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Using food to soothe: Maternal attachment anxiety is associated with child emotional eating

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Attachment anxiety (fear of abandonment) is associated with disinhibited eating in adults. Both maternal disinhibited eating and use of emotional feedings strategies are associated with emotional eating in children. On this basis, the current study sought to determine whether attachment anxiety is an underlying maternal characteristic that predicts parental reports of child emotional over-eating via its effects on maternal disinhibited eating and emotional feeding. Mothers of a preadolescent child (N = 116) completed an internet-delivered questionnaire. Maternal attachment anxiety and dietary disinhibition were assessed by the Experiences in Close Relationships questionnaire and the Three Factor Eating Questionnaire, respectively. The Parental Feeding Strategies Questionnaire and the Child Eating Behaviour Questionnaire were used to quantify emotional feeding and child emotional over-eating, respectively. Bias-corrected bootstrapping indicated a significant direct effect of maternal attachment anxiety on child emotional over-eating (*i.e.*, controlling for maternal disinhibited eating and emotional feeding). There was also a significant indirect effect of maternal attachment anxiety on child emotional over-eating via emotional feeding strategies. In a subsequent model to investigate bi-directional relationships, the direct effect of maternal attachment anxiety on emotional feeding strategies was not statistically significant after controlling for child emotional over-eating. There was, however, a significant indirect effect of maternal attachment anxiety on emotional feeding strategies via child emotional over-eating. These findings highlight the influence of maternal attachment anxiety on parental reports of aberrant eating behaviour in children. While this may be partly due to use of emotional feeding strategies, there is stronger evidence for a "child-responsive" model whereby anxiously-attached mothers use these feeding practices in response to perceived emotional over-eating in the child.

child eating behaviour

Attachment orientation refers to a representational model of personal relationships that is usually abstracted from early interactions with caregivers (Bowlby, 1969). Attachment orientations are conceptualised in terms of two orthogonal dimensions; anxiety about abandonment and avoidance of intimacy (Brennan, Clark, & Shaver, 1998). Anxiously-attached individuals are thought to have an impaired ability to internally regulate emotion in response to distress (Mikulincer & Florian, 1998), which may lead them to rely on external sources of comfort such as consuming food (Maunder & Hunter, 2001). Consistent with this prospect, previous research indicates that attachment anxiety in adults is associated with the general propensity to over-eat (*i.e.*, disinhibited eating) (Wilkinson, Rowe, Bishop, & Brunstrom, 2010). This disinhibited behaviour may be the result of a specific affect regulation strategy that is employed by anxiously-attached individuals to alleviate negative emotional states.

The tendency to eat in response to negative emotions *(i.e.,* emotional over-eating) has also been found in young children (Carper, Fisher, & Birch, 2000). This is cause for concern because emotional over-eating in children is associated with greater caloric intake and obesity (Braet & Van Strien, 1997). Emotional over-eating is likely to be a learned behaviour that is transmitted to the child via interactions with parents or caregivers and this process may occur through various pathways. First, children might model parental or caregiver disinhibited eating. In support of this "role-modelling" hypothesis, studies have shown that maternal disinhibited eating is associated with disinhibited eating and overweight status in the child (Cutting, Fisher, Grimm-Thomas, & Birch, 1999; de Lauzon-Guillain et al., 2009; Zocca et al., 2011).

Second, parents may "teach" children to emotionally eat via use of emotional feeding strategies. This is where the parent offers food when the child is anxious, angry or upset. There is

emotional eating (Blissett, Haycraft, & Farrow, 2010; Rodgers et al., 2013; Rodgers et al., 2014). For example, Blissett et al. (2010) found that children whose mothers often used emotional feeding strategies ate more chocolate in response to a negative mood induction than children whose mothers used this feeding practice infrequently. Emotional feeding strategies are likely to serve a variety of functions; however, one possibility is that offering food for emotion regulation may increase interpersonal closeness between parent and child (Hamburg, Finkenauer, & Schuengel, 2014).

Third, parents might feed their children in the same way that they feed themselves. Wardle et al. (2002) found that mothers with high emotional eating scores reported higher levels of emotional feeding. In addition, the association between parent and child emotional eating was found to be mediated by emotional feeding (Tan & Holub, 2015). Furthermore, negative affect in mothers (depression, anxiety and stress) has recently been shown to predict maternal emotional eating and, in turn, use of emotional feeding strategies and child emotional eating (Rodgers et al., 2014).

Given that attachment anxiety tends to be associated with disinhibited eating, interpersonal insecurity and negative affect, it may be an underlying maternal characteristic that predicates use of emotional feeding strategies and child emotional eating. This possibility has not been previously investigated; however, it is consistent with recent evidence that insecure caregiver-child attachment is associated with high-calorie food intake in preadolescent children (Faber & Dube, 2015). On this basis, the current study sought to determine whether there is an association between maternal attachment anxiety and emotional over-eating in the child. Specifically, it examined whether the relationship would be explained by one or more of the

(ii.) maternal use of emotional feeding strategies, (iii.) these two mediators operating in series (*i.e.*, whereby higher maternal disinhibited eating is associated with greater use of emotional feeding strategies which, in turn, predicts child emotional over-eating).

There is also evidence to suggest that the relationship between parental feeding style and child eating behaviour is bi-directional; specifically, while some feeding strategies may *increase* obesogenic eating behaviours in the child, parents may also use particular practices *in response to* the child's pre-existing weight and eating behaviour traits (Rodgers, et al., 2013; Webber, Cooke, Hill, & Wardle, 2010). For example, Rodgers et al. (2013) found a reciprocal relationship between maternal emotional feeding and child emotional eating over a 1-year period. On this basis, a secondary aim was to test an alternative hypothesis that the association between maternal attachment anxiety and emotional feeding strategies might be mediated by child emotional over-eating.

Method

Participants

One hundred and sixteen mothers of a preadolescent child (aged between 3 and 12 years) completed an internet-delivered questionnaire. They were recruited via local primary schools, an electronic database of research participants, and through advertisements on popular parenting websites in the United Kingdom. The study was advertised as a "Parent and Child Survey on Eating Behaviour". Mothers were instructed to answer the child-relevant questions about one child in their family (where mothers had more than one child in this age range, they were asked to answer the questions about their oldest child only). Individuals who completed the

study protocol was approved by the university's Human Research Ethics Committee.

Measures

Maternal attachment anxiety was quantified using the 18-item attachment anxiety subscale from the Experiences in Close Relationships (ECR) questionnaire (Brennan, et al., 1998). On a seven-point scale ranging from 'disagree strongly' (1) to 'agree strongly' (7), participants rated their level of agreement with statements about their experiences of interpersonal relationships (*e.g.,* "I worry a lot about my relationships"). The attachment anxiety scale score was obtained by calculating the mean response on all items comprising the scale (minimum score = 1, maximum = 7). In the current sample, Cronbach's α for the anxiety scale was 0.93. It is to be noted that the ECR measures global attachment orientation (general approach to relationships), as opposed to specific attachment orientation (approach to a particular relationship).

Maternal disinhibited eating was assessed using the 16-item disinhibition subscale of the Three Factor Eating Questionnaire (TFEQ) (Stunkard & Messick, 1985). Items on this subscale refer to over-eating and loss of dietary control, for example ''When I feel anxious, I find myself eating''. The disinhibited eating scale score was obtained by summing the responses of all items comprising the scale (minimum score = 0, maximum = 16). Cronbach's α for the current sample was 0.83.

Maternal use of emotional feeding strategies was assessed using the Parental Feeding Strategies Questionnaire (PFSQ) (Wardle, et al., 2002). This 27-item instrument assesses parental use of feeding strategies in relation to four scales (Instrumental feeding, Control, Emotional feeding, Encouragement). Responses on the Emotional Feeding scale only (*e.g.*, "I

examined in the current study. For each item, the response options were “Never; Rarely; Sometimes; Often; Always”. The Emotional Feeding scale score was obtained by calculating the mean response on all items comprising the scale (minimum score = 1, maximum = 5). Cronbach’s α for the current sample was 0.70.

Child emotional eating was assessed using the parent-reported Child Eating Behaviour Questionnaire (CEBQ) (Wardle, Guthrie, Sanderson, & Rapoport, 2001). This 35-item instrument assesses eight dimensions of eating style in children, however only responses on the Emotional Over-eating scale (*e.g.*, “My child eats more when worried”) were examined in the current study. For each item, the response options were “Never; Rarely; Sometimes; Often; Always”. The Emotional Over-eating scale score was obtained by calculating the mean response on all items comprising the scale (minimum score = 1, maximum = 5). Cronbach’s α for the current sample was 0.83.

Procedure

Participants who expressed an interest in the study were provided with the website address of the internet-delivered questionnaire. Before beginning the questionnaire, they provided informed consent by ticking a checkbox. Participants first provided basic descriptive information about themselves and their child (age, gender, height, weight). As a proxy measure of socio-economic status, they also indicated their highest level of educational attainment (None, GCSE/equivalent, BTEC/NVQ/Diploma, A-level/ equivalent, University degree, Other) (Clark et al., 2008). Participants then went on to complete, in chronological order, the ECR, the TFEQ, the PFSQ and the CEBQ (each of these was presented on a separate webpage). The final screen thanked participants for completing the questionnaire and gave them the option to provide their

approximately 20 minutes. The website was coded in XHTML and PHP. Responses were stored and questionnaire scale scores were automatically coded in preparation for analysis.

Statistical Analyses

Only participants who completed the questionnaire in its entirety were included in the analysis (n = 77). Pearson's correlation coefficients were computed between the main variables of interest. Maternal reports of child height and weight were converted to BMI z-scores using the World Health Organisation AnthroPlus software (http://www.who.int/growthref/tools/en/). Hypothesised indirect effects were analysed using PROCESS (Hayes, 2012). In order to standardise the measurement scales, all variables were log-transformed prior to running the mediation analyses. Firstly, a serial multiple mediation analysis was conducted; the independent variable (IV) was maternal attachment anxiety, the dependent variable (DV) was child emotional over-eating, and the mediators were maternal disinhibition (M1) and emotional feeding (M2). Secondly, in order to test the alternative hypothesis, a simple mediation analysis was conducted to investigate the hypothesised bi-directional relationship (*i.e.,* that maternal anxiety (IV) affects emotional feeding strategies (DV) via its effects on child emotional eating (M)). PROCESS compares the magnitude of the direct effect (IV-DV; controlling for the mediators) with the total effect of the IV on the DV including the indirect pathway via the mediators. It produces bias-corrected bootstrap confidence intervals for indirect effects via individual mediators and for the serial effect of the two mediators in the serial mediation model. A significant indirect effect is inferred by upper and lower confidence intervals that do not include zero.

Descriptive characteristics of the final included sample (n = 77) are shown in Table 1. Half of the children (51%) were female.

The inter-correlations between the key variables are shown in Table 2. With regard to relationships between the questionnaire measures, all correlation coefficients were statistically significant ($p < .05$), with the exception of that between maternal attachment anxiety and maternal disinhibited eating. Maternal BMI was significantly and positively correlated with maternal disinhibition, use of emotional feeding strategies, child emotional over-eating and child BMI z-score. Child BMI z-score also correlated significantly and positively with maternal attachment anxiety and child emotional over-eating.

Effect of maternal attachment anxiety on child emotional over-eating via maternal disinhibited eating and emotional feeding strategies (Figure 2)

The serial multiple mediation model indicated a significant total effect of maternal attachment anxiety on child emotional over-eating, b(SE) = .32 (.10), p = .002. With regard to the indirect pathways, there was a significant indirect effect of maternal attachment anxiety on increased child emotional over-eating via emotional feeding strategies (*i.e.*, pathway ii. in Figure 1); b(SE) = .08 (.05), 95%CI = .013 to .212. There were no other significant indirect effects (pathway i. via maternal disinhibited eating, b(SE) = .01 (.02), 95%CI = -.013 to .071; pathway iii via maternal disinhibited eating and emotional feeding strategies operating in series, b(SE) = .01 (.01), 95%CI = -.007 to .033). Notably, the direct effect of maternal attachment anxiety on child emotional over-eating remained statistically significant after controlling for the indirect effects, b(SE) = .22 (.10), p = .02, suggesting that emotional feeding strategies only partially mediate the effect of maternal attachment anxiety on child emotional over-eating.

eating (Figure 3)

The simple mediation analysis indicated a significant total effect of maternal attachment anxiety on emotional feeding strategies, b(SE) = .21 (.08), p = .01. There was a significant indirect effect of maternal attachment anxiety on increased emotional feeding strategies via child emotional over-eating, b(SE) = .09 (.04), 95%CI = .030 to .205. Notably, the direct effect of maternal attachment anxiety on emotional feeding strategies was no longer statistically significant after controlling for the indirect effect, b(SE) = .11 (.08), p = .16, suggesting that child emotional over-eating fully mediated the effect of maternal attachment anxiety on emotional feeding strategies.

To our knowledge, this is the first study to consider a potential link between a mother's global representational model of close personal relationships (*i.e*., dispositional attachment orientation) and eating behaviour in the child. The key finding was that maternal attachment anxiety was associated with reports of child emotional over-eating. Taken together, these findings highlight attachment anxiety as a previously-unconsidered maternal characteristic that may underpin aberrant eating behaviour in children.

The findings also provide insight into potential mechanisms by suggesting that the relationship between maternal attachment anxiety and child emotional over-eating was, in part, explained by maternal use of emotional feeding strategies. Specifically, anxiously-attached mothers were more likely to use emotional feeding strategies with their children which, in turn, were associated with increased child emotional over-eating (pathway ii. in our model). Attachment anxiety relates specifically to a fear of abandonment and one possibility is that anxiously-attached mothers use emotional feeding strategies in order to feel closer to their child. This may occur via emphatic emotion regulation (Hamburg, et al., 2014); specifically, offering food in times of distress may act as a means to increase positive affect for both the recipient and the provider. In addition, the sharing of food resources may increase interpersonal closeness (Hamburg, et al., 2014). An alternative possibility is that anxiously-attached mothers feel less competent in their parenting role. This could be relevant because, in a previous study, mothers who rated themselves as low on parenting self-efficacy were more likely to use food to soothe their child's distress (Stifter, Anzman-Frasca, Birch, & Voegtline, 2011).

However, the above finding is qualified by the subsequent observation that there was a relatively more robust indirect effect of maternal attachment anxiety on emotional feeding

on emotional feeding was no longer significant after controlling for child emotional over-eating). In line with our alternative hypothesis, this suggests that anxiously-attached mothers use emotional feeding strategies primarily *in response to* their child's emotional over-eating. This result is consistent with previous research which indicates that maternal choice of feeding practice is "child responsive" (Rodgers, et al., 2013; Webber, et al., 2010). The reason for the direct association between maternal attachment anxiety and child emotional over-eating (*i.e.*, the direct effect in Figure 2) remains to be determined. One possibility is that insecure child attachment is the intervening variable. There is evidence for transmission of attachment from mothers to children (Benoit & Parker, 1994; Hautamäki, Hautamäki, Neuvonen, & Maliniemi-Piispanen, 2009). Furthermore, child attachment insecurity (towards parents specifically) has been associated with high-calorie food intake, loss of control over eating, and eating pathology (Faber & Dube, 2015; Goossens, Braet, Bosmans, & Decaluwe, 2011; Goossens, Braet, Van Durme, Decaluwe, & Bosmans, 2012). On this basis, it would be informative for future studies in this area to include a measure of child attachment orientation, for example, by using the 'strange situation' paradigm (Ainsworth & Bell, 1970) or, for older children, the Child Attachment Interview (Target, Fonagy, & Shmueli-Goetz, 2003).

It was additionally predicted that the association between maternal attachment anxiety and child emotional over-eating would be mediated by maternal disinhibited eating (pathway i. in our model); however, the results provide little evidence for this role-modelling hypothesis. In addition, there was little evidence for an association mediated by maternal disinhibited eating and emotional feeding operating in series (pathway iii. in our model). Maternal disinhibited eating, emotional feeding and child emotional over-eating were positively inter-correlated,

2014; Wardle, et al., 2002); though maternal disinhibited eating was no longer directly associated with child emotional over-eating in the model.

According to attachment theory, anxiously-attached individuals are inclined to use external affect regulators, such as food, due to an impaired ability to internally regulate emotion (Maunder & Hunter, 2001; Mikulincer & Florian, 1998). Contrary to this perspective, and previous empirical findings (Wilkinson, et al., 2010), there was no significant association between maternal attachment anxiety and maternal disinhibited eating in this sample of mothers. It is possible that alternative affect regulation strategies were being used, such as consuming alcohol and smoking tobacco (Maunder & Hunter, 2001); however the occurrence of such behaviours was not assessed in the current study. In addition, it may be important to differentiate between affect regulation in response to negative emotions *per se* and a more specific form of affect regulation in which eating increases felt security (Gibson, 2012). The latter appears more relevant to anxiously-attached individuals and, on this basis, future studies might consider applying existing measures of felt security (Luke, Sedikides, & Carnelley, 2012) to the current context.

The current study also found that parent reports of child emotional over-eating correlated significantly with child BMI z-score. This association has been found in some studies (Braet & Van Strien, 1997) but not in others (Braden et al., 2014). In addition, the positive correlation between maternal attachment anxiety and child BMI z-score is a novel finding that warrants further attention. However, it is important to exercise caution when interpreting these results given that the data are parent reports of child height and weight which may be prone to bias and inaccuracies. Future research should seek to replicate these associations using objective measures

on parental reports of their own eating behaviour, feeding strategies and their child's eating behaviour. We did not include measurements of child perceptions nor was it feasible to obtain measures of actual eating behaviours, and this is a limitation of the current study. The inclusion of child-reported measures of parenting style (*e.g.*, as used by Braden et al., 2014) would be informative in future research. It will also be important to examine the relationship between maternal attachment anxiety and objectively-measured child eating behaviour using, for example, the laboratory-based emotional eating paradigm developed by Blissett et al. (2010).

The current study reports the results of cross-sectional associations and hence it is not possible to infer causality. Critically, attachment orientation tends to remain stable into and throughout adulthood (Waters, Merrick, Treboux, Crowell, & Albersheim, 2000) and determining the extent to which it predicts longitudinal changes in child emotional eating would now be informative. The current study focused on the extent to which a mother's global representational model of close personal relationships (*i.e.*, dispositional attachment orientation) would influence child eating behaviour. Whilst there is evidence that there are relationship-specific attachment orientations (Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996), the prevailing view is that the global attachment orientation will anchor these and represent the majority of the relationship-specific attachments that people hold (Baldwin, et al., 1996; Rowe & Carnelley, 2003, 2005). However, anxiously-attached individuals can still possess representations of secure relationships (Baldwin, et al., 1996); accordingly, some of the anxiously-attached mothers in the current study may have had secure attachment relationships with their child. Future research should thus explore whether mother-child attachment status moderates the association between maternal dispositional attachment anxiety and child emotional

have recently been found to predict child emotional over-eating in a longitudinal study (Farrow, Haycraft, & Blissett, 2015). It would therefore be interesting to determine whether maternal attachment anxiety also predicts these alternative feeding behaviours.

In conclusion, the current study highlights the influence of maternal attachment orientation on aberrant eating behaviour in children; maternal attachment anxiety was associated with higher child emotional over-eating. While this may be partly due to use of emotional feeding strategies, there was stronger evidence for a "child-responsive" model whereby anxiously-attached mothers used these feeding practices in response to their child's emotional over-eating. Further research to understand the exact nature of the relationship between maternal attachment anxiety and child emotional eating is now warranted.

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Table 1. Sample descriptives of the final included sample (n = 77)

Variable	Mean (*SD*)
Maternal age (y)	39.23 (5.68)
Maternal BMI (kg/m^2)	25.93 (6.14)
Maternal highest educational qualification [a]	3.59 (1.38)
Child age (y)	8.63 (1.83)
Child BMI z-score[b]	0.17 (1.53)
Maternal attachment anxiety	2.92 (1.10)
Maternal disinhibited eating	5.43 (3.70)
Emotional feeding strategies	1.62 (0.45)
Child emotional over-eating	1.70 (0.69)

[a] 6-point scale: 0 = none, 1 = other, 2 = GCSE, 3 = BTEC, 4 = A-level, 5 = university degree.

[b] n = 57 for BMI z-score due to incomplete parental reports of child height and weight.

questionnaire measures, mother BMI and child BMI z-score.

	1	2	3	4	5	6
1.Maternal ANX	-					
2. Maternal DIS	.11	-				
3. EFS	.27*	.24*	-			
4. Child EOE	.43**	.25*	.38**	-		
5. Maternal BMI	.09	.51**	.25*	.32**	-	
6. Child BMI z-score	.37**	.08	.22	.51**	.30*	-

* $p < .05$ ** $p < .01$

Key: ANX attachment anxiety; DIS disinhibited eating; EFS emotional feeding strategies; EOE emotional over-eating

Figure 1: Schematic representation of the proposed relationship between maternal attachment anxiety and child emotional over-eating via one or more of the following pathways; (i.) maternal disinhibited eating, (ii.) maternal use of emotional feeding strategies, (iii.) the two mediators operating in series.

Figure 2: Serial multiple mediation analysis with maternal attachment anxiety as the independent variable (IV), child emotional over-eating as the dependent variable (DV), and maternal disinhibited eating and emotional feeding strategies as first and second mediators, respectively. Values are unstandardized regression coefficients (*SE*s in parentheses) and associated *p*-values. Bracketed association = direct effect (controlling for indirect effects).

Figure 3: Simple mediation analysis with maternal attachment anxiety as the independent variable (IV), emotional feeding strategies as the dependent variable (DV), and child emotional over-eating as the mediator. Values are unstandardized regression coefficients (*SE*s in parentheses) and associated *p*-values. Bracketed association = direct effect (controlling for indirect effects).