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Original citation:
Palfreyman, Zoe, Haycraft, Emma and Meyer, Caroline. (2013) Unintentional role models : links between maternal eating psychopathology and the modelling of eating behaviours. European Eating Disorders Review, Volume 21 (Number 3). pp. 195-201.
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Unintentional roles models: Links between maternal eating psychopathology and the modelling of eating behaviours

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Running head: Modelling and maternal mental health.

Abstract

This study explored the relationships between maternal modelling of eating behaviours with reported symptoms of maternal eating psychopathology, anxiety and depression. Mothers (N=264) with a child aged 1.5 to 8 years completed three self-report measures designed to assess modelling of eating behaviours, eating psychopathology and levels of anxiety and depression. The study found that higher levels of maternal eating psychopathology were positively associated with eating behaviours that were unintentionally modelled by mothers but that maternal eating psychopathology was not associated with more overt/intentional forms of parental modelling. In addition, higher levels of maternal depression were associated with lower levels of both unintentional and intentional forms of maternal modelling whereas maternal anxiety was not found to correlate with modelling behaviours. This study highlights the possible detrimental influences of maternal mental health in relation to mothers providing their child with a positive parental role model around eating and feeding.

Keywords: anxiety; depression; role model; child feeding practices.

Unintentional roles models: Links between maternal eating psychopathology and the modelling of eating behaviours

The early years of an individual's life are often referred to as a 'critical period' for the development of eating behaviours (Kelder, Perry, Klepp & Lytle, 1994) and the eating behaviours and food preferences formed within this timeframe are believed to remain relatively stable into adulthood (e.g., Kelder et al., 1994; Mannino, Lee, Mitchell, Smiciklas-Wright & Birch, 2004; Nicklas, Webber & Berenson, 1991; Nicklaus, Boggio, Chabanet, & Issanchou, 2005). The parent-child relationship is an important factor in child development (e.g., Field, 2010; Merikanagas, Dierker & Szatmari, 1998) and parents have been shown to play a significant role in the development of children's food choices and eating behaviours, through factors such as the child feeding practices they employ and their control of children's food intake (e.g. Birch & Fisher, 2000; Faith et al., 2004; Hughes, Shewchuk, Baskin, Nicklas & Qu, 2008).

Research exploring parental feeding strategies has tended to concentrate on food restriction and pressure to eat (e.g., Birch & Fisher, 2000; Carper, Fisher & Birch, 2000; Faith et al., 2004). While some consideration has been given to a broader range of feeding practices (e.g., Musher-Eizenman & Holub, 2007), at present, comparatively little attention has been given to parents' modelling of eating behaviours. Parents are constant role models for their children and therefore modelling can be both intentional (with parents purposely carrying out a desired behaviour in front of their child and hoping that their child will imitate it; Reinaerts et al., 2007), and unintentional (with children observing behaviours that parents are not intentionally modelling; Palfreyman, Haycraft & Meyer, in press). This means that both intentionally and unintentionally modelled behaviours might be adopted by children. Intentional modelling of healthy eating has been found to predict lower levels of food fussiness in pre-school children (Gregory, Paxton & Brozovic, 2010) and maternal modelling has also been associated

with children's healthy food intake (e.g., Palfreyman et al., in press; Tibbs et al, 2001; Young, Fors & Hayes, 2004). In contrast, unintentional modelling has been related to less positive outcomes, for example, to a greater intake of unhealthy snack foods among children (Palfreyman et al., in press). Research has also suggested modelling to be a factor in reported relationships between mothers' and their children's eating patterns. For example, dieting behaviours (Pike & Rodin, 1991), levels of dietary restraint (Cutting, Fisher, Grimm-Thomas & Birch, 1999; Hill, Weaver & Blundell, 1990; Stein, Woolley, Cooper & Winterbottom, 2006), levels of body dissatisfaction (Brown & Ogden, 2004; Hall & Brown, 1982), weight related attitudes (Hall & Brown, 1982; Keel, Fulkerson & Leon, 1997; Steiger et al., 1994; Stein et al., 2006) and bulimic pathology (Stice, 1998). Together, this research supports a role for the process of modelling in the transference of eating behaviours and attitudes.

One important factor that has been shown to reduce the quality of parent-child interactions is maternal mental health symptoms, such as eating psychopathology, anxiety and depression (e.g., Field, 2010; Franzen & Gerlingerhoff, 1997; Nicol-Harper, Harvey & Stein, 2007). Findings of correlational studies have shown that mothers who display higher levels of eating psychopathology have a greater tendency to employ restrictive feeding strategies (e.g., Duke, Bryson, Hammer & Agras., 2004; Haycraft & Blissett, 2008; Reba-Harrelson et al., 2010; Russell, Treasure & Eisler, 1998). In addition, they show greater rigidity and control during mealtimes (e.g., Blissett & Haycraft, 2011; Blissett, Meyer & Haycraft, 2006; Evans & le Grange, 1995; Stein et al., 2001, 2004). Indeed, mothers who report higher levels of eating disorder symptoms have also reported difficulties in feeding their children (Fahy & Treasure, 1989; Franzen & Gerlingerhoff, 1997; Micali, Simonoff & Treasure, 2009; 2011; Reba-Harrelson et al., 2010) and are less likely to eat with their children (Patel, Wheatcroft, Park & Stein, 2002). This suggests that the feeding strategies employed by mothers are related to their own eating behaviours and attitudes and that mothers who restrict and control

their own diets use similar restrictive feeding practices with their children (e.g. Birch & Fisher, 2000; Haycraft & Blissett, 2008; Reba-Harrelson et al., 2010; Stein, Woolley, Cooper & Fairburn, 1994).

In addition to eating psychopathology, depression and anxiety have been linked to maladaptive feeding practices. Specifically, maternal anxiety has been associated with the use of more restrictive feeding practices (e.g., Farrow & Blissett, 2005) and more negative mealtime interactions (Blissett, Meyer & Haycraft, 2007). Maternal expression of anxiety around feeding and food may mean that the child comes to associate this with feeding and finds feeding and mealtimes a less enjoyable experience. In relation to depression it has been suggested that depressed mothers have at least two different styles of interacting, including an intrusive and controlling style or a passive withdrawn style (Malphurs, Raag, Field, Pickens, & Pelaez-Nogueras, 1996). In the domain of eating behaviours this suggestion is supported by Haycraft and Blissett (2008), who proposed that for some mothers, depressive symptoms may result in more hostile and intrusive feeding practices, such as pressuring the child to eat, while for others it may result in maternal withdrawal from interactions and involvement during mealtimes. Further support is also provided by Paulson, Dauber and Leiferman (2006), who found both mothers and fathers with higher levels of depressive symptoms were less engaged with their children during mealtimes, and by Francis, Hofer and Birch (2001), who found a relationship between maternal depression and the use of pressuring feeding practices.

In summary, while the relationships between maternal mental health symptoms and parents' use of controlling child feeding practices have been fairly well established, to date, no research has considered the relationship between symptoms of eating psychopathology, depression and anxiety with maternal modelling of eating behaviours. Given that parents continually act as role models for their children, and

that the presence of symptoms of maternal eating psychopathology, depression and anxiety have been found to impair parents' responsiveness to, and interactions with, their child during mealtimes (e.g., Paulson et al., 2006), it is possible that these symptoms may also influence the use of maternal modelling and its outcomes, and may reduce the opportunity for modelling of eating behaviours displayed to the child. Therefore, this study aimed to explore associations between maternal modelling behaviours and maternal mental health. It was hypothesised that mothers reporting higher levels of eating psychopathology, depression and anxiety would report significantly lower levels of maternal modelling of eating behaviours.

Method

Participants

Two hundred and sixty eight parents of children aged between 18 months and 8 years completed and returned questionnaires. Four of these respondents were fathers who were excluded from this sample due to the low number, leaving a final sample of 264 mothers who were included in the analyses. The mothers ranged in age from 20 to 50 years and had a mean age of 34.6 years (SD = 5.79). Mothers reported their ethnicity as predominantly White/British (84.5% of sample), with only Asian (8.3%), White/European (3%) and Mixed ethnicity (1.1%) scoring above 1% of sample. The mothers had a mean self-reported BMI score of 25.2 (SD = 5.13). This sample of mothers worked between 0 and 70 hours per week (mean working hours 18.5, SD = 14.88); the largest group (25.9%) were non-working mothers. They reported a mean of 4.6 years of education after the age of 16 (responses ranged from 0 to 12 years, SD = 2.71).

The children had a mean age of 52.7 months (SD = 23.32). Child gender was split almost evenly (male n = 119, 47.5%; female n = 131, 52.5%) but five mothers failed to provide the gender of their children, so these data were coded as missing. The children

were primarily White/British (80.7% of the sample). The next largest ethnicity group was Asian/Asian British (9.8% of sample) and only White/European 3% and Mixed Ethnicity 2.3%, scored above 1% of the sample. The mean age and gender adjusted child BMI z-score was 0.39 (SD = 2.56; Child Growth Foundation, 1996).

Measures and Procedure

Data collection for this study consisted of two methods, and commenced after receiving Institutional Review Board ethical approval. First, participants were recruited through pre-schools, nurseries, primary and junior schools, from Derbyshire, Leicestershire, Nottinghamshire and Staffordshire. Questionnaires packs were distributed to primary caregivers of children aged between 18 months and 8 years. Second, a further 184 participants were recruited through an online version of the questionnaire pack which was advertised on parenting websites, an eating disorder support website and distributed via two university email lists. Mandatory consent was required before the online questionnaire could be completed. Once completed and submitted, online data were only accessible via the researcher's online account. Both the online and paper questionnaire required caregivers to provide background information for themselves and their child, including nationality, ethnicity, age, self-reported height, weight and gender. After completing this, each participant completed the following self-report questionnaires:

Parental Modelling of Eating Behaviours Scale (PARM; Palfreyman et al., in press; see Appendix A)

This is a newly designed measure comprising 15 items, split into three subscales. The first subscale, Verbal Modelling (6 items; current sample α = .82), explores ways in which parents model their eating behaviours and food choices through verbal communication (e.g., *"I tend to talk more often about foods I would like my child to eat."*). The second subscale, Behavioural consequences (6 items; current sample α =

.86), measures outcomes associated with modelling by the parent (e.g., *"My child is more likely to try new foods he/she has seen me eating."*). Finally, the third subscale, Unintentional modelling (3 items; current sample α = .67), measures parental awareness of behaviours adopted by the child which were not intentionally modelled (e.g., *"My child has picked up eating behaviours from me which I have not intentionally encouraged him/her to adopt"*). Responses are recorded using a 7-point Likert-type scale with three anchors (Strongly disagree – Neutral – Strongly Agree). Higher scores indicate greater reported levels of modelling. The measure has been shown to have good internal consistency and validity (Palfreyman et al., in press).

Eating Disorder Examination Questionnaire (EDEQ; Fairburn & Beglin, 1994)

The EDEQ is a 38 item self-report version of the interview based Eating Disorder Examination (Cooper & Fairburn, 1987). It measures four aspects of eating disorder psychopathology (restraint, eating concern, body shape concern, and body weight concern) as well as having a global score. It addresses the respondent's current state, focusing on the last 4 weeks. High scores on the EDEQ indicate more pathological eating attitudes and behaviours. It is widely used and has been found to be a reliable and valid measure in community samples (e.g., Fairburn & Beglin, 1994; Mond, Hay, Rodgers, Own & Beumont, 2004). For the purpose of this study a shortened version of the original instrument was used, with the 13 item diagnostic section being removed.

Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983)

The HADS is a 14 item self-report measure assessing symptoms of anxiety and depression. Severely psychopathological symptoms are not covered which is thought to improve the scale's acceptability and make it more sensitive to mild forms of psychiatric disorders, thus avoiding a 'floor effect' (Herrmann, 1996). The measure consists of two subscales, both of which have been shown to have high factorial validity (Herrmann, 1996). The depression subscale consists of 7 items, for example, "*I*

still enjoy the things I used to enjoy". The anxiety subscale also consists of 7 statements, for example, *"I feel tense or wound up"*. Responses are made on a 4 point likert response scale to assess the participant's level of agreement with the statements. Higher scores on the subscales indicate higher levels of anxiety and/or depression. The measure has been found to perform well at assessing the symptom severity of anxiety and depression in clinical and in general populations (Bjelland, Dahl, Haug & Neckelmann, 2001; Herrmann, 1996).

Data analysis

A series of Kolmogorov-Smirnov tests established that all subscales were non-normally distributed. Transformation of the data was performed (squared transformation method) but it did not result in normal distribution of the study variables. Therefore, all analyses were conducted using the original, untransformed data and non-parametric analyses were conducted, when possible.

Mann-Whitney U tests identified no significant differences between mothers of boys and girls on any of the study's variables. Preliminary two-tailed Spearman's correlations indicated that child age was negatively correlated with maternal anxiety ($r = -.25$, $p = .001$) and depression ($r = .22$, $p = .001$), and positively associated with verbal modelling ($r = 16$, $p = .034$). Maternal age negatively correlated with maternal anxiety ($r = -.14$, $p = .021$) and maternal BMI positively correlated with maternal anxiety ($r = .16$, $p = .011$) and all five of the EDEQ subscales (rs 0.32 to 0.50, $p < .01$). Child BMI Z scores also negatively correlated with maternal depression ($r = -.15$, $p = .036$). Therefore, one-tailed partial correlations (due to a non-parametric version of this statistical test being unavailable), controlling for maternal BMI, were used to examine relationships between maternal modelling and maternal eating psychopathology. In addition, when testing for relationships between maternal anxiety and depression levels with maternal modelling, one-tailed partial correlations controlling for maternal and child

age, as well as maternal BMI and child BMI Z scores, were conducted. Finally, in order to identify the best predictors of maternal modelling, stepwise regressions were conducted. Significant correlates of each of the three modelling subscales were entered into regressions to determine the best statistical predictors of maternal modelling of eating behaviours. Significance was set at $p<0.01$.

Results

Descriptive Statistics

Mothers' mean scores on the PARM, EDEQ and HADS measures are provided in Table 1.

--TABLE 1 ABOUT HERE---

The EDEQ scores of this sample were similar to those reported in community samples by Fairburn and Beglin (1994) and Mond, Hay, Rodgers, Owen and Beumont (2004). The mean HADS scores in the current sample suggest mild symptoms of anxiety and depression, which are in line with other research using samples of parents with young children (e.g., Nærde, Tambs, Mathiesen, Dalgard & Samuelsen, 2000). The relationships between eating psychopathology, anxiety and depression symptoms were subsequently examined. Symptoms of depression were negatively related to four of the five EDEQ subscales ($r > -.162$, $p < .004$ in all cases). Depression and eating concern were not significantly correlated ($r = -.127$, $p > .01$). Anxiety was significantly correlated with eating concern ($r = .159$, $p = .005$) but not with any of the other EDEQ subscales ($rs < .127$, $p > .01$).

To explore potential differences between the two methods of data collection used in this study, a series of Mann-Whitney tests of difference were conducted between the sample collected online and the sample collected through schools and nurseries on

their scores on the above three measures. A significant difference in maternal levels of anxiety was revealed between mothers who provided data online (M = 9.02, Md = 9.00, n = 76) and those who were recruited via schools and nurseries (M = 5.87, Md = 5.00, n = 76, U = 11235.00, z = 7.55, p =.001). A significant difference was also found between maternal scores of depression reported online (M = 10.93, Md = 11.00, n = 76) and via schools (M = 6.91, Md = 7.00, n = 76), U = 12263.50, z = 9.268, p = .001). These two outcomes indicate that mothers who completed an online version of the questionnaire tended to report higher levels of anxiety and depression than mothers who completed paper versions of the questionnaire. Significant differences between the two groups were not found for any of the PARM or EDEQ subscales.

Table 2 presents the results of the partial correlations between EDEQ and PARM subscales, controlling for maternal BMI. Given that the age of the child was found to be positively correlated with verbal modelling, correlations conducted between verbal modelling and EDEQ scores also controlled for this factor.

--TABLE 2 ABOUT HERE---

There were no significant associations between Verbal modelling or Behavioural consequences with any of the five EDEQ subscales. Similarly, the Unintentional modelling subscale of the PARM was not significantly associated with the EDEQ restraint subscale. However, Unintentional modelling scores were significantly and positively associated with the global EDEQ subscale and with the other three EDEQ subscales (eating concern, shape concern, weight concern).

Table 3 presents the results of the partial correlation analysis between the mothers' HADS anxiety scores (controlling for maternal and child age, and maternal BMI) and

HADS depression scores (controlling for child BMI z scores and child age) with the modelling subscales (PARM).

--TABLE 3 ABOUT HERE---

Maternal anxiety was not found to be significantly correlated to any of the three maternal modelling subscales. Significant associations were found between maternal modelling and maternal depression within this sample. Verbal modelling, Unintentional modelling and Behavioural consequences of modelling were all significantly and negatively correlated with maternal depression.

Finally, in order to identify which of the significant correlates of Unintentional modelling were the best predictors, a stepwise multiple regression analysis was conducted. Child age, child BMI z scores and maternal BMI were entered into step 1. The variables found to be significantly correlated with Unintentional modelling previously (i.e. the EDEQ subscales of eating concern, weight concern, shape concern, overall global score, and the HADS depression subscale) were entered into step 2. The overall model was significant (F 4.36, p = .001) and explained 11% of the variance. The only significant predictor of Unintentional modelling was maternal eating concern (t = 3.67, Beta = 0.30, p < .001). None of the other factors entered into the regression model were statistically significant predictors of Unintentional modelling when considered together.

Discussion

The aim of this study was to explore the relationships between different aspects of maternal mental health symptoms and maternal modelling practices in relation to children's eating. A number of interesting relationships were found. Mothers who

reported higher eating psychopathology, particularly greater concern about their own eating behaviours, also reported higher levels of awareness of their unintentional modelling, i.e. eating behaviours imitated by their children which they have not intentionally displayed. A possible explanation for this relationship is that these mothers may generally be more aware of their children's eating behaviours. Previous research which supports this explanation found that mothers who reported higher levels of dietary restriction also report higher levels of monitoring behaviours (Birch, Fisher & Davison, 2003; Tiggemann & Lowes, 2002). There are a number of possible reasons for this increased awareness. It may be due to their own relationship with food and eating (Tiggemann & Lowes, 2002), or concerns about transmitting unhealthy eating behaviours to their children (Reba-Harrelson et al., 2010), or these mothers may be more consciously aware of their children displaying eating behaviours which they consider to be negative. In addition, given that these mothers may have less adaptive food and eating related attitudes and might be engaging in less desirable eating behaviours themselves, then this relationship with unintentional modelling is potentially problematic for the development of children's relationship with food. Alternatively, the PARM may be tapping into maternal beliefs and concerns about transmitting negative eating behaviours to their child, rather than maternal awareness of their modelling behaviours being adopted by their children. This concern about transmitting unhealthy eating behaviours has been previously documented in mothers with eating disorders (e.g., Micali et al., 2009; Reba-Harrelson et al., 2010) and the association between these two variables also lends support to the intergenerational transmission of eating psychopathology (e.g., Patel et al., 2002; Pike & Rodin, 1992; Stein et al., 2001; Whitehouse & Harris, 1998).

However, higher levels of eating psychopathology were not found to be associated with either verbal modelling or the consequences of intentional modelling. The lack of associations with more overt, intentional forms of modelling may be due to these

mothers engaging in lower levels of interaction with their children in relation to food and eating, as has been previously found in mothers with eating disorders (e.g., Fahy & Treasure, 1989; Franzen & Gerlingerhoff, 1997; Patel et al., 2002). Alternatively, mothers with their own eating concerns may find it easier to exhibit control around mealtimes (e.g., Blissett & Haycraft, 2011; Stein et al., 2001) rather than intentionally modelling behaviours to influence their child. Additionally, these mothers may be aware that their eating behaviours are not positive examples and so they may avoid showing them to their children when possible.

The fact that maternal eating restraint was not found to be correlated with any of the modelling subscales is interesting, given that the transference from parent to child of restrictive and dieting behaviours has been previously suggested (e.g., Cutting, et al., 1998; Hill et al., 1990; Pike & Rodin, 1991). This could mean that levels of maternal restraint do not influence the use of modelling as a feeding strategy by mothers or it may suggest that mothers with higher levels of restrictive behaviours are not aware of these behaviours being adopted by their child or consider them to be normal eating behaviours. Alternatively, it may be due to mothers within this sample reporting low levels of restrictive eating behaviours. Given that restrictive forms of eating disorder behaviours are less common in the population than other forms of eating psychopathology (e.g., Hudson, Hiripi, Pope Jr. & Kessler, 2007), this was not unexpected.

Mothers who reported higher levels of depression also reported lower levels of all three forms of modelling explored. These findings were anticipated due to mothers with higher levels of depression often exhibiting lower levels of interaction with their children (e.g., Nicol-Harper et al., 2007), poorer general awareness of their children's cues (e.g., Field, 2010), and poorer parent-child relationships (e.g., Paulson et al., 2006), thus reducing the probability of overt modelling being employed by parents. These

factors can also explain the negative relationship with unintentional maternal modelling, as the poorer relationship between parent and child could affect the parents' awareness of their children's eating behaviours in general and the lack of interaction would prevent the opportunity for all forms of modelling to be displayed to the child. The relationships between low levels of modelling and maternal depression may mean that mothers with symptoms of depression may fail to provide their child with a positive role model in relation to food and eating. This could lead children to look to others as role models in relation to food, such as family members (e.g., fathers or siblings) or they may have to look outside the home environment (e.g., to peers). This in turn could affect the development of children's eating behaviours and attitudes to foods, which could have detrimental effects in the future. Further research with fathers is required to test this suggestion.

While depression supported the hypothesis and was negatively associated with all three of the maternal modelling subscales, anxiety was not found to be significantly related to maternal modelling. These findings could suggest that maternal anxiety may not be a factor in the use of maternal modelling as a feeding practice or be related to modelling in general. Mothers with higher levels of anxiety around foods and eating may be more likely to employ more controlling feeding practices, as has been found previously (e.g., Farrow & Blissett 2005), rather than intentionally modelling eating behaviours. Alternatively, symptoms of maternal anxiety might impair parents' ability to comment on their feeding interactions objectively. The PARM modelling measure also concentrates on behaviours and may not tap into the factors which may be more prone to being affected by maternal anxiety, such as mealtime involvement. However, the lack of any associations between modelling and anxiety may also be due to the use of a broad measure of anxiety in this study rather than a specific measure of anxiety relating to food and eating behaviours, as no specific measure of eating anxiety is

currently available. Further research is required into anxiety and its relationship to modelling.

While this study has provided insight into the potential relationships between maternal mental health and acting as a role model around eating behaviours, there are a number of limitations. First, data were collected from self-report measures relying on the accuracy of maternal report and mothers who took part online had significantly greater levels of anxiety and depression. Second, within this sample the levels of mental health symptoms were relatively low and future research would benefit from exploring a clinical sample of mothers. Third, the anxiety measure used in this study was a brief measure of general anxiety and was not specific to anxiety around eating and mealtimes, which may mean associations between anxiety and maternal modelling may have remained unidentified. Moreover, the sample was predominantly white and generally well educated, which means that generalisation to the wider population is limited. Finally, the cross-sectional nature of our data limits the implications that can be drawn.

In conclusion, the findings from this study support previous research in suggesting that maternal mental health factors are related to the feeding practices employed by mothers. The relationship between maternal eating psychopathology, particularly maternal eating concerns, and higher reported awareness of unintentional modelling is especially significant as these mothers may be modelling less desirable eating behaviours which their children may be picking up on, thus highlighting a potentially negative influence on the development of children's eating behaviours. Alternatively, this relationship could suggest that mothers with higher eating psychopathology may be more concerned about the potential for transferring their less adaptive eating behaviours to their children through modelling. The relationships between depression

and maternal modelling are also important and suggest that mothers with symptoms of depression may fail to provide their child with a positive role model in relation to food and eating. Thus children may need to look to another individual or they may struggle to form adaptive relationships with food and eating, which could have detrimental future consequences. While preliminary, the current study's findings add further support to the potential value of early interventions in the form of educational programs and support for mothers with eating disorders, as suggested by Reba-Harrelson and colleagues (2010). When considered alongside previous work which has suggested modelling may also influence the diets of parents when intentionally used as a feeding strategy (Palfreyman et al., in press), this study suggests that modelling may be a useful feeding strategy for promoting healthy interactions.

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Table 1: Descriptive statistics for maternal scores on PARM, EDEQ and HADS measures (N=264).

	Mean	(SD)
Verbal modelling	4.79	(1.14)
Behavioural consequences	5.01	(1.27)
Unintentional modelling	3.70	(1.24)
Restraint	1.51	(1.54)
Eating concern	0.92	(1.28)
Shape concern	2.48	(1.72)
Weight concern	2.11	(1.63)
Global score	1.76	(1.37)
Anxiety	8.11	(3.09)
Depression	9.77	(3.13)

PARM: Parental Modelling of Eating Behaviours Scale; EDEQ: Eating Disorder Examination Questionnaire; HADS: Hospital Anxiety and Depression Scale

Table 2: One tailed partial correlations between maternal eating psychopathology and maternal modelling, controlling for maternal BMI and (when required) child age.

	PARM Subscales		
EDEQ Subscales	Verbal Modelling	Behavioural Consequences	Unintentional Modelling
Restraint	.114	.066	.076
Eating Concern	.096	.114	**.288***
Shape Concern	.034	.063	**.163***
Weight Concern	.058	.059	**.168***
Global Score	.086	.084	**.193***

*p<.01

Table 3: One tailed partial correlations, between maternal modelling and anxiety scores controlling for child age, age of the mother and maternal BMI and between maternal modelling and depression controlling for child age and child BMI z scores.

	Modelling Measure Subscales (PARM)		
HADS Scores	Verbal Modelling	Behavioural Consequences	Unintentional Modelling
Anxiety	-.051	-.074	.107
Depression	**-.192***	**-.194***	**-.205***

*p<.01

Appendix A: Parental Modelling of Eating Behaviours (PARM)

Instructions: Please respond to the following statements about food-based interactions with your child to indicate how much you agree or disagree with them.

	Strongly Disagree			Neutral			Strongly Agree
1. I make comments on my healthy eating behaviours / food choices when I am with my child (e.g. “I’ll be healthy and have vegetables”).	1	2	3	4	5	6	7
2. If I intentionally emphasise certain eating behaviours / food preferences my child is more likely to copy them.	1	2	3	4	5	6	7
3. When I show my child I enjoy fruits or vegetables, he/she tries them.	1	2	3	4	5	6	7
4. The eating behaviours of other family members influence what my child eats.	1	2	3	4	5	6	7
5. My child has picked up eating behaviours from me which I have not intentionally encouraged him/her to adopt (e.g. having tomato sauce with most meals, or eating vegetables first).	1	2	3	4	5	6	7
6. My child is more likely to try or eat new foods if I eat the new foods with him/her.	1	2	3	4	5	6	7
7. I try to influence my child’s food preferences by verbally stating my own (e.g. “I love carrots, they’re one of my favourites”).	1	2	3	4	5	6	7
8. My child is more likely to try new foods he/she has seen me eating.	1	2	3	4	5	6	7
9. I verbally encourage my child to copy my eating behaviour.	1	2	3	4	5	6	7
10. My child has picked up eating behaviours from me which I had tried to hide from him/her (e.g. avoiding certain foods).	1	2	3	4	5	6	7
11. My child has adopted eating behaviours from me which I did not previously realise I did (e.g. eating certain foods first).	1	2	3	4	5	6	7
12. My child asks to try foods from my plate which he/she sees me eating.	1	2	3	4	5	6	7
13. I tend to talk more often about foods I would like my child to eat.	1	2	3	4	5	6	7
14. I try to encourage my child to eat new foods by stating my food preferences (e.g. “I love peas, why don’t you try them?”).	1	2	3	4	5	6	7
15. I explain my food choices verbally to my child (e.g. “I think I’m going to have some fruit for my pudding as I like it and it’s good for me”).	1	2	3	4	5	6	7