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A Functional Approach to Feeding Difficulties in Children

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Abstract

Purpose of Review This review provides an approach for resolving a variety of feeding difficulties in children, ranging from normal eating behavior that is misperceived as a problem to substantial feeding disorders.

Recent Findings Criteria to identify pediatric feeding disorders have been thoroughly addressed in the newly established designations of avoidant restrictive food intake disorder (ARFID) and pediatric feeding disorder (PFD). These diagnostic criteria improve the accuracy of identifying, classifying, and managing significant feeding disorders in young children.

Summary While recent definitions of feeding difficulties are particularly appropriate in multidisciplinary settings, in this paper, we advocate for a progressive approach of managing feeding problems in all clinical settings. It begins by identifying red flags indicative of serious threats to the child, screening for oral motor dysfunction, stabilizing nutrient intake, and eliminating aversive feeding practices. The next step, if eating behavior does not improve, involves strategies that target specific eating behaviors and parental feeding styles. In severe or resistant cases, referral to specialists or interdisciplinary feeding teams is advised.

Keywords Feeding disorder · Food selectivity · Poor appetite · Fear of feeding · Picky eating

Introduction

In this review, we present an approach for medical providers to utilize when faced with parents who have difficulty feeding their children. Problems range from parents misperceiving their child's appropriate feeding responses to serious physical or mental impairments that require tube feeding. Two distinct conceptual frameworks have recently yielded working definitions of what constitutes a 'feeding disorder' in children [1, 2••]. Because the act of feeding is complex, numerous issues can disrupt its execution, which necessitate broad definitions covering a wide spectrum of problems. Although many children with feeding difficulties require interdisciplinary care, where complex aspects of feeding are addressed in an integrated fashion [3], it may not be necessary in all cases. Our approach emphasizes management of all feeding difficulties, mild to severe, across clinical settings. We suggest a stepwise progression that not only identifies red flags leading to prompt referral in severe cases but also introduces a systematic way to initiate care in milder instances. Interventions move from short-term goals developed at the first visit to more targeted strategies related to eating/feeding behavior and eventually to complex interdisciplinary coordination of care when necessary. A stepwise progression is important, because while 25 to 50% of young children are reported to have feeding difficulties [4, 5], only about 10% of them are severe enough to require intensive intervention [5, 6]. Using a stepwise approach ensures that feeding problems are not overlooked or inappropriately treated.

In 2013, a consensus group of mental health professionals proposed diagnostic criteria for feeding disorders in young children, which they termed avoidant restrictive food intake disorder (ARFID) [1]. ARFID is defined as an eating/feeding disturbance in which children cannot maintain normal

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nutrition and exhibit food selectivity, poor appetite, or fear/anxiety about eating that is not related to cultural feeding practices, food scarcity, abnormal body/weight image, or a concurrent medical or mental condition [1, 4]. ARFID is distinguished from less consequential feeding concerns when children display at least one of four criteria: weight loss or poor growth, nutrient deficiency, dependence on oral or enteral supplements, or significant psychosocial dysfunction.

More recently, an interdisciplinary consensus group broadened the definition of pediatric feeding disorders (PFD) to include feeding problems associated with medical comorbidities and developmental delay. This consensus group defines PFD as "impaired oral intake that is not age appropriate and is associated with medical, nutrition, skill, or psychosocial dysfunction" [2••]. The authors stipulate that feeding problems are disorders if they involve at least one functional domain (medical, nutrition, skill, or psychosocial) and persist longer than 3 months [2••]. While both consensus statements also encourage assessing the parent and child and the use of interdisciplinary teams for integrated care, they differ in several important ways [1, 2••]. ARFID criteria emphasize eating behaviors, in particular food selectivity, poor appetite, and fear of feeding/eating while diminishing the role that medical or psychological comorbidities play in feeding problems. PFD criteria, on the other hand, de-emphasize specific types of eating behaviors and include feeding difficulties associated with medical problems or delayed development. They also define feeding disorders so broadly that treatment distinctions between mild, moderate, or severe are not clear. Our approach examines specific eating behaviors within the four domains specified by the PFD consensus group.

A Stepwise Approach to Feeding Difficulties

Feeding difficulties take time to resolve and are best managed in progressive phases, in which evaluation leads to a series of short-term goals while emphasizing long-term objectives. In the initial phase, the first priority is to identify conditions that pose serious threats to children, or "red flags," in each domain (medical, nutritional, developmental, and psychosocial) [2••]. In addition, screening the child's oral motor development, stabilizing nutrient intake, and eliminating aversive parental feeding practices are important at this time (see Table 1).

Red flags, listed in Table 1, the most pressing of which include aspiration, dysphagia, severe growth failure, or frank nutrient deficiencies, require immediate attention, which may include additional testing and interdisciplinary intervention [7]. Aside from dysphagia and aspiration, signs related to oral motor delay, listed in Table 1, will prompt referral for an oral motor evaluation [2••, 8]. Age-appropriate mastery of feeding milestones is of particular concern; these milestones include eating pureed foods and removing food from a spoon (4 to 7 months); eating soft table foods (8 to15 months); and drinking from a cup and eating foods requiring chewing (8 to 18 months) [9, 10]. Nutrient stabilization involves appropriate recommendations for supplemental calories or nutrients [11, 12], as suggested in Table 1. Aversive feeding practices include pressuring or forcing a child to eat and are identified by asking parents how they respond to their child's food refusal, or by observing feeding interactions [7]. Feeding guidelines, such as those listed in Table 1, help to discourage aversive feeding practices [13]. A parent's perception of their child's eating behavior is not always accurate, and feeding problems may be misperceived in as many as 17% of children evaluated for feeding issues [14, 15]. Parents often have unrealistic expectations of a child's growth potential or ability to consume specific foods at various ages, resulting in the perception of poor appetite or selectivity. The consequence of this is anxiety, which drives parents to engage in inappropriate feeding practices that promote eating problems [7, 15]. Reviewing feeding

Table 1 First step to managing feeding difficulties

Look for "red flags" [7]	Signs of impaired oral development [2, 8–10]	Stabilize nutrient intake [11, 12]	Feeding guidelines to limit aversive feeding practices [7]
• Dysphagia • Aspiration • Apparent pain with feeding • Vomiting and diarrhea • Developmental delay • Chronic cardio-respiratory symptoms • Growth failure • Frank nutrient deficiencies • Force feeding	• Excessive drooling • Poor postural control • Low or high muscle tone • Excessive gagging or choking • Failure to advance textures • Difficulty with feeding milestones • Difficulty managing food or liquid in mouth	• Supplemental calories for growth failure • Multi-nutrient supplement for limited dietary variety • Single nutrient supplementation for documented deficiency	• Avoid mealtime distractions • Maintain pleasant neutral attitude while feeding • Limit meal duration • Provide 4–6 meals/snacks a day with water in between • Serve age-appropriate foods • Systematically offer new foods (8–15 times) • Encourage self-feeding • Tolerate age-appropriate mess

guidelines with parents may prevent these issues from developing.

In two to 4 weeks after the initial evaluation, if feeding or growth problems do not improve, more specific interventions tailored to the particular child's eating behavior and parental feeding style are necessary. Most feeding problems in young children are associated with three predominant eating behaviors, the most common of which are food selectivity (picky eating), poor appetite, and fear of feeding [1, 16]. Less common eating behaviors, such as rumination (repeated regurgitation) and pica (eating of non-food items), may also impact oral intake, but are rare [4]. Some children exhibit more than one problematic eating behavior, and the contribution of each to feeding dysfunction should be assessed. In addition, caregivers generally feed children using a particular feeding style, for instance, responsive (responding to child's cues), controlling (overriding child's cues), indulgent (catering to child's desires), or neglectful (unaware of child's cues) [17]. Identifying the interaction between the child's eating behavior and the parent's feeding style is helpful in developing a therapeutic strategy.

Food Selectivity

Selective or picky eaters reject specific types of food, both familiar and unfamiliar, often refusing more foods than they accept [18]. In particular, they tend to reject fruits, vegetables, and meat, resulting in diets with minimal fiber and limited variety [18, 19••]. Increased sensory sensitivities related to the taste, texture, or odor of food are common in picky eaters [20, 21] and may indicate more severe selectivity related to sensory processing issues, particularly when sensitivity generalizes to light, sound, or touch [16]. Selectivity and neophobia, the rejection of new foods, are related concepts that have evolved over time, with subtle but important distinctions. While both behaviors are often transient and part of normal development, picky eating likely represents a more extreme form of food restriction that may be influenced to a greater extent by the eating environment than by intrinsic temperamental traits [22, 23].

Depending on how picky eating is defined and measured, it occurs in as few as 5% and as many as 59% of children in the general population and accounts for approximately 2/3rds of children identified as having feeding problems [14, 18, 24]. Food selectivity begins at one to 2 years of age, when solids are incorporated into the diet, and peaks at around 6 years of age. For most children, it is a transient eating behavior, resolving by school age, but it may persist in as many as 22% of cases [25, 26]. The frequency and severity of selectivity is higher in children with neurodevelopmental disorders such as autism spectrum disorder (ASD), fragile X syndrome, or other disorders associated with sensory processing dysfunction and is less transient in such children [27, 28].

Interventions for Food Selectivity

Targeted interventions for selective eating go beyond general feeding guidelines by specifying certain foods and procedures with the goal of expanding diet variety, while supporting the child nutritionally. Most selective children grow normally [29, 30] but may require micronutrient supplementation, notably vitamin D, vitamin E, calcium, iron, and zinc [30–32]. In highly selective children, evaluating serum levels of 25-hydroxyvitamin D, zinc, iron, ferritin, and other anemia indices may be beneficial. Growth is impacted in about 5% of cases of selectivity [33], and Volger et al. [34] observed that these children consumed about 25% fewer calories than the dietary reference intakes (DRI) for age, which translates to approximately 200 to 300 cal a day.

To address mild to moderate selective eating behavior/neophobia, strategies that improve acceptance of foods include frequent exposure to new foods, parent modeling with subtle encouragement, and familiarizing children with foods through touch and play [35–38]. When food selectivity is severe, especially when accompanied by other sensory sensitivities, sensory integration and/or behavior therapy are often required [39••, 40]. Sensory integration or "desensitization" involves a gradual advancement of texture through a series of small steps [39••, 40, 41]. Behavioral therapy, on the other hand, utilizes a variety of techniques to reinforce food acceptance while decreasing maladaptive food refusal [39••, 42]. Two particularly useful behavioral techniques for food selectivity are "food chaining" or fading, in which liked foods are gradually replaced by disliked foods with similar characteristics, or shaping, in which the volume or texture of food offered is progressively increased [39••,43]. These techniques often require assistance from specialists.

Poor Appetite

Children with poor appetite rarely demonstrate a desire to eat, exhibit early satiety [44], and typically consume inadequate quantities of food to support normal growth [7, 42]. Poor appetite is less common than selectivity and accounts for about 25% of feeding problems in a primary care setting [14]. Poor appetite in children develops in several ways that impact presentation and treatment. First, because of the physiological complexities of appetite control [45], a multiplicity of medical conditions, particularly those featuring intense inflammation, hormonal dysregulation, and metabolic disturbance, can adversely affect appetite. Second, poor appetite is frequently associated with neglect or food deprivation, particularly in certain populations or geographical regions. Chronically poor intake diminishes appetite, resulting in a child who is often lethargic, inactive, and disengaged [7]. In stark contrast, a substantial number of children intrinsically have poor appetite regulation. Chatoor et al. [46], labeling

the behavior "infantile anorexia," (although it also occurs in older children) characterized these children as socially engaged, very active, disinterested in eating, and in continual conflict with their parents over meals. While this group also experiences growth failure, they are usually less malnourished, show less severe caloric deficits, and experience no cognitive impairment [7, 46]. Last, suppressed appetite may be iatrogenic, occurring in children who are tube fed or taking appetite-suppressing medication [47]. Distinctions between underlying causes of depressed appetite inform necessary interventions to improve appetite.

Interventions for Poor Appetite

Fundamentally, interventions for poor appetite focus on enhancing hunger/satiety cycles while ensuring adequate nutrition for growth, and, when appropriate, involve the treatment of an underlying condition. Increases in energy intake and other nutrients are necessary for most children with poor appetite [7, 12, 16]. While energy requirements vary between children, an additional 100 to 300 cal a day is a good place to start supplementation, using either high-calorie/energy fortified foods or high-calorie liquid supplements (HCS). Table 2 illustrates the caloric content of foods commonly consumed by young children that can be offered to increase calories [48]. If HCS or other high-calorie beverages are used, they should be given at the end of the day and phased out when no longer necessary, so as not to displace foods eaten at meals [11, 49]. Children with poor appetite have been conditioned to low volumes of intake, making incremental increases in caloric supplementation better tolerated than larger abrupt increases (Table 2).

The underlying cause of appetite suppression directs selection of the type of behavioral management. In particular, the vigorous healthy child with poor appetite requires behavioral approaches that occur in the context of clearly recognizable hunger/satiety cycles. Before behavior therapy begins, meals and beverages need to be scheduled to maximize hunger with a minimum of 3 hours between feedings and nothing but water in the interim [7, 16]. Verbally describing the sensation of hunger and fullness may improve children's ability to regulate intake, as illustrated by Johnson [50], who utilized doll play to conceptualize hunger and satiety sensations. Other behavioral approaches, specifically "shaping," where bite size or the volume of food consumed is gradually increased and reinforced, are also effective [39••]. However, while rewards may initially increase interest in eating, they need to be phased out to allow for internal regulation of appetite [51].

Appetite stimulants (cyproheptadine and megestrol) have been successfully used in poorly growing children, resulting in improved weight for age *z*-scores in the short term (two to 3 months) [52, 53]. In particular, retrospective studies and case reports of children with feeding difficulties indicated improvement in both weight gain and eating behaviors when cyproheptadine was used intermittently at levels of 0.25 m/kg/day in split doses [54, 55]. The advantage of using these medications with feeding difficulties may go beyond the appetite stimulatory effect, by potentially diminishing discomfort associated with functional gastrointestinal disorders that may contribute to poor intake in children [56••].

Fear of Feeding

Children with fear of feeding refuse to eat out of fear of discomfort, not because of a lack appetite. The classical presentation of this behavior is well documented in older children who display an abrupt refusal to eat solids and occasionally liquids, following a traumatic experience, such as choking, vomiting, nausea, gagging, or gastrointestinal discomfort [4, 16, 57]. An important characteristic of this condition is the extreme emotional response associated with food refusal, including screaming, angry outbursts, or protracted silence [58],

Table 2 Calorie content of foods [48]

Foods providing ~ 240 cal	Foods providing ~ 100 cal	Additives providing ~ 50 cal
• 8 oz HCS	• 1 slice cheese	• 1 and 1/2 teaspoon butter, margarine or oils
• 13 oz whole milk	• 1 scrambled egg	• 1 tablespoon jam or jelly
• 16 oz fruit smoothie	• 13 oz almond milk	• 1 tablespoon ranch dressing
• 18 oz soy milk	• 1 medium banana	• 1 tablespoon cream cheese
• 8 oz yogurt with fruit	• 1 waffle or pancake	• 2 tablespoon sour cream
• 2 and 1/2 tablespoon peanut butter or other nut butter	• 1 granola bar	• 1 tablespoon honey or maple syrup
• 8 oz ice cream	• 2 small meatballs	• 2 tablespoon coconut milk
• 5 oz mashed avocado	• 2 chicken nuggets	
• 8 oz mashed sweet potato	• 6 oz canned fruit	
• 1 medium blueberry muffin	• 4 oz sweetened applesauce	

followed by strategies to avoid swallowing such as prolonged chewing, pocketing food in cheeks, and hiding or discarding food [57]. The presentation in infants and non-verbal young children is different. Younger infants and children cry and recoil from bottles, nipples, or spoons and usually reject liquids [4, 16] Clinical conditions that result in pain or discomfort with feeding, as well as uncomfortable medical procedures such as nasogastric tube placement, suctioning, syringe feeding, surgery, or other oro-facial manipulations, may contribute to eating anxiety in children of all ages [7]. Fear of feeding is the least common feeding difficulty, and while prevalence data on choking phobia is lacking [57], fear of feeding in young children accounts for 1% of cases in a primary care setting [14].

Interventions for Fear of Feeding

Reducing anxiety is paramount for children to overcome their fear of eating. Changing the feeding environment, using alternate feeding equipment, and using anxiolytic medications are key strategies to accomplish this goal [42, 58]. For instance, in the young child, eating in a different place, sitting in a different chair, or using alternate feeding utensils help to diminish negative associations with past feeding experiences [14]. Play therapy with food is particularly helpful, along with behavioral therapies that sequentially increase contact with foods followed by praise or rewards as reinforcement [42, 59, 60]. For older children, counseling is often beneficial, particularly when the origin of the problem and actual risk associated with eating are explained [7, 16]. In the anxious child, behavioral therapies also have a role when focused on non-threatening incremental steps that are incentivized. For example, gradually advancing texture while rewarding the child for each advancement with stickers, "courage points," or a desired object or activity is often beneficial [16, 42]. Young infants with fear of feeding are particularly challenging because they refuse to take the breast or bottle, which is their sole source of nutrition. Chatoor [16] suggests feeding these children as they are falling asleep and are in a "twilight zone," when protective reflexes are in place but there is less resistance to taking the bottle. While "sleep feeding" may be effective, it is important to be aware that infants with persistent distress or developmental delay need to be evaluated by oral motor therapists. Other useful strategies with infants who are fearful of eating include cup sipping [61] and introduction of solid foods as soon as developmental readiness is evident (around 4 months of age).

Parental Feeding Styles and Practices

A responsive feeding style is the ideal feeding approach for parents and is characterized by appropriate reactions to children's feeding cues. This means honoring both rejection and acceptance of food, allowing children to self-feed, setting reasonable limits, modeling eating, and choosing age-appropriate healthy foods [17]. When parents are anxious about a child's weight or intake, they tend to use controlling or indulgent feeding strategies, such as physical prompts, coercive tactics (bribes, rewards), force-feeding, and other pressuring techniques [15, 62–64]. Controlling feeders are apt to use pressure, while indulgent feeders cajole and pander to children's demands [17]. These non-responsive practices are often initially successful, but ultimately result in greater selectivity and/or less food consumption in the long term, prolonging or exacerbating feeding problems [13, 65]. Coercive feeding practices also result in stressful, challenging, emotionally charged mealtimes that are full of conflict, reinforcing negative associations with eating [62]. Conflict during feeding has been theorized to be related to the behavioral and psychosocial dysfunction associated with feeding difficulties, such as behavioral or emotional disorders [66–68]. Jacobi et al. evaluated adolescents who had been picky eaters as young children and noted that they had few nutritional deficits but significant psychosocial problems that correlated with levels of conflict surrounding eating [67].

When parents are extremely anxious, removing their sense of responsibility for weight gain or food intake is helpful [59]. This is accomplished by monitoring children closely, supporting them with supplements, and redirecting parents to focus on when to feed, where to feed, and how to offer foods, instead of on the amount of food consumed [69]. Redirection involves selecting the most applicable feeding guidelines (listed in Table 1) for each parent/child dyad. For instance, a controlling parent might be encouraged to work on offering a variety of foods, allowing the child to self-feed and practicing modeling, while an indulgent parent would be guided to adhere to a meal schedule, to avoid preparing special foods, and to limit juice and milk between meals. Even more extensive intervention might be necessary with a neglectful parent not only including structured meal times and use of age appropriate foods but also having alternate caregivers feed the child until the parent is able to engage more effectively.

Interdisciplinary Management of Feeding Difficulties

When feeding problems are complex or are difficult to resolve, referral for specialized care is essential. This can take the form of specialists with expertise in a particular area or an entire interdisciplinary team. There are many descriptions in the literature of how these teams function and the role each member plays, which vary between feeding programs [3, 70, 71]. However, a recent systematic review suggests three important standards for integrated care of severe feeding problems: involvement by specialists representing all four domains, a central role for behavioral interventions, and caregiver participation [72]. Evidence from the same review found

overall reductions in tube feeding, increases in oral intake, improvement of eating behavior, and reductions in parental stress as a result of interdisciplinary intervention [72].

Conclusion

In their rational for a comprehensive definition of feeding disorders, Goday et al. note that feeding requires the integration of multiple organ systems and prompts us to consider medical, nutritional, skill, and psychosocial issues as well as the caregiver/child interaction in evaluating problems [2••]. This complexity leads the authors to conclude that ideally specialists, often part of interdisciplinary feeding team, should see these children. However, they correctly observe this is not always possible or practical. We believe that many children reported to have feeding issues can initially be managed in the primary care setting if the provider is alert to red flags mandating more specialized intervention and if a systematic approach to management is adopted. Consideration of the differential diagnosis of the three primary feeding behaviors associated with ARFID [1]—selectivity, poor appetite, and fear of feeding—coupled with an analysis of caregiver feeding style allows for the establishment of short-term goals within the context of long-term objectives. If short-term goals are not met with improvement in eating behavior or other outcomes within 3 months, as Goday et al. suggest [2••], more targeted approaches or additional help from specialists will be needed.

Compliance with Ethical Standards

Conflict of Interest Kim Milano and Irene Chatoor report receiving honoraria from Abbott Laboratories for speaking at conferences related to feeding difficulties and disorders. The other author declares that there is no conflict of interest. Benny Kerzner carried out a clinical study 5 years ago to assess the ability of pediatricians to correctly classify young children with feeding problems in the office setting. The study was funded by Abbott Laboratories.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

References

Papers of particular interest, published recently, have been highlighted as:
•• Of major importance

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-5®). American Psychiatric Pub; 2013 May 22.
2.•• Goday PS, Huh SY, Silverman A, Lukens CT, Dodrill P, Cohen SS, et al. Pediatric feeding disorder: Consensus definition and conceptual framework. J Pediatr Gast Nutr. 2019;68(1):124–9 **Provides interdisciplinary consensus on the definition of and criteria for identifying pediatric feeding disorders not related to distortions in body image or weight concerns.**
3. Silverman AH. Interdisciplinary care for feeding problems in children. Nutr Clin Pract. 2010;25(2):160–5.
4. Bryant-Waugh R, Markham L, Kreipe RE, Walsh BT. Feeding and eating disorders in childhood. Int J Eat Disord. 2010;43(2):98–111.
5. Aldridge VK, Dovey TM, Martin CI, Meyer C. Identifying clinically relevant feeding problems and disorders. J Child Health Care. 2010;14(3):261–70.
6. Kerwin ME. Pediatric feeding problems: a behavior analytic approach to assessment and treatment. Behav Anal Today. 2003;4(2):162–75.
7. Kerzner B, Milano K, MacLean WC, Berall G, Stuart S, Chatoor I. A practical approach to classifying and managing feeding difficulties. Pediatrics. 2015;135(2):344–5.
8. Kleinert JO. Pediatric feeding disorders and severe developmental disabilities. Semin Speech Lang. 2017;38(2):116–25.
9. Carruth BR, Ziegler PJ, Gordon A, Hendricks K. Developmental milestones and self-feeding behaviors in infants and toddlers. J Am Diet Assoc. 2004;104:51–6.
10. Morris SE, Klein MD, Klein DM. Pre-feeding skills: a comprehensive resource for mealtime development. New York: Academic; 2001.
11. Hojsak I, Bronsky J, Campoy C, Domellöf M, Embleton N, Fidler Mis N, et al. Young child formula: a position paper by the ESPGHAN committee on nutrition. J Pediatr Gast Nutr. 2018;66(1):177–85.
12. Golden MH. Evolution of nutritional management of acute malnutrition. Indian Pediatr. 2010;47(8):667–78.
13. Finnane JM, Jansen E, Mallan KM, Daniels LA. Mealtime structure and responsive feeding practices are associated with less food fussiness and more food enjoyment in children. J Nutr Educ Behav. 2017;49(1):11–8.
14. Benjasuwantep B, Chaithirayanon S, Eiamudomkan M. Feeding problems in healthy young children: prevalence, related factors and feeding practices. Pediatr Rep. 2013;5(2):38.
15. Byrne R, Jansen E, Daniels L. Perceived fussy eating in Australian children at 14 months of age and subsequent use of maternal feeding practices at 2 years. Int J Behav Nutr Phys Act. 2017;14(1):123.
16. Chatoor I. Diagnosis and treatment of feeding disorders in infants, toddlers, and young children. Washington, DC: Zero to Three; 2009.
17. Hughes SO, Power TG, Fisher JO, Mueller S, Nicklas TA. Revisiting a neglected construct: parenting styles in a child-feeding context. Appetite. 2005;44(1):83–92.
18. Taylor CM, Wernimont SM, Northstone K, Emmett PM. Picky/fussy eating in children: review of definitions, assessment, prevalence and dietary intakes. Appetite. 2015;95:349–59.
19.•• Gibson EL, Cooke L. Understanding food fussiness and its implications for food choice, health, weight and interventions in young children: the impact of professor Jane Wardle. Curr Obes Rep. 2017;6(1):46–56 **Excellent review of the contribution genetics, environment, and parental feeding practices has on food selectivity and neophobia and the resulting impact these factors have on children's food choice and preferences.**
20. Farrow CV, Coulthard H. Relationships between sensory sensitivity, anxiety and selective eating in children. Appetite. 2012;58(3):842–6.
21. Nederkoorn C, Jansen A, Havermans RC. Feel your food. The influence of tactile sensitivity on picky eating in children. Appetite. 2015;84:7–10.
22. Dovey TM, Staples PA, Gibson EL, Halford JC. Food neophobia and 'picky/fussy'eating in children: a review. Appetite. 2008;50(2–3):181–93.

23. Elkins A, Zickgraf HF. Picky eating and food neophobia: resemblance and agreement in parent/young adult dyads. Appetite. 2018;126:36–42.
24. Williams KE, Riegel K, Kerwin ML. Feeding disorder of infancy or early childhood: how often is it seen in feeding programs? Child Health Care. 2009;38(2):123–36.
25. Cardona Cano S, Tiemeier H, Van Hoeken D, Tharner A, Jaddoe VW, Hofman A, et al. Trajectories of picky eating during childhood: a general population study. Int J Eat Disord. 2015;48(6):570–9.
26. Van Tine ML, McNicholas F, Safer DL, Agras WS. Follow-up of selective eaters from childhood to adulthood. Eat Behav. 2017;26:61–5.
27. Marí-Bauset S, Zazpe I, Mari-Sanchis A, Llopis-González A, Morales-Suárez-Varela M. Food selectivity in autism spectrum disorders: a systematic review. J Child Neur. 2014;29(11):1554–61.
28. Field D, Garland M, Williams K. Correlates of specific childhood feeding problems. J Paediatr Child Health. 2003;39(4):299–304.
29. Brown CL, Vander Schaaf EB, Cohen GM, Irby MB, Skelton JA. Association of picky eating and food neophobia with weight: a systematic review. Child Obes. 2016;12(4):247–62.
30. Sharp WG, Postorino V, McCracken CE, Berry RC, Criado KK, Burrell TL, et al. Dietary intake, nutrient status, and growth parameters in children with autism spectrum disorder and severe food selectivity: an electronic medical record review. J Acad Nutr Diet. 2018;118(10):1943–50.
31. Taylor CM, Northstone K, Wernimont SM, Emmett PM. Macro- and micronutrient intakes in picky eaters: a cause for concern? Am J Clin Nutr. 2016;104(6):1647–56.
32. Xue Y, Zhao A, Cai L, Yang B, Szeto IM, Ma D, et al. Growth and development in Chinese pre-schoolers with picky eating behaviour: a cross-sectional study. PLoS One. 2015;10(4):e0123664.
33. Tharner A, Jansen PW, Kiefte-de Jong JC, Moll HA, van der Ende J, Jaddoe VW, et al. Toward an operative diagnosis of fussy/picky eating: a latent profile approach in a population-based cohort. Int J Behav Nutr Phys Act. 2014;11(1):14–25.
34. Volger S, Sheng XY, Tong LM, Zhao DM, Fan T, Zhang F, et al. Nutrient intake and dietary patterns in children 2.5-5 years of age with picky eating behaviors and low weight-for-height. Asia Pac J Clin Nutr. 2015;26(1):104–9.
35. Fildes A, van Jaarsveld CH, Wardle J, Cooke L. Parent-administered exposure to increase children's vegetable acceptance: a randomized controlled trial. J Acad Nutr Diet. 2014;114(6):881–8.
36. Coulthard H, Sealy A. Play with your food! Sensory play is associated with tasting of fruits and vegetables in preschool children. Appetite. 2017;113:84–90.
37. Ventura AK, Birch LL. Does parenting affect children's eating and weight status? Int J Behav Nutr Phys Act. 2008;5(1):15–27.
38. Edelson LR, Mokdad C, Martin N. Prompts to eat novel and familiar fruits and vegetables in families with 1–3 year-old children: relationships with food acceptance and intake. Appetite. 2016;99:138–48.
39.•• Marshall J, Hill RJ, Ware RS, Ziviani J, Dodrill P. Multidisciplinary intervention for childhood feeding difficulties. J Pediatr Gast Nutr. 2015;60(5):680–7 **This study compared the effectiveness of behavioral interventions for feeding problems, specifically those using operant conditioning techniques versus systematic desensitization strategies. Both types of behavioral therapies improved diet variety and mealtime behavior when provided in structured interventions.**
40. Toomey KA, Ross ES. SOS approach to feeding. Perspectives on Swallowing and Swallowing Disorders (Dysphagia). 2011;20(3):82–7.
41. Dovey TM, Martin CI. A parent-led contingent reward desensitization intervention for children with a feeding problem resulting from sensory defensiveness. Infant Child Adolesc Nutr. 2012;4(6):384–93.
42. Silverman AH. Behavioral management of feeding disorders of childhood. Ann Nutr Metab. 2015;66(Suppl. 5):33–42.
43. Fishbein M, Cox S, Swenny C, Mogren C, Walbert L, Fraker C. Food chaining: a systematic approach for the treatment of children with feeding aversion. Nutr Clin Pract. 2006;21(2):182–4.
44. van Jaarsveld CH, Boniface D, Llewellyn CH, Wardle J. Appetite and growth: a longitudinal sibling analysis. JAMA Pediatr. 2014;168(4):345–50.
45. Druce M, Bloom SR. The regulation of appetite. Arch Dis Child. 2006;91(2):183–7.
46. Chatoor I, Surles J, Ganiban J, Beker L, Paez LM, Kerzner B. Failure to thrive and cognitive development in toddlers with infantile anorexia. Pediatrics. 2004;113(5):e440–7.
47. Wright CM, Smith KH, Morrison J. Withdrawing feeds from children on long term enteral feeding: factors associated with success and failure. Arch Dis Child. 2011;96(5):433–9.
48. Spungen J. Bowes & Church's food values of portions commonly used. Baltimore: Lippincott Williams & Wilkins; 2005.
49. Wright CM, Chillingworth A. The impact of stopping high-energy oral nutritional supplements on eating behaviour and weight gain. Arch Dis Child. 2015;100(11):1024–7.
50. Johnson SL. Improving preschoolers' self-regulation of energy intake. Pediatr. 2000;106(6):1429–35.
51. Roberts L, Marx JM, Musher-Eizenman DR. Using food as a reward: an examination of parental reward practices. Appetite. 2018;120:318–26.
52. Najib K, Moghtaderi M, Karamizadeh Z, Fallahzadeh E. Beneficial effect of cyproheptadine on body mass index in undernourished children: a randomized controlled trial. Iran J Pediatr. 2014;24(6):753–8.
53. Chinuck R, Dewar J, Baldwin DR, Hendron E. Appetite stimulants for people with cystic fibrosis. Cochrane Database Syst Rev. 2014;7:1–27.
54. Sant'Anna AM, Hammes PS, Porporino M, Martel C, Zygmuntowicz C, Ramsay M. Use of cyproheptadine in young children with feeding difficulties and poor growth in a pediatric feeding program. J Pediatr Gast Nutr. 2014;59(5):674–8.
55. Spettigue W, Norris ML, Santos A, Obeid N. Treatment of children and adolescents with avoidant/restrictive food intake disorder: a case series examining the feasibility of family therapy and adjunctive treatments. J Eat Disorder. 2018;6(1):20–31.
56.•• Krasaelap A, Madani S. Cyproheptadine: a potentially effective treatment for functional gastrointestinal disorders in children. Pediatr Ann. 2017;46(3):e120–5 **Review examines possible benefits of cyproheptadine related to functional gastrointestinal discomfort along with potential side effects and appropriate dosing of medication.**
57. de Roos C, de Jongh A. EMDR treatment of children and adolescents with a choking phobia. J EMDR Pract Res. 2008;2(3):201–11.
58. Okada A, Tsukamoto C, Hosogi M, Yamanaka E, Watanabe K, Ootyou K, et al. A study of psycho-pathology and treatment of children with phagophobia. Acta Med Okayama. 2007;61(5):261–9.
59. Segal I, Tirosh A, Sinai T, Alony S, Levi A, Korenfeld L, et al. Role reversal method for treatment of food refusal associated with infantile feeding disorders. J Pediatr Gast Nutr. 2014;58(6):739–42.
60. Chiatto F, Coletta R, Aversano A, Warburton T, Forsythe L, Morabito A. Messy play therapy in the treatment of food aversion in a patient with intestinal failure: our experience. J Parenter Enter Nutr. 2019;43(3):412–8.
61. McKinney CM, Glass RP, Coffey P, Rue T, Vaughn MG, Cunningham M. Feeding neonates by cup: a systematic review of the literature. Matern Child Health J. 2016;20(8):1620–33.
62. Harris HA, Ria-Searle B, Jansen E, Thorpe K. What's the fuss about? Parent presentations of fussy eating to a parenting support helpline. Public Health Nutr. 2018;21(8):1520–8.

63. Powell FC, Farrow CV, Meyer C. Food avoidance in children. The influence of maternal feeding practices and behaviours. Appetite. 2011;57(3):683–92.
64. Johnson SL, Goodell LS, Williams K, Power TG, Hughes SO. Getting my child to eat the right amount. Mothers' considerations when deciding how much food to offer their child at a meal. Appetite. 2015;88:24–32.
65. Hendy HM, Williams KE, Riegel K, Paul C. Parent mealtime actions that mediate associations between children's fussy-eating and their weight and diet. Appetite. 2010;54(1):191–5.
66. Micali N, Simonoff E, Elberling H, Rask CU, Olsen EM, Skovgaard AM. Eating patterns in a population-based sample of children aged 5 to 7 years: association with psychopathology and parentally perceived impairment. J Dev Behav Pediatr. 2011;32(8):572–80.
67. Jacobi C, Schmitz G, Agras WS. Is picky eating an eating disorder? Int J Eat Disord. 2008;41(7):626–34.
68. Lucarelli L, Sechi C, Cimino S, Chatoor I. Avoidant/restrictive food intake disorder: a longitudinal study of malnutrition and psychopathological risk factors from 2 to 11 years of age. Front Psychol. 2018;9:1608.
69. Satter EM. The feeding relationship. J Am Diet Assoc. 1986;86(3):352–6.
70. Davis AM, Bruce A, Cocjin J, Mousa H, Hyman P. Empirically supported treatments for feeding difficulties in young children. Curr Gastroenterol Rep. 2010;12(3):189–94.
71. Maximino P, Machado RH, Junqueira P, Ciari M, Tosatti AM, de Cássia RC, et al. How to monitor children with feeding difficulties in a multidisciplinary scope? Multidisciplinary care protocol for children and adolescents. J Hum Growth Dev. 26(2):331–40.
72. Sharp WG, Volkert VM, Scahill L, McCracken CE, McElhanon B. A systematic review and meta-analysis of intensive multidisciplinary intervention for pediatric feeding disorders: how standard is the standard of care? J Pediatr. 2017;181:116–24.