



# Parental feeding practices, food neophobia, and child food preferences: What combination of factors results in children eating a variety of foods?



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## ABSTRACT

Our aim was to describe food neophobia, parenting feeding practices, and concordance in food preferences between parent–child dyads using a cross-sectional on-line survey completed by parents of preschoolers (3–5 y). Respondents ( $n = 210$ ) included mothers (89%) who were predominantly white (85%) and college educated (64%). Most children (mean age =  $41.7 \text{ mo} \pm 14.9$ ), were perceived to be of a healthy weight (81%) and “good eaters” (60%). Parent ( $21.9 \pm 7.4$ ) and child food neophobia ( $30.4 \pm 8.8$ ) correlated significantly, though modestly ( $r = 0.14$ ,  $p = 0.04$ ). The parent practice of offering new foods to eat was inversely associated with child food neophobia ( $r = -0.40$ ,  $p < .0001$ ) and pressure to eat ( $r = -0.13$ ,  $p = 0.07$ ). Parent–child dyads had >75% concordance in preferences for whole grains, fruit, starchy vegetables, and dairy. Lowest concordance (39–66%) was noted for sweetened beverages and entrees. Discordance occurred when parents had never offered their children a food (e.g., vegetables), and was uninfluenced by demographic factors. A child’s food neophobia and overweight status was associated with the child having a lower consumption of vegetables. Parent reports of giving the child more control of food-related decisions was associated with a higher number of healthy foods rated as liked by a child. Similarities in parent–child food preferences may be related to food neophobia and, consequently, the foods parents offer their children. Educating parents on the potential impact of feeding practices may be important for early intervention efforts to improve children’s food acceptance.

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## 1. Introduction

Food preferences and eating patterns develop in early childhood and remain relatively stable through adolescence (Northstone & Emmett, 2008) and adulthood (Mikkilä, Rasanen, Raitakari, Pietinen, & Viikari, 2005). Therefore, early childhood may represent a sensitive window of development for establishing good eating practices and healthy food preferences that could potentially impact an individual’s lifelong health. Known factors impacting the development of a child’s food preferences include parental characteristics such as parental feeding practices, parents’ own childhood eating experiences, and caregiver’s food neophobia (fear of trying new foods) (Birch, 1999; Fletcher, Branen, & Lawrence, 1997; Ventura & Birch, 2008; Vereecken, Rovner, & Maes, 2010),

as well as a child’s own food neophobia (Fletcher et al., 1997; Ventura & Birch, 2008).

The influence of parents and their behaviors surrounding eating and food choices (Bova & Arcidiacono, 2014) suggests that parents play a key role in shaping a child’s food preferences and eating patterns (Gregory, Paxton, & Brozovic, 2011). Parental feeding practices that influence children’s development of food preferences and intake patterns include modeling, restriction of foods, and pressuring a child to eat (Birch, 1999; Vereecken et al., 2010). Specifically, pressuring a child to eat is negatively associated with food acceptance (Birch & Marlin, 1982; Newman & Taylor, 1992), may negatively impact overall diet quality (Scaglioni, Salvioni, & Galimberti, 2008), and has been found to be a significant mediating factor between maternal feeding beliefs and food neophobia (Cassells, Magarey, Daniels, & Mallan, 2014). Alternatively, parental modeling of healthy eating has been shown to correlate with lower rates of children’s picky eating (Gregory, Paxton, & Brozovic, 2010). Furthermore, parents’ influence on a child’s diet via the foods they make available in the environment and the practices they use to offer foods to their children may also contribute to

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a child's own development of food neophobia which in turn can further impact the child's food preferences and healthy eating choices (Boles et al., 2014).

Food neophobia has been linked to the development of food preferences and in turn, limited diet variety (Howard, Mallan, Byrne, Magarey, & Daniels, 2012). Food neophobia has also been linked to both environmental and genetic (maladaptive trait) determinants (Cooke, Haworth, & Wardle, 2007; Dovey, Staples, Gibson, & Halford, 2008; Faith, Heo, Keller, & Pietrobelli, 2013). The individual level characteristics of child food neophobia has been shown to significantly shape a child's early food preferences and dietary intake (Cassells et al., 2014; Fletcher et al., 1997; Ventura & Birch, 2008; Laureati et al., 2015; Russell & Worsley, 2008; Johnson, Davies, Boles, Gavin, & Bellows, 2015), and also lessen a child's overall enjoyment of food which can in turn affect food choices (Mustonen, Oerlemans, & Tuorila, 2012). Studies have reported significant concordance rates between children's and parents' (mainly mothers') food neophobia (Galloway, Lee, & Birch, 2003), further implicating the potential genetic link between parental factors, such as parental food neophobia in the development of child eating behaviors and preferences. In one study, mothers who reported higher food neophobia scores were less likely to offer healthy foods to their children (Cooke & Wardle, 2005; Skinner, Carruth, Wendy, & Ziegler, 2002). Yet in another study, mothers who scored high for food neophobia were found to use more restriction in feeding and less monitoring (Tan & Holub, 2012). In turn, these parental feeding practices have been associated with food neophobia in children (Tan & Holub, 2012; Vereecken et al., 2010). Children with food neophobia have been reported to consume a limited variety of foods (Cooke, Carnell, & Wardle, 2006; Howard et al., 2012) and in general eat fewer servings of vegetables compared to children who do not have food neophobia (Birch, 1999; Dovey et al., 2008; Galloway et al., 2003; Laureati et al., 2015). Therefore, parental characteristics such as food neophobia, feeding practices, and the child's own food neophobia could ultimately influence children's weight status.

Parental pressure to eat and restriction, have been associated with child weight (Boles, Reiter-Purtill, & Zeller, 2013; Brown & Lee, 2011; Gregory et al., 2010; Haszard, Williams, Dawson, Skidmore, & Taylor, 2013; Ventura & Worobey, 2013), suggesting that in addition to contributing to the development of poor dietary patterns, parent feeding practices may also predispose children to weight issues early in life. Parents' restriction in feeding has been reported to be associated with larger perceived infant size while pressuring to eat has been associated with smaller perceived infant size (Brown & Lee, 2011). These findings suggest that the association between parental perceptions of children's weight and their child feeding practices begin early in life and may have important implications for the development of children's food preferences and their dietary intakes. The potential pathway between parental feeding practices and development of child food neophobia, and food preferences, warrants investigation into which elements of parental and child behavior within this pathway have the most significant impact on the outcome of child food preferences.

To date, the majority of studies examining the influences of parental feeding practices and children's food acceptance have only examined individual factors (e.g., pressuring to eat), without simultaneously accounting for other potential factors such as parent food related history and traits, multiple parental feeding practices, child food neophobia, and parent and child food preferences. To examine the relative contribution of parental characteristics (including the heritability of food neophobia), feeding practices, and child neophobia to child food preferences, this study aimed to: (1) describe food neophobia and parental feeding practices in parent-child dyads; (2) assess concordance between parent-child food preferences; (3) examine the relationship between parental

feeding practices, child food neophobia with overall child food preferences using a proposed theoretical model (Fig. 1); and (4) identify characteristics (e.g., feeding practices, food neophobia) associated with a child eating healthy foods including vegetables, fruits, and core food items.

## 2. Methods

### 2.1. Participants

University email listservs (Metropolitan State University of Denver, CO and University of Colorado Anschutz Medical Campus, Aurora, CO) were used to recruit parents of preschoolers (3–5 years). Participants included in this study ( $N = 210$  parent-child dyads) were those parents who responded to recruitment emails and consented to completing an online survey to assess feeding practices and child food preferences. This study was approved by the Colorado Multiple Institutional Review Board (COMIRB) under the exempt category and therefore all participants were deemed consented if they volunteered to submit the survey. Study data were collected and managed using the REDCap electronic data capture tool hosted at the University of Colorado (Harris et al., 2009).

### 2.2. Measures

An online Research Electronic Data Capture (REDCap) (Harris et al., 2009) survey was developed using several validated instruments to collect information regarding variables of interest (food neophobia, food preferences, parental feeding practices, and demographic information).

Food preferences for 80 food items were assessed for both adults and children, using a shortened version of Skinner et al. list of foods (Skinner et al., 2002). To avoid over-burdening participants, a branching logic was used to assign 40 foods that represented food from all food groups: girls were assigned one set of 40 foods and boys were assigned another 40 foods. The number of foods assessed ( $n = 40$ ) was balanced between boys and girls to ensure all food groups were accounted for using equal numbers of food options (see food list in appendix). Specifically, child food preferences were measured by asking parents to report their child's "liking" for the foods. Each item was evaluated on a 5 point Likert-like scale (1 = like and eat, 2 = like and do not eat, 3 = dislike and eat, 4 = dislike and do not eat, and 5 = never tasted/I have never offered this food to my child) (Skinner et al., 1998). By design, the questionnaire randomly selected 40 food items for a child depending on gender; hence the analysis was conducted separately for boys and girls. Adult and child food neophobia were assessed using the adult and child versions of the food neophobia scale (FNS; test-retest reliability ranged from  $r = 0.82$ – $0.91$ ) (Pliner, 1994; Pliner & Hobden, 1992). Parents responded by their level of agreement (scale 1–5) to specific statements (e.g. "My child is constantly sampling new and different foods" and "If my child doesn't know what is in a food, my child won't try it"). These instruments have been shown to have satisfactory test-retest and internal reliability. Possible scores ranged from 10 to 50, with a higher score indicating greater food neophobia.

Parental feeding practices were measured using the Child Feeding Questionnaire (CFQ-CO), an instrument that combines the original CFQ by Birch and colleagues (2001; Cronbach's  $\alpha = 0.70$ – $0.92$ ) with three new constructs added for this study (Birch et al., 2001). The constructs included pressure to eat (from the original CFQ) and three added constructs, Child Autonomy (giving the child control over food-related decisions), Parent Offering Child New Foods, and Parent Urging of New Foods.

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