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# Feeding in Children with Autism

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FEEDING IN CHILDREN WITH AUTISM

By

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Submitted in Partial Fulfillment of the Requirements for  
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FEEDING IN CHILDREN WITH AUTISM

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A Research Paper Submitted in Partial  
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## Introduction

Although the term "behavioral" feeding difficulty has been widely applied in the literature, these difficulties do not always meet the true description of the term behavioral, which can be defined as "willful or volitional acts of noncompliance" (Twachtman-Reilly, Amaral, & Zebrowski, 2008, p. 262). Rather, some behaviors displayed by certain children during mealtime have been shown to be a reflection of the characteristics and symptoms of underlying disorders (Twachtman-Reilly et al., 2008). For example, atypical patterns of food acceptance are a recognized clinical marker of the neurodevelopmental autism spectrum disorder (ASD) (Ahearn, 2001). Children with ASD tend to have difficulty attaining the mental flexibility necessary to adapt to new and changing situations. As a result, the challenges are displayed in the form of adverse behaviors in certain circumstances where adaptations must be made, such as feeding and mealtime.

While this pattern of symptomatic behaviors may initially be observed by caregivers as a genuine behavioral challenge, the actions are not intentional, but instead the consequence of real differences in the brain stemming from the underlying disorder of ASD (Twachtman-Reilly et al., 2008). The purpose of this review is to explore the various reasons children with autism

experience more feeding challenges than typically developing children. This review also aims to increase awareness and education regarding behavioral feeding difficulties in the ASD population, with a comprehensive description of related aspects and clinical implications.

### **Behavioral Eating Difficulties**

One method of classifying a behavioral eating difficulty, also known as problematic eating, is by a child's pattern of behavior displayed during mealtimes (Ahearn, 2001). The exact etiology of feeding difficulties in autism is not currently known; however, by observing a child's patterns of eating, the various examples of problematic eating can be grouped and established according to shared features (Twachtman-Reilly et al., 2008). Three major groups of feeding difficulties have been defined by Ahearn (2001): insufficient food intake, skill deficits, and disruptive behavior. It is important to note that behaviors in each of the categories may take place in various environments throughout the child's day, and should only be assessed and treated as disruptive feeding behaviors if the actions take place predominantly in the context of feeding.

#### **Insufficient Food Intake**

The category of insufficient food intake includes food or liquid refusal, food type or texture selectivity, and inadequate

caloric intake for weight gain and growth over extended periods of time (Ahearn, 2001). In general, children with autism have an overall tendency to refuse more foods than children without autism (Williams, Dalrymple, & Neal, 2000). However, it remains important to establish whether families of children with ASD tend to restrict their own eating behavior as a consequence of the ASD children preferences, or if the family's initial restricted food choices resulted in the children with ASD's restrictive eating (Schreck, Williams, & Smith, 2004).

Inadequate intakes of food can lead to nutritional insufficiency, a potential health risk for individuals with ASD (Cermak, Curtin, & Bandini, 2010). This category of feeding difficulties has the most severe impact on the child with ASD's physical and cognitive development (Ahearn, 2001).

Insufficient food intake would include children who, for instance, eat only pureed food past the point of being developmentally appropriate, which has been associated with ASD in a study by Schreck and Williams (2006). The researchers reported that, in addition to consuming a limited number of textures, children with ASD typically consume a limited number of food groups. The study found that when presented with more than 10 listed food items within the following food groups: fruits, dairy, vegetables, proteins, and carbohydrates, children

with autism, on average ate fewer than 10 of the listed food items, with the exception of carbohydrates.

Parents of children with autism reported that the main influence on food selectivity was texture, followed by appearance, taste, smell, and temperature (Cermak et al., 2010). Additionally, foods with textures described as being "mushy," "slimy," "slippery," or "sloppy" were avoided by children with ASD most often (Martins, Young, & Robson, 2008). Cermak et al. (2010) found that 70% of children with autism select food based on texture alone, compared to 11% of children without autism.

In another study performed by Ahearn, Castine, Nault, and Green (2001), the authors found that 17 of 30 children with ASD included in the investigation demonstrated high levels of selectivity for food type or texture. Of those children, 8 presented with overly selective food acceptance, 3 were moderately selective, 5 were mildly selective, and one showed selectivity for texture.

### **Skill Deficits**

Children with ASD displaying skill deficits may have oral-motor difficulties, such as problems with chewing, tongue movement, or lip closure (Field, Garland, & Williams, 2003), that can ultimately lead to undesired experiences during mealtime. Martins and colleagues (2008) found that children with

ASD also have reduced self-feeding skills than children without ASD. Poor oral-motor skills combined with weak self-feeding skills can trigger episodes of gagging, choking, drooling, difficulty managing food, and digestion issues. Children lacking oral-motor and self-feeding skills may also display difficulty transitioning to different textured foods, selective eating habits, and a strong preference for certain food textures, temperatures, and tastes while avoiding others (Ernsperger & Stegen Hanson, 2004).

Skill deficits displayed by children with ASD can be misconstrued as behavioral difficulties. In such cases the children with ASD may actually not be developmentally prepared for certain aspects of feeding (Martins et al., 2008).

### **Disruptive Behavior**

The category of disruptive behavior involves actions not directly associated to eating, including crying, spitting, knocking food off the table, leaving the table, aggression, and self-injury, all of which resulting in the disruption of the act of consuming food (Ahearn, 2001). For example, Johnson, Handen, Mayer-Costa, and Sacco (2008) conducted a study involving 19 children with ASD and 10 typically developing children between the ages of two to four years and concluded that children with ASD threw food more often than children without ASD.

Additionally, the researchers pointed out that these actions had a negative effect on the structure of the mealtime. Martins et al. (2008) found that mothers of children without ASD had more control upon her children's feeding situation than mothers of children with ASD. Moreover, mothers of children with ASD recorded marginally greater emotional response and behavioral control practices compared to the level exhibited by mothers of the children without ASD when assessed using the parental emotional response and behavioral control practices (PEB) survey. These results suggested that children with ASD consistently possessed more control over mealtime than their mothers (Martins et al., 2008). It seems that parents' ability to control their children's feeding behaviors during mealtime decreases as the severity of children's ASD increases.

#### **Additional Feeding Challenges Specific to ASD**

Additional concerns associated with behavioral feeding problems have also been shown to have an effect on feeding in children with ASD. Twachtman-Reilly and colleagues (2008) proposed a physiological and behavioral classification of possible factors related to feeding. Physiological challenges included problems related to (a) sensory perception issues and (b) gastrointestinal aspects. Behavioral challenges include

problems related to (a) ritualistic and repetitive behaviors, (b) executive function, and (c) social and language skills.

### **Sensory Processing**

Sensory processing issues, defined by Twachtman-Reilly et al. (2008) as “dysfunctions in one’s ability to modulate sensory input,” (p. 263) is a characteristic often displayed by children with ASD that affects the task of feeding. This characteristic may be demonstrated in the form of hyperresponsivity, an abnormally increased response to stimuli, hyporesponsivity, an abnormally decreased response to stimuli, or fluctuating responsivity, a mixture of both increased and decreased response to stimuli (Twachtman-Reilly et al., 2008).

This description encompasses a range of intensity in abnormal responses to taste and smell, sensitivity to tactile input, and auditory filtering difficulties (Twachtman-Reilly et al., 2008). A multitude of sensory experiences occur in a typical mealtime environment that children with ASD have difficulty managing and children without ASD do not. For example, in a school cafeteria, children with ASD experience sensory overload when they are unable to manage several sensory inputs at once, such as the smell of food, the visual flickering of fluorescent lights, the constant movement of students within the lunchroom, and the rising noise of conversation (Twachtman-

Reilly et al., 2008). Difficulty in managing sensory input is exhibited in atypical responses such as sensory seeking or sensory avoidance behaviors (Twachtman-Reilly et al., 2008).

The ability to accurately identify tastes has also been associated with greater acceptance of food and textures. This is significant because individuals with ASD may have a decreased level of accuracy when attempting to identify general tastes. As a result, some children with ASD tend to have lower acceptance of foods and textures (Twachtman-Reilly et al., 2008).

Furthermore, Cermak et al. (2010) used the term "tactile defensiveness" (p. 242) to describe sensitivity to sensory input in the tactile domain. This defensiveness is displayed as an overreaction to certain experiences of touch. The overreaction is often seen in the form of an observable aversion or negative behavioral response to certain tactile stimuli that most people would find harmless. More specific to the topic of feeding, oral defensiveness, which can be considered a component of tactile defensiveness, is defined as an avoidance of certain textures of food, as well as avoidance of activities using the mouth (Cermak et al., 2010). Oral defensiveness is then a form of hyperresponsivity, resulting in difficulty tolerating textures and leading to food selectivity (Cermak et al., 2010).

Some patterns of sensory input can result in behavioral difficulties in individuals with ASD who are unable to describe their distress in a form other than behaviors. Behavioral responses to what is perceived by the person with ASD as excessive sensory input during mealtime may be that of “fight,” such as screaming or becoming aggressive, “flight,” such as leaving the environment, or “fright” such as shutting down completely (Cermak et al., 2010; Twachtman-Reilly et al., 2008). Sensory processing difficulties may result in an overload of the children with ASD’s nervous system (Twachtman-Reilly et al., 2008). As such, sensory based feeding difficulties may create increased stress and negatively affect family mealtimes, having a detrimental impact on the quality of life of the children with ASD and their families.

### **Gastrointestinal Problems**

Individuals who have previously endured medical conditions resulting in uncomfortable feeding often continue to show resistance to new foods or possibly to oral feeding entirely (Twachtman-Reilly et al., 2008). For example, gastrointestinal (GI) problems have a high prevalence in individuals with ASD and often include gastroesophageal reflux disease (GERD), constipation, and diarrhea (Ibrahim, Voigt, Katusic, Weaver, & Barbaresi, 2009). These medical issues may be a side effect of

the extreme food selectivity displayed by individuals with ASD; however, the side effects may continue to take place due to the learned aversion to new or particular foods (Ibrahim et al., 2009).

It is possible that negative side effects experienced by children with ASD such as GERD, constipation, and diarrhea are inadvertently related back to the initial ideas of food and feeding that take place during mealtime (Ibrahim et al., 2009). As a result, a fear of eating is developed due to previous pain or discomfort associated with feeding even after the initial cause of discomfort has been resolved (Twachtman-Reilly et al., 2008). This fear can be manifested into continued resistance to accept or even attempt new foods; therefore, individuals with ASD who develop a fear of food present with a strong negative reaction to feeding during mealtime (Twachtman-Reilly et al., 2008).

Additionally, many children with ASD are treated with restrictive diets, vitamins, minerals, and dietary supplements, as well as various medications. The dietary treatments are typically aimed at resolving GI disorders that are sometimes merely presumed disorders, all due to the assumption that a child with ASD must always have a GI issue (Ibrahim et al., 2009).

For example, in 2008 Twachtman-Reilly et al. reported that in a large scale study including 353 children, 15.5% of children with ASD were found to be following what was referred to as a "modified diet," (p. 264), and that 17.3% were consuming some type of nutritional supplement whether a known GI disorder was identified or not. It appears that such treatments should not be provided indiscriminately to children with ASD unless there is explicit evidence indicating the presence of a GI disorder in a specific case (Ibrahim et al., 2009). This precaution should be made in order to prevent the creation of further food selectivity or food aversions that have the potential to lead to behavioral feeding issues.

An additional general aspect of ASD is that many children with ASD receive treatment with stimulant medications to control symptoms of hyperactivity, impulsivity, and inattention (Ibrahim et al., 2009). Because appetite suppression is a known adverse effect of some of these medications, this may present an additional factor that contributes to changes in eating patterns experienced by children with ASD.

### **Ritualistic and Repetitive Behaviors**

A further characteristic of individuals with ASD is displayed in the form of ritualistic and repetitive behaviors. This characteristic refers to the broad class of behaviors

linked by repetition, rigidity, invariance, and inappropriateness (Turner, 2005). "In autism these include spontaneous dyskinesias, stereotyped movements, repetitive manipulation of objects, repetitive self-injurious behavior, specific object attachments, an anxiously obsessive desire for sameness, repetitive use of language, and narrow and circumscribed interests (Turner, 2005, p. 839). This may be demonstrated by selective food types and mealtime rules, as well as insistence on specific methods of meal preparation (Twachtman-Reilly et al., 2008). For example, ritualistic behaviors may include demands that all foods be the same color, eating the same food at each meal, and insisting that foods be presented in a particular order (Twachtman-Reilly et al., 2008).

In addition to the physical texture or consistency of food often cited as the underlying factor in the choices of food made by children with ASD, other characteristics such as specific brands, product names, or packaging were also reported as determining factors (Cermak et al., 2010). Schreck and colleagues (2004) found that in order to accept food, children with ASD are also more likely to require specific utensils and particular food presentations, such as eating with only a single utensil or requiring that foods do not touch each other.

Ritualistic and repetitive behaviors tend to extend mealtime stress for children with ASD and their caregivers. However, Twachtman-Reilly et al. (2008) reminded us that the presence of rituals at mealtime is more likely to be related to ASD symptomatology and its neurological bases than to behavioral noncompliance. Therefore, the unusual requests and actions displayed during mealtime cannot be attributed to voluntary negative actions; rather, the behaviors are a result of adaptive difficulties experienced by children with ASD (Twachtman-Reilly et al., 2008).

### **Executive Function**

An additional problem typically displayed by individuals with ASD is executive functioning (Twachtman-Reilly et al., 2008), defined as "goal-directed behavior, including planning, organized search, and impulse control (Welsh, Pennington, & Groisser, 1991, p. 131). More specifically, Twachtman-Reilly and colleagues (2008) suggested that those with ASD displaying deficits in executive function struggle with aspects of mental flexibility, including events surrounding structured activities such as mealtime.

Difficulty with planning and sequencing events before and during mealtime can reduce the child with ASD's ability to predict the outcome of current situations or the occurrence of

future events; thus, children with ASD who insist on eating the same food prepared the same way at each meal may be attempting to increase the predictability of the mealtime experience (Twachtman-Reilly et al., 2008). Children with ASD seek familiar routines and often do not cope appropriately with disruptions in a specific routine such as mealtime. Therefore, it may take more time for children with ASD than children without ASD to overcome eating difficulties since these behaviors tend to be associated with adaptive problems (Twachtman-Reilly et al., 2008).

An additional skill deficit closely related to the act of planning frequently verified in individuals with ASD is related to the ability to self-monitor during mealtime. Sometimes, children with ASD appear to eat based on external stimuli such as the time on a clock or the presence of food rather than on feelings of hunger or satiation (Twachtman-Reilly et al., 2008). Overall, this means that if a child's appetite regulation is impaired or unconnected to food consumption, the child could then be forced to use other methods to monitor food intake such as visual appearance of the amount of food left on the plate or amount of time spent at the table. This, in turn, could lead not only to difficulty judging when mealtime is finished, but also to over or under eating (Twachtman-Reilly et al., 2008).

Furthermore, impairments in mental flexibility are closely related to the ritualistic and repetitive behaviors that have been previously discussed as distinctive and unusual eating habits, including a persistent desire to use a specific utensil or cup, precise method of food preparation, or definite rituals surrounding eating (Twachtman-Reilly et al., 2008). Hence, the ritualistic tendencies, need for routine, and insistence on consistency are characteristic of children with ASD who have impairments in mental flexibility, and may lead these children to choose and demand stereotyped diets that can result in an inadequate intake of fiber, fluids, and other food constituents (Ibrahim, et al., 2009). Deficits in both planning and mental flexibility can result in a rise in anxiety and stress during mealtime for both the individuals with ASD and their caregivers (Twachtman-Reilly et al., 2008).

### **Social and Language Skills**

Children with ASD who demonstrate feeding problems often have difficulty expressing their discomfort as well as identifying the source of discomfort, due to deficits in language and social skills (Twachtman-Reilly et al., 2008). This discrepancy in language use can affect the ability to manage distress, obtain relief, request assistance, and prevent the undesirable event from recurring. These communication

limitations may cause refusal of extended categories of foods rather than solely the particular one causing the discomfort, leading to frustration and consequent adverse behavior (Twachtman-Reilly et al., 2008).

Furthermore, mealtime typically occurs in a social context. Embedded within the assumed sequence of behaviors during mealtime, there are expected social rules that children with ASD frequently have difficulty to understand and follow (Twachtman-Reilly et al., 2008). These challenges may result in violations of acceptable social behavior in the form of unusual and undesirable eating habits such as spitting out or playing with food (Twachtman-Reilly et al., 2008). These behaviors increased as social demands of the mealtime environment increase (Williams et al., 2000). For instance, a study conducted by Williams and colleagues (2000) indicated that one third of the parents of children with ASD indicated that their child's eating habits were influenced by changes in situations and people, such as a clinician's attempt to engage in conversation with the child during mealtime. The resulting anxiety experienced by a child with ASD may then be displayed in the form of unusual behavior, which can further complicate and compromise the mealtime experience (Williams et al., 2000).

## Conclusion

It is evident in the literature that children with ASD demonstrate a wide variety of challenges in the area of feeding. These children are often classified as a “picky eaters” or “resistant eaters.” However, it is important to note that although these behaviors may be interpreted as acts of noncompliance, the actions are fundamentally related to the symptomatology and neurological origins of ASD (Twachtman-Reilly et al., 2008). Preconceived thoughts may lead to negatively labeling children with ASD as being deliberately stubborn or considered too difficult to please in regard to food. Instead, in order to understand the child’s specific area or areas of need for learning new skills related to the multifaceted act of feeding, caregivers and clinicians of children with ASD must be observant to these behaviors and make every attempt to view them as a mode of communication.

The topic of behavioral feeding difficulties affecting individuals with ASD is not especially new for those dealing with the issue on a regular basis; however, the prevalence of ASD seems to be increasing (Field et al., 2003), and as a consequence the information regarding the topic is constantly expanding. As the medical science continues to advance and the mortality rate of severe medical conditions decreases, the

number of children with feeding problems associated with ASD will probably continue to increase (Field et al., 2003). Therefore, research concerning the topic of feeding issues in individuals with ASD is critical.

ASD is considered to be a major health problem affecting numerous areas of daily living including the essential area of feeding, which warrants further research on the topic. Thus, future investigation of feeding in ASD should continue in order to further explore the extent of nutritional deficits resulting from feeding issues in individuals with ASD (Schreck et al., 2004).

While the entire ASD population's health is worthy of extensive research, it is critical to conduct feeding-related studies focusing on young children with ASD, as this is the age when rapid and dramatic growth is occurring and nutritional deficits may be more detrimental. This is also a period in which parents are still in predominant control of their children's diet, thus changes may be more expected and accepted. This type of research would be not only beneficial to individuals with ASD, caregivers, and clinicians, but also educational to society as a whole.

Expanding and intensifying research on those with multiple diagnoses (versus a diagnosis of only ASD) is also important;

more specifically, research on those with ASD who have an accompanying diagnosis that may impact oral motor control or related skills needed for eating should be developed. This is an essential variable to carefully consider and evaluate due to the oral cavity's imperative effect on sucking, chewing, and swallowing. Neurological and developmental disorders accompanying ASD may produce poorly coordinated chewing and swallowing, further impeding a person with ASD's experience during mealtime.

Typically developing oral motor function is highly influenced by experience, so limited exposure to different foods will hinder an individual with ASD's oral motor skill acquisition. Those with a diagnosis of ASD concomitant with other disorders are subject to further research due to the importance of a more elaborate analysis involving not just the behavioral aspects, but also the physiological aspects of feeding.

The literature emphasizes the potential for the implementation of feeding programs intended to treat and ultimately overcome the feeding and eating difficulties experienced by individuals with ASD. Feeding patterns in ASD vary tremendously and treatment programs designed to help children with ASD improve their eating and feeding behaviors

should always aim to target these characteristics. Because difficulty in the area of feeding in children with ASD result in high levels of concern for caregivers and clinicians, development of research towards creating specific treatment plans would be valuable.

While research on feeding problems in the ASD population is growing, the complex nature of ASD and its many influences on feeding skills and behavior create the need for change in how caregivers and clinicians view children displaying these problems. It is important to remember that of the 25-35% of young children affected by feeding difficulties, just 3% are purely "behavioral" (Fraker & Walbert, 2011). Caregivers and clinicians must not be too quick to label children with ASD "behavioral" and always strive to make mealtime an enjoyable experience. Today's society perceives mealtime as a social act intended to be nutritionally and emotionally healthy for every individual, including those with ASD.

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