

Differences in parental behaviour, emotions, and cognitions between children's eating profiles

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ABSTRACT

A variety of parent psychological characteristics (e.g., wellbeing) have been related to children's eating behaviour. However, parent-child feeding interactions are reciprocal and complex, including relationships between parental cognitions, emotions, as well as the influence of children's varying appetitive traits. Using a person-centred approach, children's appetitive traits can be clustered into meaningful eating profiles. To date, no research has examined whether parental behaviours, emotions, and cognitions differ depending on a child's eating profile. Hence, this study recruited parents/primary caregivers from the APPETiTE project, whose child had previously been identified as having an avoidant, typical, happy, or avid eating profile. Parents/primary caregivers of children (3–6 years; $N = 632$) completed online questionnaires examining broader parenting behaviour (parenting styles), parental emotions (stress, wellbeing), and parental cognitions (goals, self-efficacy, time and energy for meal planning and preparation, and perceptions about children's body size). Findings showed significant differences in parent responses to the questionnaires based on children's eating profiles. Parents of children with a happy eating profile reported better psychological wellbeing and greater parenting time and energy for meal planning and preparation, as well as being less likely to report goals of avoiding mealtime stress and conflict. In contrast, parents of children with an avoidant eating profile reported poorer psychological wellbeing. Children with an avid eating profile were perceived by parents as having a higher body weight, whereas children with an avoidant eating profile were perceived as having a lower body weight. Overall, these findings demonstrate that differences in parental characteristics and perceptions exist between children's eating profiles and thus should be considered in the development of tailored interventions to support children's healthy eating.

1. Introduction

There are multiple interacting factors which influence the development of children's eating behaviour (Russell & Russell, 2018; Scaglioni et al., 2018; Varela et al., 2023). At an individual level, children differ in their appetitive traits, resulting in differences in children's susceptibility to their food environment (Llewellyn & Wardle, 2015). While previous research has predominantly focused on a variable-centred approach (i.e., examining eating behaviours in isolation), recent research has used person-centred approaches such as Latent Profile Analysis to advance

our understanding of common eating patterns in preschool children (Fisher et al., 2022; Pickard et al., 2023). Our previous research with a sample of 995 UK parents/caregivers of preschool children (aged 3–6 years) used Latent Profile Analysis with data from the Children's Eating Behaviour Questionnaire (CEBQ) (Wardle et al., 2001). We identified four distinct eating profiles in preschool children: avoidant (16%), typical (44%), happy (18%), and avid eating behaviour (22%) (Pickard et al., 2023). An avoidant eating profile was characterised by low levels of food enjoyment, food responsiveness, and emotional under-eating in combination with high levels of food fussiness. Children with typical

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eating behaviour had standardised z-scores that were close to zero for all appetitive traits measured by the CEBQ. An avid eating profile was characterised by high levels of food responsiveness, enjoyment of food, and emotional over-eating in combination with lower levels of satiety responsiveness, slowness in eating and food fussiness. Children with a happy eating profile demonstrated similar levels of satiety responsiveness and enjoyment of food to children with avid eating behaviour, but lower levels of food responsiveness and emotional overeating. Conceptualising children's eating behaviour as behavioural profiles may better indicate risk-associated profiles, such as children who may be at greater risk of developing obesity, and improve the effective tailoring of interventions to support children's healthy eating.

Whilst children's appetitive traits are in part genetically driven (Llewellyn & Wardle, 2015; Russell & Russell, 2018), interactions within the family system also play a key role in shaping children's eating behaviour (Scaglioni et al., 2018; Varela et al., 2023). For example, parents are often the 'gatekeepers' to a child's food environment, influencing *what*, *when*, and *how* children eat (Vaughn et al., 2018). Research has shown that parent-child feeding interactions are complex and bidirectional (Jansen et al., 2020; Kininmonth et al., 2023). Thus, as suggested by Family Systems Theory (Broderick, 1993), subsystems within a child's food environment (e.g., parent and child behaviour) cannot be fully understood in isolation from one another due to the complexity and interrelatedness within the family system. While there are numerous parental influences on children's eating behaviour (Varela et al., 2023), and several studies of how parental factors relate to children's individual appetitive traits, it is not yet known whether these characteristics differ depending on a child's eating profile. Russell and Russell (2018) proposed a biopsychosocial process model of the early development of children's eating and weight, which connects parent characteristics and behaviours with children's appetitive traits and eating behaviours in a longitudinal, transactional manner. In this model, parental styles, emotions, and cognitions are framed as the primary psychosocial influence processes. We have already established that parental feeding practices differ based on children's eating profiles (Pickard et al., 2023) but we do not yet know how parental cognitions (goals, self-efficacy), emotion (stress, wellbeing) and broader parenting behaviour (parenting styles) differ based on children's eating profiles. A better understanding of differences in parents' psychological characteristics between children's eating profiles will pinpoint potential levers for the development of interventions to support children's healthy eating in ways tailored to individual family needs (Russell & Russell, 2018).

1.1. Parenting style

Parenting styles, which are not specifically related to feeding are characterised by a parent's responsiveness (e.g., warmth and involvement), and demandingness (e.g., control and supervision) to their child's behaviour; for example, authoritative parenting (high levels of responsiveness and demandingness), authoritarian parenting (low responsiveness and high demandingness) and permissive parenting (high responsiveness and low demandingness) (Hughes et al., 2005). Both authoritarian and permissive parenting have been associated with higher food responsiveness and emotional overeating (Goodman et al., 2020; Leuba et al., 2022). While these findings provide initial evidence for a link between parenting style and preschool children's appetitive traits, further research is needed to examine how parenting styles differ depending on a child's unique eating profile. Examining this is important given that parenting styles are associated with child health outcomes, such as children's nutritious food intake and BMI (Vollmer & Mobley, 2013).

1.2. Parental emotions

Managing challenging feeding interactions, such as feeding children

with high levels of food approach or food avoidance traits, is associated with greater parental stress and poorer wellbeing (Blissett et al., 2007; Edwards et al., 2024; Wolstenholme et al., 2020). Since poorer parent mood and wellbeing can negatively impact children's diet quality and eating behaviour (Jarman et al., 2015; Webb et al., 2018), research is needed to examine whether parental stress and wellbeing differ between children's eating profiles.

1.3. Parental cognitions

According to the biopsychosocial process model (Russell & Russell, 2018), parental cognitions, which include beliefs about child behaviour and parenting, play an influential role in how parents respond to, and interact with, children, particularly in relation to eating. Parental self-efficacy, which refers to parental perceptions about their confidence and capability of raising their child (Albanese et al., 2019), has also been associated with children's eating behaviour traits. For example, research using survey data showed that higher maternal self-efficacy was associated with lower use of pressure to eat, which in turn reduced children's food avoidance (Camfferman et al., 2019). Moreover, a systematic review showed differences in self-efficacy beliefs between parents of children with fussy eating, with some parents feeling that their child's fussy eating was a reflection of their parenting ability, whereas others felt in control of their child's behaviours (Wolstenholme et al., 2020). While the relationship between parental self-efficacy and children's eating behaviour is not yet clear, investigating differences in parental self-efficacy is important given that it is positively associated with children's healthy eating (Campbell et al., 2010; Möhler et al., 2020; Rohde et al., 2018; Tarro et al., 2022) and parental use of positive feeding practices (Camfferman et al., 2019; Holley & Haycraft, 2022).

Additionally, mealtime factors, such as perceived parenting time and energy for meal preparation and feeding goals, may also vary by children's eating profiles. For example, purchasing and preparing healthy food for children can be challenging due to differences in children's eating behaviour (e.g., food preferences) and a lack of parental resources (e.g., time and high food cost) (Arora et al., 2021; Kopetsky et al., 2021; Screti et al., 2024). For example, qualitative research has shown that parental motivation to provide varied and healthy meals is hindered by children's fussy eating behaviour, with parents reporting reticence about giving children new foods (Screti et al., 2024). Furthermore, research has shown that parental feeding goals are driven by children's food preferences (Russell et al., 2015). For example, in addition to health-related feeding goals, parents of 6–10-year-old children with fussy eating reported goals of avoiding mealtime stress, conflict, and hunger, restricting less healthy foods, and wanting to involve children in food preparation (Wolstenholme et al., 2019). While these findings suggest that parental feeding goals are associated with children's fussy eating, it is not yet known whether specific feeding goals differ for parents who experience other challenging feeding interactions. For example, health-related feeding goals may be relevant for most parents, whereas aiming to avoid stress and conflict at mealtimes could be more relevant to parents who are managing challenging avid or avoidant eating profiles. It is important to establish whether mealtime feeding goals and perceived time and energy as a barrier to meal planning and preparation differ depending on children's eating profiles because developing interventions which align with parents' goals and resources may be more likely to encourage and maintain behaviour change (Snuggs et al., 2019).

Children's eating behaviour traits have been consistently associated with BMI, whereby avoidant eating behaviour is negatively associated with BMI, and appetite avidity is positively associated with BMI (Kininmonth et al., 2021). While weight outcomes were not assessed in our original research (Pickard et al., 2023), Fisher et al. (2022) showed differences in BMI between preschool children's eating profiles, with an avoidant eating profile being associated with lower BMI. Objective measures of BMI are an important indicator of children's risk of under-

or over-weight. However, it is also important to consider parent perceptions and cognitions about their child's weight, irrespective of its accuracy. Indeed, research has shown that parental perceptions about child weight are associated with the use of specific feeding practices (Loth et al., 2021). For example, parents who report greater concerns about their child's weight are more likely to engage in coercive feeding practices (Loth et al., 2021). Therefore, investigating differences in parent perceptions about children's weight between eating profiles could improve our understanding of risk-associated (avid and avoidant) child eating profiles.

1.4. Aims and hypotheses

This study aimed to examine whether broader parenting behaviour (parenting styles), parental emotions (stress, wellbeing), and parental cognitions (goals, self-efficacy, time and energy for meal planning and preparation, and perceptions about children's body size) differ by children's eating profiles. Based on previous research, it was hypothesised that parents of children with avoidant or avid eating behaviour will exhibit more authoritarian parenting styles, compared to children with typical and happy eating behaviour. It was also hypothesised that parents of children with typical or happy eating behaviour will have lower levels of perceived stress, and greater emotional wellbeing, compared to children with avoidant or avid eating behaviour. For parental cognitions, it was hypothesised that parents of children with typical or happy eating behaviour will have greater parental self-efficacy. It was also hypothesised that parents of children with avid eating behaviour will be more likely to perceive their child as having a larger body size compared to parents of children with avoidant, typical, or happy eating behaviour. Given the limited research relating to mealtime feeding goals and perceived parenting time and energy for meal planning and preparation, we did not make a directional prediction in relation to differences between children's eating profiles.

2. Method

Data analysed for this study are from the APPETiTE project (Appetite in Preschoolers: Producing Evidence for Tailoring Interventions Effectively; <https://www.appetite-research.com/>) which examines feeding and eating in preschool children, to inform future intervention efficacy. This study was pre-registered on the Open Science Framework (<https://osf.io/h3kf5>).

2.1. Participants

Parents/primary caregivers (N = 995) who previously completed an online survey looking at their child's eating behaviour and parental feeding practices (Wave 1: Pickard et al., 2023) were invited to complete this online survey (Wave 2). Recruitment for Wave 1 and 2 was through the online recruitment platform, Prolific, which enabled the same participants to be recontacted and invited to participate. In total, 816 parents completed Wave 2 (82%). Participants were parents/primary caregivers (who will now be referred to as parents for brevity) of a child aged 3–6 years old from the United Kingdom. Eligibility criteria included English-speaking parents who are responsible for feeding their child for more than half the time when their child is at home. Parents whose child is autistic, or has severe learning disabilities, or a chronic illness that directly influences their dietary requirements and eating habits were not eligible to participate. Aston University Health and Life Sciences Research Ethics Committee (HLS21003) provided ethical approval. Parents provided informed consent for their participation.

2.2. Procedure

Data collection for Wave 2 was between November and December 2022. Parents were asked to complete the online survey about the same

child as in Wave 1 (their youngest child born between 2017 and 2019). Parents reported their child's date of birth and sex to ensure that they were completing the survey about the same child. The survey also included three attention-check questions where participants were asked to select a specific response. The study took approximately 15 min to complete. Participants received £3.00 upon completion of the study.

2.3. Measures: Wave 1 survey

Data gathered from the Wave 1 survey was used in this study. Demographic data including parent and child sex, age, and parent ethnicity and food security were used to characterise the sample. Parents' food security was measured using the Short Form of the Household Food Security Scale (Blumberg et al., 1999), with responses summed and categorised as: 0–1 = high or marginal food security; 2–4 = low food security; 5–6 = very low food security. Our previous research used data from the CEBQ (Wardle et al., 2001) to identify four distinct eating profiles in preschool children (see Pickard et al., 2023 for more details). The CEBQ showed good reliability in our sample with Cronbach's alphas for the eight scales ranging from .73 to .92 (Pickard et al., 2023). Children's eating profiles (avid, happy, avoidant, and typical eating) are used in this study.

2.4. Measures: Wave 2 survey

Parents completed several questionnaires examining their own and their child's characteristics. Given the aim of the current study, only measures assessing parental factors and children's body size are reported here for brevity. See <https://osf.io/h3kf5> for details of other measures that were included in the Wave 2 survey. Parents reported additional demographic data about their own and their child's height and weight to calculate BMI. Parents were also asked to report when their child's height and weight was last measured to determine the reliability of responses (e.g., 'unsure/it is a guess' to 'more than 6 months ago'). Children's BMI z-scores were calculated using the World Health Organisation Child Growth Standards, adjusting for child age and sex (WHO, 2006).

2.4.1. Parenting style

Parents completed the reduced 11-item version of the Parenting Practices Questionnaire (Robinson et al., 1995), which measured authoritative (4 items), authoritarian (4 items), and permissive parenting styles (3 items) (Jennings et al., 2019). Responses are on a 5-point Likert scale: 1 = never, 2 = once in a while, 3 = about half of the time, 4 = very often, and 5 = always. Cronbach's alphas in this study were below acceptable: authoritative parenting $\alpha = .56$, authoritarian parenting $\alpha = .53$, and permissive parenting $\alpha = .48$. While we continued to include these data in our analysis in accordance with our pre-registered analysis plan, and present these for information, cautious interpretation of the validity of all findings related to parenting style is needed.

2.4.2. Parental emotion

Parental stress and wellbeing were examined. Parents completed the 18-item Parental Stress Scale (PSS) (Berry & Jones, 1995) to examine their feelings and perceptions about their experience of being a parent (e.g., "I am happy in my role as a parent"). Responses are on a 5-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree and 5 = strongly agree, with greater scores indicating higher stress. Parents also completed the 5-item World Health Organisation Well-Being Index (WHO-5) (Topp et al., 2015), which assessed parents' self-reported mental wellbeing over the past two weeks. Responses are made on a 6-point Likert scale from 0 ('at no time') to 5 ('all of the time'), with higher scores indicating greater wellbeing. Both scales showed good reliability in this sample, with Cronbach's alphas of .86 (PSS) and .89 (WHO-5).

2.4.3. Parental cognitions

2.4.3.1. Self-efficacy. The 5-item Brief Parental Self Efficacy Scale (BPSES) (Woolgar et al., 2023) assessed parents' belief that they can effectively perform or manage parenting tasks (e.g., "I can make an important difference to my child"). Responses are on a 5-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. Higher scores indicate greater self-efficacy. The BPSES showed good reliability in this sample (Cronbach's alphas = .82).

2.4.3.2. Parenting time and energy for meal preparation and planning. Perceived parenting time and energy for meal preparation and planning was assessed using two subscales: time and energy (5 items, e.g., "I do not have the time or energy to cook for my children") and meal planning (3 items, e.g., "I plan meals for my children at least 1 day in advance") (Storfer-Isser & Musher-Eizenman, 2013). Responses are on a 5-point Likert scale: 0 = never; 1 = rarely; 2 = sometimes; 3 = often; 4 = always. Scale means were calculated, with higher scores indicating greater endorsement of time and energy as a barrier to meal preparation, and higher scores indicating greater endorsement of meal planning as a facilitator for meal preparation. The subscales showed good reliability in this sample, with Cronbach's alpha of .80 and .88 for time and energy for meals and preparing meals subscales, respectively.

2.4.3.3. Family Mealtime Goals Questionnaire. Parents also completed the Family Mealtime Goals Questionnaire (FMGQ) (Snuggs et al., 2019) which assessed distinct mealtime feeding goals using 9 subscales: shared family foods (3 items, e.g., "I want my child and I to eat the same food"); stress/conflict avoidance (3 items, e.g., "I want to avoid arguments at mealtime"); homemade food (3 items, e.g., "I want to give my child home-cooked food"); family involvement in mealtimes (3 items, e.g., "I want to choose food that my child can help prepare"); price (2 items, e.g., "I want to keep costs down"); occasional treat (2 items, e.g., "I want to give my child sugary treats sometimes"); high and low-fat regulation (2 items, "I don't want to give my child fatty foods"); ease of preparation (2 items, e.g., "I don't want to spend a long time preparing food for my child"); and health (3 items, e.g., "I want to give my child food that is nutritious"). Responses are on a 5-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree and 5 = strongly agree. Mean scores for each subscale were calculated. Cronbach's alpha for subscales in this study were .63–.81.

2.4.3.4. Perceptions about child body size. Parents' perception of their child's weight was measured using 3 items from the Child Feeding Questionnaire (Birch et al., 2001). Parents were asked to report their child's weight during (1) their first year of life, (2) as a toddler, and (3) now. Responses were on a 5-point Likert scale: 1 = markedly underweight, 2 = underweight, 3 = average, 4 = overweight, 5 = markedly overweight. Item means were calculated, with higher scores indicating greater perception of child weight (Birch et al., 2001). The scale showed acceptable reliability in this sample, with a Cronbach's alpha of .67. Parents also reported their perceptions of their child's current and ideal body size using a 7-point figure rating scale of silhouettes of 4-5-year-old children (Hanson, 2011 with permission received from Stunkard et al., 1983, pp. 115–120). Silhouettes depicted boys and girls of Asian, Hispanic/Latino, and White ethnicities. Parents saw a figure rating scale that was matched to their child's sex and ethnicity. Higher scores indicate greater current and ideal child body size.

2.5. Statistical analysis

SPSS version 29 was used for statistical analyses. Data from Wave 1 and 2 surveys were paired. Data were merged, and all questionnaires were independently scored by KLE and AP to ensure reliability. One-way ANOVA and Chi-square tests examined differences in sample

characteristics and food security between child eating profiles. One-way ANOVA examined differences between children's eating profiles in cognition, emotion, and parenting style.¹ Due to interrelatedness of the FMGQ subscales, a one-way MANOVA was conducted. To reduce family-wise error, a Tukey's HSD adjustment was applied to examine post-hoc pairwise comparisons.

3. Results

3.1. Sample characteristics

In total, 816 parents participated in Waves 1 and 2. Data were incomplete for 30 of these participants so were not included in analyses. Parents who completed the survey about a different child (i.e., reported a different date of birth or sex for their child; $n = 154$) were excluded from analyses. Hence, the final sample comprised 632 parents of children aged 3-6-years-old. Parents (517 females, 114 males) had a mean age of 36.4 years (range = 22.9–59.0) and a mean BMI of 28.10 (SD = 6.94). Children (333 females, 299 males) had a mean age of 4.1 years (49.1 months; range = 36.1–69.9 months). Children's eating profiles were avoidant ($n = 103$; 16.3%), typical ($n = 297$; 47.0%), happy ($n = 102$; 16.1%), or avid ($n = 130$; 20.6%). BMI data were available for 616 children. BMI z-scores beyond ± 5 SD were classified as implausible (WHO, 2006) and so were not included in analyses ($n = 65$). Many parents reported uncertainty about their child's height ($n = 247$, 39.1%) or weight ($n = 211$, 33.4%) and so were not included in analyses. Hence, plausible BMI z-scores were available for 309 participants. See Table 1 for sample characteristics.

3.2. Parenting style

Authoritarian and permissive parenting styles differed significantly between children's eating profile ($F(3, 631) = 4.27, p = .005, \eta_p^2 = .02$ and $F(3, 631) = 7.65, p < .001, \eta_p^2 = .04$, respectively). Post hoc comparisons showed that parents of children with avoidant eating were more authoritarian than parents of children with happy ($p = .030$) and typical eating ($p = .020$), but not compared to parents of children with avid eating ($p = .835$). For permissive parenting, post hoc comparisons showed that parents of children with happy eating were less permissive than parents of children with avid ($p = .002$), avoidant ($p < .001$), and typical eating ($p = .003$). All other comparisons were not significant ($p > .05$). Authoritative parenting scores did not differ between children's eating profiles ($F(3, 631) = .73, p = .536, \eta_p^2 = .003$; Fig. 1). See Table A in the supplementary material for group means and effect sizes.

3.3. Parental emotion

3.3.1. Stress

Parental stress differed significantly between children's eating profiles ($F(3, 632) = 15.49, p < .001, \eta_p^2 = .07$). Post hoc comparisons showed that parents of children with happy eating behaviour had lower parental stress than parents of children with avid ($p < .001$), avoidant ($p < .001$), or typical eating behaviour ($p = .002$). Parents of children with typical eating had significantly lower parental stress than parents of children with avoidant eating ($p < .001$) but not compared to children with avid eating ($p = .057$). All other comparisons were not significant ($p > .05$; Fig. 2).

3.3.2. Wellbeing

Parental wellbeing differed significantly between children's eating profiles ($F(3, 632) = 6.30, p < .001, \eta_p^2 = .03$). Post hoc comparisons

¹ Based on our previous findings (Pickard et al., 2023), food security was examined as an exploratory covariate in main analyses. Including food security as a covariate in ANCOVA did not change the pattern of results.

Table 1
Sample characteristics between children’s eating profiles.

	Eating profile					p
	Total N = 632	Avoidant n = 103 (16.3%)	Typical n = 297 (47.0%)	Happy n = 102 (16.1%)	Avid n = 130 (20.6%)	
Child age, months, M(SD)	49.15 (7.72)	48.47 (7.65)	49.08 (7.50)	49.78 (8.12)	49.34 (7.99)	.665
Child sex, n (%)						.146
Male	299 (47.3)	43 (41.7)	133 (44.8)	52 (51.0)	71 (52.6)	
Female	333 (52.7)	60 (58.3)	164 (55.2)	50 (49.0)	59 (45.4)	
Child BMI z-score, M(SD)	.73 (1.66)	.48 (1.92)	.68 (1.59)	.73 (1.78)	1.47 (1.47)	.319
Parent age, years, M(SD)	36.36 (5.57)	35.64 (5.42)	36.80 (5.47) ^a	37.35 (5.08) ^a	35.12 (6.05)	.004
Parent sex, n (%)						.633
Male	114 (18.0)	19 (18.4)	56 (18.9)	22 (21.6)	17 (13.1)	
Female	517 (81.8)	84 (81.6)	240 (80.8)	80 (78.4)	113 (86.9)	
Parent BMI, M(SD)	28.10 (6.94)	29.41 (7.94)	27.64 (6.61)	27.98 (6.54)	28.20 (7.07)	.170
Parent ethnicity, n (%)						.381
Asian or Asian British	28 (4.4)	9 (8.7)	12 (4.0)	4 (3.9)	3 (2.3)	
Black, Black British, Caribbean, or African	16 (2.5)	2 (1.9)	6 (2.0)	3 (2.9)	5 (3.8)	
Mixed or multiple ethnic groups	18 (2.8)	4 (3.9)	7 (2.4)	1 (1.0)	6 (4.6)	
White	566 (89.6)	88 (85.4)	269 (90.6)	94 (92.2)	115 (88.5)	
Other ethnic groups	4 (0.6)	0 (0.0)	3 (1.0)	0 (0.0)	1 (0.8)	
Food security, n (%)						<.001
Food security	506 (80.1)	75 (72.8)	247 (83.2)	92 (90.2)	92 (70.8)	
Food insecurity	70 (11.1)	17 (16.5)	29 (9.8)	7 (6.9)	17 (13.1)	
Extreme food insecurity	56 (8.9)	11 (10.7)	21 (7.1)	3 (2.9)	21 (16.2)	

Note. Reliable BMI data were available for 309 children and 630 parents.

Bold indicates significantly different from all other eating profiles.

^a Denotes significantly different to avid eating profile.

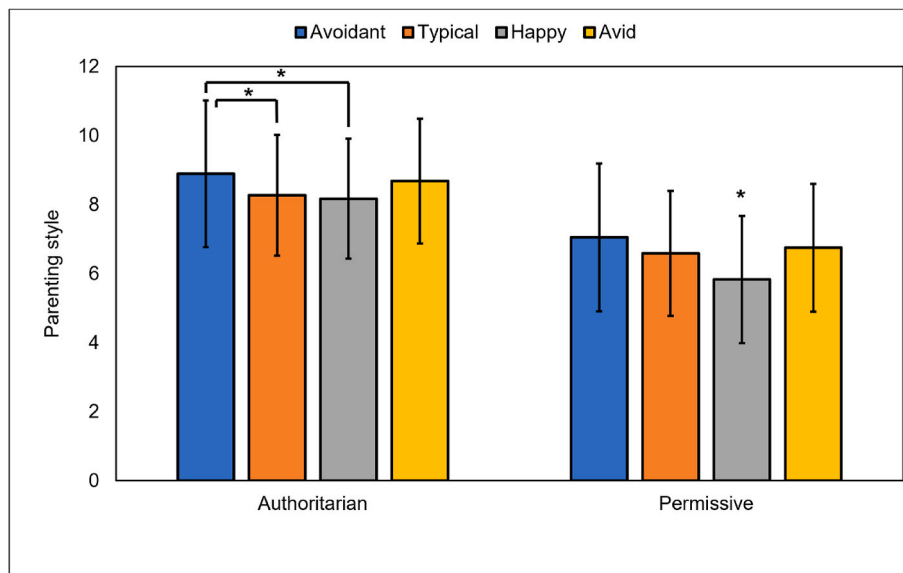


Fig. 1. Mean (SD) parenting style, split by children’s eating profile. * $p < .05$.

showed that parents of children with avoidant eating had lower well-being scores than parents of children with typical ($p = .008$) or happy eating ($p < .001$), but not compared to children with avid eating ($p = .137$). All other comparisons were not significant (p 's $> .05$; Fig. 3). See Table B in the supplementary material for group means and effect sizes for parental emotion measures.

3.4. Parental cognitions

3.4.1. Self-efficacy

Parental self-efficacy differed significantly between children’s eating profiles ($F(3, 632) = 3.67, p = .012, \eta_p^2 = .02$). Post hoc comparisons

showed that parents of children with avoidant eating had lower self-efficacy scores than parents of children with happy eating ($p = .007$), but not compared to children with avid ($p = .686$) or typical eating ($p = .323$). All other comparisons were not significant (p 's $> .05$; Fig. 4).

3.4.2. Parenting time and energy for meal preparation and planning

Endorsing time and energy as a barrier for meal preparation was significantly different between children’s eating profiles ($F(3, 631) = 12.18, p < .001, \eta_p^2 = .06$), with parents of children with happy eating being less likely to report it as a barrier, compared to all other eating profiles (all p 's $< .001$). All other comparisons were not significant ($p > .05$; Fig. 6). Endorsing meal planning as a facilitator for meal

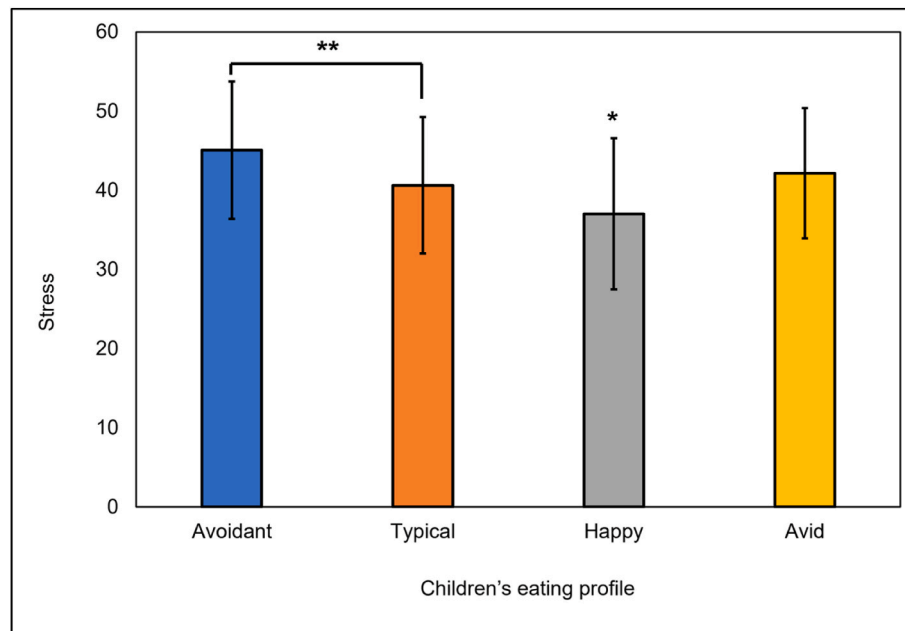


Fig. 2. Mean (SD) parental stress scores, split by children's eating profile. * $p < .05$, ** $p < .001$.

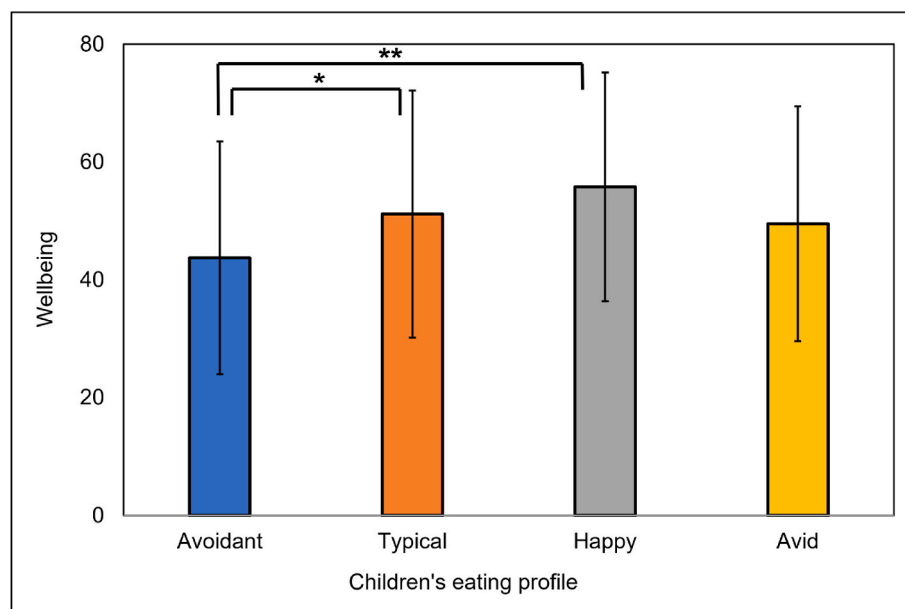


Fig. 3. Mean (SD) parental wellbeing scores, split by children's eating profile. * $p < .05$, ** $p < .001$.

preparation differed significantly between children's eating profiles ($F(3, 631) = 3.62, p = .013, \eta_p^2 = .02$), with parents of children with happy eating being more likely to report it as a facilitator, compared to parents of children with avoidant ($p = .011$) and avid eating ($p = .046$), but not compared to children with typical eating ($p = .100$). All other comparisons were not significant ($p > .05$; Fig. 5).

3.4.3. Family mealtime feeding goals

Goals of avoiding stress/conflict differed significantly between children's eating profile ($F(3, 631) = 5.00, p = .002, \eta_p^2 = .023$). All other mealtime goals were not significantly different between children's eating profile (all p 's $> .05$). Post hoc comparisons showed that goals to avoid mealtime stress/conflict were lower for parents of children with happy eating, compared to parents of children with avoidant ($p = .002$),

typical, ($p = .006$) and avid eating ($p = .015$). All other comparisons were not significant ($p > .05$; Fig. 6).

3.4.4. Perceptions about child body size

Parent perceptions of their child's weight (measured using the Child Feeding Questionnaire) differed significantly by child eating profile ($F(3, 631) = 4.50, p = .004, \eta_p^2 = .021$), whereby children with avid eating behaviour were perceived to have significantly higher child weight compared to parents of children with avoidant ($p = .003$) and typical eating ($p = .023$), but not compared to parents of children with happy eating ($p = .203$). All other comparisons were not significant ($p > .05$).

Parent perceptions of their child's current body size (measured using the figure rating scale) differed significantly by child eating profile ($F(3, 609) = 8.40, p < .001, \eta_p^2 = .040$), however, parent perceptions of their

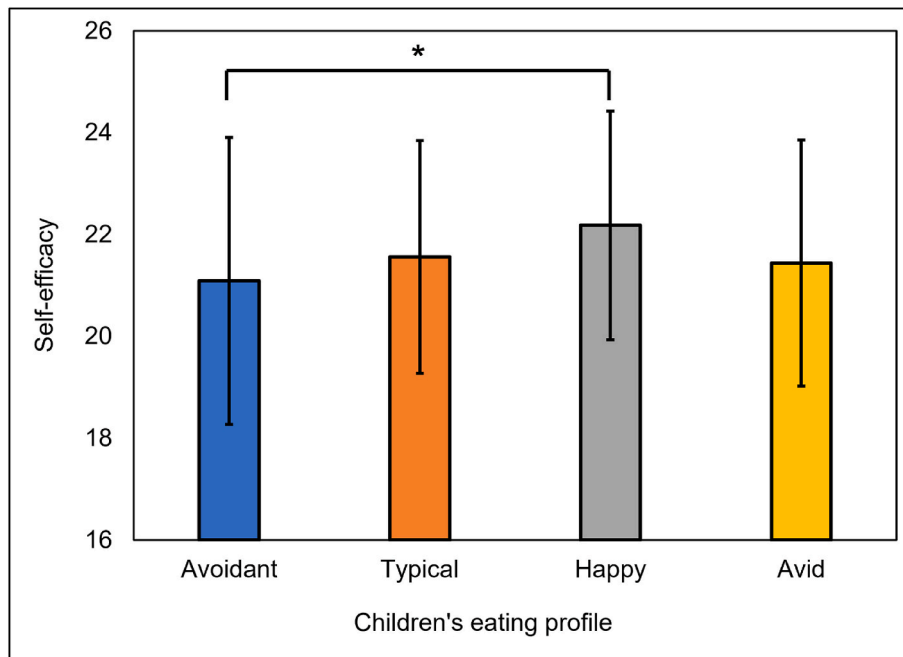


Fig. 4. Mean (SD) parental self-efficacy scores, split by children's eating profile. * $p < .05$.

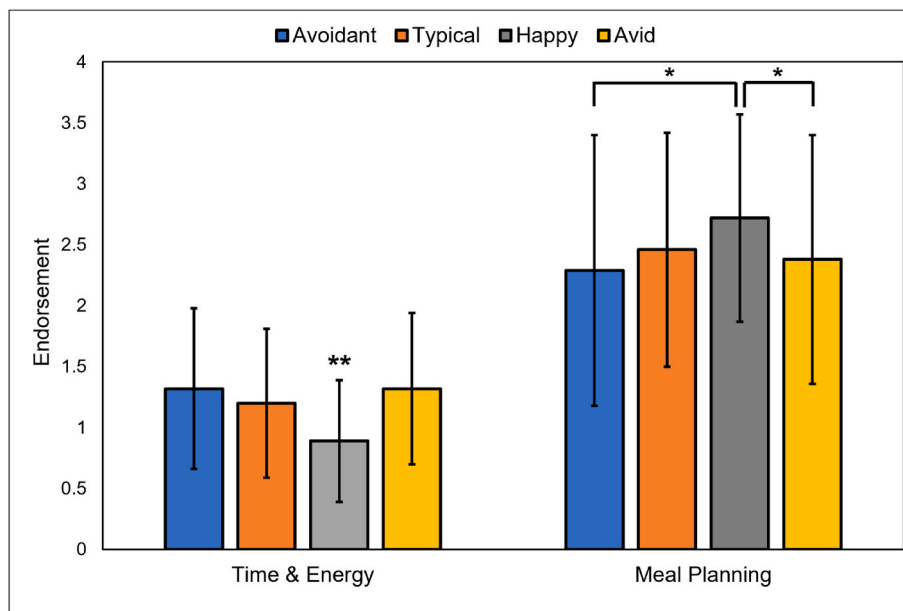


Fig. 5. Mean (SD) parenting time and energy for meal preparation and planning, split by children's eating profile. Endorsement of time and energy as a barrier to meal preparation was significantly lower for parents of children with happy eating behaviour. Endorsement of meal planning as a facilitator was significantly lower for parents of children with avoidant and avid, compared to happy, eating behaviour. * $p < .05$, ** $p < .001$.

child's ideal body size did not ($F(3, 611) = 2.55, p = .055, \eta_p^2 = .012$). Parents of children with avoidant eating perceived their child's current body size as significantly smaller compared to parents of children with typical ($p = .017$), happy ($p = .010$) and avid eating profiles ($p < .001$). Children with an avid eating profile were perceived as having a larger body size compared to parents of children with a typical eating profile ($p = .015$). All other comparisons were not significant ($p > .05$; Fig. 7). See Table C in supplementary material for group means and effect sizes for parental cognition measures. See Table 2 for a summary of all significant differences in parenting style, and parental emotion and cognition between children's eating profiles.

4. Discussion

This study demonstrates the differences in broader parenting behaviour (parenting styles), parental emotion (stress, wellbeing) and parental cognitions (goals, self-efficacy, time and energy for meal planning and preparation, and perceptions about children's body size) between 3-6-year-old children's eating profiles. Overall, findings showed that a happy eating profile was associated with better parental cognitive and emotional outcomes, whereas an avoidant eating profile was associated with poorer emotional outcomes. These findings align with Family Systems Theory (Broderick, 1993) and the biopsychosocial model of children's eating behaviour (Russell & Russell, 2018),

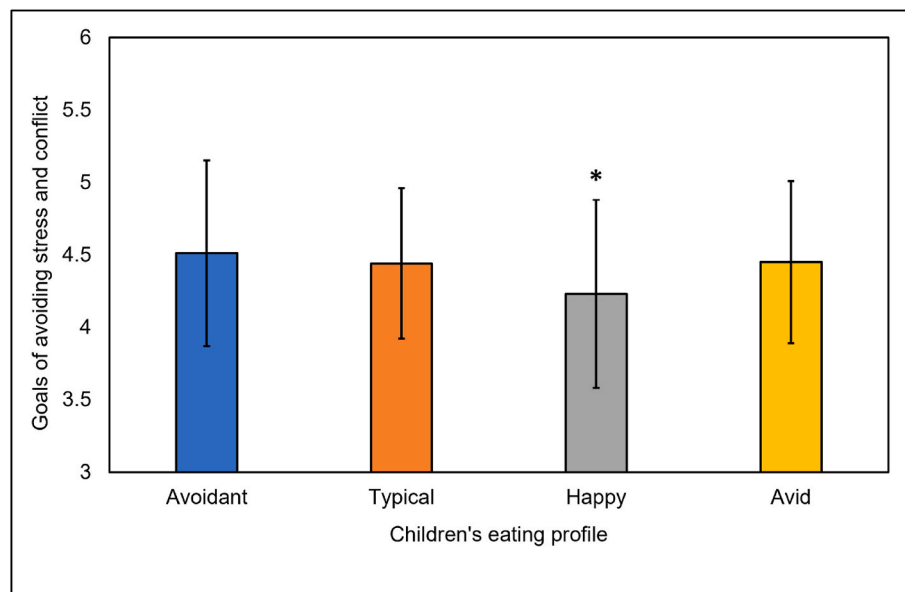


Fig. 6. Mean (SD) parental goals of avoiding stress and conflict at mealtimes, split by children's eating profile. $*p < .05$.

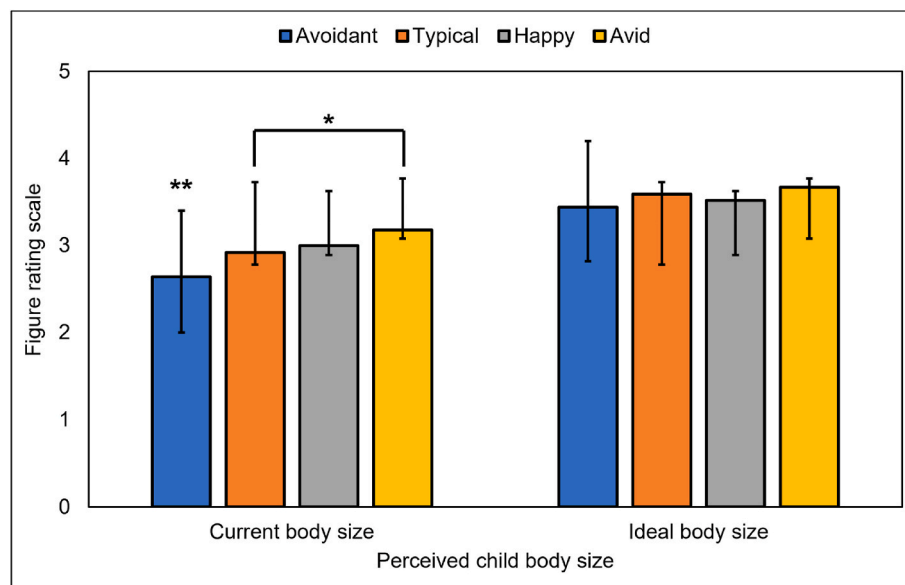


Fig. 7. Mean (SD) scores on figure rating scale assessing parent perceptions of children's current and ideal body size, split by children's eating profile. $**p < .001$, $*p < .05$.

highlighting the importance of considering parental characteristics in the development of tailored interventions to support children's healthy eating.

4.1. Parenting style

Permissive and authoritarian parenting styles were found to differ between children's eating profiles, but an authoritative parenting style did not. Parents of children with avoidant eating were more likely to have an authoritarian parenting style, compared to parents of children with typical or happy eating behaviour. This could be explained by parents perceiving themselves to have high demandingness due to the high levels of feeding responsibility and challenges experienced with children's fussy eating behaviour (Wolstenholme et al., 2020). Contrary to hypotheses and previous research (Goodman et al., 2020; Leuba et al., 2022), parents of children with avid eating behaviour did not report

more authoritarian or permissive parenting styles compared to parents of children with typical or happy eating behaviour. Findings also showed that parents of children with happy eating behaviour were less likely to have a permissive parenting style. However, the reliability of our findings which relate to parenting styles should be considered and interpreted with caution, given that the reduced version of the Parenting Practices Questionnaire (Jennings et al., 2019) showed poor reliability in our sample. Indeed, research has suggested that inconsistent findings about parenting styles could be due to issues and differences in the conceptualisation of domains and the variability in measures used (Vollmer & Mobley, 2013). Thus, further research which uses more reliable measures to assess the relationship between parenting styles and children's eating behaviour is needed.

Table 2
Summary of differences in parenting style, and parental emotion and cognition between children's eating profiles.

Concept	Measure	Group Differences
Parenting Style	Authoritarian	Avoidant > Happy \cong Typical Avoidant \cong Avid
	Permissive	Happy < Avoidant \cong Typical \cong Avid
Emotion	Stress	Happy < Avoidant \cong Typical \cong Avid Typical < Avoidant Avoidant \cong Avid
	Wellbeing	Avoidant < Typical \cong Happy Avoidant \cong Avid
Cognition	Self-efficacy	Avoidant < Happy Avoidant \cong Typical \cong Avid
	Time and energy as a barrier	Happy < Avoidant \cong Typical \cong Avid
	Meal planning as a facilitator	Happy > Avoidant \cong Avid Happy \cong Typical
	Mealtime Goal: Avoiding stress/ conflict	Happy < Avoidant \cong Typical \cong Avid
	Perceptions of child weight	Avid > Avoidant \cong Typical Avid \cong Happy
	Perceptions of child current body size	Avid > Typical Avoidant < Typical \cong Happy Avoidant < Avid Avid \cong Happy

Note. \cong Denotes means are approximately equal and do not differ significantly.

4.2. Parental emotions

Differences in parental emotions were found between children's eating profiles, whereby a happy eating profile was associated with better parental emotional wellbeing. Consistent with previous research examining children's appetitive traits (Blissett et al., 2007; Wolstenholme et al., 2020), an avoidant eating profile was associated with poorer parental emotional wellbeing. Therefore, tailored interventions which target parental emotions (e.g., improving wellbeing) could be important for supporting parents of children with avoidant eating behaviour (Jarman et al., 2015; Webb et al., 2018), particularly since parents who are managing children's non-clinical eating problems (e.g., fussy eating) do not receive professional help (Mitchell et al., 2013). Contrary to our hypotheses, children's avid eating behaviour did not predict poorer parental emotions. Thus, the feeding challenges associated with children's avid eating behaviour such as managing frequent requests for food, may have a momentary, rather than general, effect on parental mood (Berge et al., 2017, 2020). While our findings provide evidence that parental emotions are associated with children's eating profiles, longitudinal research is needed to determine the transactional way in which they are related (Russell & Russell, 2018).

4.3. Parental cognitions

Additionally, findings showed that parents of children with a happy eating profile reported greater parenting time and energy for meal preparation and planning, and were less likely to report goals of reducing mealtime stress and conflict. This suggests that children with happy eating behaviour may be more likely to experience a positive mealtime emotional climate, which is important for encouraging children's healthy eating behaviour (Smith et al., 2022).

Parental self-efficacy was found to be lower for children with an avoidant, compared to a happy, eating profile. This is consistent with previous research showing that some parents perceive their child's fussy eating as a reflection of their parenting ability (Wolstenholme et al., 2020). Given this, improving self-efficacy for parents of children with an avoidant eating profile could be an important target in tailored interventions to support children's healthy eating behaviour.

Contrary to our hypotheses, parental cognitions, apart from parental perceptions about child body size, did not differ between parents of children with an avid eating profile, compared to children with an avoidant and typical eating profile. This suggests that the feeding challenges associated with an avid eating profile (Edwards et al., 2024) may not relate to parental beliefs about self-efficacy, parenting energy, or feeding goals. One explanation for the absence of a difference, is that parents of children with avid eating behaviour may have greater concerns about providing their child with sufficient food, rather than having concerns about children's over-eating (Edwards et al., 2024). Additionally, findings showed that parental perceptions about child body size differed between eating profiles, whereby parents perceived children with an avoidant eating profile as having a lower body size, and children with an avid eating profile as having a higher body size. While the accuracy of parental perceptions is not clear, and research which objectively measures children's BMI is needed, it is equally important to understand parental perceptions about children's weight since they have been shown to negatively impact eating behaviour and body image (Robinson & Sutin, 2017). Particularly, since these findings suggest that children with avoidant and avid eating behaviour may be at greater risk of having under- or over-weight, respectively. Overall, this study demonstrates the differences in parental cognitions between children's eating profiles. However, it is not yet clear from this cross-sectional study whether a happy eating profile is protective for parental cognitions, or vice versa.

4.4. Strengths and limitations

Strengths of this study include the relatively large sample size and the use of a person-centred approach to conceptualise children's eating behaviour. Identifying patterns in children's eating behaviour, rather than focusing on individual eating behaviours in isolation, appears beneficial for identifying risk-associated child eating profiles (Russell et al., 2023). While parent-reported BMI z-scores did not differ significantly between eating profiles, the findings may be clinically significant since there was almost a one standard deviation difference in BMI z-scores between children with avoidant and avid eating profiles. Indeed, children with avid eating behaviour had a mean BMI z-score greater than 1 standard deviation which suggests that these children have overweight. However, parent-reported child BMI may have poor reliability. For example, there was a large amount of missing BMI data in this study since over one third of parents reported uncertainty about their child's height or weight. Thus, research which objectively measures children's BMI is needed. While this study provides an important insight into parental differences between children's eating profiles, the cross-sectional nature does not allow for causal conclusions to be drawn. For example, it is unknown whether parent psychosocial factors are protective for the development of children's more adaptive eating profiles, or vice versa. Indeed, research has highlighted the complexity of parent-child feeding interactions, suggesting that relationships are reciprocal (Jansen et al., 2020; Kininmonth et al., 2023). Thus, future research is needed to examine the directionality of relationships between parental factors and children's eating behaviour. Furthermore, social desirability may have influenced the current findings due to the self-report nature of this study. For example, it is possible that parents of children who report more happy eating behaviour may have provided more socially desirable responses and that this tendency applied throughout the questionnaires. Thus, these families may appear as though there are few challenges with eating behaviour and in the family system. Participants were recruited using Prolific, an online recruitment platform which has a diverse range of participants and we aimed to recruit a broadly nationally representative sample. Most participants in this study were of White ethnicity (89.6%), and whilst this is largely representative of the UK context where data were collected (Office for National Statistics, 2022), the generalisability of the current findings to families of non-White ethnicities is limited. It is important that future

research specifically targets the recruitment of individuals from a diverse range of backgrounds.

5. Conclusion

This is the first study to examine differences in parenting styles, and parental emotions and cognitions between children's eating profiles. A happy eating profile was associated with better parental psychosocial factors, whereas an avoidant eating profile was associated with poorer emotional outcomes. Contrary to hypotheses, parents of children with avid eating behaviour did not report poorer psychosocial outcomes. Aligned with the biopsychosocial model of children's eating behaviour (Russell & Russell, 2018), these findings demonstrate the potential mechanisms and risk factors that influence the development of children's eating profiles and highlight the need for tailored health interventions. Developing interventions which consider broader parent characteristics could better support families to shape children's healthy eating behaviour. Further research which uses longitudinal methods is needed to better understand the transactional way children's eating profiles and parent psychosocial factors are connected.

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Ethical statement

Aston University Health and Life Science Research Ethics Committee provided ethical approval (HLS21003). Participants provided informed consent for their participation.

CRediT authorship contribution statement

Katie L. Edwards: Writing – original draft, Methodology, Formal analysis, Conceptualization. **Abigail Pickard:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Claire Farrow:** Writing – review & editing, Methodology, Funding acquisition, Conceptualization. **Emma Haycraft:** Writing – review & editing, Methodology, Funding acquisition, Conceptualization. **Moritz Herle:** Methodology, Funding acquisition, Conceptualization. **Clare Llewellyn:** Methodology, Funding acquisition, Conceptualization. **Helen Croker:** Methodology, Funding acquisition, Conceptualization. **Jacqueline Blissett:** Writing – review & editing, Methodology, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be available on the Open Science Framework.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.appet.2024.107641>.

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