although this study contributes to the literature on maternal feeding practices, its findings should be interpreted with these limitations in mind. First, our data are correlational, and thus we cannot conclude that mothers' eating behaviors cause or directly impact their feeding practices. Second, most mothers in our study were recruited from childcare centers, and they likely cannot control the type of food, frequency of meals/snacks, and feeding environment their child is exposed to while at childcare. Therefore, their child may be affected by different messages and styles of feeding (although it is important to recognize that we are assessing mothers' feeding practices rather than how children are impacted by how they are fed). Third, our sample was fairly homogenous, as mothers were primarily Caucasian, married, and employed full time from an urban city in the U.S., making it possible that our findings may not generalize well to mothers who do not fit these categories. The psychometric properties of the IES, ecSI, and CFRS have not yet been explored with ethnically diverse samples of caregivers. Thus, we cannot guarantee that the constructs were equivalent for all mothers sampled. Future research should evaluate these scales for measurement invariance as well as examine the influence of maternal eating behaviors on feeding practices in more ethnically diverse samples.

Fourth, our exclusive use of self-report measures is somewhat limiting. Mothers' reports of their eating behaviors and roles in the feeding process may or may not be an accurate portrayal of reality and may be influenced by social desirability, memory, response style, and other perceptions. In the future, researchers could investigate the accuracy of self-reported maternal feeding practices and child eating behaviors by examining actual feeding practices using videotaped feeding sessions. It is also unknown whether mothers who completed the survey differed on any of the study variables from those who received a survey but did not complete it. The study design also precluded an objective measure of the child's BMI, which may influence maternal feeding practices. However, maternal perceptions of child's weight status, as was used in the present study, may more accurately predict their feeding practices than a child's BMI because perceptions may drive behavior more so than actual measurements (Kelly, 1955). Nevertheless, researchers could measure children's weight and height to determine if their BMI is confounded with examining whether mothers' adaptive eating behaviors predict their feeding practices.

5. Conclusions

The use of optimal (and avoidance of harmful) child feeding practices encourages children to use their own internal hunger and satiety cues when eating by allowing them to engage in some responsibilities in the eating process (Satter, 2005). Caregivers also monitor the foods the child eats by structuring regular and healthy meals and snacks, thereby performing their

responsibilities in the eating process. The current study provides initial evidence that certain positive maternal eating behaviors predict unique variance in child feeding practices. Specifically, mothers who engaged in intuitive eating and displayed eating competence were more likely to report increased use of optimal and decreased use of harmful feeding practices, even after controlling for maternal demographic variables. Professionals may want to design interventions to promote maternal intuitive eating and eating competence, which then may help build positive feeding environments for children.

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Table 1

Means, standard deviations, and intercorrelations among maternal eating behaviors and feeding practices.

Measure	M	SD	Range	1	2	3	4	5	6	7	8	9	10
1. IES: unconditional permission to eat	3.18	0.73	1–5	–									
2. IES: eating for physical reasons	3.28	0.99	1–5	.46***	–								
3. IES: reliance on internal cues	3.66	0.71	1–5	.30***	.49**	–							
4. ecSI: eating attitudes	2.08	0.66	0–3	.47***	.51**	.38***	–						
5. ecSI: food acceptance	1.65	0.75	0–3	.02	.12	.21**	.39***	–					
6. ecSI: internal regulation	2.17	0.66	0–3	.19*	.05	.25***	.43***	.33***	–				
7. ecSI: contextual skills	1.71	0.66	0–3	.01	.20**	.29***	.37***	.47***	.37***	–			
8. CFQ: restriction	2.95	0.62	1–5	−.19*	−.08	.09	−.11	−.01	−.09	−.03	–		
9. CFQ: monitoring	4.03	0.83	1–5	−.01	.23**	.18*	.17*	.19*	.14	.40***	.09	–	
10. CFQ: pressure to eat	2.78	0.92	1–5	−.10	.00	.11	.05	−.02	−.11	−.03	.38***	.03	–
11. CFRS: dividing feeding w/child	3.84	0.46	1–5	.02	.21**	.17*	.23**	.35***	.16*	.53***	−.14	.36***	−.18*

Note. $N=180$. IES = Intuitive Eating Scale; ecSI = ecSatter Inventory; CFQ = Child Feeding Questionnaire; CFRS = Caregiver Feeding Responsibility Scale.

*
$p<.05$.

**
$p<.01$.

***
$p<.001$.

Table 2

Hierarchical multiple regression analyses of maternal eating behaviors predicting feeding practices.

Step/predictor	R^2	ΔR^2	ΔF	B	SE	β	t
Criterion: CFQ: restriction, F(3,168)=4.48, p=.002							
Step 1	.07	.07	4.25*				
Ethnicity-Asian American				0.43	.17	.20	2.54*
Ethnicity-African American				0.10	.13	.06	0.82
Recruitment venue				0.17	.10	.14	1.74
Step 2	.10	.03	4.86*				
Ethnicity-Asian American				0.47	.17	.22	2.79*
Ethnicity-African American				0.12	.13	.07	0.93
Recruitment venue				0.16	.10	.13	1.62
Unconditional permission to eat				−0.14	.06	−.17	−2.21*
Criterion: CFQ: monitoring, F(5,174)=7.20, p<.001							
Step 1	.05	.05	8.24**				
Years of education				0.04	.01	.21	2.87**
Step 2	.21	.16	6.72***				
Years of education				0.02	.01	.12	1.63
Eating for physical reasons				0.16	.07	.19	2.21*
Reliance on internal cues				−0.02	.10	−.02	−0.18
Positive eating attitudes				−0.04	.11	−.04	−0.40
Food acceptance				−0.01	.09	−.01	−0.06
Contextual skills				0.44	.11	.35	4.24***
Criterion: CFQ: pressure to eat, F(4,167)=7.80, p<.001							
Step 1	.20	.20	7.79***				
Years of education				−0.01	.02	−.05	−0.55
Maternal age				−0.03	.01	−.21	−2.52*
Ethnicity-Asian American				0.74	.24	.23	3.06**
Ethnicity-African American				0.49	.20	.20	2.44*

Step/predictor	R^2	ΔR^2	ΔF	B	SE	β	t
Recruitment venue				0.23	.15	.12	1.55
Criterion: CFRS: dividing feeding responsibility with child, F(8,153)=8.49, p<.001							
Step 1	.14	.14	8.24***				
Years of education				0.02	.01	.20	2.38*
Maternal age				0.01	.01	.14	1.67
Maternal BMI				−0.01	.01	−.18	−2.26*
Step 2	.34	.20	7.55***				
Years of education				0.01	.01	.13	1.69
Maternal age				0.01	.01	.06	0.81
Maternal BMI				0.00	.01	−.01	−0.15
Eating for physical reasons				0.06	.04	.13	1.49
Reliance on internal cues				0.00	.05	.00	0.05
Positive eating attitudes				−0.03	.06	−.04	−0.46
Food acceptance				0.07	.05	.13	1.58
Internal regulation				−0.05	.06	−.08	−0.96
Contextual skills				0.30	.06	.43	5.04***

Note. N=180 for Monitoring; N=172 for restriction and pressure to eat (eight participants were excluded because they were not Caucasian, Asian American, or African American); N=162 for dividing feeding responsibility with child (we excluded eight participants because they were not Caucasian, Asian American, or African American and 10 participants who did not provide height and weight data). R^2 = percentage of variance accounted for by the set of predictors at each step, ΔR^2 = how much incremental variance in R^2 that is accounted for by the predictors at each step, ΔF = change in the F test from the last step, B = unstandardized beta, $SE\ B$ = standard error of the corresponding unstandardized beta, β = standardized beta, t = t value.

*
  $p<.05$.

**
  $p<.01$.

***
  $p<.001$.