



This item was submitted to Loughborough's Institutional Repository (<https://dspace.lboro.ac.uk/>) by the author and is made available under the following Creative Commons Licence conditions.



CC creative commons  
COMMONS DEED

**Attribution-NonCommercial-NoDerivs 2.5**

**You are free:**

- to copy, distribute, display, and perform the work

**Under the following conditions:**

 **Attribution.** You must attribute the work in the manner specified by the author or licensor.

 **Noncommercial.** You may not use this work for commercial purposes.

 **No Derivative Works.** You may not alter, transform, or build upon this work.

- For any reuse or distribution, you must make clear to others the license terms of this work.
- Any of these conditions can be waived if you get permission from the copyright holder.

**Your fair use and other rights are in no way affected by the above.**

This is a human-readable summary of the [Legal Code \(the full license\)](#).

[Disclaimer](#) 

For the full text of this licence, please go to:  
<http://creativecommons.org/licenses/by-nc-nd/2.5/>

MATERNAL AND PATERNAL CONTROLLING FEEDING PRACTICES: RELIABILITY  
AND RELATIONSHIPS WITH BMI

Emma L. Haycraft

Jacqueline M. Blissett

School of Psychology, University of Birmingham, UK.

Address correspondence to: Dr Emma Haycraft, School of Psychology, University of  
Birmingham, Edgbaston, Birmingham B15 2TT, UK.

Email: [e.l.haycraft@bham.ac.uk](mailto:e.l.haycraft@bham.ac.uk); Fax: + 44 (0)121 414 4897

**ABSTRACT**

**OBJECTIVE:** The current study aimed to examine the interrelationships between mothers' and fathers' reports on the Child Feeding Questionnaire (CFQ), the BMI of parents and their children, and observations of parents' controlling feeding practices at mealtimes.

**RESEARCH METHODS AND PROCEDURES:** Twenty-three mothers and 23 fathers of children aged between 18-67 months reported on their child feeding practices, on their child's height and weight, and were observed during a normal family mealtime at home.

**RESULTS:** No associations were found between mothers' reported and observed feeding practices. Fathers' reported pressure to eat and restriction were associated with more controlling observed mealtime feeding practices. Mothers and fathers did not significantly differ in their reported or observed child feeding practices. Children's BMI was not related to maternal or paternal reported or observed feeding practices. More mealtime pressure was observed in parents with a higher BMI.

**DISCUSSION:** Fathers' self-reports of their mealtime practices are reliable. Mothers' feeding practices may differ when fathers are present and further work should examine mothers at mealtimes with and without fathers. Although children's BMI was not related to parents' use of reported or observed control, parents with a higher BMI were more controlling, highlighting the importance of considering parents' own weight in future studies.

**Key words:** Child Feeding Questionnaire, restriction, pressure to eat, mothers and fathers, mealtime observations.

## INTRODUCTION

Overly controlling feeding practices can unintentionally contribute to childhood overweight by disrupting the child's autonomy regarding feeding and eating (1-6). Research has begun to address what drives parental feeding practices and why parents implement the strategies that they do. Yet, to date, little attention has been given to whether mothers' and fathers' reports of their feeding practices actually reflect independent observations of their child feeding behaviours.

Data within the child feeding domain are often obtained from parental self-report measures and, indeed, previous research has demonstrated that maternal reports of feeding interactions are fairly reliable, accurate sources of information (7,8). However, few studies have examined the relationship between observed feeding practices at mealtimes and self-reports from one of the most widely used methods for examining parents' controlling practices, attitudes and beliefs regarding feeding their child, the Child Feeding Questionnaire (CFQ) (1, and see Faith et al. (9) for a review of its use). While maternal reports of pressure to eat but not restriction have been found to significantly relate to relevant observations of maternal feeding behaviours with one-year-old children (10), no study has assessed both maternal and paternal reports of control using the CFQ with preschool-age children and related these to independent observations of parents' feeding behaviours at a mealtime with both parents present.

Orrell-Valente and colleagues (11) have recently conducted an extensive study examining the structure of children's mealtimes and the strategies which parents employ in an attempt to get their children to eat. A key finding from their research was that parents' primary aim at mealtimes was to get their children to eat more. In addition, they identified

that the parental controlling feeding practice of restriction was seldom witnessed during a normal mealtime (11), supporting the findings of Farrow and Blissett (10). Restriction of children's food intake can be carried out fairly covertly by parents (for example, limiting children's unhealthy food intake by not purchasing unhealthy snacks at the supermarket) and this may account for the low incidence of observed mealtime restriction in parents who report restricting foods. Despite this, while restriction appears to be observed less frequently than parental application of pressure, both restriction and pressure are feeding practices which have the potential to be observed during a mealtime. In contrast, the CFQ feeding practice of monitoring, which refers to parents keeping track of the unhealthy foods that their children consume, is a more covert, cognitive process, which is unlikely to be observable during a mealtime.

Despite the fact that numerous methods for observing mealtimes exist (for example: the Mealtime Interaction Coding System (12) which assesses family functioning in an unstructured naturalistic mealtime setting; and, the Behavioural Coding Inventory (13) which looks at parents' infant feeding behaviours and infants' responses to them) as yet, no observational measure has been devised which examines feeding practices which relate directly to those reported in Birch and colleagues' CFQ in a naturalistic mealtime setting. Recently, Moens and colleagues (14), when considering mothers of overweight versus non-overweight children, found more self-reported controlling child feeding behaviours and observed less adaptive mealtime behaviours in mothers of overweight children. However, they observed mothers' style of feeding, which they categorised as authoritative, authoritarian or permissive, and they did not examine associations between observed feeding behaviours with CFQ subscales. Thus, the current study designed a specific observational measure to

reflect the CFQ's feeding practice subscales of pressure to eat and restriction: the Family Mealtime Coding System (FMCS).

The inclusion of data from fathers *and* mothers was considered to be important in view of the literature which has called for fathers to be included in the study of child feeding (15-21). Up to now, research has tended to focus on mothers and their feeding practices, with fathers receiving little attention, yet studies have shown that the father has an important role to play in child feeding practices (18). Johannsen, Johannsen and Specker (18) found fathers who reported more controlling feeding practices had daughters with a higher percentage of body fat than fathers who reported less control. Although the data are cross-sectional, this finding highlights value in studying fathers' feeding practices, as do other studies which have found fathers to be important in contributing to the decision to breastfeed (22) and adolescents' decisions to eat healthy food (16). Despite the fact that mothers tend to have more responsibility than fathers for deciding on the types of food that a child eats (23) and that mothers tend to report more monitoring of their children's food consumption than fathers do (15), there have been few studies that have established major differences between mothers and fathers in their use of controlling feeding practices. Indeed, Blissett, Meyer and Haycraft (15) found mothers and fathers to be similar in their reports of controlling feeding practices with their children. It was therefore anticipated that mothers and fathers would not differ significantly in their feeding practices and that parents' reported feeding practices would relate to their observed behaviours for both mothers and fathers.

Children's height, weight and/or BMI have been found to relate to parents' self-reported feeding practices (1,18,24,25). For example, studies have demonstrated that less reported pressure to eat is applied to heavier children (1), and greater reported pressure is

applied to children with a lower BMI (25). Moreover, child weight status has also been found to associate with the degree of food restriction implemented by parents, with parents reporting more restriction of heavier children (1), and greater monitoring of children's food intake has been found in mothers of boys and girls with an increased weight status (26). Yet data in this domain are equivocal, as some studies have found children's weight to be insignificant in determining parents' controlling feeding practices. Indeed, parental use of control has been shown to be no different in obese and non-obese siblings (27). These previous studies have considered parents' self-reported feeding practices and, as far as is known, no study has looked at the associations between children's BMI with parents' controlling feeding practices observed within the home. Therefore the current study will examine whether parents' observed and reported feeding practices are related to their children's BMI. Furthermore, parents' own BMI and weight concerns have also been positively related to parents' reported use of controlling feeding practices (23,26) but, to date, no study has considered associations between parents' BMI and their observed use of control. Hence, the current study will also examine relationships between parents' observed and reported feeding practices and their BMI. In addition, although it is desirable for researchers within the child feeding domain to conduct independent assessments of children's weight and height, it is sometimes necessary for these data to be obtained via parental self-report (17,28). Thus a further aim of the current study is to examine whether parents' self-report data about their child's height and weight status are in line with independent assessments of children's height and weight.

This exploratory study had four main aims. Primarily, validation of maternal and paternal self-reports regarding their own child feeding practices (pressure to eat and restriction) was sought by comparing feeding behaviours at an observed family mealtime, coded according to the FMCS, with maternal and paternal responses to two subscales of the

CFQ. Secondly, the differences between maternal and paternal controlling feeding practices were examined. Thirdly, the relationships between BMI (children's and parents') and parents' observed and reported feeding practices were also investigated. Finally, validation of parents' reports of their child's height and weight was also sought by comparing them with independent measurements of children's height and weight, obtained at observations.

It was predicted that observed behaviours at the mealtime would associate with parents' reports of their feeding practices, with greater reported pressure correlating with increased evidence of controlling feeding behaviours observed at the mealtime. Monitoring was not examined in this study because of its low likelihood of being externally observable in a mealtime setting. Based on studies which have observed little restriction at mealtimes (e.g. 11), it was expected that observations of restrictive practices would be low. However, where restriction occurred, it was predicted that it would relate to parents' reported controlling feeding behaviours. It was hypothesised that mothers and fathers would not differ in their controlling feeding practices, either self-reported or observed. Furthermore, it was expected that higher parent and/or child BMI would relate to more controlling observed and reported feeding practices. Finally, it was anticipated that parents' reports of their child's height and weight would positively correlate with independent measures of child height and weight.

## **METHOD**

### **Participants**

Twenty-three families, consisting of a mother, father and target child, and any siblings, were observed during a normal mealtime in their own home. The families were recruited via questionnaires which were distributed by nurseries in Cambridgeshire and the West Midlands, in the UK. The mean age of the mothers was 36 years (*SD* 4.39, range 29-46



years) and the mean age of the fathers was 37 years ( $SD$  4.54, range 31-49 years). The mean age of the children was 37 months ( $SD$  12.96, range 18-67 months). The participants were generally highly educated (52% of mothers and 65% of fathers had more than five years of education post-16) and were in 'managerial and professional occupations' (74% of mothers and 87% of fathers) (NS-SEC self-coded method) (29). The sample of children comprised 14 girls and 9 boys. All parents co-habited and were the children's biological parents. Parents reported that twenty-two out of the twenty-three children in this study had been breastfed (96%). The mean breastfeeding duration was 10 months ( $SD$  8.15, range 0-36 months). Out of a possible 21 mealtimes in a week, the mean number of meals mothers reported spending with their child in a typical week was 15 ( $SD$  4.61, range 6-21) while the mean for fathers was 10 mealtimes ( $SD$  3.63, range 2-16). A post-hoc Mann-Whitney U test revealed that these mothers spend significantly more mealtimes with their child in a typical week than fathers do ( $Z$  -3.23,  $p < .01$ ).

## **Measures and procedure**

### *Child Feeding Questionnaire (CFQ) (1)*

The pressure to eat and restriction subscales of the CFQ were administered to pairs of mothers and fathers. Pressure to eat assesses parental application of pressure for their children to eat more food. Restriction examines parents' tendencies to limit their children's consumption of particular foods. The CFQ has been found to display adequate reliability and validity (1).

### *Descriptive and demographic questionnaire*

In addition, parents self-reported their own and their child's heights and weights, their socioeconomic status and education, family composition, marital status, the child's

breastfeeding history, and the number of meals they spend with their children in an average week. Parents were also asked to give their contact details if they would be willing to receive further information about participating in a mealtime observation (described to them as the ‘observation of a normal family mealtime’). Forty percent of respondents consented to an observation and 28 mealtimes were recorded in total. Families were excluded if either only one parent was present at the mealtime, or if only one parent had returned a completed questionnaire, leaving 23 complete datasets.

### **Mealtime observations**

For each observation, the researcher arrived at the family’s home approximately twenty minutes before they anticipated that they would be eating, in order for the camcorder to be set up, and for the children to become used to having a camcorder and a stranger in the home. A video camera (Panasonic NV-GS3B), which was used to record the mealtime, was set up in the optimal position for observing the target child during their mealtime. If possible other family members who were involved in the mealtime were also included in shot. Height and weight information was obtained by the researcher for the target child, where possible, before the meal commenced. The child was asked to remove shoes and any heavy clothing before stepping onto the digital scales (Weight Watchers LCD Precision Electronic Scales) and was then measured, following the procedure outlined by Blissett (30, p.211), by standing up tall against a wall (without skirting board) with their heels back and feet flat on the floor. Children were measured to the nearest 0.5 centimetre and weighed to the nearest 0.1 kilogram. Parents were asked to feed their children as usual and to carry out the mealtime as normal. The researcher waited in a different room, in order that the mealtime was as typical as possible. Each mealtime was subsequently coded in real time using all-occurrence sampling, in order that the entire mealtime was represented. The mealtimes were coded using

Obswin 32 observational software (31) and a laptop computer. Obswin 32 is software designed for observational data collection and analysis in Windows. It permits the recording and analysis of frequency and duration variables and keys on a laptop keyboard can be assigned to the behaviours which are to be observed. Only one observation was recorded per family due to time and resource constraints. However, previous analyses have suggested single observations of family interactions at mealtimes are representative (32). The target children were all 18 months or older, had been weaned and were able to feed themselves relatively autonomously. The average meal duration was 28.63 minutes (*SD* 7.41, range 8.70-38.72). Of the 23 observed mealtimes, two were breakfast, six were lunch and fifteen (65.2%) were the evening meal. There were no significant differences in observed control by meal type. Furthermore, both parents were present for at least some time during all of the observations analysed in this study. For eight mealtimes, parents and target child were present, for fourteen mealtimes siblings were present too, and for one mealtime a grandmother was also present. The number of family members at the mealtime was unrelated to any of the variables used within this study and so was not controlled for in subsequent analyses.

### **Family Mealtime Coding System (FMCS)**

The FMCS was developed in order to assess parents' feeding practices with both the target child and with any other children at the observed mealtime (based on the CFQ feeding practice subscales). Four subscales are included in the current study: pressure for target child to eat; physical prompts for target child to eat; restriction of target child's food consumption; and use of incentives/rewards with target child. Brief operational definitions for these four subscales are given below. Further details of the coding scheme are available from the authors upon request.

*Pressure (from either parent) for target child to eat:* Parental verbal encouragements for child to consume more food, such as “eat a little bit more”, “have some peas” or “eat three more mouthfuls”. Includes gentle use of coercion, such as “just eat the meat”, or “try a mouthful”.

*Physical prompt (from either parent) for target child to eat:* Parental use of physical encouragements to get child to eat, usually by offering food to the child. Includes placing food on the spoon/fork and offering it to the child, or putting food on the cutlery ready for the child to pick up and eat.

*Restriction (by either parent) of target child's food intake:* Limiting children's consumption of foods, for example by not letting them have any more cheese or garlic bread, or by restricting the amount of biscuits the child is allowed to eat. This can be verbal restriction, for example “you can't have any more”, or physical restriction, such as moving the garlic bread away. Note: this variable does not refer to covertly controlling or limiting portion sizes which are given to the child, but to overt restriction demonstrated during the mealtime.

*Use of incentives/conditions (by either parent) with target child:* Parental use of verbal incentives or bargaining in an attempt to increase children's food consumption. For example, “Mummy will be so happy if you eat your beans”, or “eat this then you can have pudding”.

These four subscales were specifically devised to reflect the CFQ subscales of pressure to eat and restriction. An independent second observer, who was trained on the coding method by the first coder, coded a random sample of 13% of the video tapes. Inter-rater reliability was then calculated using the observational coding software's inter-rater reliability function (Obswin 32) (31). Stein et al. (33) indicate acceptable reliability for raw data percentage agreements to be greater than 75%. Secondary coding conducted across all variables of the FMCS found the percentage concordance ranged from 86.57% - 100.00%, indicating that the coding of this measure achieved good reliability.

## Data analysis

A Kolmogorov-Smirnov test for normal distribution established the dataset to be primarily non-normally distributed, and hence one-tailed Spearman's correlations were run to test this study's hypotheses. Analyses were run separately for mothers and fathers. There were no significant differences between male and female children in parental reports of controlling feeding practices and, given that the sample size was small, data were amalgamated for analysis. The following variables did not correlate significantly with any of the factors tested in this study, and so were not controlled for in the analyses: child age, parent age, the number of mealtimes each parent typically spends with the child, and parent demographic information (mothers' and fathers' SES and years of education). Breastfeeding duration was negatively related to observations of paternal use of incentives ( $-.358, p < .05$ ) and restriction ( $-.536, p < .01$ ) but was unrelated to any observations of maternal feeding.

## RESULTS

The mean value for maternal BMI was 24.82 ( $SD 5.37$ ) which is within the normal range. The mean paternal BMI was 25.99 ( $SD 2.99$ ) and is on the border between normal and overweight. No parents were underweight, as classified by having a Body Mass Index (BMI) of  $< 18.5$ , 17% of mothers and 52% of fathers were overweight ( $BMI \geq 25$ ), and 13% of mothers and 9% of fathers were obese ( $BMI \geq 30$ ). Children's BMIs, calculated from the child height and weight data collected at the observations, were standardised to consider child age and gender using the Child Growth Foundation reference disc (34) and converted into BMI Z scores. The mean standardised child BMI Z score was 0.29 ( $SD 1.12$ , range  $-1.87$ - $2.03$ ). With reference to the International Obesity Task Force guidelines, two of the seventeen children who were over 2-years-old at the time of the observation were categorised

as 'overweight' and a further five were categorised as 'at risk of overweight'. One child was categorised as 'underweight'. There were no significant differences in observed control for parents of overweight versus non-overweight children.

-----  
TABLE 1 ABOUT HERE  
-----

Table 1 shows that there were no significant differences between mothers and fathers in either their reported or their observed child feeding practices.

-----  
TABLE 2 ABOUT HERE  
-----

Table 2 demonstrates that maternal reports of their child feeding practices did not correlate with any of their observed mealtime behaviours. Greater paternal reported pressure to eat positively correlated with observations of paternal pressure, paternal prompting and paternal use of incentives to the target child at the mealtime. Paternal reports of restriction correlated with greater observed paternal pressure for the target child to eat and with greater observed paternal use of incentives with the target child. Parents' self-reported BMI was significantly related to higher reported restriction in mothers and to greater observed use of pressure in both mothers and fathers, but not to any of the other observed or reported feeding behaviours. Children's BMI Z-scores were unrelated to mothers' or fathers' observed or reported feeding practices.

Finally, strong, positive correlations were found between maternal reports and independent assessments of children's height ( $r = .829, p < .001$ ) and weight ( $r = .936, p < .001$ ),

and also between paternal reports and independent assessments of children's height ( $r = .803$ ,  $p < .001$ ) and weight ( $r = .859$ ,  $p < .001$ ).

## DISCUSSION

The current study hypothesised that: there would be no differences in maternal and paternal feeding practices; observed behaviours at the mealtime would accurately relate to parents' reports of their feeding practices; higher parent and/or child BMI would relate to more controlling reported and observed feeding practices; and parents' reports of child height and weight would relate to independent measures. In general, these hypotheses were partially supported.

Paternally reported feeding practices were found to associate with several observed paternal feeding practices. Fathers who reported greater application of pressure for their children to eat were observed to exhibit more verbal pressure, physical prompting and greater use of incentives with their child. Furthermore, fathers who reported restricting their children's food intake were observed to apply more verbal pressure and greater use of incentives. These findings begin to validate fathers' self-reported feeding practices and support existing literature regarding the exhibition of generally controlling parental feeding practices, as parents who apply pressurising tactics often also employ restriction of food intake (1,35). For example, pressurising and restrictive feeding practices may co-occur with parents who are concerned about their child's food intake implementing more pressure to eat healthy foods while restricting their children's unhealthy food intake. The absence of significant associations between observations of fathers' restrictive feeding practices and their reports on the CFQ is in line with previous studies which have found restriction to be less frequently observed at mealtimes (11). Furthermore, restriction may occur covertly and hence

may not be witnessed during a mealtime. As an example, the CFQ restriction subscale includes questions such as “I intentionally keep some foods out of my child’s reach” and this is a behaviour which is unlikely to occur during a mealtime. Future laboratory studies could observe parents’ use of restrictive feeding practices when their child is presented with an array of healthy and less healthy, or traditionally restricted, foods to consume.

Contrary to expectations, maternally reported child feeding practices did not associate with any observed maternal feeding practices. However, previous studies have suggested that mothers are reasonably accurate in their reports of mealtime interactions (7,8). One reason for the absence of such relationships in this study could be that mothers’ feeding practices differ when fathers are present. Mothers in this study reported eating significantly more meals with their children during a typical week than fathers, suggesting that at least some of these mothers often feed their children without fathers present. As Olrick and colleagues acknowledge, the amount of mother-child interaction diminishes when fathers are present (see 36). For many of the families in this study, family meals were observed at the weekend, in order that both parents were present. The pattern of relationships found might suggest that if fathers mostly eat with their children at the weekends and when the mother is present, the mealtime observation may have captured a fairly typical mealtime for fathers and hence their reports may be consistent with their observed behaviours. In contrast, if mothers usually feed the children in the absence of the father, distortion might occur between what mothers report doing usually and what they were observed to do in this relatively unusual mealtime setting. This does not mean to say that maternal reports on the CFQ do not reflect their actual practices, but it is possible that by choosing to observe a mealtime with both parents present, the observations may yield different maternal information than when fathers are absent. We propose that our findings suggest discrepancy between these mothers’ reported and observed



feeding practices rather than inaccuracy in mothers' reports, given that we observed a single, perhaps unrepresentative, mealtime. Indeed, Farrow and Blissett (37) found maternally reported pressure to eat related to observed pressurising practices in mealtimes where mothers and children were observed without fathers being present. In view of the discrepancies found here, future research should examine the relationships between self-reports and observations of mothers' feeding practices with and without fathers being present.

It is noteworthy that post-hoc analyses demonstrated that a similar pattern of relationships occurred for breastfeeding duration, which was found to relate to paternal but not maternal observed control. That no associations were found between mothers' observed control and breastfeeding duration likely reflects the atypical mealtimes which were observed. However, fathers were observed to use fewer incentives and less restriction when their children had been breastfed for longer. This extends previous work with mothers which has found breastfeeding to relate to reduced control of children's feeding (38). Because these associations are also seen in fathers, one possible interpretation is that breastfeeding promotes good appetite regulation and responsivity to internal signals of hunger and satiety in children, which in turn facilitates parents' trust in their children's ability to regulate their own food intake. To our knowledge, this is the first study to have explored associations between fathers' controlling feeding and breastfeeding duration. Furthermore, the children in the current sample are older than children in many previous studies regarding breastfeeding and control (38,39), suggesting that the protective effects of breastfeeding on controlling feeding practices may extend into early childhood.

Parents' observed and controlling feeding practices were not significantly related to their children's BMI Z scores. This lack of association adds to the equivocal data in this

domain and suggests that in this sample of parents, their feeding practices occur independently of their child's weight status. However, while parental BMI was unrelated to observed use of prompting, restriction and incentives, both mothers and fathers with higher BMIs were observed to apply more pressure for their children to eat. These findings accord with previous work which suggests that mothers concerned about their own weight are more likely to exert control over their children's eating (23,26) and extends this to demonstrate that this tendency also applies to fathers. Given that maternal BMI also related to greater reported, but not observed, restriction of their children's intake, this may suggest that there is a tendency for overweight mothers to also use more restrictive practices, but that these may not be observed at mealtimes (for example, the use of covert control, such as keeping snack foods out of reach, rather than overt control, such as limiting food intake within a mealtime).

Verification of parents' accuracy at reporting on their child's height and weight was obtained in this study. Both mothers' and fathers' reports of child weight and height associated strongly and positively with independent measurements taken at the mealtime observation. This suggests that, in future studies where it is not feasible to obtain children's height and weight through experimenter-obtained measures, parents' reports can be accurate and reliable. Furthermore, there were no significant differences found between mothers' and fathers' feeding practices (reported or observed) supporting previous work which has found parents' use of controlling feeding practices to be similar (15). Future work should examine predictors of parents' feeding practices to discover whether these are also similar in mothers and fathers.

The data from this sample are generally in line with data from other studies in this field. Mothers' and fathers' mean self-reported pressure to eat and restriction scores appear

consistent with the scores found by Blissett et al. (15) in their non-clinical sample of UK mothers and fathers. Moreover, the observed pressure, prompting and use of incentives scores appear to be higher than the restriction scores, with pressure being the observed feeding behaviour most used by mothers and fathers. Observed restriction scores were low, in keeping with the findings of Orrell-Valente et al. (11). It is worth noting that while the majority of mealtime durations fell within a fairly limited range it is acknowledged that variability in meal duration affected opportunities for the occurrence of observed and coded behaviours during the mealtime. However, a decision was made to evaluate the raw frequency of the observed mealtime behaviours rather than adjusting the frequency to account for mealtime length. This was because it was felt that the number of interactions of this nature was more important than their relative occurrence in a specific time period. For example, adjusting for length of mealtime would mean that a child who had one experience of pressure to eat in a 10 minute mealtime would be comparable to a child who experienced ten pressurising practices over a 100 minute mealtime. The accumulation of negativity within the latter mealtime climate would be far greater than the former, and adjusting for meal length may have removed some of these more subtle effects.

Although the study's initial hypotheses can be at least partially supported, this study is not without its limitations. Firstly, the relationships obtained must be interpreted with caution due to the relatively small sample size and the alpha level being set at .05. Secondly, the fact that families were being recorded is obviously likely to affect mealtime behaviours and parents' feeding practices, and hence might not portray a truly accurate series of events. It is possible that the specific atypical circumstances of this single mealtime (father present at the mealtime, observer present in the home, mealtime being recorded) inhibited the use of certain feeding practices. Repeated assessments of families over an extended period of time may

help to increase the ecological validity of such observational procedures and their findings. By requesting mealtimes where both parents are present, this study may have witnessed slightly different mealtimes from other mealtimes where just one parent is present. However, the use of observations is also a strength of the current study, as it provides independent assessment of parents' child feeding practices. This sample was not large enough for an examination of these findings for different child genders. Previous literature has suggested that child gender can play an important role in parents' feeding practices (4,26,40). However, future work should aim to recruit larger samples whereby feeding practices with both daughters and sons can be explored separately for mothers and fathers. Similarly, the small sample size did not permit detailed analysis of the potential differences in observed child feeding practices with overweight versus non-overweight parents and children, a factor which should be considered in subsequent research. Additionally, further studies which independently assess parents' height and weight in order to calculate parental BMI are recommended in view of research which has found general trends in self-report data for under-reporting weight and over-reporting height (41). Moreover, while child age was a non-significant correlate of observed parental control, further research could examine age stratified samples and could conduct observations of more than one mealtime, in order to discover the potential impact of variability on these findings. Finally, these findings are likely to reflect family interactions at mealtimes in well educated, affluent UK families, and cannot be extrapolated to the wider community.

The current exploratory study found greater observed application of pressure for children to eat in parents who had a higher BMI, but no associations between child BMI Z scores with parents' observed or reported feeding practices, highlighting the importance of considering parents' BMI in studies of controlling feeding practices. Moreover, this study

found no differences in mothers' and fathers' child feeding practices, and has corroborated the accuracy of parents' self-reported child height and weight data in this sample. Furthermore, it has verified paternal reported feeding practices and has suggested that research should examine differences in the mother's role at mealtimes when fathers are and are not present. A mother's reports of her feeding practices may not be reflective of her child feeding behaviours at every meal, and may be attenuated by her BMI and the presence or absence of her co-parent.

### **ACKNOWLEDGEMENTS**

Thanks to Ben Andrews for carrying out secondary coding of the observations and to two anonymous reviewers for their constructive comments on an earlier version of this manuscript.

**REFERENCES:**

1. Birch LL, Fisher JO, Grimm-Thomas K, Markey CN, Sawyer R, Johnson SL. Confirmatory factor analysis of the Child Feeding Questionnaire: A measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite*. 2001;36:201-210.
2. Birch LL, Fisher JO. Development of eating behaviours among children and adolescents. *Pediatrics*. 1998;101:539-549.
3. Fisher JO, Birch LL. Restricting access to foods and children's eating. *Appetite*. 1999;32:405-419.
4. Johnson SL, Birch LL. Parents' and children's adiposity and eating style. *Pediatrics*. 1994;94:653-661.
5. Spruijt-Metz D, Li C, Cohen E, Birch LL, Goran MI. Longitudinal influence of mother's child-feeding practices on adiposity in children. *J Pediatr*. 2006;148:314-320.
6. Spruijt-Metz D, Lindquist CH, Birch LL, Fisher JO, Goran MI. Relation between mothers' child-feeding practices and children's adiposity. *Am J Clin Nutr*. 2002;75:581-586.
7. Cooper PJ, Whelan E, Woolgar M, Morrell J, Murray L. Association between childhood feeding problems and maternal eating disorder: Role of the family environment. *Br J Psychiatry*. 2004;184:210-215.
8. Whelan E, Cooper PJ. The association between childhood feeding problems and maternal eating disorder: A community study. *Psychol Med*. 2000;30:69-77.
9. Faith MS, Scanlon KS, Birch LL, Francis LA, Sherry B. Parent-child feeding strategies and their relationships to child eating and weight status. *Obes Res*. 2004;12:1711-1722.
10. Farrow C, Blissett J. Breast-feeding, maternal feeding practices and mealtime negativity at one year. *Appetite*. 2006;46:49-56.

11. Orrell-Valente JK, Hill LG, Brechwald WA, Dodge KA, Pettit GS, Bates JE. "Just three more bites": An observational analysis of parents' socialization of children's eating at mealtime. *Appetite*. 2007;48:37-45.
12. Dickstein S, Hayden LC, Schiller M, Seifer R, San Antonio W. The family mealtime interaction coding system Unpublished coding manual, Brown University School of Medicine, Providence, RI; 1994.
13. Young B, Drewett R. Eating behaviour and its variability in 1-year-old children. *Appetite*. 2000;35:171-7.
14. Moens E, Braet C, Soetens B. Observation of family functioning at mealtime: A comparison between families of children with and without overweight. *J Pediatr Psychol*. 2007;32:52-63.
15. Blissett J, Meyer C, Haycraft E. Maternal and paternal controlling feeding practices with male and female children. *Appetite*. 2006;47:212-219.
16. De Bourdeaudhuij I. Perceived family members' influence on introducing healthy food into the family. *Health Educ Res*. 1997;12:77-90.
17. Holm-Denoma JM, Lewinsohn PM, Gau JM, Joiner Jr TE, Striegel-Moore R, Otamendi A. Parents' reports of the body shape and feeding habits of 36-month-old children: An investigation of gender differences. *Int J Eat Disord*. 2005;38:228-235.
18. Johannsen DL, Johannsen NM, Specker BL. Influence of parents' eating behaviors and child feeding practices on children's weight status. *Obes Res*. 2006;14:431-439.
19. Patel P, Wheatcroft R, Park RJ, Stein A. The children of mothers with eating disorders. *Clin Child Fam Psychol Rev*. 2002;5:1-19.
20. Robinson TN, Kiernan M, Matheson DM, Haydel KF. Is parental control over children's eating associated with childhood obesity? Results from a population-based sample of third graders. *Obes Res*. 2001;9:306-312.

21. Sherry B, McDivitt J, Birch LL, Cook FH, Sanders S, Prish JL. et al. Attitudes, practices and concerns about child feeding and child weight status among socioeconomically diverse white, Hispanics and African-American mothers. *J Am Diet Assoc.* 2004;104:215-221.
22. Scott JA, Landers MCG, Hughes RM, Binns CW. Factors associated with breastfeeding at discharge and duration of breastfeeding. *J Paediatr Child Health.* 2001;37:254-61.
23. Francis LA, Hofer SM, Birch LL. Predictors of maternal child-feeding style: Maternal and child characteristics. *Appetite.* 2001;37:231-243.
24. Brann LS, Skinner JD. More controlling child-feeding practices are found among parents of boys with an average body mass index compared with parents of boys with a high body mass index. *J Am Diet Assoc.* 2005;105:1411-1416.
25. Galloway AT, Fiorito LM, Francis LA, Birch LL. 'Finish your soup': Counterproductive effects of pressuring children to eat on intake and affect. *Appetite.* 2006;46:318-323.
26. Tiggemann M, Lowes J. Predictors of maternal control over children's eating behaviour. *Appetite.* 2002;39:1-7.
27. Saelens BE, Ernst MM, Epstein LH. Maternal child feeding practices and obesity: A discordant sibling analysis. *Int J Eat Disord.* 2000;27:459-463.
28. Lewisohn PM, Holm-Denoma JM, Gau JM, Joiner Jr TE, Striegel-Moore R, Bear P, et al. Problematic eating and feeding behaviors of 36-month-old children. *Int J Eat Disord.* 2005;38:208-219.
29. Office For National Statistics. *The National Statistics Socio-Economic Classification user manual* ([http://www.statistics.gov.uk/methods\\_quality/ns\\_sec](http://www.statistics.gov.uk/methods_quality/ns_sec)); 2005.
30. Blissett J. *Feeding problems in children with growth disorders.* Unpublished PhD Thesis, University of Birmingham; 1998.



31. Martin NT, Oliver C, Hall S. Obswin 32: Observational data collection and analysis for Windows (Version 3) [Computer software]. School of Psychology, University of Birmingham; 2000.
32. Stark LJ, Jelalian E, Powers SW, Mulvihill MM, Opiari LC, Bowen A, et al. Parent and child mealtime behavior in families of children with cystic fibrosis. *J Pediatr*. 2000;136:195-200.
33. Stein A, Woolley H, Murray L, Cooper PJ, Cooper S, Noble F, et al. Influence of psychiatric disorder on the controlling behaviour of mothers with one-year-old infants: A study of women with maternal eating disorder, postnatal depression and a healthy comparison group. *Br J Psychiatry*. 2001;179:157-162.
34. Child Growth Foundation. *Cross Sectional Stature and Weight Reference Curves for the UK*. London, United Kingdom: Child Growth Foundation; 1996
35. Carper JL, Fisher JO, Birch LL. Young girls' emerging dietary restraint and disinhibition are related to parental control in child feeding. *Appetite*. 2000;35:121-129.
36. Olrick JT, Pianta RC, Marvin RS. Mother's and father's responses to signals of children with cerebral palsy during feeding. *J Dev Phys Disabil*. 2002;14:1-17.
37. Farrow CV, Blissett JM. Is maternal psychopathology related to obesigenic feeding practices at 1 year? *Obes Res*. 2005;13:1999-2005.
38. Taveras EM, Scanlon KS, Birch LL, Rifas-Shiman SL, Rich-Edwards JW, Gillman MW. Association of breastfeeding with maternal control of infant feeding at age 1 year. *Pediatrics*. 2004;114:e577-e583.
39. Fisher JO, Birch LL, Smiciklas-Wright H, Picciano MF. Breast-feeding through the first year predicts maternal control in feeding and subsequent toddler energy intakes. *J Am Diet Assoc*. 2000;100:641-6.

40. Blissett J, Meyer C, Farrow C, Bryant-Waugh R, Nicholls D. Maternal core beliefs and children's feeding problems. *Int J Eat Disord.* 2005;37:127-134.
41. Gorber SC, Tremblay M, Moher D, Gorber B. A comparison of direct vs. self-report measures for assessing height, weight and body mass index: A systematic review. *Obes Rev.* 2007;8:307-26.

*Table 1: Descriptive and frequency statistics for mothers' and fathers' self-reported (measured by CFQ subscales) and observed (measured by FMCS) controlling child feeding practices with the target child, and Mann-Whitney U tests of difference between mothers' and fathers' feeding practices (self-reported and observed).*

|  | Mothers (n=23) |      |       | Fathers (n=23) |      |       | Mann-Whitney U<br>Z scores |
|--|----------------|------|-------|----------------|------|-------|----------------------------|
|  | Mean<br>(SD)   | Min  | Max   | Mean<br>(SD)   | Min  | Max   |                            |
| <b>Self-reported feeding practices (CFQ)</b> |                |      |       |                |      |       |                            |
| Pressure to Eat                              | 2.84<br>(0.78) | 1.25 | 4.25  | 2.99<br>(0.88) | 1.75 | 4.50  | -.53 (NS)                  |
| Restriction                                  | 3.40<br>(0.76) | 2.00 | 4.50  | 3.61<br>(0.64) | 2.63 | 4.63  | -.78 (NS)                  |
| <b>Observed feeding practices (FMCS)</b>     |                |      |       |                |      |       |                            |
| Pressure for target<br>child to eat          | 7.22<br>(7.75) | 0.00 | 26.00 | 4.04<br>(3.43) | 0.00 | 12.00 | -.70 (NS)                  |
| Prompting to target<br>child                 | 2.52<br>(2.94) | 0.00 | 11.00 | 1.22<br>(1.35) | 0.00 | 4.00  | -1.53 (NS)                 |
| Restriction to<br>target child               | 0.70<br>(1.11) | 0.00 | 4.00  | 0.52<br>(0.79) | 0.00 | 2.00  | -.35 (NS)                  |
| Use of incentives<br>to target child         | 2.48<br>(2.76) | 0.00 | 9.00  | 1.30<br>(1.96) | 0.00 | 7.00  | -1.63 (NS)                 |

(NS) Non-significant difference between mothers' and fathers' reports.

Table 2: Spearman's correlations between maternal and paternal observed feeding practices (measured by FMCS) and parents' reported feeding practices (measured by CFQ), parents' self-reported BMI and children's BMI Z scores, and correlations between maternal and paternal reported feeding practices and parents' BMI and children's BMI Z scores.

|                    | Mothers (n=23) |           |               |              | Fathers (n=23) |        |            |           |               |              |       |        |
|--------------------|----------------|-----------|---------------|--------------|----------------|--------|------------|-----------|---------------|--------------|-------|--------|
|                    | Observed       |           | Reported      |              | Observed       |        | Reported   |           |               |              |       |        |
|                    | Pressure ‡     | Prompts ‡ | Restriction ‡ | Incentives ‡ | PtE †          | Rest † | Pressure ‡ | Prompts ‡ | Restriction ‡ | Incentives ‡ | PtE † | Rest † |
| Pressure to Eat †  | .079           | -.043     | -.270         | .204         | -              | -      | .362*      | .647**    | .191          | .436*        | -     | -      |
| Restriction †      | .077           | -.208     | .052          | .143         | -              | -      | .368*      | .053      | .132          | .469*        | -     | -      |
| Parent BMI †       | .473*          | .134      | .194          | .281         | .114           | .378*  | .536**     | .090      | .152          | .241         | .182  | .225   |
| Child BMI Z scores | -.038          | -.233     | .007          | -.334        | -.235          | -.237  | -.338      | -.245     | -.231         | -.250        | -.164 | .138   |

\*p≤.05, \*\*p≤.01 † self-reported data; ‡ data collected independently at observations; PtE † Reported Pressure to Eat (from CFQ); Rest †

Reported Restriction (from CFQ)