Maternal correlates of maternal child feeding practices: A systematic review.

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Abstract

Establishing healthy eating habits early in life is one important strategy to combat childhood obesity. Given that early maternal child feeding practices have been linked to child food intake and weight, identifying the maternal correlates of maternal child feeding practices is important in order to understand the determinants of childhood obesity; this was the overall aim of the current review. Academic databases were searched for studies examining the relationship between maternal child feeding practices and parenting, personal characteristics and psychopathology of mothers with preschoolers. Papers were limited to those published in English, between January 2000 - June 2012. Only studies with mothers of normally developing children between the ages of 2 - 6 years were included. There were no restrictions regarding the inclusion of maternal nationality or SES. Seventeen eligible studies were sourced. Information on the aim, sample, measures and findings of these was summarised into tables. The findings of this review support a relationship between maternal controlling parenting, general and eating psychopathology, and socioeconomic status and maternal child feeding practices. The main methodological issues of the studies reviewed included inconsistency in measures of maternal variables across studies and cross-sectional designs. We conclude that the maternal correlates associated with maternal child feeding practices are complex, and the pathways by which maternal correlates impact these feeding practices require further investigation.

Keywords: preschool, mothers, feeding, obesity, maternal characteristics, maternal behaviours
Introduction

Childhood obesity is a worldwide problem that tends to track into adulthood. It is estimated that in 2020 the global prevalence of childhood obesity will have risen a further 2.4% to reach 9.1% (de Onis et al. 2010). Establishing healthy eating habits early in life, is seen as one important strategy to combat childhood obesity (Savage et al. 2007; Skouteris et al. 2011). Given that mothers tend to be the primary caregivers of young children, understanding their influence on the child food supply and socialisation towards food, as their children develop adult-like food intake patterns and eating behaviours, is of importance (Savage et al. 2007).

To date, a substantial amount of research has focused on the relationship between maternal child feeding practices and child food intake and weight (Birch & Fisher 2000; Clark et al. 2007; Crouch et al. 2007; Galloway et al. 2006; Kröller & Warschburger 2008; Ventura & Birch 2008). Maternal child feeding practices are defined as the behavioural strategies that mothers employ to influence their child’s food intake (Gregory, Paxton & Brozovic 2010). The most highly researched maternal feeding practices are restricting food intake (restriction), pressuring a child to eat (pressure to eat), and monitoring what a child eats (monitoring) (Birch et al. 2001). Paradoxically, maternal restriction is related positively to child weight status (Birch & Fisher 2000; Crouch, O’Dea & Battisti 2007; Fisher & Birch 1999a, b) and child food consumption once the prohibited food is available (Fisher & Birch 1999b; Jansen, Mulkens & Jansen 2007). In comparison, maternal pressure is associated with both increased (Campbell, Crawford & Ball 2006) and decreased (Fisher et al. 2002; Galloway et al. 2006; Galloway et al. 2005) child food intake and lower weight/adiposity (Crouch et al. 2007; Farrow & Blissett 2008; Kröller & Warschburger 2008; Matheson et al. 2006; Powers et al. 2006; Spruijt-Metz et al. 2002). Monitoring of child eating has been less researched; while several studies have failed to report a relationship between maternal monitoring and child food intake (Kröller & Warschburger 2008) and child BMI (Crouch et al. 2007; Farrow & Blissett 2008; Kröller & Warschburger 2008; Musher-Eizenman et al. 2009; Spruijt-Metz et al. 2002), Faith et al. (2004) reported a negative relationship between monitoring of child fat intake and child body mass index (BMI) amongst children with a low risk of becoming obese. Restriction, pressure to eat, and monitoring may be regarded as controlling or non-responsive maternal child feeding practices as they fail to recognize and appropriately respond to a child’s internal cues of hunger. Such maternal child feeding practices may disrupt a child’s ability to self-regulate their own food intake (DiSantis et al.
While understanding the potential correlates and consequences of maternal child feeding practices in relation to child eating and BMI is important, it is also important to understand what factors are associated with maternal feeding practices and what factors mediate or moderate the associations between maternal feeding practices and child eating and BMI. Given that for preschoolers, mothers tend to be responsible for the emotional and social factors of the feeding experience, as well as the quality, quantity and timing of food availability (Harrison et al. 2011), evaluating the maternal correlates of maternal feeding practices may inform the design of targeted intervention programs that prevent unhealthy weight gain early in life. Hence, the purpose of this review was to undertake a systematic conceptual and methodological review of the literature on the maternal correlates of maternal child feeding practices during the formative preschool years. There are a wide range of maternal variables implicated in the development of childhood obesity, however, we focused our review only on the proximal maternal correlates (within the mother) of maternal child feeding practices, as opposed to environmental or family-based variables that impact on mothers (e.g. work/employment; household situation). Consequently, we sourced published papers that investigated the relationships between maternal parenting, personal characteristics and psychopathology and maternal child feeding practices; each of these proximal maternal factors have been shown to be associated with child weight and eating (Chen & Kennedy 2004; Kröller & Warschburger 2008; McDermott et al. 2008; McPhie et al. 2011; Moens et al. 2009; Ogden et al. 2006; Olvera & Powers 2010; Parsons et al. 1999; Rhee et al. 2006; Vereecken et al. 2004; Zeller et al. 2007), and may mediate or moderate the relationship between how mothers feed their children and child food intake and/or weight. For example, Gubbels et al. (2009) explained that the tendency for mothers to restrict their child’s intake of sweets, crisps, sugar and soft-drinks may be a reflection of a restrictive parenting style. Additionally, Rhee (2008) argued that child weight may be influenced by parenting factors interacting with specific parent behaviours, such as how mothers feed their children. Also, mothers with a higher SES are more likely to rely on controlling child feeding practices, such as structuring mealtimes and/or dictating portion size (Ogden et al. 2006; Orrell-Valente et al. 2007), and Haycraft and Blissett (2008a) reported that maternal and paternal eating psychopathology, anxiety, and to some extent depression are linked to greater control and reduced sensitivity in parental child feeding practices. Hence, the following questions were addressed in this review:
1) What are the maternal correlates of maternal child feeding practices?

2) What are the methodological limitations of research to date?

3) What recommendations can be made for future research?

**Method**

*Search strategy*

Our review was informed by the PRISMA statement (Liberati et al. 2009). The purpose of the PRISMA guidelines is to ensure that systematic reviews are reported in their entirety and transparently. As such, PRISMA guidelines use a 27-item checklist that details the requirements for each section of the review (i.e. title, abstract, introduction, methods, results, discussion, funding) and 4-phase flow diagram detailing article inclusion/exclusion. The purpose of this search strategy was to identify all papers focused on maternal parenting and/or personal characteristics and/or psychopathology and maternal child feeding practices. A search of CINAHL with full text, Medline with full text, Health Source-Consumer Edition, PsycINFO, PsycARTICLES, Psychological and Behavioural Sciences Collection, Expanded Academic ASAP, Health Reference Centre Academic, Scopus and Science Direct was conducted. Jstor was also searched for studies exploring the relationship between maternal parenting and maternal child feeding practices. The search was conducted in June 2012 and the search strategy outlined in Box 1 was followed. Additional File 1 details the full search strategy for one database.

*Inclusion and exclusion criteria*

Papers were limited to those published in English and between January 2000 and June 2012. This systematic review only included mothers of normally developing children (i.e., not born preterm, not diagnosed with physical or mental health complications) between 2- and 6-years-old (i.e., preschoolers). There were no restrictions regarding the inclusion of maternal nationality or SES. Studies which examined mothers from special groups (i.e., teen mothers) were excluded. While the focus of this review was on mothers, studies that involved both mothers and fathers were included. To facilitate comparisons across studies, those reporting only qualitative data were excluded.

*Selection process*

Figure 1 shows a flow diagram of the processing of search results from the initial literature review (N=715). The titles and abstracts of the initial papers identified were screened by one
author (S.M.) for potential eligibility; 544 articles were excluded as they did not meet the inclusion criteria for this review. The full texts of the remaining 40 articles were read by all authors (S.M. doctoral candidate; H.S. associate professor; L.D. professor; E.J. PhD candidate); 17 papers were deemed relevant for this review. A full list of excluded studies and their reasons for exclusion can be found in Additional File 2.

Data abstraction

Information from the studies was summarised into three tables to improve the ease of comparability of findings across studies depending on which maternal correlates were the focus of the research. As such, Table 1 includes studies examining the association between maternal parenting and maternal child feeding practices. Table 2 summarises studies investigating the relationship between maternal personal characteristics and maternal child feeding practices. Table 3 summarises studies examining the association between maternal psychopathology and maternal child feeding practices. These tables permitted comparisons of aims, samples, methodology, and results. The variables included in the tables were: the country of study, maternal and child age, maternal child feeding practices and maternal parenting (Table 1) or maternal personal characteristics (Table 2) or maternal psychopathology (Table 3). The summary statistics (e.g., multiple regression, correlation, least squares means) differed across articles. Due to the wide variety of analyses reported in the included papers, the studies were compared using a range of reported results. In accordance with the PRISMA guidelines, the studies were also reviewed to determine if they were biased for selective reporting by one author (S.M.). Examples of selective reporting include studies reporting only significant results, not providing adequate details regarding sample characteristics or using inadequate/inappropriate measures. Such studies were included in the current review, however their findings were interpreted with caution.

Summary of included studies

Seventeen studies were included in the review of the association between maternal parenting, personal characteristics or psychopathology and maternal child feeding practices (Anderson et al. 2005; Blissett & Haycraft 2008, 2011; Blissett et al. 2006; De Lauzon-Guillain et al. 2009; Evans et al. 2011; Francis et al. 2001; Haycraft & Blissett 2008a, 2011; Hughes et al. 2005; Hughes et al. 2008; Jingxiong et al. 2009; McPhie et al. 2011; Musher-Eizenman et al. 2009; Ventura et al. 2010; Vereecken et al. 2010; Ystrom, Barker & Vollrath 2012). Five of the studies are summarised in more than one table (Blissett & Haycraft 2008; Blissett et al. ...
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2006; De Lauzon-Guillain et al. 2009; Francis et al. 2001; Hughes et al. 2008). The majority of the studies included children over age 3 years (n = 14), while only three studies (Evans et al. 2011; Jingxiong et al. 2009; Ystrom, Barker & Vollrath 2012) included children < 3 years. Tables 1, 2 and 3 summarise the aim, sample characteristics, measures and findings for each of these 17 studies, and hence will not be repeated in the subsections below.

The most frequently used measures for maternal child feeding practices were the subscales of the Child Feeding Questionnaire by Birch and colleagues (CFQ; 2001) (Anderson et al. 2005; Blissett & Haycraft 2008; Blissett et al. 2006; Francis et al. 2001; Haycraft & Blissett 2008a, 2011; McPhie et al. 2011; Ystrom, Barker & Vollrath, 2012). Five other measures were used to assess maternal child feeding practices: the Caregiver’s Feeding Styles Questionnaire by Hughes and colleagues (CFSQ; 2005) (Hughes et al. 2005; Hughes et al. 2008; Vereecken et al. 2010); the Comprehensive Feeding Practices Questionnaire by Musher-Eizenman and Holub (CFPQ; 2007) (De Lauzon-Guillain et al. 2009; Musher-Eizenman et al. 2009); the Feeding Demands Questionnaire by Faith and colleagues (FEEDS; 2008) (Ventura et al. 2010); the Preschooler Feeding Questionnaire (PFQ; Baughcum et al. 2001) (Evans et al. 2011), and the Family Mealtime Coding System by Haycraft and Blissett (FMCS; 2008b) (Blissett & Haycraft 2011). Finally, Jingxiong et al. (2009) conceptualised maternal child feeding practices in a different way and developed a questionnaire to measure feeding on schedule and using food to soothe children.

Results

Association between maternal parenting and maternal child feeding practices

Three cross-sectional studies were included in the review of the association between maternal parenting and maternal child feeding practices (Blissett & Haycraft, 2008; Francis et al. 2001; Vereecken et al. 2010) and are presented in Table 1. The samples included in these studies differed: equal numbers of mothers and fathers (Blissett & Haycraft 2008), mothers of daughters only (Francis et al. 2001), and mothers but not fathers (Vereecken et al. 2010). In addition, predominately Caucasian samples were included in these studies (Blissett & Haycraft 2008; Francis et al. 2001; Vereecken et al. 2010), and therefore cultural or ethnic variations were not considered. Mothers in all three of the studies were in their mid-thirties (Blissett & Haycraft 2008; Francis et al. 2001; Vereecken et al. 2010).

Maternal parenting was measured differently across each of these studies. Blissett and Haycraft (2008) used the Parenting Styles and Dimensions Questionnaire by Robinson et al. (PSDQ; 2001); Francis et al. (2001) used Baumrind’s (1971) measure of general parental
control and Vereecken et al. (2010) used parenting laxness, overreactivity and support/positive interaction dimensions from the Parent Practices Scale by Strayhorn and Weidman (PPS; 1998).

The study by Francis et al. (2001) suggested that mothers who have a more demanding or controlling (i.e., rigid) parenting style might be more likely to put pressure on their child to eat. Findings by Vereecken et al. (2010) also supported this association as maternal discipline (which is seen as equivalent to demandingness in this review) was related positively to parent-centred feeding strategies (e.g. pressure to eat and restriction). In contrast, Blissett and Haycraft (2008) did not find an association between maternal parenting and maternal pressure to eat, but reported a positive relationship between permissive/indulgent parenting style and maternal restriction.

These three cross-sectional studies were assessed for risk of bias in the reporting of sample characteristics and inclusion of significant and non-significant results. One of the studies did not report selected sample characteristics including father age (9% of the primary caregivers of this sample were fathers), and socioeconomic variables such as family income and maternal educational level or parental weight status (Vereecken et al. 2010); consequently, the capacity to generalise the findings of this study is reduced.

Associations between maternal personal characteristics and maternal child feeding practices

Twelve cross-sectional studies and one longitudinal study evaluated the relationships between maternal personal characteristics and maternal child feeding practices (Anderson et al. 2005; Blissett & Haycraft 2008; Blissett et al. 2006; De Lauzon-Guillain et al. 2009; Evans et al. 2011; Francis et al. 2001; Hughes et al. 2005; Hughes et al. 2008; Jingxiong et al. 2009; McPhie et al. 2011; Musher-Eizenman et al. 2009; Ventura et al. 2010; Ystrom, Barker & Vollrath, 2012); these studies are presented in Table 2. While nine studies included samples of mothers and fathers (Anderson et al. 2005, Blissett & Haycraft 2008; Blissett et al. 2006; De Lauzon-Guillain et al. 2009; Evans et al. 2011; Hughes et al. 2005; Hughes et al. 2008; Musher-Eizenman et al. 2009; Ventura et al. 2010), they were mostly comprised of mothers or could (due to separate analyses) easily be separated and results individually interpreted for mothers. One study included mothers of daughters only in their sample (Francis et al. 2001). Six nationalities were represented across the studies: Australian, Norwegian, American, French, British and Chinese.

Six studies examined the relationship between maternal ethnicity and maternal child feeding practices (de Lauzon-Guillain et al. 2009; Evans et al. 2011; Hughes et al. 2005;
Hughes et al. 2008; Musher-Eizenman et al. 2009; Ventura et al. 2010), with five studies reporting at least partial support for this association (de Lauzon-Guillain et al. 2009; Evans et al. 2012; Hughes et al. 2005; Musher-Eizenman et al. 2009; Ventura et al. 2010). Using the CFSQ, Hughes and colleagues report mixed associations with ethnicity. While one of their studies revealed differences in the use of uninvolved and indulgent feeding practices between African-American and Hispanic mothers (Hughes et al. 2005), this finding was not replicated in a subsequent study (Hughes et al. 2008).

A significant relationship between maternal socioeconomic background, as measured by maternal education and/or family income, and maternal child feeding practices was reported in six studies (Anderson et al. 2005; Blissett & Haycraft 2008; Francis et al. 2001; McPhie et al. 2011; Musher-Eizenman et al. 2009; Ystrom, Barker & Vollrath, 2012). Family income was related negatively to maternal use of pressure to eat amongst non-overweight mothers (Francis et al. 2001). Higher maternal education was associated with lower use of maternal restriction (Blissett & Haycraft 2008) and monitoring (McPhie et al. 2011). In contrast, lower maternal education was related to higher use of food as an incentive (Musher-Eizenman et al. 2009), less concern about child’s weight amongst African-American mothers, and to greater perceived responsibility for feeding the child (i.e., responsibility for the frequency, portion size, kind of foods their child’s food intake) amongst Hispanic mothers (Anderson et al. 2005). However, one study did not find a relationship between maternal education/income and maternal feeding practice (Evans et al. 2011).

Six studies investigated the relationship between maternal weight and maternal child feeding practices, with inconsistent findings (Blissett & Haycraft 2008; Blissett et al. 2006; Jingxiong et al. 2009; McPhie et al. 2011; Musher-Eizenman et al. 2009; Ystrom, Barker & Vollrath, 2012). Jingxiong et al. (2009) and Musher-Eizenman et al. (2009) found a significant negative relationship between maternal weight and mothers teaching their children about nutrition, encouraging balance and variety in their child’s diet, and modelling healthful eating behaviours. In contrast, Blissett and Haycraft (2008), Blissett et al. (2006) and McPhie et al. (2011) did not find an association between maternal weight and how mothers feed their children. However, these studies were quite different; one sample consisted of Chinese mothers of infants through to preschoolers (Jingxiong et al. 2009), one was comprised of Australian mothers and their preschoolers (McPhie et al. 2011), and the two other samples included British families with preschoolers (Blissett & Haycraft 2008; Blissett et al. 2006).

The risk of bias across these 13 studies was assessed, and despite including some maternal personal characteristics, five studies did not provide information on the age, weight
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status or socioeconomic background of the mothers in their samples (De Lauzan-Guillain et al. 2009; Evans et al. 2011; Haycraft & Blissett 2008a; Jingxiong et al. 2009; Ventura et al. 2010). One study did not use a previously validated instrument to measure maternal child feeding practices, and despite including maternal child feeding practices and maternal weight status in their analyses, Jingxiong et al. (2009) only provided limited information on how these variables were assessed. To better understand the appropriateness of using this measure, it is necessary to validate this tool in future studies; until then, results and associations from this study should be interpreted with caution.

Associations between maternal psychopathology and maternal child feeding practices

Eight cross-sectional studies and one longitudinal study evaluated the relationships between maternal psychopathology and maternal child feeding practices (Blissett & Haycraft 2008, 2011; Blissett et al. 2006; De Lauzon-Guillain et al. 2009; Francis et al. 2001; Haycraft and Blissett, 2008a, 2011; Hughes et al. 2008; Ystrom, Barker & Vollrath, 2012); these studies are presented in Table 3. American, British, Norwegian and French samples were used across these studies. Again, the majority of studies involved samples of mothers and fathers (Blissett & Haycraft 2008; Blissett et al. 2006; De Lauzon-Guillain et al. 2009; Haycraft & Blissett, 2011; Hughes et al. 2008), and most studies either separately analysed mothers from the fathers or their sample was comprised mainly of mothers. One sample was restricted to mothers of daughters only (Francis et al. 2001).

The relationship between maternal eating psychopathology (e.g., bulimia, drive for thinness, body dissatisfaction) and maternal child feeding practices was assessed in seven studies (Blissett & Haycraft 2008, 2011; Blissett et al. 2006; de Lauzon-Guillain et al. 2009; Francis et al. 2001; Haycraft & Blissett 2008a, 2011). While five studies used the Eating Disorder Inventory-2 (EDI-2; by Garner 1991) to assess maternal eating psychopathology (Blissett & Haycraft 2008, 2011; Blissett et al. 2006; Haycraft & Blissett 2008a, 2011), de Lauzon-Guillain et al. (2009) used the Dutch Eating Behaviour Questionnaire (DEBQ; Van Strien et al. 1986), Francis and colleagues (2001) used the Weight Concern Scale (WCS; Killen et al. 1994) and the Three-Factor Eating Questionnaire (TFEQ; Stunkard & Messick, 1985). The majority of these studies, found at least partial support for an association between maternal eating psychopathology and maternal child feeding practices (Blissett & Haycraft 2008, 2011; Blissett et al. 2006; de Lauzon-Guillain et al. 2009; Francis et al. 2001; Haycraft & Blissett 2008a). Maternal bulimia was associated positively with restriction of daughter’s food intake, yet no maternal eating psychopathology variables were related to the use of this
maternal child feeding practice amongst sons (Haycraft & Blissett 2008a). In contrast, Haycraft and Blissett (2011) did not report a relationship between maternal eating psychopathology and maternal child feeding practices.

Five studies examined the association between general maternal psychopathology and maternal child feeding practices (Evans et al. 2011; Francis et al. 2001; Haycraft & Blissett 2008a, 2011; Hughes et al. 2008). Across these studies a variety of mental health concerns were assessed (i.e., depression, hostility, psychoticism, interpersonal insensitivity, phobic anxiety, general psychopathology, positive and negative affect). However for simplicity, and to differentiate from the previously discussed eating psychopathology, this diverse range of mental health concerns will be termed ‘general maternal psychopathology’ here. Like maternal eating psychopathology, there was variation in how general maternal psychopathology was assessed within these studies. Two studies by Haycraft and Blissett (2008a, 2011) used scales from the Brief Symptom Inventory (BSI; Derogatis, 1993), one study used the Centre of Epidemiologic Studies depression scale by Radloff (CES-D; 1977) (Francis et al. 2001), and another used the Positive and Negative Affect Schedule by Watson et al. (PANAS; 1988) (Hughes et al. 2008). In addition, Ystrom, Barker, and Vollrath (2012) combined measures of anxiousness/depression (short version of the Hopkins Symptom Checklist by Strand et al. 2003), anger (Anger subscale of the Differential Emotions Scale by Izard et al. 1993) and self-esteem (short version of the Rosenberg Self-Esteem Scale, by Rosenberg 1989) to create a negative affectivity variable. All five studies demonstrated some evidence for the relationship between general maternal psychopathology and maternal child feeding practices. For example, maternal general psychopathology was related positively to maternal pressure for her child to eat, and not related to maternal restriction and monitoring (Haycraft & Blissett 2011). In contrast, Francis et al. (2001) and Haycraft and Blissett (2008a) found that maternal general psychopathology was related positively to maternal restriction of the daughter’s or child’s food intake, respectively.

The risk of bias across these nine studies was assessed, and De Lauzan-Guillain et al. (2009), and Haycraft and Blissett (2008a) included some maternal personal characteristics information, but did not report on maternal age, weight status or socioeconomic background specifically. As such, identifying the relevant sample for which these results apply is somewhat ambiguous.

Discussion
To date, research has implicated maternal child feeding behaviours in the development of childhood obesity. To a lesser extent, the existing literature has also focused on maternal parenting, personal characteristics and psychopathology as correlates of maternal feeding practices during the formative preschool years. Understanding the role of these proximal maternal correlates in the development of child eating habits and weight gain patterns may inform preventative efforts to reduce childhood obesity.

**Summary of findings**

The findings of the studies in this review appear to support a relationship between maternal parenting and maternal child feeding practices. However, given the paucity of studies and inconsistency in how maternal parenting is conceptualised and subsequently measured, only tentative conclusions can be drawn. Two out of the three studies support the hypothesis that maternal parenting control and demandingness are related positively to controlling maternal child feeding practices, including pressure to eat and restriction (Francis et al. 2001; Vereecken et al. 2010).

The findings of this review also showed that maternal personal characteristics are significantly associated with maternal child feeding practices. More specifically, there was evidence to suggest that maternal SES, as determined by maternal education or family income, and ethnicity are correlated with how mothers feed their children. Both maternal SES and culture may influence a mother’s knowledge, beliefs and/or motivation regarding maternal child feeding practices (Anderson et al. 2005; de Lauzon-Guillain et al. 2009; Hendrie et al. 2008; Kumanyika 2008). In contrast, the empirical support for maternal weight as a correlate of maternal child feeding practices was inconsistent.

Additionally, the findings of this review suggest that maternal general and eating psychopathology are associated with maternal child feeding practices. That is, maternal eating psychopathology was more often found to be associated with greater use of maternal restriction and maternal general psychopathology tended to be related positively to maternal pressure to eat. It appears therefore that both maternal eating and general psychopathology are linked to greater control and reduced sensitivity in how mothers feed their children (Blissett & Haycraft 2011; Blissett et al. 2006; Francis et al. 2001; Haycraft & Blissett 2008a, 2011), which may disrupt the child’s ability to self-regulate their food intake based on internal hunger cues (DiSantis et al. 2011; Johnson & Birch 1994). This disturbance in child self-regulation may encourage child eating behaviours associated with excessive weight gain.
Limitations of the studies reviewed and implications for future research

This review highlighted a number of methodological issues, the first of which is the wide variation in how maternal variables were measured; this was particularly true for maternal parenting and maternal child feeding practices. For example, all three studies that investigated the relationship between maternal parenting and maternal child feeding practices used a different instrument or conceptualisation of parenting. Similarly, there were six different measures used to assess maternal child feeding practices across all studies included in this review. This lack of consistency in study measures reduces the comparability of results between studies. In addition, Jingxiong et al. (2009) did not use a validated instrument to measure maternal child feeding practices.

All except one of the studies included in this review were cross-sectional. As such, neither the directionality of the relationships between the maternal correlates and maternal child feeding practices can be explicitly determined, nor the long-term relationships between maternal correlates and maternal child feeding practices. Moreover, the studies included in this review had relatively small sample sizes, thereby restricting the generalisation and accuracy of their findings. Many of the studies focused only on simple correlations and often did not adjust for covariates. Collectively, these issues may compromise the strength of the findings amongst the reviewed studies.

A final methodological limitation was the variability of parent and child gender across the samples. For example, 10 studies included mothers and father, two studies examined daughters and sons separately (Blissett et al. 2006; Haycraft & Blissett 2008a), while another only included daughters (Francis et al. 2001). The results of Haycraft and Blissett (2008a) and Blissett et al. (2006) demonstrated that the role of maternal child feeding practices varies depending on child gender.

Given these methodological limitations, future research may benefit from unifying the conceptualisation, and subsequent measurement, of maternal child feeding practices to improve the comparability of findings across studies. In addition, large longitudinal studies are needed to establish directionality and the pathways linking maternal correlates of how mothers feed their children to child eating and weight and future reviews may benefit from exploring the role of child correlates of maternal child feeding practices. For example, the mother-child interaction has been shown to be related to preschooler weight (McPhie et al. 2011; Washington et al. 2010), and Skouteris et al. (2011) proposed childhood obesity research move from a top-down to a more interactive relationship-based approach when examining the influence of parents on child weight gain.
Limitations of the scope of this review

The primary limitation of the current review was it only concentrated on a restricted selection of maternal correlates associated with maternal child feeding practices. Findings of existing research (Francis et al. 2001; Haycraft & Blissett 2008a, 2011; Musher-Eizenman et al. 2009) and the ecological model (Bronfenbrenner 1993; Harrison et al. 2011) suggest that a wide range child, family, and community variables are likely to influence child weight status. For example, previous research has shown that maternal cognition and beliefs, such as perceptions or concerns of their children’s body size are related to maternal child feeding practices (Brann & Skinner 2005; McCabe et al. 2007) and child weight (Davison & Birch 2001; Spruijt-Metz et al. 2002). Similarly, personal characteristics not considered in this review, such as maternal employment, maternal parity or household composition, are also likely to be key correlates of feeding practices. As such, other important avenues for further review are the pathways between child, family or environmental factors and maternal child feeding practices.

Additionally, the focus of the current review did not extend to the role of paternal correlates and paternal child feeding practices. While most research undertaken in this area has included mothers as the primary caregivers, fathers have received markedly less attention; research focused specifically on the paternal influences of preschool children’s weight gain, overweight and obesity is needed (Fraser et al. 2011).

Finally, the grouping of a wide range of mental health concerns into a single category of maternal general psychopathology may have impeded coherent associations from being identified. The diverse range of maternal mental health concerns investigated in the studies included in the current review suggests this maternal correlate warrants further attention.

Implications for interventions

The maternal correlates focused on in the current review are not easily changeable. However, identifying mothers at risk for developing or performing unhealthy feeding practices is important and may allow for intervention programs to target their needs. For example, different interventions may be needed for families from various ethnic/cultural groups, or socioeconomic backgrounds. Similarly, interventions addressing maternal pressure to eat for mothers with general psychopathology, and restriction of daughters’ food intake for mothers
with eating psychopathology may be beneficial. Likewise, it may be valuable for
interventions to approach maternal child feeding practices from within the context of
parenting. Tailoring interventions that aim to modify maternal feeding practices to the needs
of the mothers in the target group is likely to enhance the effectiveness of childhood obesity
prevention programs.

Similarly, the results of Blissett et al. (2006), and Haycraft and Blissett (2008a)
highlight the need to continue stratifying study results based on child gender in future
childhood obesity research; that is, gender effects need to be considered when designing
interventions. In particular, child gender appears to have a role in studies examining the
relationship between maternal eating psychopathology and maternal child feeding practices.
As such, mothers who report eating psychopathology tend to use controlling feeding practices
more often with daughters than sons (Blissett et al. 2006; Haycraft & Blissett 2008a). Again,
accounting for the potential interaction between maternal child feeding practices and child
gender may be beneficial when designing childhood obesity prevention programs.

Conclusions

The role of maternal influences, particularly maternal feeding practices, in the development
of childhood obesity, is complex and the pathways that contribute to child weight gain
require further understanding. However, the findings of this review suggest that maternal
parenting and maternal characteristics (personal and psychopathology) are likely to be
correlated with maternal child feeding practices. Future childhood obesity research needs to
account for these maternal variables when examining the determinants of child eating and
weight gain. By doing so, the multi-dimensional impact of maternal behaviors on child
obesity risk will be better understood and will inform the design and implementation of
interventions designed to prevent excessive weight gain during the formative preschool years.
Key messages
Maternal parenting, personal characteristics and psychopathology are associated with maternal child feeding practices.
There are variations in sample characteristics and measurement of key maternal variables within the current literature examining maternal correlates of maternal child feeding practices.
Research examining the longitudinal pathways linking maternal parenting, personal characteristics and psychopathology to maternal child feeding practices and in turn to child food intake and weight is needed urgently.
Tailoring interventions to the needs of the mothers in the target group (e.g., culturally or socioeconomically diverse; with general or eating psychopathology; different general parenting) is likely to enhance the effectiveness of childhood obesity prevention programs.

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overweight and obesity in childhood: The six-C’s model. *Child Development Perspectives* 5, 50-58.

Haycraft, E. & Blissett, J. (2008a) Controlling feeding practices and psychopathology in a
non-clinical sample of mothers and fathers. *Eating Behaviors* 9, 484-492.

Haycraft, E. & Blissett, J. (2008b) Maternal and paternal controlling feeding practices:
Reliability and relationships with BMI. *Obesity* 16, 1552-158.

Haycraft, E. & Blissett, J. (2011) Predictors of parental and maternal controlling feeding
practices with 2- to 5-year-old children. *Journal of Nutrition Education and
Behavior* Available online 2 March 2011. doi:10.1016/j.jneb.2010.03.001

demographic variation in knowledge level in an Australian community sample.

*Public Health Nutrition* 11, 1365-1371.


feeding style and children’s weight status in preschool. *Journal of Developmental
and Behavioral Pediatrics* 28, 403-410.

and their relations to traits of personality. *Journal of Personality and Social
Psychology* 64, 847–860.

leads to their relatively higher consumption in children. *Appetite* 47, 572-577.

Relationship of parental characteristics and feeding practice to overweight in infants

*Pediatrics* 94, 653-661.

Pursuit of thinness and onset of eating disorder symptoms in a community sample of


systematic review of the literature. *Early Child Development and Care* First
published on: 21 April 2011 (iFirst).

between mothers’ child-feeding practices and children's adiposity. *American Journal

status of the Norwegian population: a comparison of the instruments SCL-25, SCL-

and mental health. *Journal of the American Academy of Child and Adolescent
Psychology* 27, 613-618.


Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and


diverse sample of low-income parents of preschool-age children. *Journal of
Nutrition Education and Behavior* 42, 242-249.

food parenting practices and food habits of young children. *Appetite* 43, 93-103.

feeding practices and child characteristics with young children’s fruit and vegetable
consumption. *Appetite* 55, 589-596.

style and intergenerational transmission of obesity risk. *Obesity Research* 10, 453-
462.

Changes in family variables among normal and overweight preschoolers. *Issues
Comprehensive Pediatric Nursing* 33, 20-38.


**Box 1. Search Terms**

<table>
<thead>
<tr>
<th>Search Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child* OR pediatric*</td>
</tr>
<tr>
<td>Parent* OR parenting style OR childrearing practices</td>
</tr>
<tr>
<td>Parent* demograph* OR parent* psychopath* OR parent* character*</td>
</tr>
<tr>
<td>Parent* mental health OR parent* belie* OR parent* body dissatisfac*</td>
</tr>
<tr>
<td>Feeding practic* OR feeding strateg* OR feeding behavior OR feeding style</td>
</tr>
</tbody>
</table>
Records identified through database searching 
(n = 715)

Additional records identified through other sources 
(n = 0)

Records after duplicates removed 
(n = 584)

Records screened 
(n = 584)

Records excluded 
(n = 544)

Full-text articles assessed for eligibility 
(n = 40)

Studies included in qualitative synthesis and review 
(n = 17)

Full-text articles excluded, with reasons 
(n = 23)

Did not include maternal child feeding practices = 7
Did not assess relationship between maternal correlates and child feeding practices = 4
Children are not between 2 and 6 years old = 8
Qualitative design = 2
Review = 2

Figure 1. Flow of Studies included in review.
### Studies examining the relationship between maternal parenting and maternal child feeding practices (N = 3)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Participant characteristics; study design</th>
<th>Study aim/s</th>
<th>Measures of Maternal Child Feeding Practices</th>
<th>Measures of Maternal Parenting Correlates</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blissett &amp; Haycraft (2008)</td>
<td>n = 48 pairs of cohabiting parents (96 parents; 48 mothers)</td>
<td>To investigate the associations between parenting styles, parent child feeding practices and parent Body Mass Index.</td>
<td>Monitoring, restriction and pressure to eat subscales on the Child Feeding Questionnaire(^a)</td>
<td>Parenting Styles and Dimensions Questionnaire(^b) that measures authoritative, authoritarian and permissive parenting style.</td>
<td>Maternal monitoring was negatively associated with permissive/indulgent parenting style ((r = -0.30, p &lt; 0.05)). Maternal restriction was positively related to permissive/indulgent parenting style ((r = 0.26, p &lt; 0.05)). No other maternal parenting styles were related to maternal child feeding practices.</td>
</tr>
<tr>
<td>UK</td>
<td>Mean mother age = 35.7 years Mean father age = 37.1 years Mean child age = 41.6 months</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Questionnaires Cross-sectional</td>
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</tr>
<tr>
<td>Francis et al. (2001)</td>
<td>n = 197 mothers</td>
<td>To explore the role of child and maternal characteristics on maternal use of restriction of energy-</td>
<td>Restriction and pressure to eat scales on the CFQ(^a).</td>
<td>Baumrind's measure(^c) of general parental control to categorise parenting style as authoritative,</td>
<td>More rigid general parenting was related to greater pressure to eat amongst non-overweight mothers ((\beta = 0.30, p &lt; 0.05)). There was no relationship between pressure to eat</td>
</tr>
<tr>
<td>Study</td>
<td>Sample Size and Characteristics</td>
<td>Methodology</td>
<td>Research Questions</td>
<td>Findings</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
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</tr>
<tr>
<td>Vereecken et al. (2010)</td>
<td>$n = 755$ (91% mothers)</td>
<td>Questionnaires; objective measurement of weight and height</td>
<td>To investigate the extent to which parent and child characteristics are related to child fruit and vegetable intake.</td>
<td>Parent-centred feeding style was positively associated with parental overreactivity ($r = .13, p &lt; .001$). Child-centred feeding style was negatively correlated with parental overreactivity ($r = -.11, p &lt; .01$), and positively related to parental support/positive interactions ($r = .27, p &lt; .001$). Parental laxness was not associated with child- or parent-centred feeding style.</td>
<td></td>
</tr>
</tbody>
</table>

The subscales of child- and parent-centred feeding strategies on the CFSQ. The Parenting Practices Scale’s subscales of laxness (permissiveness and inconsistent discipline), overreactivity (exaggerated and unstructured discipline) and support/positive interactions (the extent to which parents have positive interaction with their child).


Table 2

Studies examining the relationship between maternal personal characteristics and maternal child feeding practices (N=13)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Participant characteristics; study design</th>
<th>Study aim/s</th>
<th>Measures of Maternal Child Feeding Practices</th>
<th>Measures of Maternal Personal Characteristics Correlates</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson et al. (2005)</td>
<td>USA</td>
<td>To develop a culturally valid version of the Child Feeding Questionnaire(^a) (CFQ) for two ethnic minorities.</td>
<td>The restriction, pressure to eat, monitoring, responsibility for feeding, perceived weight of child, concern about child weight scales of the CFQ(^a).</td>
<td>Parents were asked to report their ethnicity and educational achievement (as measured by high school diploma or less verse some college or more).</td>
<td>African-American parents with lower education were less concerned about their child’s weight than more highly educated African-American parents (LSM = 1.79 low ed, 2.61, higher ed, p&lt;.05). All Hispanic parents had comparable levels of concern about their child’s weight (LSM = 2.21 low ed, 2.50 higher ed, p&gt;.05). Hispanic parents with lower education were more likely to feel responsible for their child’s feeding</td>
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</tbody>
</table>
Blissett & Haycraft (2008)  

**UK**  

- *n* = 48 pairs of cohabiting parents (96 parents; 48 mothers)  
- Mean mother age = 35.7 years  
- Mean father age = 37.1 years  
- Mean child age = 41.6 months  

To investigate the associations between parenting styles, parent child feeding practices and parent Body Mass Index (BMI).  

Monitoring, restriction and pressure to eat subscales on the CFQ*.  

Self-reported BMI.  

The National Statistics Socio-Economic Classification self-coded method.  

Self-reported educational  

Mothers who continued education after 16 years of age were less likely to use restriction (*r* = -.40, *p* < .05).  

No other maternal variables were related to maternal child feeding practices.
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size and Characteristics</th>
<th>Methods of Measurement</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blissett et al. (2006)</td>
<td>n = 94 pairs of cohabitating parents (188 parents)</td>
<td>To compare paternal and maternal child feeding practices for sons and daughters. Perceived feeding responsibility, restriction, monitoring and pressure to eat subscales from the CFQ.</td>
<td>Maternal BMI was not related to maternal child feeding practices amongst daughters or sons.</td>
</tr>
<tr>
<td>UK</td>
<td>Mean parent age = 36.4 years Mean child age = 37.7 months</td>
<td>Questionnaires Cross-sectional</td>
<td></td>
</tr>
<tr>
<td>De Lauzon-Guillain et al. (2009)</td>
<td>n = 219 parents (US 97; France 122)</td>
<td>To investigate and compare some of the possible motivators of parental child feeding practices in 2 samples; 1 from the US and 1 from France. Nine domains from the Comprehensive Feeding Practices Questionnaire (CFPQ): monitoring, emotional regulation,</td>
<td>Multivariate analysis of parental perceived responsibility, perceptions of child’s body weight and eating behaviours revealed that parental restriction for weight reasons (US vs. France: $β = 0.24$, $p&lt;.01$), using food to regulate child emotions (US vs. France: $β = 0.37$,</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Sample</td>
<td>Methodology</td>
<td>Practices</td>
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<tr>
<td>Evans et al. (2011)</td>
<td>n = 659 parents (86% mothers)</td>
<td>Questionnaires Cross-sectional</td>
<td>reward, child control, teaching about nutrition, encouraging balance and variety, restriction for weight reasons, restriction for health reasons, and modelling healthful eating habits.</td>
</tr>
</tbody>
</table>

Evans et al. (2011) | USA | To compare the differences in parenting feeding according to practices ethnicity/race, household income, parent education and acculturation. | Parental ethnicity/race, household income and parent education was reported in questionnaire. | African-American parents ($\beta = .11, p < .05$) and Spanish-speaking Hispanic parents ($\beta = .12, p < .05$) were more likely to use food to calm their children. None of the other feeding practices differed between ethnicity/race, household income or parent education. |
<table>
<thead>
<tr>
<th>Francis et al. (2001)</th>
<th>$n = 197$ mothers</th>
<th>To explore the role of child and maternal characteristics on maternal use of restriction of energy-dense foods and pressure to eat when feeding their daughter.</th>
<th>Height and weight data was collected by trained staff and then BMI was calculated.</th>
<th>Family income and maternal education were not associated with pressure to eat amongst overweight mothers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>Mean mother age = 35.4 years</td>
<td></td>
<td>Maternal report of combined family income.</td>
<td>Family income had a negative relationship with pressure to eat amongst non-overweight mothers ($\beta = -.24, p &lt; .05$). No other variables were related to pressure to eat amongst non-overweight mothers.</td>
</tr>
<tr>
<td></td>
<td>Mean daughter age = 5.4 years</td>
<td></td>
<td>Maternal report of number of years of education.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Questionnaires; objective measurement of weight and height</td>
<td>Restriction and pressure to eat scales on the CFQ$^a$.</td>
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<tr>
<td></td>
<td>Cross-sectional</td>
<td>This was achieved by examining structural equation models for maternal restriction and pressure to eat, which included the following variables: maternal weight concern and restraint, daughters’ adiposity, perceptions of daughters’ weight,</td>
<td></td>
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</tbody>
</table>

$^a$ CFQ: Children’s Feeding Questionnaire.
Hughes et al. (2005) conducted a study with 231 parents (85% mothers) in the USA to investigate the validity and reliability of the CFSQ^d, amongst low-income families with preschoolers. The CSFQ aims to identify parental feeding styles based on differing level of parental demandingness and responsiveness. Parental ethnicity was reported in the questionnaire. Indulgent feeding style was more common amongst Hispanic parents (62.5%) than African-American parents (37.5%). Uninvolved feeding style was more common amongst African-American parents (66.7%) than Hispanic parents (33.3%).

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Sample Composition</th>
<th>Study Design</th>
<th>Data Collection</th>
<th>Parental Feeding Styles</th>
<th>Ethnicity Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hughes et al.</td>
<td>n = 231 parents (85% mothers)</td>
<td>Mean parent age = not reported</td>
<td>Cross-sectional</td>
<td>Questionnaires; objective collection of child weight and height</td>
<td>Demandingness and responsiveness scales in the CFSQ^d to generate 4 parent feeding styles; authoritative, authoritarian, indulgent or uninvolved.</td>
<td>Parental ethnicity was reported in questionnaire.</td>
</tr>
<tr>
<td>Hughes et al.</td>
<td>n = 718 parents (92.7%)</td>
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<td>There was no relationship between</td>
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</tbody>
</table>

In this study, concern for daughters’ weight, family income, maternal education, maternal depression and general parenting style were considered as potential correlates of maternal child feeding practices.
<table>
<thead>
<tr>
<th>Year</th>
<th>Study Location</th>
<th>Sample Size</th>
<th>Mother Age</th>
<th>Child Age</th>
<th>Ethnicity</th>
<th>Study Method</th>
<th>Data Collection</th>
<th>Parental Feeding Style</th>
<th>Maternal Weight Status</th>
<th>Child Overweight</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>USA</td>
<td>430 mothers</td>
<td>31.6 years</td>
<td>4.4 years</td>
<td>43% African-American; 29.1% Hispanic; 27.9% Caucasian</td>
<td>Questionnaires; objective collection of child and parent weight and height</td>
<td>Cross-sectional</td>
<td>Differences amongst parental affect and child temperament associated with parental feeding styles used by low-income families.</td>
<td>Responsiveness scales reported in questionnaire</td>
<td>Parent ethnicity and feeding style.</td>
<td>43% African-American; 29.1% Hispanic; 27.9% Caucasian</td>
</tr>
<tr>
<td>2009</td>
<td>China</td>
<td>n = 430 mothers</td>
<td>Mean mother age not reported</td>
<td>Child age range = 1 – 35 months</td>
<td>Interview using a questionnaire; objective collection of child height</td>
<td>To identify parental characteristic and feeding practices associated with child overweight amongst Beijing families.</td>
<td>Questionnaire interview asked mothers about their use of a regular feeding schedule and use of food to soothe their child.</td>
<td>Maternal weight status (normal-weight or overweight). How this information was collected was not reported.</td>
<td>Overweight mothers were more likely to control feeding by using a regular feeding schedule (47.7%, ( p &lt; .05 )), than normal-weight mothers.</td>
<td>Normal-weight mothers were more likely to use food to soothe their children than overweight mothers</td>
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<tr>
<td>Research</td>
<td>Sample Size</td>
<td>Methods</td>
<td>Findings</td>
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<tr>
<td>McPhie et al. 2011 Australia</td>
<td>175 mothers</td>
<td>To investigate the maternal child feeding practices, maternal parenting and the mother-child interaction as cross-sectional predictors of child eating behaviours and weight.</td>
<td>The restriction, pressure to eat and monitoring scales of the CFQ were related to maternal weight, educational achievement and family income. Maternal educational achievement was negatively correlated with monitoring of child’s food intake. Maternal weight and family income were not related to any maternal child feeding practices.</td>
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<tr>
<td>Musher-Eizenman et al. 2009 USA and France</td>
<td>219 parents (131 mothers; US 59; France 72)</td>
<td>To investigate the relationship amongst socio-cultural factors and child feeding practices between and within French and American families.</td>
<td>American mothers were more likely to use food to regulate their child’s emotions ($\chi^2 = 10.5, p &lt; .05$), use food as a reward ($\chi^2 = 14.7, p &lt; .05$), give their child control over eating ($\chi^2 = 34.1, p &lt; .05$), teach their child about nutrition ($\chi^2 = 10.5, p &lt; .05$), teach their child about nutrition ($\chi^2 = 10.5, p &lt; .05$). Maternal weight and family income were not related to any maternal child feeding practices.</td>
<td></td>
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</tr>
<tr>
<td>Questionnaires; objective collection of child weight and height</td>
<td>health reasons scales.</td>
<td>information was collected was not reported.</td>
<td>15.8, ( p &lt; .05 ) and encourage balance and variety in their child’s diet (( \chi^2 = 7.0, p &lt; .05 )), in comparison to French mothers. French mothers were more likely to monitor their child’s food intake (( \chi^2 = 7.7, p &lt; .05 )) and use restriction for weight reasons (( \chi^2 = 20.3, p &lt; .05 )), than American mothers. Higher education was related to reduced use of food as a reward by mothers (OR = .03, ( p &lt; .05 )). Mothers with a higher BMI were less likely to teach their child about nutrition (OR = .9, ( p &lt; .05 )), encourage balance and variety in their child’s diet (OR = .9, ( p &lt; .05 )), and model healthful eating.</td>
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</tbody>
</table>
Correlates of maternal child feeding practices

Family income was not related to maternal use of any child feeding practices.

| Ventura et al. (2010) | $n = 32$ (78% mothers; 53% African American; 28% East Asian; 19% Hispanic or non-Hispanic white) | To identify the parental child feeding practices and styles of low-income parents with preschoolers. | Three subscale on the Feeding Demands Questionnaire (FEEDS)\(^e\), anger/frustration, food amount demandingness, food type demandingness. | Ethnicity was presumably identified during qualitative interviews. | African American had significantly higher mean ($M=20.0$, $p<.05$) amount demandingness scores than parents of East Asian ($M=10.9$, $p<.05$) and other ethnic backgrounds ($M=14.8$, $p<.05$). African American had significantly higher mean type demandingness scores ($M=20.7$, $p<.05$) than parents of East Asian ($M=9.9$, $p<.05$) and other ethnic backgrounds ($M=14.4$, $p<.05$). There were no significant relationships between | USA | Questionnaires; qualitative interviews | Cross-sectional |

\(^e\) FEEDS = Feeding Demands Questionnaire

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| Ystrom, Barker & Vollrath (2012) Norway | $n = 14,122$ | To investigate the role of maternal negative affectivity, external parental locus of control and control-orientated child feeding practices in child food intake. | The restriction and pressure to eat scales of the CFQ$^a$. | Maternal education and weight were reported in questionnaire. | Maternal education was negatively related to pressure to eat ($\beta = -.01, p < .01$) and positively related to restriction ($\beta = .02, p < .01$). | Maternal weight was negatively related to pressure to eat ($\beta = -.01, p < .01$) and restriction ($\beta = -.01, p < .01$). |

---

**Abbreviations:** ed = education; LSM = least squares means


<table>
<thead>
<tr>
<th>Reference</th>
<th>Participant characteristics; study design</th>
<th>Study aim/s</th>
<th>Measures of Maternal Child Feeding Practices</th>
<th>Measures of Maternal Psychopathology Correlates</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blissett &amp; Haycraft (2008)</td>
<td>n = 48 pairs of cohabiting parents (96 parents; 48 mothers)</td>
<td>To investigate the associations between parenting styles, parent child feeding practices and parent Body Mass Index (BMI).</td>
<td>Monitoring, restriction and pressure to eat subscales on the CFQ&lt;sup&gt;a&lt;/sup&gt;.</td>
<td>The bulimia, drive for thinness and body dissatisfaction subscales on the Eating Disorder Inventory-2&lt;sup&gt;b&lt;/sup&gt; (EDI-2).</td>
<td>Maternal bulimia was positively associated with restriction (r = .24, p &lt; .05).</td>
</tr>
<tr>
<td>UK</td>
<td>Mean mother age = 35.7 years Mean father age = 37.1 years Mean child age = 41.6 months</td>
<td></td>
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<td></td>
<td>No other maternal variables were related to maternal child feeding practices.</td>
</tr>
<tr>
<td></td>
<td>Questionnaires Cross-sectional</td>
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<tr>
<td>Blissett &amp; Haycraft (2011)</td>
<td>n = 23 pairs of cohabitating parents (46 parents; 23 mothers)</td>
<td>This study aimed to examine whether eating disorder</td>
<td>Video recorded home observations of a normal mealtime were Drive for thinness, bulimia and body dissatisfaction scales</td>
<td></td>
<td>Maternal bulimia was related to greater use of verbal pressure to eat (r = .47, p &lt; .05). Restriction,</td>
</tr>
<tr>
<td>Study</td>
<td>Sample Size</td>
<td>Methods</td>
<td>Findings</td>
<td></td>
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<tr>
<td>UK</td>
<td>Mean mother age = 36 years, Mean father age = 37 years, Mean child age = 37 months</td>
<td>Home observations; questionnaires</td>
<td>Symptoms of mothers and fathers showed a relationship with the observed feeding practices and observed children's eating behaviour. Coded using the Family Mealtime Coding System (FMCS). The FMCS measures parental verbal pressure to eat, physical prompts to eat, restriction and use of incentives. Physical prompts to eat, and incentives were not related to maternal bulimia. Maternal drive for thinness was related to greater use of physical prompts to eat ($r = .42$, $p &lt; .05$), and verbal pressure to eat ($r = .36$, $p &lt; .05$), yet not restriction or incentives. Maternal body dissatisfaction was positively related to use of restriction ($r = .39$, $p &lt; .05$), and verbal pressure to eat ($r = .57$, $p &lt; .01$). In contrast, maternal body dissatisfaction was not related to use of physical prompts or incentives for their child to eat.</td>
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</tr>
</tbody>
</table>
| Blissett et al. (2006) | $n = 94$ pairs of cohabitating parents (188 parents) | To compare paternal and maternal child Perceived feeding responsibility, Bulimia, drive for thinness and body | Maternal bulimia was positively related to her use of restriction of }
<table>
<thead>
<tr>
<th>Country</th>
<th>Sample Size</th>
<th>Mean Parent Age</th>
<th>Mean Child Age</th>
<th>Questionnaires</th>
<th>Cross-sectional</th>
<th>Feeding Practices</th>
<th>Parental Eating</th>
<th>Statistical Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>n = 219</td>
<td>36.4 years</td>
<td>37.7 months</td>
<td>Cross-sectional</td>
<td>Questionnaires</td>
<td>Feeding Practices</td>
<td>Parental Eating</td>
<td>Parental restrained eating was related to greater use of monitoring ($\beta = .3, p &lt; .01$), and restriction for weight purposes ($\beta = .2, p &lt; .001$). Parental uncontrolled eating was associated with greater use of restriction for health reasons ($\beta = .3, p &lt; .001$), emotional regulation ($\beta = .2, p &lt; .001$), and encouragement of balance and variety in diet ($\beta = -.1, p &lt; .05$).</td>
</tr>
<tr>
<td>US and France</td>
<td>n = 219</td>
<td>36.4 years US; 37.8 years France</td>
<td>5 years US; 5.5 years France</td>
<td>Cross-sectional</td>
<td>Questionnaires</td>
<td>Feeding Practices</td>
<td>Parental Eating</td>
<td>Parental restrained eating was related to greater use of monitoring ($\beta = .3, p &lt; .01$), and restriction for weight purposes ($\beta = .2, p &lt; .001$). Parental uncontrolled eating was associated with greater use of restriction for health reasons ($\beta = .3, p &lt; .001$), emotional regulation ($\beta = .2, p &lt; .001$), and encouragement of balance and variety in diet ($\beta = -.1, p &lt; .05$).</td>
</tr>
</tbody>
</table>
Parental emotional eating was related to greater use of incentives ($\beta = .2, p < .001$). Monitoring, emotional regulation, child control, teaching about nutrition, encouraging balance and variety, restriction for weight reasons, restriction for health reasons, and modelling healthful eating habits were not related to parental emotional eating.

<table>
<thead>
<tr>
<th>Francis et al. (2001)</th>
<th>$n = 197$ mothers</th>
<th>To explore the role of child and maternal characteristics on maternal use of restriction of energy-dense foods and pressure to eat when</th>
<th>Restriction and pressure to eat scales on the CFQ$^a$.</th>
<th>Weight Concern Scale$^f$.</th>
<th>Maternal weight concern and restraint had a positive relationship with restriction amongst non-overweight mothers ($\beta = .22, p &lt; .05$) and overweight mothers ($\beta = .28, p &lt; .05$). Maternal depression was also related to greater</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>Mean mother age = 35.4 years</td>
<td>Mean daughter age = 5.4 years</td>
<td>Maternal weight concern and restraint had a positive relationship</td>
<td>Three-Factor Eating Questionnaire’s$^g$ restraint scale.</td>
<td></td>
</tr>
<tr>
<td>measurement of weight and height</td>
<td>feeding their daughter.</td>
<td>Height and weight data was collected by trained staff and then BMI was calculated.</td>
<td>restriction amongst non-overweight mothers ($\beta = 0.33$, $p &lt; 0.05$). No other variables were related to restriction amongst overweight and non-overweight mothers.</td>
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<tr>
<td>Cross-sectional</td>
<td></td>
<td>Centre for Epidemiologic Studies Depression scale.</td>
<td>Maternal weight concern/restraint and maternal depression were not associated with pressure to eat amongst overweight mothers.</td>
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</tbody>
</table>

This was achieved by examining structural equation models for maternal restriction and pressure to eat, which included the following variables: maternal weight concern and restraint, daughters’ adiposity, perceptions of daughters’ weight, concern for daughters’ weight, family income, maternal education, maternal depression and general parenting style.
<table>
<thead>
<tr>
<th>Haycraft &amp; Blissett (2008a) UK</th>
<th>$n = 214$ parents (107 mothers)</th>
<th>To investigate the role of parent and child gender in the relationship between parental controlling feeding practices and mental health.</th>
<th>Pressure to eat and restriction scales from the CFQ(^a).</th>
<th>Drive for thinness, bulimia and body dissatisfaction scales in the EDI-2(^b).</th>
<th>Maternal bulimia was associated positively with restriction of daughter’s food intake ($r = .32, p &lt; .01$). No other variables were related to maternal restriction of daughter’s food intake.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean mother age = 37 years</td>
<td>Mean father age = 37 years</td>
<td>Mean child age = 41 months for girls; 42 months for boys</td>
<td>Maternal use of pressure for her daughter to eat was correlated positively with maternal depression ($r = .26, p &lt; .05$), hostility ($r = .23, p &lt; .05$), psychoticism ($r = .31, p &lt; .01$) and Global Severity Index scores ($r = .27, p &lt; .05$). No other variables were related to maternal pressure for her daughter to eat.</td>
<td>Greater maternal interpersonal insensitivity ($r = .27, p &lt; .05$) and Global Severity Index scores ($r = .27, p &lt; .05$).</td>
</tr>
<tr>
<td>Haycraft &amp; Blissett (2011) UK</td>
<td>n = 96 parents (48 mothers)</td>
<td>To investigate predictors of controlling feeding practices by parents of preschoolers.</td>
<td>The CFQ’s monitoring, pressure to eat and restriction scales.</td>
<td>Drive for thinness, bulimia and body dissatisfaction scales from the EDI-2.</td>
<td>Maternal eating psychopathology and general psychopathology were not related to maternal monitoring or restriction.</td>
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<tr>
<td></td>
<td>Mean mother age = 35 years</td>
<td>Mean father age = 37 years</td>
<td>Mean child age = 42 months Living in West Midlands or Cambridge; UK</td>
<td></td>
<td>The BSI’s Global Severity Index.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Questionnaires</td>
<td></td>
<td>Maternal use of pressure for her child to eat was related positively to maternal general psychopathology ($r = .38, p &lt; .01$). Maternal eating psychopathology was not correlated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cross-sectional</td>
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</tbody>
</table>

Severity Index (a measure of current and past level of symptomology, as determined by distress intensity and number of symptoms). $r = .30, p < .05$ were associated with pressure for her son to eat. No other variables were related to maternal pressure for her son to eat. Maternal restriction of her son’s food intake was correlated positively with maternal phobic anxiety ($r = .28, p < .05$). No other variables were related to maternal restriction of her son’s food intake.
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Methodology</th>
<th>Purpose</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hughes et al. (2008)</td>
<td>USA: 718 parents (92.7% mothers)</td>
<td>Cross-sectional</td>
<td>To investigate differences amongst parental affect and child temperament associated with parental feeding styles used by low-income families.</td>
<td>Demandingness and responsiveness scales in the CFSQ to generate 4 parent feeding styles; authoritative, authoritarian, indulgent or uninvolved. The trait versions of the positive and negative affect scales of the Positive and Negative Affect Schedule. Negative parental affect was lower amongst parents with an indulgent feeding style (mean = 19.2) than parents with an authoritarian feeding style (mean = 21.1, p &lt; .05). Parents with an uninvolved feeding style tended to have lower positive affect (mean = 32.9) than parents with an authoritative feeding style (mean = 36.5, p &lt; .05) or indulgent feeding style (mean = 36.0, p &lt; .05).</td>
</tr>
<tr>
<td>Ystrom, Barker &amp; Vollrath (2012)</td>
<td>Norway: 14,122</td>
<td>Longitudinal (measurements)</td>
<td>To investigate the role of maternal negative affectivity, external parental locus of control and control-orientated child feeding practices in with pressure to eat.</td>
<td>The restriction and pressure to eat scales of the CFQ. Negative affectivity was assessed using a combination of measures. These included anxiousness/depressio n scales on the short and restriction (β = .34, p &lt; .01). Using structural equation modelling, maternal negative affectivity was related positively to external parental locus of control (β = .55, p &lt; .01), which in turn was related to pressure to eat (β = .29, p &lt; .01).</td>
</tr>
</tbody>
</table>
| Take at 6-months, 18-months and 3-years postpartum) | child food intake. | version of the Hopkins Symptom Checklist, anger subscale of the Differential Emotions Scale and the short version of the Rosenberg Self-Esteem Scale.


