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Does child weight influence how mothers report their feeding practices?

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Does child weight influence how mothers report their feeding practices?

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Original article

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Abstract

Objectives: The present study aimed to ascertain whether parental reports of their feeding practices are associated with independent observations of these behaviours, and whether the reliability of maternal report depends upon the child's weight. **Methods**: 56 mothers and their children ate a lunch to satiety which was videotaped and coded for maternal use of control during feeding. Mothers also completed questionnaires about their feeding practices and children were weighed and measured. **Results:** Maternal reports of controlling feeding practices were poorly related to independent observations of these behaviours in the laboratory. However, there was a significant interaction between child BMI z score and observed pressure to eat in predicting maternally reported pressure to eat. There was also a significant interaction between child BMI z score and observed maternal restriction with food in predicting maternally reported restriction. When decomposed, these interactions suggested that only mothers of relatively underweight children were accurate at reporting their use of pressure to eat when compared to independent observations. For mothers of relatively overweight children there was a significant negative relationship between observed and reported restriction over food. **Conclusions:** Overall there was poor correspondence between maternal reports and independent observations of the use of controlling feeding practices. Further research is needed to replicate these findings and to ascertain whether parents who are inaccurate at reporting their use of these feeding practices are unaware that they are using controlling feeding practices or whether they are responding in socially desirable ways to questionnaires assessing their feeding behaviour.

Keywords: Child, weight, feeding behaviour, observation, pressure

Introduction

Overly controlling parental feeding practices can impact negatively upon child eating and weight. The use of pressure or force to make a child eat has been shown to reduce the child's liking for the pressured food[1], predicts dietary restraint and lower consumption of pressured food in adulthood[2,3]. Conversely, restricting food has been associated with greater liking and selection of restricted foods[4], greater snack food intake[5], eating in the absence of hunger[6] and weight gain over time in high risk families[7].

Most of the research conducted in this area has used a questionnaire developed to measure maternal feeding practices; the Child Feeding Questionnaire[8]. Other measures have been developed to assess feeding behaviour[2,9,10,11,12,13,14,] but these have also focused on maternal or child report of feeding practices. Researchers have also utilized observations or interviews concerning mealtime interactions to assess feeding practices[2,7,15] but these have often produced inconsistent results. For example, insignificant relationships have been found between observed and reported levels of maternal control[15] and there is a lack of data validating parental report of feeding practices during feeding observations. Indeed, the studies that have observed parents feeding their children have often done so in the home, with parentally selected meals, where there is perhaps less likelihood of observing pressure to eat or restriction of foods[15]. This may be particularly problematic when seeking to validate reports of restriction as caregivers are unlikely to select foods to offer the child and then restrict those foods. The first aim of this research was therefore to observe a sample of parents feeding their children in a laboratory with an experimenter provided meal to observe whether reports of pressure to eat and restriction correspond with observations of these behaviours in the laboratory.

The associations identified between parental feeding practices with child eating and BMI are complicated by the fact that parents often use these practices in response to concerns

about child weight[16,17,18]. Research suggests that parental report of the use of pressure to eat and restriction varies depending on the child's weight status[19,20]. What is unclear however is whether any relationships between parental control and child weight reflect actual behaviour, or are the result of social desirability. Parents of heavier children may be more likely to want to demonstrate using restrictive feeding practices to control their child's weight, whilst parents of lighter children may want to show that they are encouraging their child to eat. The second aim of this research was to evaluate whether child BMI moderates the relationship between parental report of pressure to eat and restriction of food with observations of these constructs in a laboratory. Based on previous research which has found positive associations between reported and observed feeding control[21], it was hypothesised that parental reports of feeding practices would correlate with observations of these behaviours in a laboratory using an experimenter provided meal. In addition, given the previously reported links between child weight and parental feeding practices[20], it was hypothesised that the relationships between observed and parentally reported use of controlling feeding practices would be moderated by the child's BMI, with parents of normal weight children being accurate in their reports, but parents of over and underweight children showing less accuracy.

Methods

Participants

Participants were 56 primary caregivers of 31 male and 25 female children who were recruited through University community newsletter advertisements, University alumni advertisements and a snowball technique whereby participants informed interested eligible friends about the research. Caregivers were invited to come into the laboratory to complete questionnaires during the autumn of 2008, be video-recorded eating a standard lunch with their child, and have their child's weight and height recorded. Primary caregivers of children aged 3-4 years old from the East-Midlands area of the UK were invited to take part in the

research, thereby not excluding fathers, however no fathers chose to participate. The mean age of mothers was 34.05 years (SD=5.91), and the mean age of the children was 3.89 years (SD=.55). Eighty six percent of the sample were White British, with a mean of 4.18 years of post-16 education (SD=2.97). Ethical permission for this study was gained from Loughborough University Research Ethics Committee.

Procedure

Mothers and children were welcomed to the children's eating behaviour laboratory at the University and provided informed consent. Only one family was tested at a time. Parents and children familiarized themselves with the room by playing with a range of age-appropriate toys whilst the researcher prepared the meal. The child's meal included 1 white bread roll, ½ slice of cheese (approximately 12.5g), ½ slice of chicken (approximately 10g), 5 carrot sticks, 4 cheese crackers, 2 chocolate chip cookies, 3 pieces of sliced apple and a glass of water. Mothers were given the same meal but with 2 bread rolls, 1 slice of chicken and 1 slice of cheese. In total the meals offered to the children contained approximately 453.5kcl, consisting of the following calorie breakdown: bread roll 170kcl (5.8g protein, 31.1g carbohydrate, 2.4g fat); cheese 34.5kcl (1.6g protein, 1g carbohydrate, 2.6g fat); chicken 11.5kcl (1.9g protein, 0.3g carbohydrate, 0.03g fat); carrot 25kcl (0.56g protein, 5.85g carbohydrate, 1.7g fat); crackers 66.5kcl (1g protein, 7.75g carbohydrate, 13g fat); cookies 110kcl, (1.34g protein, 14.51g carbohydrate, 5.2g fat); and apple 36kcl (0.18g protein, 9.53g carbohydrate, 0.12g fat). Vegetarians were given the same meal with no chicken and with additional cheese. The foods chosen were based on previous examples of child-friendly meals that have been used in this area of research[22], with the intentional inclusion of cookies alongside the savoury foods to elicit potential parental restriction. Parents were not asked if the meal was typical for the child but were given the opportunity to list foods that their child did not like or would not eat on a screening questionnaire that they completed prior to coming

into the laboratory. Children and parents were explicitly told that they could ask for more food if they wished, however, no families actually requested more food. Mothers and children were invited to eat the meal as they normally would at home and the researcher left the room. All interactions were video recorded by a camcorder hidden behind a screen. Afterwards mothers completed questionnaires, and finally the child was weighed and measured.

Measurements

Maternal questionnaires: Mothers completed a demographic questionnaire about their age, ethnicity and education level, as well as about their child's age and gender. They also completed the Child Feeding Questionnaire subscales assessing maternal pressure to eat and use of restriction of food[8]. This is a widely used and well validated measure with good psychometric properties[8,23].

Mealtime observations: Mealtime observations were coded using the Family Mealtime Coding System (FMCS)[15,24] to rate the prevalence of maternal pressure to eat and maternal restriction of food during the mealtimes. This measure was designed to reflect the constructs of pressure to eat and restriction measured in the CFQ. Restriction is defined as verbally forbidding (e.g. "that's enough now, you can't eat any more"), or physically restricting the child from eating food. Pressure to eat is defined as verbally encouraging or coercing the child to eat more (e.g. "eat one last mouthful"), or physically forcing or prompting the child to eat. Constructs were coded as counts of the number of instances each behaviour was observed according to the definitions above. The FMCS has good inter-rater reliability[15]. For the present study, 15% of the observations were coded by a second observer to establish inter-rater reliability. Intra-class correlation coefficients between observers were 0.95 ($p < 0.001$) for pressure to eat and 0.97 ($p < 0.001$) for restriction.

Child BMI: Height and weight measurements were taken from the child, accurate to the nearest kg and cm, in light indoor clothing with shoes removed. BMI data were converted to BMI z scores adjusting for child age and gender[25].

Statistical Analyses.

Given the previously identified differences in the use and consequences of maternal control over child feeding according to child gender, age and maternal BMI[5,15,26], independent sample t-tests and Pearson's correlations were used to explore whether there were significant differences between girls and boys, or relationships with child age or maternal BMI, on child BMI z scores or in maternal control over food intake. Due to the directional nature of the hypotheses 1-tailed statistics were used throughout. Two moderated regressions were used, controlling for any significant covariates of age, gender, or maternal BMI, to explore whether the relationships between a) maternally observed and reported pressure to eat, and b) maternally observed and reported restriction, were moderated by child BMI z scores. In all analyses interaction effects were evaluated after the effects of the independent variable and the moderator were controlled for, and all variables were centred prior to computing interaction effects. The effects of the independent variable at different levels of the moderator were tested using SIMPLE slope analysis[27].

Results

Descriptive statistics

Descriptive statistics as mean and standard deviation scores are presented in Table 1. Mean scores for pressure to eat and restriction assessed by the Child Feeding Questionnaire are similar to other published means of parents with children in this age range[15, 17]. Mothers were observed either verbally or physically pressuring their children to eat an average of 12 times during the course of the meal, and were observed restricting their children from eating once or twice during the meal. Mothers were observed using more pressure to eat and more restriction during this observation compared to the previously reported means[15]; most likely a

result of the mealtime being in the laboratory with a meal not chosen by the mother, in comparison to previous observations made in the family home with foods chosen by the parent. The mean child BMI z score is close to 0 suggesting that the weight of the children in this sample is broadly representative.

Table 1 about here

Relationships with child gender, age and maternal BMI

Independent sample t-tests indicated that there were no significant gender differences in reported maternal pressure to eat or restriction, or in child BMI z scores. However, mothers were observed to use significantly more controlling practices with their sons compared to their daughters, in both pressure to eat [$t(54)=2.91$, $p<.05$; mean male = 17.81, mean female = 6.52], and restriction [$t(52)=2.02$, $p<.05$; mean male = 2.13, mean female = .88]. Pearson's correlations indicated that maternal BMI was not correlated with observed or reported controlling feeding practices, or the child BMI z scores. Child age was not correlated with child BMI z scores or reported pressure to eat or restriction, however child age was significantly and negatively correlated with observed pressure to eat ($r=-.29$, $p<.05$) and restriction ($r=-.27$, $p<.05$). Child age and gender were therefore controlled for in subsequent analyses. Table 2 presents mean and standard deviation scores for reported and observed maternal control broken down according to categories of child gender, age and weight status using the international cut offs for thinness and overweight developed by Cole et al.[29,30].

Table 2 about here

Child BMI as a moderator of the relationship between observed and reported maternal feeding behaviour

Moderated regression analyses were used to explore whether child BMI z scores moderated the relationships between observed and maternally reported pressure to eat and also between observed and maternally reported restriction. The independent variable and moderator were centred and entered as independent variables in step 1 of the regressions, step 2 consisted of the interaction between the centred independent variable and the centred moderator. In all analyses the effect of child gender and age were controlled for in the initial step. The interaction between observed maternal pressure to eat and child BMI z score was a significant predictor of maternally reported pressure to eat. Similarly the interaction between observed maternal restriction and child BMI z score was a significant predictor of maternally reported restriction. The model statistics for the regressions are presented in Table 3. The significant interactions were analyzed using simple slope analyses. Slopes for the regression of observed maternal feeding behaviour upon reported maternal feeding behaviour were computed at three levels of the moderator: the mean (average child BMI z score), one standard deviation above the mean (high child BMI z score), and one standard deviation below the mean (low child BMI z score).

Table 3 about here

For restriction, the relationship between observed and reported maternal restriction was significantly negative when children had a high BMI (i.e. were one standard above the mean in their BMI z scores) [$B=-.16$, $t(52) = -2.60$, $p<.05$]. The relationships between observed and reported maternal restriction were not significant when children's BMI z scores were at the mean [$B=-.06$, $t(52) = -1.23$, $p>.05$] or one standard deviation below the mean

[B=.04, t(52) = .62, p>.05]. Figure 1 shows the significant negative relationship between observed and reported use of maternal restriction for children who were relatively overweight (BMI z score 1 standard deviation above the mean). This suggests that in general, parents' reports of restrictive feeding practices do not correspond particularly well to observations of restriction in a laboratory mealtime, and that in the context of child overweight, mothers who report high levels of restrictive feeding practices are actually observed to use very few instances of restriction. Conversely, mothers who report little use of restrictive practices are observed to use higher levels of that practice in an observed laboratory mealtime when their children have a higher BMI z score.

Figure 1 about here

For pressure to eat, the relationship between observed and reported maternal pressure to eat was positively significant when children were relatively underweight (i.e. one standard below the mean in their BMI z scores) [B=.04, t(52) = 1.97, p<.05]. The relationships between observed and reported maternal pressure to eat were not significant when children were at the mean [B=.01, t(52) = 1.17, p>.05] or one standard deviation above the mean [B=-.01, t(52) = -.10, p>.05] in their BMI z scores. Figure 2 demonstrates that when children were average or below average in their BMI z scores the relationship between observed and maternally reported pressure to eat was positive. However, when children were 1 standard deviation above average in their BMI (relatively overweight), the relationship between observed and reported pressure to eat was non-significant and negative. Only for mothers of underweight children was there a correspondence between maternal reports and observations of the use of pressure to eat.

Figure 2 about here

Discussion

The results of this research suggest that there is relatively little correspondence between maternally reported use of pressure to eat and restriction over food with independent observations of these behaviours in the laboratory setting, and that the level of agreement between reported and observed control over child feeding in this setting depends upon the child's BMI. Only parents of children who were relatively underweight showed significant correspondence between their reports and independent observations of their use of pressure to eat in the laboratory. For parents of healthy weight children there was no significant relationship between mothers' reports of their pressure to eat and restriction with independent observations of these feeding practices in the laboratory. Moreover, for parents of relatively overweight children there was a significant negative relationship between maternal reports and independent observations of their use of restriction over food. These findings suggest that in general there is very little association between what mothers report that they do and what they are observed doing in terms of controlling their child's eating during an observed laboratory mealtime, and that the accuracy of these reports when assessed independently depends upon the child's BMI.

The results demonstrated a significant negative relationship between observed and reported use of restriction in the mothers of children who were relatively overweight. This indicates that when mothers of overweight children reported high use of restriction they were rarely observed using restrictive feeding practices in the laboratory. Indeed, mothers of relatively overweight children may feel social pressure to restrict their child from eating too much food or to restrict them from eating unhealthy foods, and this may lead to a greater desire to report using restrictive feeding practices irrespective of the actual employment of

these strategies. When mothers reported using low levels of restriction they were observed using this feeding practice more frequently. Whilst it is possible that the laboratory based environment did not provide enough real life validity to appropriately elicit normal maternal feeding behaviours, it is also possible that mothers are unaware that they are using these controlling feeding practices, or are responding in socially desirable ways to avoid or enhance their reports of these behaviours. It is also possible that mothers of overweight children may be less aware of the feeding practices they use, and may perhaps not attend to, or monitor, how frequently they use restriction over food. Alternatively, mothers of overweight children may find that their attempts to restrict child food intake are met with greater resistance and as such their memories of restriction become more salient and memorable, resulting in differences between observed and reported restriction. Restrictive feeding practices are notoriously difficult to observe in standard feeding settings as parents are unlikely to offer children foods to eat which they then intend to restrict. Whilst we attempted to increase our ability to observe maternal use of restriction in the lab by providing high calorie food (i.e. cookies) associated with parental restriction[8], we cannot be sure of how successful this strategy was in terms of eliciting normal maternal restrictive behaviour. Restrictive feeding practices may be more easily observed during the presentation of snack foods or desserts, and further research evaluating restriction in these contexts is merited.

It is difficult to account for both interpretations of this negative relationship, but it is possible that in this observational setting, in the context of child overweight, mothers behave differently than they typically might at home. For example, we have no data on the family food environments of our sample, and this observed effect may be the result of differences in the amount of less healthy, high calorie food available at the home. For example, in a relatively health home food environment, there may be less need to overtly restrict the child's food intake (see [31] for a discussion of differences in overt and covert control), but when faced

with high calorie foods in the laboratory, parental restriction may be elicited. In contrast, in a family with a less healthy food environment at home, where parental restriction may be perceived as higher or occur more frequently, when faced with the relatively small amounts of high calorie foods in the laboratory setting, lower rates of parental restriction may be elicited. Further research is needed with this group to replicate these findings and to investigate whether this negative relationship between observed and reported restriction is a result of poor parental awareness, other factors such as family food environments, or lack of acknowledgement of the use of this feeding practice.

In contrast, mothers of underweight children were the only group who showed a significant positive relationship between their reported and observed use of pressure to eat. Parents of children who are relatively underweight are likely to be concerned about their child's weight and health and in addition, lower child weight is often associated with fussy eating and feeding problems[32] which are in turn associated with high levels of parental anxiety and concern[33,34] Parents of underweight children may be more sensitive to their child's feeding and more conscious about how their child eats and the feeding practices that they employ, particularly with the feeding practices that are designed to increase, rather than limit, food consumption. This may be in contrast to the parents of healthy weight and overweight children who are perhaps less likely to have problems with fussy eating and food refusal and as such may be less invested in their feeding practices.

Although the findings of this research may have important implications for the methodologies used to assess maternal feeding practices, this study is not without its limitations. This research relies on a relatively small of participants and focuses on observations within a relatively limited age range (3-4 years). The study participants were also a relatively homogenous group and care must be taken to not generalize the results beyond their demographics. The findings of the research are limited to the laboratory setting

where participants may behave differently to how they would at home because of social desirability and the influence of demand characteristics. Indeed, the fact that parents used more controlling feeding practices with younger children may result from a greater parental need to keep younger children engaged with the meal, given the potentially distracting nature of the novel environment. These results clearly require replication in a home environment before they can be generalized. In addition, we only have one observation per family and it is possible that we would have found different results had we used more frequent observations. The observation scheme used provided an index of frequency but not intensity of maternal control with food, and it may be fruitful to explore the different effects of the intensity of controlling feeding practices in further research. However, despite the limitations of the present study, the results of this research have important implications for research focused on early child feeding and eating, particularly that which utilizes parental report of feeding practices.

The findings suggest that the validity of maternal report of feeding practices depends in part upon the child's BMI. It may well be that the validity of maternal report also depends upon other factors yet to be explored, such as maternal age, weight-status, education, experience with other children, or the child's food fussiness, and further research can begin to explore these interesting possibilities. Further research is also needed to establish whether the poor correspondence identified here between maternal report and independent observations of feeding behaviour is a result of mothers being unaware of, or unprepared to report accurately on, their use of these very influential child feeding practices, which have important consequences for child eating and weight.

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Farrow; observed feeding and child weight

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Figure legends

Figure 1: The interaction between observed maternal restriction and child BMI z score in predicting reported maternal use of restriction with food.

Figure 2: The interaction between observed pressure to eat and child BMI z score in predicting reported maternal use of pressure to eat.

Farrow; observed feeding and child weight

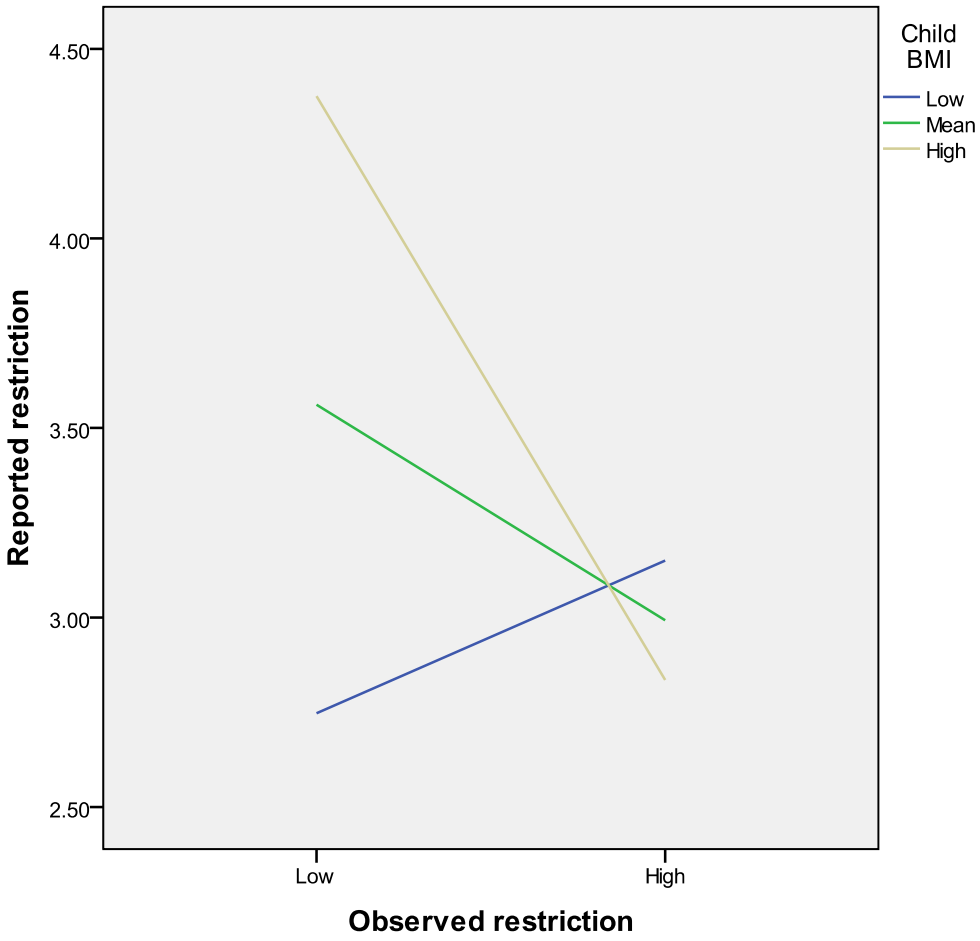


Figure 1

Farrow; observed feeding and child weight

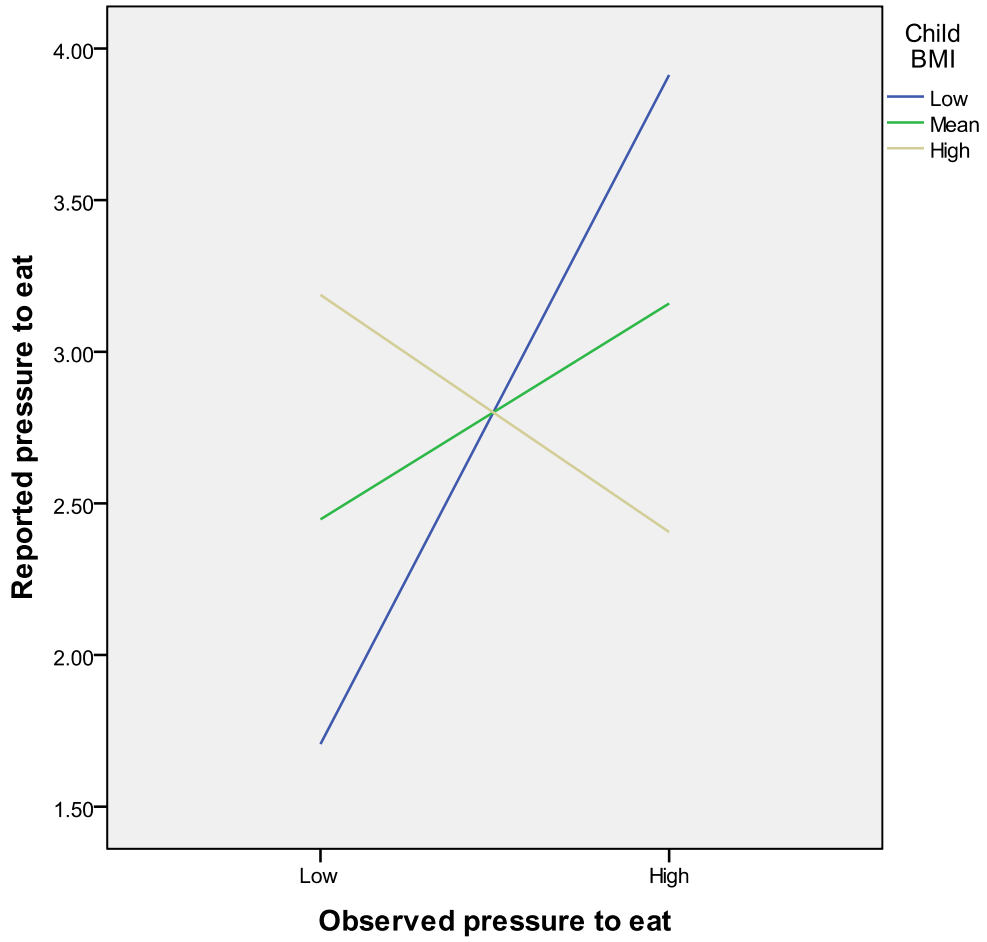


Figure 2

Table 1: Descriptive statistics for maternal use of control during feeding and child BMI z scores

Variable	Mean	Standard deviation
Child BMI z score	.07	.95
Maternally reported pressure to eat	2.75	1.06
Maternally reported restriction	3.27	.92
Observed maternal pressure to eat	12.77	15.37
Observed maternal restriction	1.57	2.46

Z score= standard deviation score

Table 2: Mean scores for maternal observed and reported pressure to eat and restriction separated according to child gender, age and weight categories.

	Maternally reported pressure to eat Mean (SD)	Maternally reported restriction Mean (SD)	Observed maternal pressure to eat Mean (SD)	Observed maternal restriction Mean (SD)
Boys (N=31)	2.83 (1.12)	3.35 (1.01)	17.81 (17.93)	2.13 (2.80)
Girls (N=25)	2.66 (.99)	3.18 (8.12)	6.52 (8.12)	.88 (1.79)
Aged 3 (N=30)	2.74 (.96)	3.17 (.94)	17.00 (18.67)	2.10 (2.70)
Aged 4 (N=26)	2.77 (1.18)	3.39 (.91)	7.88 (8.30)	.96 (2.05)
Underweight (N=6)	2.63 (1.63)	2.60 (.75)	6.00 (5.55)	1.50 (1.97)
Normal weight (N=45)	2.84 (.97)	3.38 (.85)	12.44 (15.68)	1.29 (2.16)
Overweight (N=5)	2.10 (1.04)	3.13 (1.48)	23.80 (16.81)	4.20 (4.21)

Table 3: Model statistics for variables predicting reported maternal pressure to eat and restriction

	β	t
Predicting reported maternal pressure to eat		
Step 1: Child age	.13	.48
Child gender	-.18	-.62
Step 2: Observed pressure to eat	.01	.47
Child BMI z score	.01	.03
Step 3: Observed pressure to eat X child BMI z score	-.03	-1.84*
Model: R=.28, F(55)=.85, p>.05		
Predicting reported maternal restriction		
Step 1: Child age	.10	.42
Child gender	-.18	-.70
Step 2: Observed restriction	-.08	-1.45
Child BMI z score	.26	2.01*
Step 3: Observed restriction X child BMI z score	-.12	-2.45*
Model: R=.47, F(55)=2.76, p<.05		

*p<.05