

Food selectivity in childhood: should be concerned about it?

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Abstract

Eating is a human experience that involves the integration of senses, motor skills and cognition that, in addition to satisfying the need to maintain life, is associated with coexistence and pleasure. Eating habits are influenced by genetic, social, ethnic, economic, cultural and religious factors, which begin early, and variations in appearance, texture, taste, mouthfeel and smell influence the way a child accepts or rejects food. An important aspect for understanding characteristics related to a child's eating is knowing how the human brain's sensory integration system works, which captures stimuli, sends them to the brain, which processes, integrates, synthesizes and uses the information to formulate appropriate responses. When any phase is altered, the responses can compromise language, learning, behavior or sensor motor development. Since sensory factors are influential determinants of eating behavior, this article, in the form of a narrative review, presents the main characteristics of three conditions commonly observed among children: food selectivity, food neophobia and picky eating, highlighting their causal factors, possible repercussions on the child and the family, as well as some guidelines on ways to understand and deal with these behaviors.

Key-words: Food selectivity-Neophobia-Picky eating–Eating habits

Introduction

Food is a human experience that involves the integration of several functions, such as senses (sight, taste, smell, and touch), motor skills, and cognition [1], which, in addition to satisfying the need to maintain life, is associated with coexistence and pleasure. The interaction of the olfactory and gustatory systems develops the ability to identify odors being closely linked to emotions and memories. In addition, the sense of taste also helps to identify different textures and temperatures, which are important characteristics associated with food consumption [2].

Eating habits are influenced by genetic, social, ethnic, economic, cultural and religious factors, which begin early [3], with a large family component given the influence of maternal eating habits on children's food choices. Mothers influence children's taste perception and food preferences both during pregnancy and postnatal period through the flavors of foods transmitted through amniotic fluid and breast milk [4]. Children may also exert influence on their parents' diets, as bidirectional influences and shared physical and sociocultural food environments suggest that parents and children are likely to have similar dietary intakes [4].

Children generally prefer sweet foods and have an aversion to bitter tastes. This characteristic is part of normal development and is understood as a protective mechanism to avoid ingesting harmful substances [5,6]. Variations in appearance, texture, taste, mouthfeel and smell influence the way a child perceives a food and whether it is accepted or rejected. The preference for crunchy foods over viscous or chunky foods is another aspect observed in the first years of life, as the latter are more difficult to manipulate in the mouth [7].

Responsiveness

One of the important aspects for understanding some characteristics related to children's feeding is to know how brain's sensory integration system works. Visual, tactile, olfactory, auditory and gustatory sensory receptors capture external stimuli from the environment or internal stimuli originating in the body itself (through tactile, vestibular or proprioceptive receptors). The receptors transform the stimulus into sensory information that is sent to the brain, resulting in motor and behavioral responses [8]. Both sensory processing and integration are complex neurodevelopment functions that allow children to regulate, perceive, discriminate and use sensory information received from the environment and internally from their bodies to effect response [9]. The brain processes, integrates, synthesizes and uses information to interpret the stimuli received and formulate appropriate responses. Therefore, sensory processing skills develop naturally and play important roles in learning, behavior and emotional regulation [10]. When one or more of these phases are altered, inadequate responses may occur that compromise language, learning, behavior or sensorimotor development, making daily activities difficult [8,10,11]. This condition is called Sensory Processing Disorder (SPD), meaning problems with the ability to adequately perceive and interpret sensory information received or experienced by one or more sensory systems [9]. This can be observed in children with hypersensitivity to tactile, visual, auditory or vestibular stimuli [12]. SPD may be related to genetic factors, prenatal or birth complications, prematurity, low birth weight, parental stress and alcohol and drug use during pregnancy [8]. Sensory sensitivity is a very important characteristic related to the establishment of eating habits. Sensory characteristics are identified as one of the most influential determinants of eating behavior, with textures being the main reason for the rejection or acceptance of foods.

In children. Also, the noises that accompany the disintegration of food in the oral cavity, due to its texture and structure, can influence acceptance, with hard and grainy textures being less acceptable to children [13].

Food Selectivity

Food selectivity (FS) in childhood can be understood as a complex behavioral manifestation characterized by the persistent refusal of certain foods or food groups that end up limiting the child's nutritional quality and diversity [3, 14, 15]. It is characterized by the high consumption of high-calorie, ultra-processed, energy-rich, and nutrient-poor foods, causing a significant reduction in dietary diversity and increasing the risk of developing micronutrient deficiencies [16], with direct implications for health, nutrition, and growth [14, 17]. Children with FS are reluctant to accept new foods, avoid fruits, vegetables, whole grains [2, 10, 14], and pieces of meat due to their hardened consistency [6, 18]. These children usually have tactile sensitivity and increased sensitivity related to taste, texture, and odor [6]. Most of the time, FS is transient [11] and should be differentiated from other conditions that can compromise growth, development, and quality of life, and are often confused with food neophobia and picky eating [19]. It causes stress among family members and caregivers due to fear of nutritional inadequacy, but it can be resolved without many difficulties [2, 4, 18]. The prevalence of FS is highly variable, ranging from 6% to 50%, according to studies conducted using different methodologies [18, 20, 21]. The peak of prevalence is around 3 years of age and declines until 5 years of age, eventually persisting in some children, adolescents, and even into adulthood [7]. It affects both sexes equally, can be inherited [5, 20, 23], and is much more frequent in children with autism spectrum disorder [24].

Some possible causes of FS have been highlighted such as early weaning, late introduction of foods beyond the window of opportunity (between 17 and 26 weeks of life), sensory predisposition, limited exposure to different foods during early childhood, growth retardation and family influence [11,14,25]. Parental relationships can influence this behavior, which can interfere with family routines, relationships between people and with the child, and sometimes generate feelings of guilt in parents for not feeling capable of dealing with this behavior [11,19,21]. Some aspects of parents' eating habits and the family environment interact with selective eating behaviors and can reinforce their persistence, such as pressure to eat, which can have a rebound effect and discourage children from trying to eat certain foods, and restriction of preferred foods, which can serve to reinforce their appeal to more palatable foods [21]. Nutritional deficiencies, compromised immunity, increased susceptibility to infections, low weight and height, iron deficiency, small intake of vitamins and other micronutrients, and constipation are indicated as possible consequences of FS, as well as excess weight when foods with a higher caloric value predominate in meals [14, 15, 18, 21, 25, 26]. To a lesser extent, FS has been related as a risk factor for anorexia and associated with other behavioral and emotional disorders such as low self-esteem, depression, and anxiety [18, 20, 23]. It is also worth noting that FS can have negative impacts on social and emotional development, making it difficult or impossible to participate in common activities related to food, such as family dinners, parties, eating at school, or with other people at social events [27]. Because it is a benign and transient condition, FS does not require specialized treatment. However, it is important to highlight that some measures, such as exclusive breastfeeding for at least 6 months and gradual and varied introduction of foods at the

Appropriate stage (between 17 and 26 weeks of life) can prevent this behavior [14,26]. As age advances, it is advisable to involve the child in the choice and preparation of food, simultaneous and repeated offering of preferred and non-preferred foods in small quantities and at fixed times, avoiding coercive practices [13,28], establishing models and active participation of parents, family members and caregivers and making mealtimes positive experiences within the social and cultural context of the family [3,14,15,20,26]. Another highlight should be given to the need to clarify and guide parents and caregivers on all aspects related to FS, involving them in the child's daily eating routine [16,27] in an appropriate and natural way.

Food Neophobia

Food neophobia (FN) is characterized by a child's tendency to avoid or refuse new or unfamiliar foods before they are introduced into the mouth. It is considered a normal part of development and may appear, in rare cases, in the first year of life, but most often intensifies between 18 and 24 months of age, which is related to the child's increased mobility [13, 20]. The origin of FN can be understood as a process of evolution of the species when neophobic behavior protected omnivores against the consumption of potentially poisonous foods [29]. FN can be genetically determined or shaped by the environment. Parents, especially mothers, who play an important role in shaping the child's eating habits, can transmit the tendency towards FN to their children. In this sense, some factors can be highlighted, such as diet during pregnancy and lactation, the mode of exposure, and the limitation of food varieties [13, 29]. The frequency of FN varies greatly depending on the population, ranging from 11% to 30%, and may lead to deficiencies in some essential nutrients [13, 30]. FN does not require treatment or therapy and tends to resolve spontaneously. However, educational work with the participation of a specialist and understanding on the part of parents is strongly recommended [13].

Picky eating

Picky eating (PE) is a behavior characterized by the consumption of an inadequate and restricted variety of food items, through the rejection of both familiar and unfamiliar foods, showing preferences and leading parents to offer meals that are different from those of other family members [18]. The child is reluctant to try new foods, has a limited intake of vegetables and legumes, appears to have little appetite, eats slowly, and demonstrates preferences for high-calorie foods. The prevalence of PE varies greatly in different populations, ranging between 25% and 53%, usually occurring between 1 and 5 years of age, peaking at 3 years, and is recognized as a normal and transitory phase of development, which [31] can interfere with the daily routine of children and impact the relationship between parents and children. PE is associated with early weaning, introduction of new foods at an inappropriate time, being a first-born child, having young mothers, children and family members with emotional changes, low social and economic status, controlling and insistent parents regarding meals, limited availability of food at home, and parental stress [32]. Less variety in the diet can alter the nutritional composition due to reduced micronutrient intake and excessive consumption of calories from carbohydrates, compromising

nutritional status and eventually causing constipation [33, 34]. As with FN, educational work with parents/caregivers is also important to calmly manage this phase of the child's life.

Table I presents the main characteristics of food selectivity, food neophobia and picky eating.

Table I. Characteristics of food selectivity, food neophobia and picky eating

	FS	FA	PE
prevalence (%)	6-50	11-30	25-53
age of onset(years)	2	1	2
peak (years)	3	2	3
decline(years)	5	4-5	5

FS= food selectivity FA= food neophobia PE= picky eating

Conclusions

Food is a necessity for survival that is established through a complex process involving many variables. It begins in intrauterine life with rudimentary swallowing movements and evolves to full capacity and autonomy after 2 years of age. Throughout this period, the child's diet is subject to the influence of numerous factors that can both contribute to and hinder the establishment of habits and attitudes during meals. Some eating behaviors in children are considered inherent to the developmental process, although they can occasionally create conflicts with the nutritional needs for adequate growth. Within the broad spectrum of individual characteristics related to food, behaviors can be found with high frequency and that generate concerns among family members, including Food Selectivity (FS). The differentiation between FS, FN and PE is of relevant importance for establishing the correct diagnosis and adopting adequate educational, preventive and even therapeutic measures to provide better conditions for parents and caregivers to deal with these challenges in their daily lives. Due to the frequency with which the complaint "my child doesn't eat" appears in consultations, it is essential to have broad knowledge and dissemination of the concepts, in addition to activities that can be adopted in childcare programs by all health professionals.

Conflict of interest: none

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