Mothers’ experiences of their own parents’ food parenting practices and use of coercive food-related practices with their children

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Abstract

The current research examines the relationships between mothers’ experiences of the ways in which they were provided food as a child, their current eating behaviours, and their use of coercive food parenting practices with their own child. Mothers (N = 907 (M = 37 years, SD = 7.7)) completed an online/paper survey that included validated measures of food parenting practices and eating behaviours. Regression analyses show that mothers’ experiences of being provided food as a child, and their current eating behaviours are significant unique predictors of engagement in coercive food-related parenting practices with their child. Exploratory mediation analyses further show that the relationship between mothers’ experiences of being provided food as a child and use of coercive food-related parenting practices with their child is partially mediated by mothers’ eating behaviours. The findings indicate concordance between mothers’ experiences of being provided food as a child and use of the same coercive food-related parenting practices with their child. Furthermore, maternal experiences of food-related parenting practices as a child are the strongest predictors of use coercive food parenting practices with their own child. There may be value in focussing on the food-related experiences mothers had as a child in addition to their existing eating behaviours prior to food-related parenting practice intervention. Longitudinal research is needed to strengthen the current findings and to further understand the links identified.

1. Introduction

Parents are influential in the intergenerational transmission of obesity and eating disorders (e.g., Lee, Ledoux, Johnston, Ayala, & O’Connor, 2019; Lydecker & Grilo, 2016; Watson, O’Brien, & Sadeh-Sharvit, 2018; Ziaudeen et al., 2020), where child obesity risk increases with parental weight (Health Survey for England, 2019; Whitaker, Jarvis, Beeken, Boniface, & Wardle, 2010). One environmental factor potentially implicated in this transmission is parental use of food parenting practices (FPPs).

FPPs are behaviours used by parents to influence their child’s eating behaviours and food intake, and are categorised under three overarching constructs: coercive control, structure, and autonomy support (Vaughn et al., 2016). Examples of coercive control FPPs are food restriction, pressure to eat, food-based threats and bribes, and use of food to control negative emotions. Coercive control FPPs aim to fulfill parent centred goals and desires with regards to their child’s food consumption and eating behaviours. Consequently such FPPs can override a child’s internal cues of hunger and satiety (Birch & Fisher, 1998). In contrast, examples of FPPs that implement structure and support child autonomy are healthy food role modelling, healthy home food environment, monitoring, meal and snack routines, limited or guided choices, nutrition education, and child involvement (Vaughn et al., 2016). Therefore coercive control FPPs are of paramount importance to research since they have been found to be positively associated with unhealthy child and adolescent eating behaviours and outcomes such as eating in the absence of hunger and Body Mass Index (BMI) (e.g., Boots, Tiggemann, & Corsini, 2019; Volmer & Baietto, 2017).

Eating behaviours typically fall into three distinct areas: emotional eating (eating in response to one’s emotions), external eating (eating in response to stimuli (sight, taste, smell) in the environment), and restrained eating (eating less to deliberately maintain or lose weight) (van Strien, Frijters, Bergers, & Defares, 1986). Rather than responding to one’s internal cues of hunger and satiety, these eating behaviours are...
suggested to be in response to emotions and external factors, and contribute to the development of overweight and obesity (van Strien et al., 1986). In addition to FPPs, maternal eating behaviours are a known influence on children’s eating behaviours. For instance, it has been found that maternal emotional eating positively predicts daughters’ emotional eating; maternal restrained eating positively predicts daughters’ restrained eating, and maternal emotional and external eating positively predict sons’ emotional and external eating behaviours (Zarycha et al., 2019). Maternal external eating has also been found to be positively associated with children’s picky eating and desire to eat (Morrison, Power, Nicklas, & Hughes, 2013).

Research evidence suggests that maternal eating behaviours are implicated in use of coercive FPPs (e.g., Saltzman et al., 2016). For example, high levels of maternal restrained eating positively predict the use of food restriction of daughters’ eating (Birch & Fisher, 2000), and high levels of maternal emotional eating are positively associated with use of food to control negative emotions and food-based threats and bribes (Wardle, Sanderson, Guthrie, Rapoport, & Plomin, 2002). More recent research show that parents’ diets and eating behaviours are consistent with use of FPPs with adolescents, i.e., parental consumption of junk food positively influences the availability of junk food in the home environment (Fleary & Ettienne, 2019). Furthermore, systematic reviews of maternal eating disorders and child development report that mothers with eating disorders are likely to have difficulties feeding and with eating behaviours such as breast feeding, establishing feeding routines, and engagement in coercive control FPPs (Chapman, Cartwright-Hatton, Thomson, & Lester, 2021; Martini, Barona-Martinez, & Micali, 2020), thus contributing to the transmission of eating behaviours from parent to child.

Experiences of being provided food as a child and parental use of coercive FPPs have been previously explored in order to understand their relationship to adult eating behaviour outcomes. Early qualitative research found that adults with obesity recalled experiencing food rules and having to clear their plate at each mealtime, suggesting that this childhood experience to eat beyond the point of satiety may influence the likelihood of overeating as an adult (Brink, Ferguson, & Sharma, 1999). Later research reported that adults who remember their parents using food-based threats or bribes to control their behaviour, engage in higher levels of binge-eating and dietary restraint (Puhl & Schwartz, 2003). Galloway, Farrow, and Martz (2010) collected data from a student sample on their recollections of being provided food as a child and found that recollections of being restricted were positively associated with student BMI and emotional eating. In another study, reported experience of food restriction and being provided food for emotion regulation as a child was positively associated with later adult emotional eating (Tan, Ruhl, Chow, & Ellis, 2016). Experience of food restriction has also been found to positively predict disordered eating behaviours in adulthood (Lev-Ari & Zohar, 2013). Recollections of being pressured to eat as a child have been found to predict less intuitive eating (responding to cues of hunger and satiety), and high levels of disordered eating behaviours among young adults (Ellis, Galloway, Webb, Martz, & Farrow, 2016; Tan et al., 2016). Overall, there is compelling evidence to suggest a lasting relationship between childhood experiences of being provided food as a child and later eating behaviours. Although adult reports are based on recalled experience, Roberts, Carbonneau, Goodman, and Mushier-Eizenman (2020) provide support for the use of retrospective reporting of childhood experiences of being provided food as a child. In this study, experiences of being provided food as a child appeared to influence adult eating behaviours. Additionally, maternal eating behaviours are linked to parents’ use of FPPs. To our knowledge there is only one study to date that has examined parents recollections of being provided food as a child, disordered attitudes towards food and eating, and FPPs (Lev-Ari, Zohar, Bachner-Melman, & Totah Hanhart, 2021). The study found that the experiences of being provided food as a child were positively associated with use of the same types of FPPs, and disordered attitudes towards food and eating mediated this relationship (Lev-Ari et al., 2021). However, the study’s sample size is rather small (n = 174). In addition, it appears to examine only three coercive control FPPs (food restriction, pressure, and monitoring) from the Child Feeding Questionnaire (Birch et al., 2001). It is also worth examining other coercive control FPPs such as food-based threats and bribes, use of food to control negative emotions and iterations of food restriction (Vaughn et al., 2016). Research has yet to investigate whether coercive food parenting practices can be explained by parents’ experiences of being provided food as a child and current eating behaviours.

Given the evidence to date, it seems plausible that parents’ experiences of being provided food as a child and their existing eating behaviours might predict FPP use. Therefore, the aim of the study was to explore whether the way mothers were provided food as a child affects their adult eating behaviours and use of coercive FPPs with their own child. It was predicted that; (1) there would be an association between mothers’ experiences of being provided food as a child with their current FPPs; (2) an association between mothers’ reports of being provided food as a child and their current eating behaviours; (3) mothers’ experiences of being provided food as a child, and their existing eating behaviours would predict their current use FPPs. Exploratory mediation analyses were conducted where appropriate to explore whether maternal eating behaviours potentially mediated relationships between mothers’ experiences of being provided food as a child and their current use of FPPs.

2. Method

2.1. Participants and procedure

Mothers of children aged between 2 and 16 years were invited to participate. Mothers are the focus in the current study as it has been previously reported that mothers tend to engage more than fathers with overall house and family issues, including feeding their children (e.g., Davison, Haines, Garcia, Douglas, & McBride, 2020; Pratt, Hoffmann, Taylor, & Mushier-Eizenman, 2019). Using convenience sampling, mothers were recruited via social media platforms, a crowdsourcing platform (Prolific Academic), primary/secondary schools and community services (e.g., rhyme time sessions) across the Midlands, UK. Mothers completed a series of demographic questions and self-reported questionnaires online or on paper. The study conformed to the Declaration of Helsinki and was approved by the University of Warwick’s Biomedical and Scientific Research Ethics Committee (BSREC 100/18-19).

2.2. Measures

2.2.1. Demographic questionnaire

Maternal characteristics collected included gender, age, height, weight, ethnicity, and highest level of education, and age of youngest child.

2.2.2. Retrospective comprehensive feeding practice questionnaire (rCFPQ; (Mushier-Eizenman & Holub, 2007))

As per the original CFPQ (Mushier-Eizenman & Holub, 2007), the modified, retrospective CFPQ is a 49-item self-report measure of how a parent remembers to have been provided food as a child. The rCFPQ contains the same twelve subscales as the original CFPQ: child control, emotion regulation, encourage balance and variety, environment, food restriction, food as reward, involvement, modelling, monitoring, pressure, food restriction for health reasons, food restriction for weight control, and teaching about nutrition. The wording of items in this version of the CFPQ is modified to reflect experience. For example, “My parent restricted the food that I ate that might have made me fat?” “Did your parent give you something to eat or drink if you were upset even if s/he thought you were not hungry?”. Higher scores in each subscale indicate greater use of the FPP. Cronbach’s alphas demonstrated good reliability in the current
sample ($\alpha = 0.83$ to $\alpha = 0.96$). Several studies have used this modified approach with community samples and have demonstrated similar levels of reliability (e.g., Ellis et al., 2018; Farrow, 2014; Goldstein, Tan, & Chow, 2017; Malachowska & Jezewski-Zychowicz, 2021; Roberts et al., 2020). The teaching about nutrition subscale demonstrated weaker reliability ($\alpha = 0.57$), similar to previous research (Haycraft, Karasouli, & Meyer, 2017; Mushuer-Eizenman, de Lazon-Guillain, Holub, Leporc, & Charles, 2009; Tan et al., 2016), and so was excluded from the analyses.

### 2.2.3. Dutch eating behaviour questionnaire (DEBQ (van Strien et al., 1986))

The DEBQ is a 33-item self-report questionnaire assessing emotional, external, and restrained eating behaviours. For example, “Do you have a desire to eat when you are feeling lonely?” “If food smells and looks good, do you eat more than usual?” “Do you try to eat at less meal times that you would like to eat?”. Higher scores in each subscale indicate greater frequency of the eating behaviour. Cronbach's alphas demonstrated good reliability in the current sample (α = 0.89 to α = 0.96). This measure has been used extensively with community samples with adequate reliability and validity (e.g., Damiano, Hart, & Paxton, 2016; Zarychta et al., 2019).

### 2.2.4. Comprehensive feeding practices questionnaire (CFPQ (Musher-Eizenman & Holub, 2007))

The CFPQ is a 49-item self-report measure of a variety of FPPs. Data on five of its subscales that were related to coercive food parenting practices were utilised in the current study (emotion regulation, food as reward, pressure, food restriction for health reasons and food restriction for weight). For example, “I restrict the food my child eats that might make him/her fat?”, “Do you give this child something to eat or drink if s/he is bored even if you think s/he is not hungry? A higher total subscale score indicates greater use of the CFPQ. Mothers were asked to base their responses on their youngest child (aged between 2 and 16) (e.g., Vollmer, Adamsons, Foster, & Mobley, 2015). All included subscales demonstrated good reliability in the current sample (α = 0.75 to α = 0.85). The measure and its subscales have been used extensively with community samples and with parents of younger and older children with adequate reliability and validity (e.g., Haycraft et al., 2017; Holley, Haycraft, & Farrow, 2020; Jansen et al., 2021).

### 2.3. Power calculation

G*Power analysis software was used to determine the sample size (Faul, Erdfelder, Buchner, & Lang, 2009). To detect a correlation coefficient of $r = 0.3$ with 80% power ($\alpha = 0.05$), $N = 84$ participants were required. For multiple regression analyses with $N = 15$ predictor variables, to detect a $R^2 = 0.15$ with 80% power ($\alpha = 0.05$), $N = 139$ participants were required.

### 2.4. Data analyses

Analyses were conducted using IBM SPSS software (v25) (IBM Corp., 2017). Kolomogorov–Smirnov tests indicated that data were not normally distributed, therefore non-parametric tests were employed where applicable. Missing questionnaire data were not included in the specific analyses when missing but included where data allowed (pairwise deletions). BMI was calculated with the formula: weight (kilograms)/height (meters)$^2$. Two-tailed Spearman’s correlations were conducted to investigate associations between FPPs and maternal demographic variables, mothers’ experiences of being provided food as a child (rCFPQ) and their existing eating behaviours (DEBQ). Preliminary two-tailed Spearman’s correlations were conducted to assess whether maternal and child age were related to FPP use, since these have been previously identified as covariates of FPP use (Gonçalves, Lima, Machado, & Machado, 2017).

Maternal age was significantly correlated with use of emotion regulation ($r_2 = -0.11, p < 0.01$), food as reward ($r_2 = -0.21, p < 0.01$), pressure to eat ($r_2 = -0.12, p < 0.01$) and food restriction for weight control ($r_2 = 0.10, p < 0.01$). Child age was significantly correlated with maternal use of emotion regulation ($r_2 = -0.16, p < 0.01$), food as reward ($r_2 = -0.15, p < 0.01$), and food restriction for weight control ($r_2 = 0.19, p < 0.01$). Partial correlations were subsequently conducted between rCFPQ, DEBQ, and CFPQ controlling for maternal and child age due to associations. All study variables were then entered into standard multiple regression to identify a model that could predict maternal use of each coercive food parenting practice and understand the unique contribution that mothers’ reports of being provided food as a child, and their existing eating behaviours had in the prediction of coercive FPPs. Multiplicity was controlled for using Benjamini and Hochberg’s False Discovery Rate (FDR) methods, assuming an FDR of 5% (Benjamini & Hochberg, 1995). All p-values reported represent adjusted p-values.

Mediation is a statistical method to examine whether a relationship between a predictor variable and outcome variable can be explained by a third variable (the mediator) (Hayes, 2017). Exploratory mediation analysis was conducted only when maternal eating behaviours (mediators; DEBQ (M)) were significantly associated with the antecedent variable (mothers’ reports of being provided food as a child; rCFPQ (X)), and the outcome variable (food parenting practice; CFPQ (Y)), controlling for the independent variable. Fig. 1 presents an example conceptual model using the study variables.

Path a refers to the association between the rCFPQ subscale and potential mediator(s) (DEBQ subscale). Path b refers to the association between the potential mediators (DEBQ subscale) and the CFPQ subscale. Path c refers to the total effect of the rCFPQ subscale on the CFPQ subscale. Path c’ refers to the direct effect of the rCFPQ subscale on the CFPQ subscale while keeping the mediator(s) constant. The indirect effect (ab) refers the effect of the rCFPQ subscale on the CFPQ subscale through the DEBQ subscale. Full mediation is indicated when X no longer affects Y after M has been controlled for (i.e., the c’ path is non-significant). Partial mediation is indicated where the strength of the relationship between X and Y is less than that of the c path way but is still significant in the presence of M (i.e., the c’ path is significant).

Maternal age, maternal BMI, and child age were included as covariates. Mediation models (model 4) were tested using the PROCESS macro (Hayes, 2017). Multiple mediators were tested simultaneously if more than one maternal eating behaviour met the criteria for mediation analysis (Preacher & Hayes, 2008). All models ran 10,000 bootstrap samples and 95% bias-corrected confidence interval based on 10,000 bootstrap samples are reported. For indirect effects, 95% bias-corrected confidence intervals were calculated using 10,000 repetitions since this method does not require the assumption of normality, in addition to higher power while controlling for Type one errors (MacKinnon, Lockwood, Hoffman, West, & Sheeber, 2002; MacKinnon, Lockwood, & Williams, 2004). Indirect pathways were determined to be significant by a 95% bias-corrected bootstrapped interval (based on 10,000 bootstrapped samples) that did not contain zero (Preacher & Hayes, 2004; 2008). Where applicable, multiplicity was controlled for using FDR-adjusted confidence intervals (CI) using the Benjamini and Yekutieli (2005) method.

### 3. Results

#### 3.1. Descriptive statistics

Mothers ($N = 907$; female, $n = 905$; not reported, $n = 2$) were on average 37 years old (range 21–61; $SD = 7.7$), with a mean child age of 5 ½ (range 2–11; $SD = 4.1$). Mothers were predominantly of White ethnicity (91%), educated to degree level (60.7%), and had a mean BMI of 27.6 (range 18.6–64.9; $SD = 6.7$; healthy-weight (BMI 18.6–24.9), 43%; overweight/obese (BMI >25.0), 57%).
3.2. Mothers’ perceptions of being provided food as a child and mothers’ eating behaviours

Several FPPs experienced as a child were associated with mothers’ existing eating behaviours (Table 1). First, mothers’ experiences of rCFPQ control and rCFPQ food restriction for health reasons as a child were significantly (positively) associated with DEBQ emotional and external eating. Second, mothers’ experiences of rCFPQ emotion regulation, rCFPQ food as reward, rCFPQ pressure to eat and rCFPQ food restriction for weight control as a child were significantly (positively) associated with DEBQ restrained, emotional, and external eating behaviours. Third, mothers’ experiences of rCFPQ environment, and rCFPQ food as reward as a child were significantly (negatively) associated with DEBQ restrained, emotional, and external eating. Forth, mothers’ experience of rCFPQ involvement as a child was significantly (negatively) associated with DEBQ emotional and external eating. Fifth, mothers’ experience of rCFPQ modelling as a child was significantly associated (negatively) with DEBQ emotional eating. Finally, mothers’ experience of rCFPQ encouragement of balance and variety as a child was significantly associated (negatively) with DEBQ restrained and emotional eating.

3.3. Mothers’ perceptions of being provided food as a child and use of coercive food parenting practices

Mothers’ use of rCFPQ emotion regulation was significantly associated (positively) with rCFPQ child control, rCFPQ emotion regulation, rCFPQ food as reward, and rCFPQ food restriction for weight control, and significantly associated (negatively) with rCFPQ encourage balance and variety and rCFPQ environment (Table 2). Mothers’ use of rCFPQ food as reward was significantly associated (positively) with rCFPQ emotion regulation, rCFPQ food as a reward, and rCFPQ pressure to eat, and significantly associated (negatively) with rCFPQ environment. Mothers’ use of rCFPQ pressure to eat was significantly associated (positively) with rCFPQ food as a reward and rCFPQ pressure to eat. Mothers’ use of rCFPQ food restriction for health reasons was significantly associated (positively) with maternal BMI, rCFPQ food as a reward, rCFPQ monitoring, rCFPQ pressure to eat, rCFPQ food restriction for health and rCFPQ food restriction for weight and significantly associated (negatively) with rCFPQ involvement. Mothers’ use of rCFPQ food restriction for weight was significantly associated (positively) with maternal BMI, rCFPQ child control, rCFPQ emotion regulation, rCFPQ food as a reward, rCFPQ food restriction for weight and significantly associated (negatively) with rCFPQ encourage balance and variety and rCFPQ environment.

3.4. Investigating relationships between mothers’ eating behaviours and use of coercive food parenting practices

Table 1
Associations (two-tailed) between mothers’ recollections of being provided food as a child (rCFPQ), and mothers’ eating behaviours (DEBQ).

<table>
<thead>
<tr>
<th>Variables</th>
<th>DEBQ</th>
</tr>
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<td></td>
<td>Restrained eating</td>
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<td></td>
<td>Rho  p</td>
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<tr>
<td>rCFPQ</td>
<td></td>
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<tr>
<td>Restriction for weight control</td>
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Cases excluded pairwise; N ranges from 811 to 885 due to missing data; Bold indicates significance after applying Benjamini-Hochberg FDR procedures.
3.5.2. Food as reward

The regression model significantly predicted CFPQ food as reward score and was a good fit for the data ($F(17, 792) = 8.811, p < .001$), accounting for 14.1% of the variance in CFPQ food as reward. This was driven by experiencing more rCFPQ food as a reward as a child ($\beta = 0.135$, $p = 0.008$) (Table 3).

3.5.3. Pressure to eat

The regression model significantly predicted CFPQ pressure to eat score and was a good fit for the data ($F(17, 792) = 4.706, p < .001$), accounting for 7.2% of the variance in CFPQ pressure to eat. This was driven by more experience of more rCFPQ pressure to eat as a child ($\beta = 0.164$, $p < .001$), and less rCFPQ food restriction for weight control as a child ($\beta = -0.135$, $p = 0.008$) (Table 3).

3.5.4. Food restriction for health reasons

The regression model significantly predicted CFPQ food restriction for health reasons score and was a good fit for the data ($F(17, 792) = 3.866, p < .001$), accounting for 5.7% of the variance in CFPQ food restriction for health reasons. This was driven by more experience of rCFPQ food restriction for health reasons as a child ($\beta = 0.159$, $p = 0.008$), and increased DEBQ restrained ($\beta = 0.135$, $p < 0.001$) and external eating behaviours ($\beta = 0.118$, $p = 0.034$) (Table 4).

3.5.5. Food restriction for weight control

The regression model significantly predicted CFPQ food restriction for weight control score and was a good fit for the data ($F(17, 792) = 8.011, p < .001$), accounting for 12.8% of the variance of CFPQ food restriction for weight control. This was driven by mothers’ experiences of more rCFPQ child control ($\beta = 0.119$, $p = 0.030$) and rCFPQ food restriction for weight control as a child ($\beta = 0.190$, $p < 0.001$), increased

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<th>Pressure to eat</th>
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Cases excluded pairwise; N ranges from 810 to 907 due to missing data; aPartial correlation controlling for maternal and child age; bPartial correlation controlling for maternal age. Bold indicates significance after applying Benjamini-Hochberg FDR procedures.
0.001), and a significant positive association between mothers’ experience of emotion regulation as a child (rCFPQ emotion regulation), and use of emotion regulation with their child (β = 0.190, p < 0.001). There was no significant direct relationship between mothers’ experience of rCFPQ encouragement of balance and variety as a child and DEBQ restrained eating behaviours (β = 0.014, p = 0.878). This remained the same case when DEBQ external eating was included in the model (total effects, c = 0.002, p = 0.878). There was no significant direct association between mothers’ experience of rCFPQ encouragement of balance and variety as a child (rCFPQ encouragement of balance and variety), and use of emotion regulation with their child (CFPQ emotion regulation) when no mediators were included in the model (total effects, c = 0.002, p = 0.099), however there was a significant positive association between mothers’ DEBQ external behaviours and use of CFPQ emotion regulation with their child (b = 0.09, p < 0.001). There was a significant direct relationship between experience of encouragement of balance and variety as a child (rCFPQ encourage balance and variety), and use of emotion regulation with their child (CFPQ emotion regulation) when no mediators were included in the model (total effects, c = −0.04, p = 0.063). When mediators were included in the model, this relationship was significant (direct effect, c' = −0.03, p = 0.025), indicating partial mediation. A significant indirect effect through mothers’ external eating (b = −0.007, 95% BCA CI [−0.14, −0.001]). (Fig. 3).

Third, there was no significant association between mothers’ experience of CFPQ modelling as a child and DEBQ external eating behaviours (a = −0.03, p = 0.534), however there was a significant positive association between mothers’ DEBQ external eating behaviours and use of CFPQ emotion regulation with their child (b = 0.09, p < 0.001). There was no significant direct relationship between mothers’ experience of modelling as a child (rCFPQ modelling), and use of emotion regulation with their child (CFPQ emotion regulation) when no mediators were included in the model (total effects, c = 0.002, p = 0.735), and no significant indirect effect through mothers’ external eating (b = −0.002, 95% BCA CI [−0.010, 0.005]) (Fig. 4).

3.6.2. Food restriction for health reasons

Parallel mediation analysis showed that there was no significant association between mothers’ experience of rCFPQ food restriction for health as a child and DEBQ restrained eating behaviours (a1 = 0.07, p = 0.243). There was a significant positive association between mothers’ experience of rCFPQ food restriction for health as a child and DEBQ external eating behaviours (a2 = 0.10, p = 0.036). There were significant positive associations between mothers’ DEBQ restrained and external eating behaviours and use of CFPQ food restriction for health with their child (b1 = 0.06, p < 0.001; b2 = 0.08, p < 0.001). There was a significant direct relationship between mothers’ experience of being restricted food as a child for health (rCFPQ food restriction for health reasons), and use of food restriction for health with their child (CFPQ food restriction...
for health) when no mediators were included in the model (total effects, \(c = 0.13, p < 0.001\)). This remained the same case when mediators were included (direct effects, \(c' = 0.12, p < 0.001\)), indicating partial mediation. A significant indirect effect ran through mothers’ external eating (\(b = 0.012, 95\% \text{ BCa CL}_{FDR} \{0.005, 0.020\}\)), but not mothers’ restrained eating (\(b = 0.005, 95\% \text{ BCa CL} \{-0.004, 0.015\}\)). (Fig. 5).

### 3.6.3. Food restriction for weight control

Results from a simple mediation analysis showed that there was no significant association between mothers’ experience of rCFPQ child for health and the use of CFPQ restriction for health (\(b = 0.012, 95\% \text{ BCa CL} \{-0.004, 0.020\}\)). (Fig. 5).

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**Fig. 3.** Direct and indirect pathways from mothers’ experience of encouragement of balance and variety as a child and use of CFPQ emotion regulation with their own child.

**Fig. 4.** Direct and indirect pathways from mothers’ experience of modelling as a child and use of CFPQ emotion regulation with their own child.

**Fig. 5.** Direct and indirect pathways from mothers’ experience of food restriction for health as a child and use of CFPQ restriction for health with their own child.
control and DEBQ restrained eating behaviours \((a = 0.04, p = 0.593)\), however there was a significant positive association between mothers’ DEBQ restrained eating behaviours and use of CFPQ food restriction for weight control with their child \((b = 0.18, p < 0.001)\). A significant direct relationship between mothers’ experience of control as a child \((r_{CFPQ} \text{ child control})\), and use of food restriction for weight control with their child \((r_{CFPQ} \text{ food restriction for weight control})\) when no mediators were included in the model \((\text{total effects}, c = 0.20, p < 0.001)\). This remained the same case when DEBQ external eating was included in the model \((\text{direct effects}, c' = 0.20, p < 0.001)\), indicating partial mediation however the indirect effect running through mothers’ restrained eating was not significant \((b = 0.007, 95\% \text{ BCa CI } [-0.019, 0.034])\) \((\text{Fig. 6})\).

Second, there was a significant positive association between mothers’ experience of \(r_{CFPQ}\) food restriction for weight control as a child and DEBQ restrained eating behaviours \((a = 0.17, p < 0.001)\), and there was a significant positive association between mothers’ DEBQ restrained eating behaviours and use of CFPQ food restriction for weight control with their own child \((b = 0.16, p < 0.001)\). There was a significant direct relationship between mothers’ experience of food restriction for weight control as a child \((r_{CFPQ} \text{ food restriction for weight control})\), and use of food restriction for weight control with their child \((r_{CFPQ} \text{ food restriction for weight control})\) when no mediators were included in the model \((\text{total effects}, c = 0.15, p < 0.001)\). This remained the same case when DEBQ restrained eating was included in the model \((\text{direct effects}, c' = 0.12, p < 0.001)\), indicating partial mediation and a significant indirect effect through mothers’ restrained eating \((b = 0.027, 95\% \text{ BCa CI}_{\text{FDR}} \{0.017, 0.037\})\) \((\text{Fig. 7})\).

4. Discussion

The aim of the study was to understand whether the way mothers were provided food as a child affected their adult eating behaviours and use of coercive FPPs with their own child. It also sought to understand whether indirect effects ran through maternal eating behaviours between how mothers were provided food as a child and use of coercive FPPs with their own child. The results indicate that mothers’ experiences as a child were positively associated with their current eating behaviours, and that mothers’ experiences as a child and their existing eating behaviours predicted use of coercive food parenting practices with their own child.

Specifically, maternal use of food to control their child’s emotions was predicted by mothers’ experiences of higher levels of emotion regulation and modelling as a child alongside higher levels of external eating behaviours. Other research using the DEBQ similarly report that higher levels of maternal external eating are positively associated with use of emotion regulation FPPs \((\text{Wardle et al., 2002})\). The current finding is of particular importance to target in clinical interventions as emotional eating is likely a learned behaviour \((\text{with only a small percentage accounted for through genetic transmission})\) \((\text{Herle, Fildes, & Llewellyn, 2018; Steinsbekk, Barker, Llewellyn, Fildes, & Wichstrom, 2018})\) and therefore potentially modifiable via FPP intervention.

Maternal use of CFPQ food as reward was predicted by mothers’ experiences of being provided food as a reward as a child. This result suggests that mothers have learnt this FPP from the ways in which they were rewarded as child. Further research is needed to understand this finding as the current interpretation is speculative. However the long-term impact of such a finding is concerning as adults report increased engagement in binge-eating and dietary restraint with experience of their parents use of food as a reward as a child \((\text{Puhl & Schwartz, 2003})\).

Maternal use of pressure to eat was predicted by mothers’ experiences of higher levels of pressure to eat, and less food restriction for weight control as a child. No maternal eating behaviours were associated with CFPQ pressure to eat. This finding is in contrast to previous research reporting that maternal external and restrained eating are both positively associated with CFPQ pressure to eat \((\text{Haycraft, 2020})\). However, although \(\text{Tylka, Enoli, Kroon Van Diest, and Lumeng (2013)}\) administered the Intuitive Eating Scale to mothers in their study, they also report that no maternal behaviours were related to pressuring their child to eat, supporting the findings identified.

Maternal use of food restriction for health reasons was predicted by mothers’ experiences of food restriction for health reasons as a child, and their current restrained, and external eating behaviours. Finally, maternal use of CFPQ food restriction for weight control, was predicted by mothers’ experiences of having more control and increased food restriction for weight control as a child, higher levels of restrained eating behaviours and older child age. These findings support previous research reporting that food restriction for weight is positively associated with parental restrained eating \((\text{de Lauzon-Guillain, Mushet--Eizenman, Leporc, Holub, & Charles, 2009; Haycraft, 2020})\), and other previous research reporting that mothers who engage in higher levels of restrained eating are likely to restrict their preschool daughters’ food intake \((\text{Birch & Fisher, 2000})\). More recent research further reports that external and emotional eating behaviours are also positively associated with use of CFPQ food restriction for health reasons and food restriction for weight control \((\text{Haycraft, 2020})\). In addition to supporting the findings of previous research, the current results also identify restrained eating behaviours as a significant predictor of increased use of food restriction for health reasons and weight control.

Exploratory mediation analyses revealed that relationships between mothers’ childhood experiences of FPPs and use of coercive FPPs were
The current study forms an important step towards understanding the potential long-term relationship between experiences of being provided food as a child and use of coercive FPPs. However, there are a few study limitations to consider. Owing to the cross-sectional nature of the study, the study findings are limited. It is also not possible to rule out that mothers’ current eating behaviours or current use of FPPs may affect their memories of being fed as a child (i.e., certain memories/experiences may become more or less salient based on current circumstances). It is also evident that other factors contribute to the use of coercive FPPs such as concern about child weight, child eating behaviours and child BMI (Jansen et al., 2014; Shloim, Edelson, Martin, & Hetherington, 2015) that were not explored. The sample were mostly white and educated to university/college degree level, and therefore the results may not apply to mothers from other cultural backgrounds and of less education level. Previous research generated from a large cohort indicates that there is higher engagement in coercive FPPs among parents from ethnic minority groups compared to white ethnicity groups, and those with less than high school education compared to those with a degree (Loth, MacLehose, Fulkerson, Crow, & Neumark-Sztainer, 2013).

The study is strengthened by the inclusion of subscales that capture broader coercive FPPs from the CFPQ that include use of food to control negative emotions, use of food as a reward and different types of food restriction. Previous research has used subscales from the Child Feeding Questionnaire that are limited to the assessment of use of food restriction, pressure to eat, and monitoring (e.g., Haycraft & Blissett, 2012; Hazzard et al., 2020; Lev-Ari et al., 2021). The current study results indicate there is a pattern of experience of FPPs in childhood on eating behaviours and subsequent use of FPPs. This is important as results from interventions demonstrate that FPPs are modifiable influences. For instance, the Child Feeding Guide delivers a digitally based health intervention comprising evidence-based support to aid parents’ FPP use (Haycraft, Witcomb, & Farrow, 2020). Evaluation of the intervention shows a significant decrease in mothers’ use of CFPQ pressure to eat and CFPQ food restriction for weight control (Haycraft et al., 2020). Follow-up from another parent-based intervention targeting parental eating, family eating patterns, and healthy eating show a significant reduction in parental engagement in emotional eating behaviours, and significant improvements in structured mealtimes, the home food environment, and healthier food consumption (parents and children) (Willis et al., 2014). Finally in an intervention that focussed on appetite regulation among children, when compared to the control group, mothers in the intervention group rated their child to emotionally overeat significantly less (Ruggiero, Hohman, Birch, Paul, & Savage, 2021). Mothers also reported to provide significantly more consistent meal routines, and significantly less pressure to eat, emotion regulation,
and use of food as a reward when compared to the control group (Ruggiero et al., 2021). The best, although complex, way to approach the current study again would be via longitudinal replication of this study that follows children into adulthood to untangle the reported findings further.

5. Conclusion
To the authors’ knowledge, this study presents the first known investigation into the relationship between mothers’ experiences of being provided food as a child, mothers’ current eating behaviours and their use of coercive food parenting practices. Exploratory mediation analyses suggest that maternal eating behaviours are a potential mechanism linking mothers’ experiences of being provided food as a child and use of coercive food parenting practices. Mothers (and caregivers more generally) have a pivotal role in influencing their child’s intake and relationship with food. Understanding the influences that promote certain coercive food parenting practices are useful in clinical and community practice when working with parents and families and in the development of FPP-targeted interventions.

Availability of data
The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Ethical statement
The study conformed to the Declaration of Helsinki and was approved by the University of Warwick’s Biomedical and Scientific Research Ethics Committee (BSREC 100/18-19).

Declaration of competing interest
The authors declare no potential conflict of interest.

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