“I still put them on her plate”: A qualitative study exploring strategies implemented by parents to promote vegetable intake

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Abbreviations: CEBQ; Child Eating Behaviour Questionnaire

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Abstract

This study explored strategies implemented by parents to encourage their children to eat vegetables, especially when children exhibit fussy eating. The study involved a mixed methods approach using semi-structured interviews with twenty parents of preschool children (aged 2-5 years) with a high and low level of food fussiness (established by questionnaire). All interviews were audio recorded, then *verbatim* transcribed and analyzed using thematic analysis. Thematic analysis revealed seven main themes with sixteen subthemes encompassing various vegetable promoting strategies. These included (1) Instructed knowledge, (2) Experiential learning, (3) Food manipulation, (4) Reinforcement, (5) Encouragement of autonomy (6) Commitment to a food ideal and (7) Inherent values. Parents used a range of methods to encourage their children to eat vegetables but there were no major differences by level of food fussiness. Parents talked about variable success in applying strategies even with the same child. Home based strategies were more diverse and personalized to the child than those tested in most research studies. Therefore, interventions to promote vegetable intake in preschool children will benefit from co-production with parents adopting a tailored approach to match the needs of the specific child.

Keywords: parental strategies, preschool children, nutrition education, taste exposure, qualitative research, food promotion

1. Introduction

Eating habits and food preferences developed in the early years of life are said to track into later life (De Cosmi, Scaglioni, & Agostoni, 2017; Nicklaus, Boggio,

Chabanet, & Issanchou, 2005). Therefore, children are encouraged to make healthy eating choices from early childhood (Birch, Savage, & Ventura, 2007; Hetherington, Cecil, Jackson, & Schwartz, 2011; Schwartz, Scholtens, Lalanne, et al., 2011). Most vegetables are rich in micronutrients, dietary fiber, and phytochemicals at the same time they are low in sugar, sodium, fat and energy density (Liu, 2013; Slavin & Lloyd, 2012). Eating adequate amounts of these foods can significantly reduce the risk of a number of diseases (Aune, Giovannucci, Boffetta, et al., 2017; Boeing, Bechthold, Bub, et al., 2012; Hartley, Igbiniedion, Holmes, et al., 2013; Lee, Shin, Oh, & Kim, 2017; Wang, Ouyang, Liu, et al., 2014). However, across Europe and the US intakes fall below the recommended amounts for vegetables (Kim, Moore, Galuska, et al., 2014; Lynch, Kristjansdottir, te Velde, et al., 2014). For example, in one study using the Child and Diet Evaluation Tool (CADET) diary among 3 to 4 year old children, only 16% of the sample (n = 207) ate the recommended 5-a-day and 14% had eaten no fruits or vegetables on the test day (Cockroft, Durkin, Masding, & Cade, 2005). Vegetables may be eaten less by children than other foods due to their bitter taste and unfamiliar texture (Johnson, 2016; Zeinstra, Koelen, Kok, & de Graaf, 2007), as well as the emergence of food fussiness/ pickiness and food neophobia during the early years (Cooke, Haworth, & Wardle, 2007; Dovey, Staples, Gibson, & Halford, 2008; Lafraire, Rioux, Giboreau, & Picard, 2016). Moreover, during the preschool years children develop a sense of autonomy over their feeding and food choices and as a result parents may have to adapt their feeding approach to match their child's needs (Walton, Kuczynski, Haycraft, et al., 2017).

Parents are the gatekeepers to child nutrition therefore their perspectives on their child's dietary habits, and the methods they use to encourage healthy eating are important to explore and understand. Parents determine the home food environment

by making some foods available and accessible (Krolner, Rasmussen, Brug, et al., 2011; Rasmussen, Krolner, Klepp, et al., 2006). However, provision of healthy foods does not necessarily result in them being eaten (Holley, Farrow, & Haycraft, 2017a). Therefore, inviting parents to discuss their experience of feeding their child, and how they establish food preferences in the home is necessary to develop a complete picture of how a child's eating habits are formed. For example, parents may report ways they limit some types of foods and try to encourage intake of others to achieve a balanced diet. Inhulsen, Merelle, and Renders (2017) conducted a study with children aged 3 to 7 years ($n = 5926$) and reported that more encouraging and controlling parental feeding styles were associated with higher consumption of vegetables. However, the study found that the use of instrumental feeding (using food to reward good behavior) was inversely associated with vegetable intake (Inhulsen, et al., 2017).

A number of systematic interventions have improved preschoolers' vegetable consumption, mainly based on repeated exposure (Appleton, Hemingway, Saulais, et al., 2016; Hodder, Stacey, O'Brien, et al., 2018; Nekitsing, Blundell-Birtill, Cockroft, & Hetherington, 2018). But these may be impractical for families, particularly for fussy children. Indeed, parenting practices are dynamic, influenced by context, the child's behavior and characteristics. Parents may apply differing levels of pressure to eat depending on the fussiness of their child (Jansen, de Barse, Jaddoe, et al., 2017; Webber, Cooke, Hill, & Wardle, 2010) and children with fussy eating may respond better to some strategies than others. This is borne out by a previous study which found that children who did not eat an unfamiliar vegetable (celeriac) at baseline were more likely to eat that vegetable after experiencing a combination of sensory play and storybook featuring that vegetable (Nekitsing, Blundell-Birtill, Cockroft, et

al., 2019). The success of this approach was partly attributed to a gradual build up to introducing a novel vegetable. It follows that parents may adjust their feeding strategies in response to specific circumstances including child eating traits, for example, by using a step-by-step approach with a child who is rather fussy or wary of new foods.

The present study was conducted to explore the different ways that parents offer vegetables at home especially among those children who are fussy eaters. Specific objectives included investigating provision of vegetables, including unfamiliar or disliked vegetables, how parents dealt with food rejection and their response to fussiness. It was predicted that parents would use a variety of strategies to encourage intake and that these might differ by fussiness level. A qualitative approach was applied in order to identify challenges faced by parents in encouraging vegetable consumption, in part, to consider how future interventions might be improved to account for these challenges.

2. Method

For the present study a mixed methods approach was adopted. The data collection and analysis were mostly based on qualitative methods, but some quantitative data from parental questionnaires were applied to measure child food fussiness. The present study is reported according to the Standards for Reporting Qualitative Research; SRQR (O'Brien, Harris, Beckman, et al., 2014).

2.1. Qualitative approach and research paradigm

For the purpose of this study, the guiding theoretical approach adopted assumes that there are multiple realities (constructivism) and how we know about it (epistemology) is based on social interaction (interpretivism). The present research paradigm

applies an inductive approach and semi-structured interviews are compatible with a grounded theory approach (Duffy, Ferguson, & Watson, 2004). Each interview was collected during a single session and data were analyzed using thematic analysis.

2.2. Researcher characteristics and reflexivity

The main researcher (CN) who conducted and analyzed the interviews is female, aged 30 years, from a middle-class family, studying for a PhD in Psychology, and a parent to a child who was aged 3 years at the time. The researcher made parents aware of her background as a means to reassure them of her personal and professional interest in their experience of feeding practices and to build trust between interviewer and parent. Also, the researcher is British Asian, living in a multi-cultural society and is sensitive to, and aware of, cross-cultural differences in parenting methods, feeding strategies and types of vegetables offered.

The main researcher conducted the interviews and transcribed and checked all the written transcripts soon after the actual interview. Nineteen of the twenty participants were not known to the researcher prior to recruitment. The only person known to the researcher was through professional association.

2.3. Recruitment strategy and settings

Parents who had children aged 2-5 years and were able to speak and understand English language were eligible to take part. The study was conducted from April to June 2017 and participants were recruited from West Yorkshire (United Kingdom) using A5 recruitment flyers and email advertisements. They were informed that the study would involve a short questionnaire followed by an interview lasting no more than 45 min and that they would be reimbursed £10 for their time. All participants were assured of their confidentiality, anonymity and data protection and written

informed consent was obtained prior to onset of the study. The present study was approved by the University of Leeds, School of Psychology Ethics Committee; reference 17-010.

A minimum of 20 participants were recruited to achieve saturation based on a previous qualitative study with a similar interest (Holley, et al., 2017a). Twenty-one participants were recruited using convenience and a snowball sampling method from an existing database of parents who participated in a previous study ($n = 11$; Nekitsing, Blundell-Birtill, Cockroft, & Hetherington, 2019), word-of-mouth ($n = 6$), parent and child playgroups ($n = 3$) or a preschool ($n = 1$). One parent opted-out after agreeing to participate as they were unable to commit to the interview session due to their busy work schedule at the time of the study. The final sample consisted of ten parents whose children scored high on the eating trait “food fussiness” and ten parents whose children scored low on this attribute (see below in the data analysis section for categorization). The interviews took place in locations convenient for the participants, this included their home ($n = 11$), the university ($n = 5$), local coffee shops ($n = 2$), local library ($n = 1$) and nearby preschool ($n = 1$).

2.4. Data collection

Demographic questionnaire

The demographic questionnaire asked questions about age, sex, ethnicity, education level, number of hours worked on a weekly basis, annual household income, relationship to the child, the number of other (older and younger) children in the household, as well as target child age, sex and the number of hours they attended preschool or school in a week.

145 *Child eating behaviours*

146 Food fussiness was measured using 6-items of the Food Fussiness subscale from
 147 the validated Child Eating Behaviour Questionnaire; CEBQ (Wardle, Guthrie,
 148 Sanderson, & Rapoport, 2001). Food Neophobia was assessed using the 6-items of
 149 the Food Neophobia Scale (Pliner, 1994). Both scales had a good internal
 150 consistency as indicated by the Cronbach's alpha value of $\alpha = 0.88$ for the Food
 151 Fussiness subscale and $\alpha = 0.91$ for the Food Neophobia scale.

152 *One-to-one semi-structured interview*

153 A semi-structured interview was used as this allowed the researcher to explore
 154 experiences of participants on a topic of interest with the meaning they attribute to
 155 their experience (Tong, Sainsbury, & Craig, 2007). The average duration of the
 156 interviews was 36 minutes (range 24 – 59 minutes). Interview sessions were on a
 157 one-to-one basis, however for some participants, their child/ other children were
 158 present in the same room ($n = 11$). One-to-one interviews were selected over group
 159 formats to facilitate free and open discussion, free from judgement and the influence
 160 of others. At the beginning of the interview session participants were reassured of
 161 their confidentiality, anonymity and their right to withdraw at any time. They were
 162 given the opportunity to ask further questions before the interview started. All
 163 interviews were digitally recorded using 2 devices (digital voice recorder and a
 164 password protected iPhone).

165 Questions for the interview were generated based on previous literature and
 166 according to the research aim and specific objectives of the present study. Interview
 167 questions were piloted with other researchers (4 senior researchers, 1 post-graduate
 168 student and 1 MSc student) to check suitability and to estimate time required to

conduct the interview session. This process resulted in refining some of the interview questions.

The questions were designed with the purpose of encouraging parents to share their experiences with minimum researcher influence. The interview questions prompted parents to be as open as possible and gave them the opportunity to reflect on their feeding practices. At the beginning of the interview, parents were given an overview of the topics covered during the session. The main question categories included: (1) opening questions, (2) questions about fussy eating, their experience of this and any methods used to promote vegetable intake at that time, (3) general vegetable intake including provision, (4) intake of unfamiliar vegetables and strategies used to introduce these, (5) dealing with vegetable refusal, and (6) closing questions.

Participants were asked eighteen open-ended questions with some follow-up questions. Examples of the questions asked are provided in Table 1. Prompts and probes were also used to encourage respondents to share more details or to clarify what they have already said (e.g. *“please tell me more about...”* or *“what did you do?”*).

2.5. Data processing and analysis

Quantitative data

Data from questionnaires provided some descriptive statistics such as child age and fussiness score. Children were considered high (score ≥ 3) or low (score < 3) in food fussiness based on suggestions by Steinsbekk, Sveen, Fildes, et al. (2017) derived from the CEBQ Food Fussiness subscale. All quantitative data was managed in IBM SPSS Statistics, Version 24.

192 *Qualitative analysis*

193 All interview recordings were transcribed *verbatim* using free, secure online software
194 OTranscribe (<https://otranscribe.com/>). The transcripts were then transferred to
195 Microsoft Word (2016) and NVivo (qualitative data analysis software, QSR
196 International Pty Ltd, Version 11). Data were analysed using procedures developed
197 for thematic analysis by Braun and Clarke (2006). This involved 'repeated reading' of
198 the interview transcripts then they were rechecked against the original audio
199 recordings and participant's names and any names mentioned during the interviews
200 were replaced by pseudonyms in the transcript itself.

201 With re-reading and checking of the transcripts, themes were identified and
202 transcripts were printed for manual coding and read again. This stage involved
203 systematically working through the entire dataset by highlighting segments of text of
204 interest to the researcher and meaningful for the research subject. Key concepts and
205 initial codes generated from each interview were noted in the margins alongside the
206 highlighted text (phase 2). The interview data and codes were then transferred and
207 managed through NVivo. The segments of the text coded manually were re-
208 assessed and codes were collated and compiled in a meaningful way to identify
209 potential sub-themes and overarching themes (phase 3). The next part of the
210 analysis process involved reading the collated extracts and reviewing and refining
211 the themes (phase 4). At this stage a coherent narrative was developed from the
212 data. The themes were further defined and refined for example, by identifying sub-
213 themes or giving more appropriate names to the themes which were then applied in
214 the results section (phase 5).

A meeting was held with the research team to discuss analysis plans and theme identification, and further advice was sought from researchers who were experienced in qualitative data analysis. These discussions were used to reflect, understand and qualify the reliability of identified themes and to reach consensus with reporting of the results.

3. Results

3.1. Descriptive statistics

Characteristics of the parents are provided in Table 2 and characteristics of the children are summarized in Table 3. Most of the children attended preschool, however the number of hours they attended varied (see, Table 2). All children were reported as healthy at the time of the study. However, one child was born prematurely at week 27 and another child was diagnosed with congenital heart disease at the age of ten months. Both children scored high on food fussiness; however, their parents had reported no other, specific feeding problems at the time of the study.

Most participants were mothers and a fifth of participants were fathers (see, Table 3). They were predominantly White British, with one parent identified as Asian Pakistani and one as Black African. Three-quarters of the parents were educated to university level or higher. Most parents reported that they were working at the time of the study and 65% of them had household income of £30,000 or above. Seventy percent of the parents also had other children.

3.2. Qualitative data: 'fussiness as a phase'

All parents stated that their child experienced food fussiness at some point. In the present study parents described food fussiness as refusing to eat new or previously liked foods, eating food selectively or creating fuss at mealtimes. Many parents described food fussiness as a 'phase'. Fussiness emerged around the age of 18 months to two years. Children generally used verbal behaviours to express their refusals, but many parents also recalled physical and overt behaviours such as throwing food, spitting, making themselves sick, and gagging. Parents explained that vegetables were refused by children due to their colour, taste, texture, how they were presented (overwhelmed by the amount, or not cut or cooked in the preferred way), or if their child was full, tired or unwell. Fussiness and refusing to eat vegetables were also described in relation to children seeking control and asserting autonomy.

3.3. Thematic analysis: themes related to strategies

Thematic analyses indicated no major differences in strategies implemented by level of fussiness. Therefore, overall themes are discussed with the two groups combined; any apparent differences are identified under relevant sections. Seven main themes encompassing sixteen strategies used by parents to increase their children's vegetable consumption were identified. Parents reported that some strategies worked on some occasion and others did not work at all (see, Figure 1 for an illustration of themes describing parental strategies). Major themes included: (1) Instructed knowledge, (2) Experiential learning, (3) Food manipulation, (4) Reinforcement, (5) Encouragement of autonomy, (6) Commitment to a food ideal (7) Inherent values.

The quotes (*italic font*) in the section below are presented to illustrate themes, they are presented alongside some identifying features such as pseudonym, parent status (e.g. mother /father), child's food fussiness (FF) level (high or low) and age (e.g. 4 years). These quotes are provided to represent and exemplify themes extracted during analysis.

3.3.1. Theme 1: Instructed Knowledge (*purposive*)

Parents reported that teaching children about nutrition was important and this included eating vegetables. According to parents even young children were able to differentiate between foods which are considered healthy (e.g. fruits and vegetables) and foods considered to be less healthy (e.g. confectionery). Parents shared their experience of how they talked to their children about eating vegetables in relation to health and wellbeing. For example, linking the consumption of vegetables to their body and how they can help them to grow (e.g. see quote from Ashley).

Nutrition related educational messages were also conveyed to children in a more subtle way with parents incorporating learning into normal everyday routines, such as having and discussing healthy foods at mealtimes (e.g. see quote from Sarah).

"I'm very into healthy eating anyway so we just talk to her a lot about where it comes from, why is it good to eat vegetables, it's good for your physical wellbeing, and it's good for your heart, it will help you grow." (Ashley, mother; child high FF, age 3)

"I don't think it needs direct teaching; I think it just has to become embedded in normal family life." (Sarah, mother; child low FF, age 4)

As explained by Ashley and other parents, conversations begin early on about why eating vegetables is a “good thing” and that this can be achieved through numerous activities. For example, parents actively involved children (aged 3 and above) in food preparation activities believing this to support vegetable intake:

“Do you know if they help you to prepare their meal, they will eat it and they forget about what’s inside it... with vegetables, yeah, I used to have a lot of problems but then when I used to go to classes and centers as well, that’s what they suggest. So, I tried that, and it does work.” (Shaheen, mother; child high FF, age 3)

Parents reported teaching children directly about eating vegetables, and in a less didactic way through encouraging active engagement with vegetables. In addition, parents applied other, more implicit strategies.

3.3.2. Theme 2: Experiential Learning (incidental)

Sensory play: parents identified ways to engage which employed different senses such as smell and touch:

“I’d just encourage them to help in the prep as much as possible you know, play with them, touching them, smelling them and all that that sort of stuff, I think it helps.” (Lauren, Mother; child low FF, age 4)

Parents also encouraged exploration through making shapes and playing games with food.

Fun with vegetables: examples of play included making faces with vegetables, adopting appealing names (e.g. referring to broccoli as small trees) and inventing games during meals to encourage intake:

“Like the sandwiches and getting her to eat salad and cucumber and things, we’d dress it so it was like a face or a tractor or something daft to either encourage her to eat it or at least try some of it.” (Jennifer, mother; child high FF, age 4)

“We used to play the pea sucking game, which was quite fun, so you have to put them on a plate and then the first one to suck erm all off the plate is the winner. That goes down well, he likes that.” (Amanda, mother, child high FF, age 2)

The sense of fun and engagement conveyed by parents to support their children stands in contrast to the more stealth-oriented strategy of hiding vegetables. Here the objective is to “fool” the child as a passive recipient rather than as active agent in creative play or preparations.

3.3.3. Theme 3: Food Manipulation

Stealth/ pairing: for disliked vegetables, parents pureed or chopped them into small pieces and then “hid” them in other complex dishes, for example in mashed potatoes, soups, or sauces. Children were not generally aware that the vegetable was present in the food and sometimes parents concealed this with similar colour foods (e.g. adding sweet potatoes in carrot soup, or cauliflower in mash potatoes or describing a red pepper as a tomato):

“Mushrooms will go in a sauce really, really small but Chloe wouldn’t know that they were there. She wouldn’t know them as the rubbery mushroom.”
(Rebecca, mother; child low FF, age 4)

327 *"I would still try, some of them I'd chop it up small and hide it in the food and*
 328 *then others I would just leave it big for her to proactively eat, with maybe a bit of*
 329 *encouragement."* (Tiffany, mother; child low FF, age 3)

330 Offering vegetables by stealth was applied as measure to counter refusal of
 331 vegetables which children disliked. However, this strategy was risky as the effort to
 332 conceal may be detected as illustrated below:

333 *"He's finding the bits in the food that he doesn't like, even if I'm disguising the*
 334 *onions in like spaghetti bolognese or shepherd's pie or whatever he is finding*
 335 *the onions and he is refusing to eat them. In fact, he's refusing to eat all of it,*
 336 *unless the onions are taken out."* (Melissa, mother; child low FF, age 4)

337 Parents also masked the taste of vegetables or paired a disliked vegetable with liked
 338 foods. For example, offering carrots with a new vegetable or with liked flavors such
 339 as gravy, sauce, cheese or dips. This is a modified stealth strategy since the pairing
 340 masks the taste/ texture of the vegetable but does not entirely hide the food.

341 Commercial vegetable products for very young children, often "hide" vegetable
 342 content. Some parents take advantage of this by offering readily available products
 343 such as vegetable smoothies or vegetable pouches to ensure that their children are
 344 eating enough vegetables:

345 *"He'll have one or two of the vegetables from [brand of baby food] ... so, the*
 346 *couple where you have fifty, forty-nine. Forty percent apple or pear and the rest*
 347 *is like sweet potato and carrots, or whatever, so he has them as... so we make*
 348 *sure that he is getting something the days he is not at nursery."* (Robert, father;
 349 *child high FF, age 2)*

An alternative to stealth or masking was offering vegetables in a different format (e.g. raw rather than cooked; or using different shapes). Talk around different ways to offer vegetables indicated a willingness by parents to experiment and to persist. Stealth, pairing and alternative formats provide evidence of the ways in which parents are willing to adapt to encourage intake, particularly taking account of previous experience of a food being refused, or disliked. Parents also reinforced eating vegetables by using rewards and verbal encouragements along with other strategies.

3.3.4. Theme 4: Reinforcement

Reward (food and non-food): using a liked food as an incentive to tempt children to eat vegetables was frequently reported by parents. Parents referred to both offering and withholding foods to encourage vegetable intake. Withheld foods tended to be highly prized such as dessert (see Heather, below). Parents acknowledged that this strategy was variable in success and risky (see Brittany).

“Now that he is a little bit older if he doesn’t sit down and eat it I’ll take things away from him. Like his tablet or the TV, so if you want to watch TV you need to eat some of your tea or if you want pudding you need to eat some of your tea.” (Heather, mother; child high FF, age 3)

“I think offering some sort of incentive sometimes can help, but then not going overboard with that because you don’t want them to just link “I’m eating the vegetables just to get a chocolate button at the end of it”, or whatever, cause I think that kind of goes against the point.” (Brittany, mother; child high FF, age 3)

373 On some occasions, parents would offer tangible rewards such as stickers or a gift
 374 and on others they might withhold access to the TV or computer. Nonetheless
 375 parents also identified the importance of praise (social reward).

376 Verbal encouragement: parents praised their child with comments after tasting
 377 vegetables using reinforcing comments such as 'nice', 'tasty', 'yummy' or
 378 encouraging the child by reminding them that they had tried and liked the vegetable
 379 before:

380 *"Certainly, one time when he did eat them was from quite a lot of persistence in*
 381 *terms of go on you can try this, you had this before, have a bit of this and this.*
 382 *I'll say well done, so say well done after he's tried it and that's reinforced it in a*
 383 *positive way." (Robert, father; child, high FF, age 2).*

384 *"She sometimes says she doesn't like tomatoes, but I'm like yes you do... you*
 385 *love tomatoes remember and she's like oh yeah." (Tiffany, mother; child low*
 386 *FF, age 3)*

387 Verbal praise, encouragement and reminders are used by parents to reinforce
 388 intake, but parents also gave children more autonomy over choices they could make
 389 to increase intake of vegetables.

390 3.3.5. Theme 5: Encouragement of Autonomy

391 Parents encouraged children to make their own food choices and to build autonomy
 392 more generally. Parents used negotiation, and choice to help children take more
 393 control over their choices.

394 Negotiation: offering small portions or smaller pieces as part of a negotiation to try a
 395 vegetable was a strategy used to prevent overwhelming children:

396 *"I think what tends to work is the portioning out, she does seem to appreciate*
 397 *that, I did it the other day and she quite like seeing on the plate visually okay I*
 398 *only need to eat that bit." (Brittany, mother; child high FF, age 3)*

399 Element of choice (or backup choice): providing 'an element of choice' or offering a
 400 variety also encourages autonomy:

401 *"If I offer her an element of choice, she'll generally eat something so if I say to*
 402 *her you've got dip do you want pepper or do you want cucumber with it, then*
 403 *generally she'll eat one of them, again I think it's about control and just having*
 404 *that choice and asserting herself." (Nicole, mother; child low FF, age 2)*

405 Child autonomy was important to the parents, but they often took the lead to ensure
 406 that they were supporting their children to eat vegetables.

407 3.3.6. Theme 6: Commitment to a Food Ideal (parent led)

408 Parents appeared to be committed to an ideal of food intake which included eating
 409 "enough" vegetables. They described modelling the target behavior themselves but
 410 that this ideal could be compromised by eating out of home.

411 Modelling: parents acknowledge the importance of their own eating habits (likes and
 412 dislikes) in shaping their child's intake and even invoke vegetable preferences of
 413 superheroes (see the quote below by Sarah).

414 *"I think one of the important things is to demonstrate to your child yourself that*
 415 *you will eat a wide range of vegetables, make them part of everyday meals."*
 416 *(Stephanie, mother; child low FF, age 4)*

417 *"We might say oh Spiderman likes this so, you know, superman eats spinach*
 418 *to make him strong. But, to be honest, I am not sure if that really works."*
 419 *(Sarah, mother; child low FF, age 4)*

420 Context dependent: parents recognized that context is also important in vegetable
 421 intake, so parents used opportunities outside the home to try new foods, for
 422 example, at a grandparent's house (e.g. Mathew), or restaurant or limiting choice for
 423 convenience (e.g. Shaheen).

424 *"So we usually go to my parents for a Sunday dinner, like Sunday evening and*
 425 *erm yeah I just kind of let that stuff be done there... coz they do all that kind of*
 426 *stuff anyway like they eat broccoli and sprouts and yeah cauliflower and stuff so*
 427 *yeah he has it there."* (Mathew, father; child low FF, age 5)

428 *"Like whenever I take her she's got her bag in the car and I'll just put fruit piece*
 429 *in there, apple, banana, so I won't put her favorites in there... and I'll say would*
 430 *you like apple, sometimes she'll say yeah mumma please yeah so she'll have it.*
 431 *So, it's not like she doesn't want it, she's fussed sometimes, especially at home*
 432 *when they know there is more choice there."* (Shaheen, mother; child high FF,
 433 *age 3)*

434 Persistence: parents continued to offer disliked vegetables and persisted in offering
 435 these vegetables (see the quote below by Tiffany):

436 *"I still put them on her plate even though I know she's not going to eat them,*
 437 *but I still put a few... you know like so if we're having a little bit of salad then I*
 438 *might put.... and then sometimes she'll eat a bit of the yellow pepper... so I still*
 439 *put a little tiny bit on her plate"* (Tiffany, mother; child low FF, age 3)

440 *"We haven't done it in a very consistent manner... we will always offer him*
 441 *something that we know that he's not going to eat, or we know that previously*
 442 *he's refused to eat... sometimes we are like ok put some here. I know some of*
 443 *the advice sort of says oh you consistently put a veg that he has never eaten*
 444 *before on his plate then eventually he will try it but I'm sort of skeptical. I'm*
 445 *skeptical about that advice... I think to be honest it's just, that's just a child*
 446 *getting older thing rather than getting acclimatized to broccoli."* (David, father;
 447 *child high FF, age 2)*

448 *"If you put stuff you know he doesn't like on his plate so if you put veg on a*
 449 *plate with some fish which he usually eats he might refuse the whole meal*
 450 *because he doesn't want the veg. So, some days we kind of give him like some*
 451 *fish and tomatoes first so he has eaten something and then we put the veg on*
 452 *afterward so at least he's getting's something."* (Robert, father; child high FF,
 453 *age 2)*

454 Persistence also had drawbacks (e.g. see the quotes above by David and Robert),
 455 but it is interesting to note that parents did not stop offering these nor did the parents
 456 mind occasional food waste. This suggests that they favor repeated experience over
 457 the potential for refusal or waste. Parents' commitment to the food ideal was often
 458 related to the inherent value placed on the importance of eating vegetables.

459 3.3.7. Theme 7: Inherent Values

460 Parents imply that eating vegetables is a "good thing", and that providing vegetables
 461 and expecting them to be eaten was something of value to strive for.

462 Provision of vegetables: parents appeared to value the provision of vegetables,
 463 especially parents of low food fussy children who provided a range of vegetables and
 464 other food experiences from complementary feeding encourage intake and mitigate
 465 the effects of food fussiness:

466 *“So, the freezer is stocked with broccoli and cauliflower and peas and*
 467 *sweetcorn and whatever else just because they... when they ask for it, I want to*
 468 *be able to provide that because actually asking for the vegetables is a really*
 469 *positive thing.” (Kathrine, mother; child low FF, age 3)*

470 *“I think offering as wide a range of foods as you can when your baby starts*
 471 *weaning is important... So, if you have a child who gets to the age of 5 for*
 472 *example who hasn't eaten very many vegetables then I think that will be really*
 473 *difficult to start them eating them whereas if you start off introducing them right*
 474 *from weaning, I think, even if they go through a fussy phase it's more likely that*
 475 *they'll eat a wider range of things.” (Stephanie, mother, child low FF, age 4)*

476 Boundaries: Parents set boundaries, but there was still concern about eating
 477 “enough” (see the quote below by Elijah)

478 *“I try not to get into the- if you don't eat that you can get this instead- because I*
 479 *think she needs to learn that vegetables are a normal part of life and you have*
 480 *to eat them as part of the balanced diet. So, I try not to sort of, well if you're not*
 481 *gonna eat that you can have a piece of toast instead because she will just go*
 482 *for the toast” (Nicole, mother; child low FF, age 2)*

483 *“Like I said, we tend to focus mostly on - is he getting enough to give him the*
 484 *energy for the day? So, if I mean if he's not touched his vegetables, at least*

485 *he's ate his potatoes, he's ate his rice. Erm and we're happy with that."* (Elijah,
 486 *father; child high FF, age 3)*

487 Parents balance the ideal that they hold in promoting vegetables with the reality of
 488 ensuring their child gets enough to eat.

489 **4. Discussion**

490 The present study found that parents used a wide variety of ways to encourage
 491 vegetable intake, but these did not differ markedly by level of child food fussiness. A
 492 consensus across parents was that strategies had variable success and parents of
 493 children with high food fussiness were more likely to report this. Methods varied from
 494 direct, didactic approaches to more implicit, incidental ways of learning and from
 495 reinforcement and encouragement to outright deception. The diversity of approaches
 496 reveals a willingness to experiment and to be persistent. Interestingly, evidence-
 497 based recommendations include repeated taste exposure, a point of intersection
 498 between what families do and what researchers investigate. These efforts appear to
 499 suggest that parents place a high value on eating vegetables as "a good thing".
 500 Overall, parents were instructive and deployed experiential learning, collaborative
 501 efforts, parent-led and child-responsive approaches underpinning an implied value in
 502 eating vegetables and an attempt to achieve a food ideal.

503 Investing in a food ideal such as eating vegetables may be informed by advice from
 504 outside agencies such as the Government including the five-a-day campaign.

505 However, mothers may distrust professional advice (O'Key & Hugh-Jones, 2010;
 506 Underwood, Pridham, Brown, et al., 1997; Zehle, Wen, Orr, & Rissel, 2007), since
 507 there is an obvious mismatch between guidelines, professional advice and what is

508 practical for parents (Rodriguez-Oliveros et al., 2014). In the present study, parents
509 sought out ways to offer vegetables to their children as something of value not
510 simply as a reflection of healthy eating guidelines. The value placed on eating
511 vegetables was a key motivator for persistence (Haines, Haycraft, Lytle, et al., 2019).

512 Most of the strategies reported by parents in the present study support those
513 identified in a previous study with caregivers of 2-5 year olds using focus groups
514 (Holley, et al., 2017a). For example, making vegetables available, hiding, masking,
515 engaging in fun activities, modelling, using rewards, different forms and compromise.
516 The present study complements previous research by revealing the extent of both
517 direct and indirect teaching parents engage in to encourage vegetable intake.

518 Parents use of deception or masking in order to ensure that children ate some
519 vegetables, further demonstrates that parents place an inherent value on achieving
520 an adequate vegetable intake, even if this means using covert action (Caton, Ahern,
521 & Hetherington, 2011; Holley, et al., 2017a; Spill, Birch, Roe, & Rolls, 2011).

522 However, if children are unaware of the presence of a particular vegetable, they may
523 then miss the opportunity to experience and familiarize themselves with the distinct
524 appearance, flavor and texture of the specific vegetables. As a result, they may be
525 less likely to develop a liking for the vegetables and less willing to eat them when
526 they are presented alone (Pescud & Pettigrew, 2014).

527 Parents were willing to model vegetable eating in the present study, and consistent
528 with (Holley, et al., 2017a) modelling is an important social factor and an effective
529 and feasible method (Holley, Haycraft, & Farrow, 2015; Remington, Aññez, Croker,
530 et al., 2012; Wardle, Cooke, Gibson, et al., 2003). However, this is predicated on
531 parents themselves buying and making accessible a range of vegetables to model

rather than only those which they themselves like. People other than parents can also be effective models. A qualitative research study with slightly older children (7-9 years) found that siblings and peers had both positive and negative effects on eating (Williams, et al., 2011).

Commitment to a food ideal and the inherent value parents place on eating vegetables may be linked to greater consumption of vegetables in preschool children (Romanos-Nanclares, Zazpe, Santiago, et al., 2018). A potential effect of “normalizing offering” (p.244, Holley, et al., 2017a), is that it increases familiarity with these foods and promotes willingness to eat novel vegetables (Caton, Ahern, Remy, et al., 2013; de Wild, de Graaf, & Jager, 2013; Holley, Farrow, & Haycraft, 2017b; Nekitsing, et al., 2018). In persisting with disliked vegetables, parents are applying a technique known to be effective in more systematic studies, namely repeated exposure.

In contrast, parents of food fussy children reported that they faced the risk that their child may refuse to eat an entire meal if they were persisted in offering disliked vegetables. Hence, repeated exposure is potentially aversive to some children, an unintended consequence of a well-intended strategy used by parents. A less aversive method of exposure may be to provide this in the form of visual exposure or through sensory play rather than with an expectation to taste the food (Coulthard & Sealy, 2017; Houston-Price, Owen, Kennedy, & Hill, 2019), a technique promoted by the Sapere method and Flavor School (DeCosta, et al., 2017; Hoppu, et al., 2015).

Finally, in combination with other strategies parents often used reinforcements such as verbal encouragement, confirming findings from other qualitative studies (Williams, Veitch, & Ball, 2011). For the older children in this latter study,

encouragement was through educational messaging and this was mirrored in the present study with younger children (2-5 years). Here, nutrition education was communicated in various ways, both purposively and incidentally. Teaching children about the importance of eating vegetables may change their attitude towards vegetables and this contributes to an increased intrinsic motivation to eat vegetables (Sarti, Dijkstra, Nury, et al., 2017). This is particularly important for sustained consumption of high nutrient dense foods and underscores the inherent value parents place on vegetable intake.

4.1 Strengths and Limitations

A strength of this study was replication of previous research demonstrating the variety of ways parents encourage vegetable intake at home. Some of these strategies mapped onto techniques used in systematic research, such as repeated exposure, reinforcement, instructive and incidental learning; and others which have not been systematically studied such as the relative efficacy of vegetables by stealth. This adds to the field but also highlights the importance of responding to individual differences. Overarching themes included the importance of a food ideal and the inherent value placed on eating vegetables. However, a limitation of the study was that participants may not be representative of the general population and so other parents may not hold this ideal nor place the same value on eating vegetables.

A methodological strength of the present study was inclusion of parents from diverse socioeconomic backgrounds, inclusion of fathers as well as mothers and parents of children with both high and low levels of food fussiness. This enabled comparison of methods across groups. Few differences in strategies implemented by parents with fussy eaters were observed, rather all parents interviewed were striving to

encourage vegetable intake. This finding confirms the need to offer support to parents which is evidence-based and informed by parental experience.

A limitation of the present study is that interviews may encourage participants to respond in a socially desirable manner. However, the risk of social desirability may have been attenuated by the interviewer also being a parent with a preschool child, therefore in a position to empathize with successes and challenges.

4.2 Implications for research and practice

Collective actions articulated by parents in the present study may help to advance future interventions aiming to increase vegetable intake in preschool children. Including parents in the design of future studies may increase their ecological validity and translation into practice. Since caregivers do seek out information on getting children to eat vegetables from various sources (e.g. people, books, television, online) involving parents in recommendations might reduce confusion and conflict (Holley, et al., 2017a) and improve trust in what is recommended (O'Key, et al., 2010). Evidence based guidelines to promote vegetable intake are needed which are compatible with common home practices, are inclusive of different child needs and relevant within diverse populations.

Conclusion

In conclusion, parental commitment to a food ideal, formulating vegetable intake as a “good thing” and involving children in vegetable related activities are key findings from this study. Parents used a combination of strategies, in rotation depending on circumstances and context. Strategies appeared to vary in success but were based on child needs and context. Therefore, parental involvement in ways to promote

603 vegetable intake is crucial for future interventions and for developing child feeding
604 guidance.

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Table 1 Examples of main questions asked during the semi-structured interview

Question Category	Example Questions
Opening questions (about them/ child)	<ul style="list-style-type: none"> • Please tell me little bit about yourself and what you do? • Tell me about your child, what are they usually like?
Fussy eating/ Strategies used during this period	<ul style="list-style-type: none"> • When I say the words “fussy eating” what do you think of? • I know it may be hard to remember, but what did your child do during these times and what did you do in response? • Which foods were your child fussy about and what was it about these foods they did not like? • How did you encourage your child to eat vegetables during this period?
General vegetable intake	<ul style="list-style-type: none"> • What sorts of vegetable do you generally eat in your household? • Do you keep track of how much vegetables your child eats? • Do you offer vegetables to your child that you do not eat?
Unfamiliar (novel or disliked) vegetable intake/ strategies used	<ul style="list-style-type: none"> • What sorts of vegetables do you NOT eat generally in your household? • Do you offer vegetables to your child which are new to them or they do not like? • How do you introduce these vegetables to your child? • How often (days/ weeks) and how many times would you offer a disliked or novel vegetable to your child before you decide to stop offering?
Dealing with vegetable refusal	<ul style="list-style-type: none"> • Tell me about vegetables (or foods) which your child refuses to eat • What do you usually do when your child refuses to eat their veg (or other food)? • Do you offer anything else when he/she refuses to eat their veg?
Closing questions (suggestions from their experience)	<ul style="list-style-type: none"> • From your experience, what advice would you give to other parents on ways to get their children to eat vegetables when they are going through food fussiness? • Would you like to share anything else about how to encourage children to eat a variety of vegetables or ways to deal with food fussiness?

Table 2 Characteristics of parents according to children's food fussiness level

Parent characteristics	High food fussy (children)	Low food fussy (children)	Overall
n (%)			
Parent sex			
Female (mother)	7 (70%)	9 (90%)	16 (80%)
Male (father)	3 (30%)	1 (10%)	4 (20%)
Parent age (years)			
25-35	7 (70%)	2 (20%)	9 (45%)
35+	3 (30%)	8 (80%)	11 (55%)
Ethnicity			
White British	8 (80%)	10 (10%)	18 (90%)
Black African	1 (10%)	0 (0%)	1 (5%)
Asian, Pakistani	1 (10%)	0 (0%)	1 (5%)
Highest education level			
GCSE or equivalent	0 (0%)	1 (10%)	1 (5%)
A Level or equivalent	4 (40%)	0 (0%)	4 (20%)
Undergraduate or equivalent	1 (10%)	5 (50%)	6 (30%)
Masters or equivalent	4 (40%)	3 (30%)	7 (35%)
PhD or equivalent	1 (10%)	1 (10%)	2 (10%)
Work hours (weekly)			
0	3 (30%)	0 (0%)	3 (30%)
1 -19	1 (10%)	0 (0%)	1 (5%)
20-29	1 (10%)	3 (30%)	4 (20%)
30-39	3 (30%)	7 (70%)	10 (50%)
39+	2 (20%)	0 (0%)	2 (10%)
Household income (per annum)			
< £16,000	2 (20%)	2 (20%)	4 (20%)
£16,000 - £29,999	3 (30%)	0 (0%)	3 (15%)
£30,000 - £59,999	2 (20%)	1 (10%)	3 (15%)
> £60,000	2 (20%)	7 (70%)	9 (45%)
I prefer not to say	1 (10%)	0 (0%)	1 (5%)
Other children			
Have other children	7 (70%)	7 (70%)	14 (70%)
Older children	5 (50%)	7 (70%)	12 (60%)
Younger children	3 (30%)	1 (10%)	4 (20%)

Table 3 Characteristics of children according to their food fussiness level and general demographic information

Child characteristics	High Food Fussy	Low Food Fussy	Overall
n (%)	10 (50%)	10 (50%)	20 (100%)
Child sex			
Girl	4 (40%)	7 (70%)	11 (55%)
Boy	6 (60%)	3 (30%)	9 (45%)
Child age (years)			
2	4 (40%)	1 (10%)	5 (25%)
3	5 (50%)	3 (30%)	8 (40%)
4	1 (10%)	5 (50%)	6 (60%)
5	0 (0%)	1 (10%)	1 (10%)
Preschool hours (weekly)			
0	3 (30%)	0 (0%)	3 (30%)
1-20	6 (60%)	2 (20%)	8 (80%)
21 – 39	1 (10%)	7 (70%)	8 (80%)
39+	0 (0%)	1 (10%)	1 (10%)
Eating Behaviours	Mean ± SEM		
Food Neophobia	3.0 ± 0.2	2.2 ± 0.1	2.6 ± 0.1
Food Fussiness ^a	3.6 ± 0.1	2.4 ± 0.1	3.0 ± 0.2
^a Score range from 1 – 5, score ≥ 3.0 is an indication of high food fussiness			