Feasibility and Need for a Parent-Implemented Picky Eating Intervention for ASD

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Abstract of Thesis

Feasibility and Need for a Parent-Implemented Picky Eating Intervention for ASD

Food selectivity or "picky eating" is a common behavior found in the majority of children; however, unlike typically developing children, children with Autism Spectrum Disorder (ASD) have not only a higher rate of picky eating behaviors, but those behaviors extend well beyond the developmental norm (Sharp et al., 2013; Bandini et al., 2017; Suarez et al., 2014). At this point, there are no easily implementable interventions for picky eating in children with ASD that can be performed at home by the parents. However, *Tiny Tastes* is an intervention that showed increased vegetable consumption for typically developing children between ages of 3-7 years (Cooke, 2010). The aim of this study was to determine the need and feasibility of a parent-implemented intervention like that of *Tiny Tastes* for picky eating children with ASD by surveying parents of children and adolescents with ASD. Results indicated that the majority of parents of children with ASD do see a need for a home-based intervention and are wanting to participate in trial studies of such interventions. Results also indicated that a *Tiny Tastes*-like intervention for children with ASD is feasible; however, future studies are needed to determine necessary alterations to fit the specific needs of the ASD population.

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Chapter 1: Introduction

ASD and Feeding/Eating Challenges

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by impairments in social-communication, as well as the presence of restricted repetitive interests, behaviors, and activities that impair daily functioning (American Psychiatric Association, 2013). The most recent prevalence estimates find that 1 in 54 eight-year-old (i.e., ~1.9% of) children have ASD (Maenner et al., 2016). Under the rubric of restricted and repetitive behaviors that characterize ASD are sensory atypicalities, including hypo- and hyper-responsivity to sensory stimuli, as well as a tendency towards 'insistence on sameness.' Both these sensory, particularly oral-texture sensitivities and behavioral inflexibility have been linked with challenges around eating and feeding in ASD (Zickgraf et al., 2020).

The broad term that captures many of these eating and feeding challenges is food selectivity. Food selectivity encompasses a range of behaviors including picky eating, food refusal, restricted dietary variety, etc. (Cermack et al., 2014). These eating-related behaviors, specifically, limited variety of food intake and food refusal, have real-world impacts and can lead to nutritional deficiencies (Sharp et al., 2013). Though food selectivity, particularly food neophobia (i.e., fear of trying a novel food), is common among all preschool aged children, studies have found that a much greater proportion of children with ASD have problems directly related to feeding than their same-age typically developing peers (Sharp et al., 2013). Food selectivity usually dissipates after the preschool years within the general population. In contrast, studies employing longitudinal designs have shown that food selectivity behaviors in children with ASD

persist beyond this developmental window (Bandini et al., 2017; Suarez et al., 2014). Converging with these findings are studies of adolescents and adults with ASD demonstrating continued challenges around food selectivity at later ages (Kuschner et al., 2015). Therefore, evidence to date suggests that food selectivity is not a transient part of development in ASD. Instead, these eating-related difficulties continue to impact individuals with ASD throughout their lives.

Lack of ASD Feeding Interventions

Atypical feeding and eating behaviors have been linked with ASD at least since Leo Kanner's original description of ASD in the 1940s (Kanner, 1943). There are well-established interventions that address feeding difficulties; however, the majority of these are intensive in-patient programs designed to address severe feeding difficulties (Sharp et al., 2017). What's missing are easily implemented interventions or techniques that can serve to help the majority of individuals with ASD who exhibit mild to moderate feeding challenges that are nevertheless interfering with everyday functioning across childhood and adolescence. Recently, a systematic review of 36 studies—30 of those being single case studies—of interventions that aimed to increase the acceptance of new foods in both children and adults with developmental disorders including ASD was completed (Chawner et al., 2019). Among the different techniques used, varying approaches to increasing the amount of exposure an individual has to a certain food was found to improve the person's acceptance and consumption of that food (Chawner et al., 2019).

Potential New ASD Feeding Intervention

One intervention that holds considerable promise is *Tiny Tastes. Tiny Tastes* is a simple and cost-effective, parent-implemented, home-based program that utilizes extrinsic rewards to facilitate children tasting a new food. *Tiny Tastes* was developed to increase the acceptance of vegetables in typically developing children (Cooke, 2010). *Tiny Tastes* increases a child's exposure to a previously disliked (or untried) food through 14 days of exposure for 5-10 minutes each day outside of regular meal times. Parents begin by showing their child the food and teaching them about the food (e.g., the name of the food, how and where it grows, etc.). Next, parents cut off a small piece of the food and ask the child to try it, explaining that if they do, they will receive a sticker as a reward. If the child tries the food—whether they taste it and spit it out or eat the whole piece—then the child gets a sticker, as well as social praise; however, if the child does not try the food, the child does not receive a sticker reward, and the parent explains that they will try again the next day. Each food trial continues for 14 days (Cooke, 2010). The *Tiny Tastes* program provides paper booklets that parents use to note the progress of their child and the food item. A single sheet from the booklet can be used to track data for each intervention period (i.e., each 14-day food trial).

Research has shown that children are more likely to accept and eat food when they're familiar with it; however, children who experience eating difficulties such as food neophobia, are reluctant to try new foods (Birch, 1993). More to the point, subsequent research has demonstrated that merely giving children additional exposures to the food increased the children's tolerance of the food (Fildes et al., 2014). The use of giving children rewards for eating healthy foods has been controversial; however, multiple studies have found that it is effective to combine tangible rewards (e.g., stickers; not

other food) with repeated exposures to new/previously disliked foods to encourage children to eat healthier (Remington et al., 2011; Corsini et al., 2011; Cooke et al., 2011; Fildes et al., 2014).

There is a paucity of well-validated interventions to address mild to moderate eating-related challenges in ASD (Kuschner & Wallace, 2020). Considering this lack of interventions along with the effectiveness that parent implemented interventions such as *Tiny Tastes* have shown for typically developing children with eating and feeding difficulties, it is important to assess whether a parent-implemented intervention can improve eating habits among children with ASD. Thus far, *Tiny Tastes* has been implemented systematically among 3-7 year old typically developing children only. Therefore, it is unclear whether *Tiny Tastes* or a similar program can be used to improve food acceptance and the dietary variety of children and adolescents with ASD. Therefore, prior to creating a *Tiny Taste*-esque program for children and adolescents with ASD, the need, feasibility, and appropriateness of this intervention for not only younger children with ASD, but also older children and adolescents with ASD, should be established. A feasibility study will provide the first step to allow for later research to examine the effectiveness and acceptability of these types of intervention approaches for children and adolescents with ASD.

Regarding the feasibility of a *Tiny Tastes* like intervention for the ASD population, it's well established that persons with ASD often have sensory difficulties and/or insistence on sameness (American Psychiatric Association, 2013); therefore, will 5-10 minutes a day for 14 days be appropriate for persons with ASD, or will their

previously established routines and sensory difficulties call for a longer intervention period? In *Tiny Tastes*, parents tracked data during the intervention period using a paper booklet; however, due to the increased presence and use of electronic devices, would utilizing an app on a tablet or smartphone be easier/more desirable in order to gather data throughout the implementation of such an intervention?

Regarding the appropriateness of a *Tiny Tastes*-like intervention for the ASD population. Research has shown that children with ASD who have feeding difficulties continue to struggle with those difficulties throughout adolescence and adulthood (Kuschner et al., 2015); however, *Tiny Tastes* has only been systematically implemented with children ages 3-7 years (Cooke, 2010); therefore, what changes need to be made specifically for an adolescent or adult population (e.g., developmentally appropriate and desired rewards etc.)? There is also a strong possibility that stickers may not work as an incentive for all (particularly older) children with ASD; therefore, what (non-food) rewards are more likely to work for these children? It is also important to assess whether the extrinsic rewards can be individualized for each child depending on their idiosyncratic interests and motivations.

The current study examined the need and feasibility of a parent-implemented intervention that addresses selective eating in ASD during childhood and adolescence. The following specific aims will be addressed and their accompanying hypotheses will be tested in the context of this study:

Hypotheses/Aims/Research Questions

Specific Aim 1: Examine the need for a home-based, parent-implemented intervention to address food selectivity in children and adolescents with ASD.

Hypothesis 1: We hypothesize that parents will endorse the need for this type of intervention to address feeding and eating challenges in children with ASD.

Specific Aim 2: Examine the feasibility and appropriateness of a home-based, parent-implemented intervention to address food selectivity in children and adolescents with ASD.

Hypothesis 2a: We hypothesize that parents will indicate that a home-based, parent-implemented intervention approach is feasible.

Hypothesis 2b: We hypothesize that parents will provide appropriate motivators/rewards for children with ASD older than 7 years of age, allowing for adaptation of the intervention to include a broader age range and developmental level beyond early childhood

Chapter 2: Methods

Participants

Participants in this study were parents of children with ASD. Participants were recruited from a convenience sample of parents of children and adolescents (ages 4-17 years old) with ASD who had previously participated in research at the GWU Lab of Autism and Developmental Neuroscience (GWU LADN). Emails with links to the two surveys were sent out to 25 parents of children with ASD via Research Electronic Data Capture (REDCap). Out of the 25 emailed invitations to participate in the study, seven parents expressed interest and completed the surveys. The average age of the seven children with ASD was 9.71 (+/- 2.81; Range=6-14 years). Consistent with expectations, a 5:2 male to female ratio among the children with ASD was noted. All seven children were of Caucasian descent. Six parents had completed post-high school educational degrees (two parents with bachelor's degrees, three parents with master's degrees, and one parent with a doctorate degree) and one parent completed some college. None of the children had any food allergies. One child had a diagnosed gastrointestinal condition, ulcerative colitis (14-year-old). One child had a diagnosed eating disorder of anorexia nervosa (7-year-old). None of the children require any special diet.

Measures

The following questionnaires (See Appendix) were distributed and filled out by the child's parent or caregiver. The questionnaires were written in Standard American English (SAE) and required an 8th grade level reading proficiency in SAE to comprehend and answer. The two questionnaires—the Feasibility Questionnaire and the Background

Questionnaire—were administered online using REDCap. The Feasibility Questionnaire (FQ) consisted of 37 questions. Domains assessed by this questionnaire included: the parent's interest and ability to participate in a home-based intervention (i.e., Can they spend the 5-10 minutes per day for 10-14 days to target each vegetable?) and preferred method of data collection (e.g., paper booklet or smartphone/tablet app), professional consultations for picky eating including the specific professional (e.g., occupational therapist, speech-language pathologist, etc.) and duration/intensity of picky eating therapy services. The FQ also included questions about any current rewards or strategies that parents use, their satisfaction with those rewards/strategies, and their desire to learn more/different strategies.

The Background Questionnaire (BQ) consisted of 89 questions. The BQ included questions about the children's demographic information (e.g., age, sex, race/ethnicity, parent's highest completed education level, etc.). The BQ asked whether the child has a diagnosed feeding/eating disorder, and any other medical problems or diagnoses that affect their child's eating/feeding habits (e.g., food allergies/special diets, Temporomandibular Joint Dysfunction, gastrointestinal conditions, etc.). The BQ also assessed the child's status as a picky eater, including if the child's picky eating affects them/the family in social situations, health concerns due to the child's picky eating, mealtime flexibility (e.g., insistence on sameness, food preparedness, etc.), as well as sensitivities to the textures and smells of foods. The BQ asked a multiplicity of questions about the frequency of consumption of the six *Tiny Tastes* vegetables (e.g., carrots, celery, red peppers, cucumbers, cabbage, and sugar snap peas) and seven other broad food categories including: vegetables/vegetable juice, fruits/fruit juice, soft and crunchy

salty bread products (e.g., pasta, crackers), soft and crunchy sweet bread products (e.g., cookies, cake with frosting), dairy food and beverage (e.g., cheese, yoghurt, milk), unprocessed (e.g., steak, fish) and processed (e.g., chicken fingers, pepperoni) meats, and mixed foods (e.g., casserole, pizza). The four mealtime and mealtime flexibility questions were combined into a summary score. Similarly, due to the large number of questions asked regarding consumption of foods from the seven categories described above, scores from similar categories were combined. Specifically, two questions were asked about the consumption of each of the following vegetables/vegetable juice, fruits/fruit juice, salty bread productions, and sweet bread products dairy food/beverage. Three questions were asked about consumption of both processed and unprocessed meat.

Data Analytics Approach

Descriptive statistics were used to quantify parental endorsements of existing levels of community support to address eating challenges (e.g., parent satisfaction of available strategies/interventions from professionals), capability of/bandwidth to complete potential future intervention procedures, as well as adaptability of procedures and rewards for older children and adolescents with ASD. These data were linked with the demographic information and eating habits we gathered on their children.

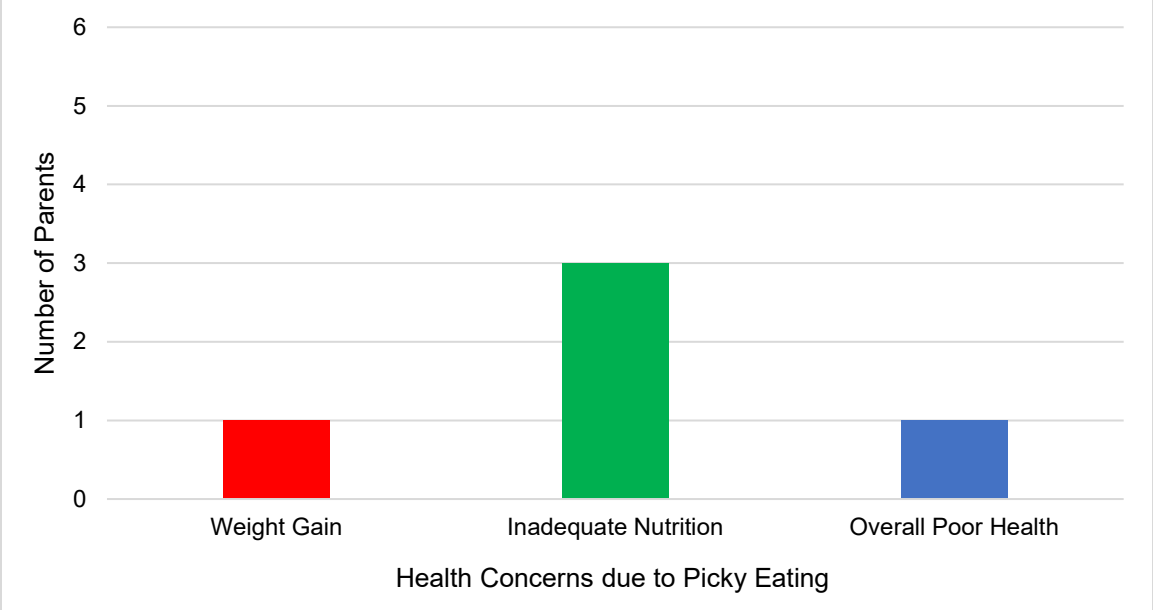
As the FQ was created specifically for this study, the validity for the FQ was established through linking the parent's desire and therefore, need for a parent-implemented picky eating intervention, with the behavioral characteristic (e.g., being a picky eater) of the child.

Chapter 3: Results

The Children and Picky Eating

Six of seven parents of children with ASD considered their child to be a picky eater; interestingly, the only parent who didn't consider their child to be a picky eater was the parent whose child was also diagnosed with anorexia nervosa. Five of the six parents of children with ASD who are picky eaters, indicated that they had a specific concern about their child's health due to their child's picky eating habits. One of the five parents was concerned about their child's weight gain. Three of the five parents were concerned about their children receiving adequate nutrition. One of five parents was concerned about their child's overall health. See Figure 1.

Figure 1. The parents' specific health concerns about their child's picky eating. This figure indicates that more parents are concerned that their child's picky eating will lead to inadequate nutrition (shown in green), than weight gain (shown in red) or overall poor health (shown in blue).

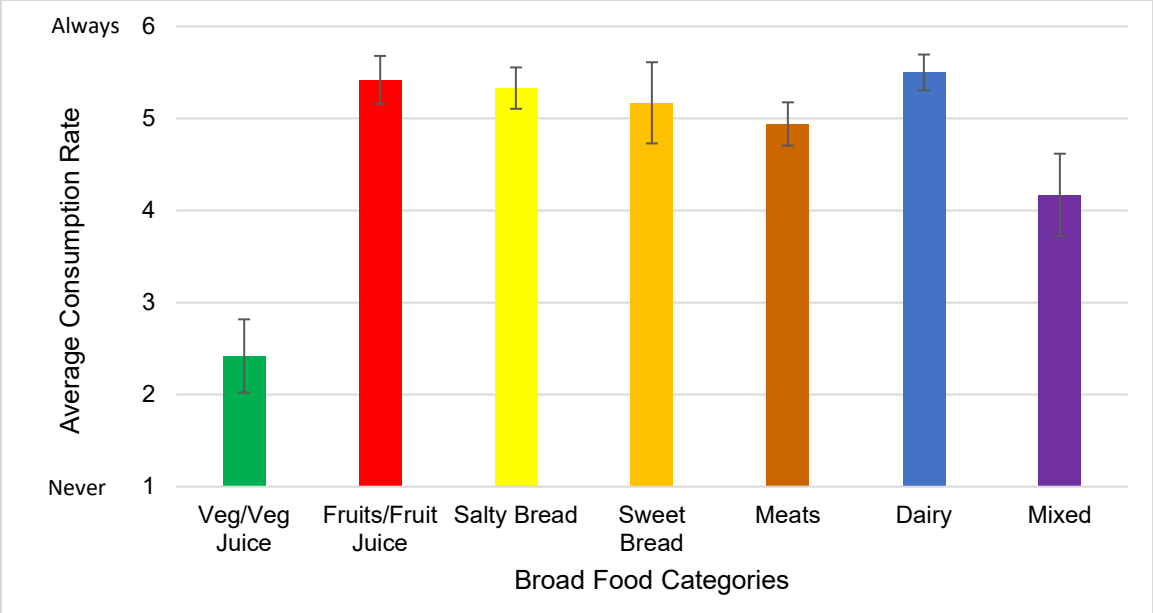


Consumption of Specific Vegetables and Broad Food Categories

As stated previously, parents were asked to rate the frequency that their child consumed the six vegetables (i.e., carrots, celery, red peppers, cucumbers, cabbage, and sugar snap peas) used in the original *Tiny Tastes* trial and seven other broad food categories. The frequency of consumption of each vegetable and broad food category was rated on a scale of 1 to 6 (i.e., 1, Never. 2, Rarely. 3, Less than half the time. 4, About half the time. 5, More than half the time. 6, Always).

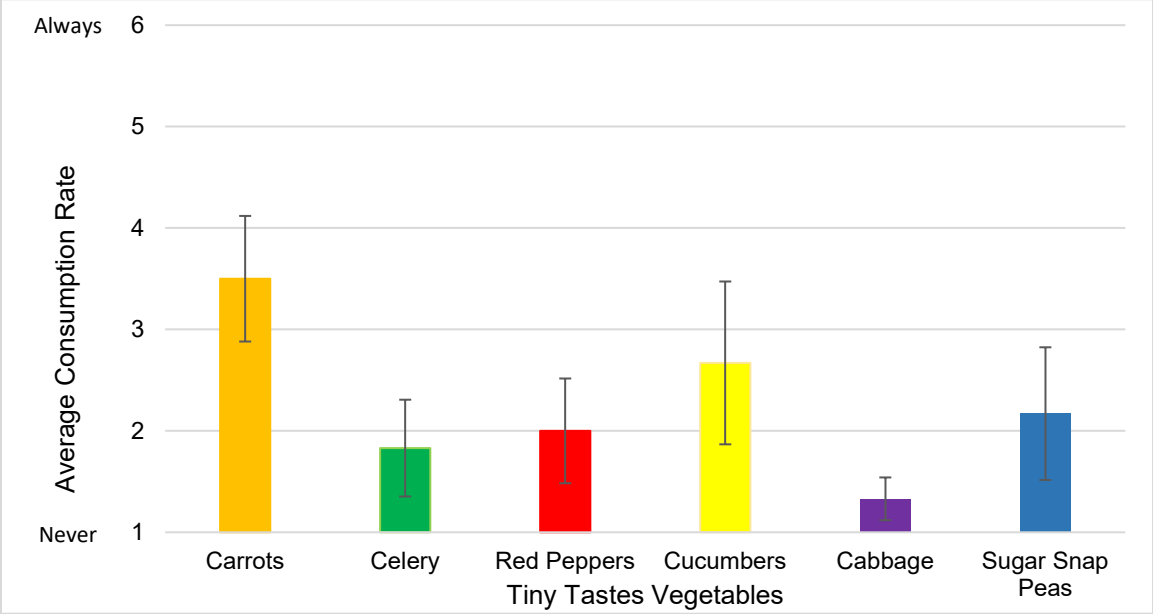
Data were gathered from the food category questions and the average consumption of each category was analyzed and compared to the other categories using the 1 to 6 rating scale. According to the parents, the children consumed dairy foods/beverages (5.5, +/-0.67) nearly always. The children consumed fruits/fruit juice (5.42, +/-0.90), salty bread products (5.33, +/- .78), sweet bread products (5.17 +/-1.53), and unprocessed/processed meats (4.94, +/-1.00) more than half the time on average. Mixed foods (4.17, +/-1.10) were consumed about half the time. Vegetables/vegetable juices (2.42, +/-1.38) were consumed only rarely. Of these seven categories, the children's' average consumption of vegetables was far below their average consumption of all other food categories. See Figure 2.

Figure 2. The children's average consumption rate (i.e., 1, Never. 2, Rarely. 3, Less than half the time. 4, About half the time. 5, More than half the time. 6, Always) of seven broad food categories. This figure illustrates the vast difference between the children's average consumption of vegetables (shown in green), versus the other six categories.



The average of each of the six *Tiny Tastes* vegetables was calculated and compared to the 1 to 6 scale of consumption. Five of the six parents who rated their children as picky eaters, indicated that their child never eats at least one of the six vegetables (i.e., carrots, celery, red peppers, cucumbers, cabbage, and sugar snap peas) used in the original *Tiny Tastes* trial. Of the six *Tiny Tastes* vegetables, carrots had the highest average consumption rate of 3.5 (+/- 1.52) which equated to about half the time. Cucumbers (2.67, +/-1.97) and sugar snap peas (2.17, +/- 1.60) were consumed less than half the time. On average, red peppers (2.00, +/- 1.26) and celery (1.83, =/- 1.17) were rarely consumed by these children. Cabbage (1.33 +/- 0.52) had the lowest average consumption rate, which equated to never consuming these foods, when presented. See Figure 3. Interestingly, four of the specific *Tiny Tastes* (e.g., celery, red peppers, cabbage, sugar snap peas) vegetables' average scores were similar to or lower than the summary vegetables/vegetable juices category score.

Figure 3. The average consumption rate (i.e., 1, Never. 2, Rarely. 3, Less than half the time. 4, About half the time. 5, More than half the time. 6, Always) of the six *Tiny Tastes* vegetables. This figure depicts that carrots (shown in orange) are the most consumed of the six *Tiny Tastes* vegetables, whereas cabbage (shown in purple) is the least consumed of these vegetables.

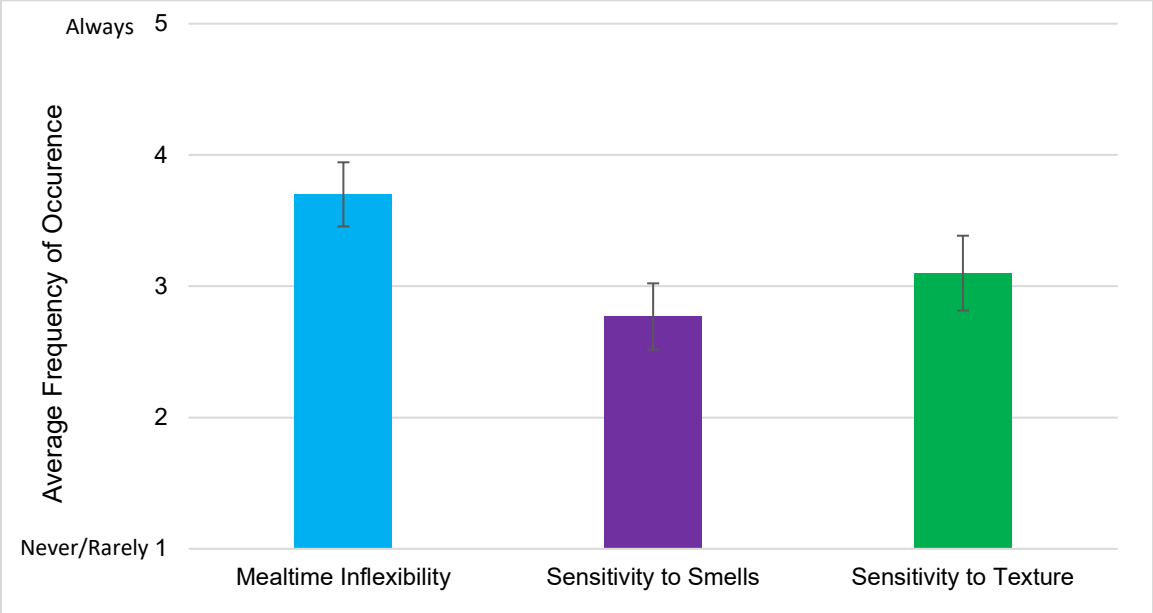


The Children's Negative Mealtime/Food Behaviors

Parents were also asked to rate their children's mealtime flexibility (e.g., seating arrangements, food preparations, same food at each meal), sensitivity to food smells, and sensitivity to food textures. Each category was rated on a scale of 1 to 5 (i.e., 1, Rarely or Never. 2, Less than half the time. 3, About half the time. 4, More than half the time. 5, Always). The children's average mealtime flexibility scores were 3.71 (+/- 1.20), indicating mealtime inflexibility occurs more than half the time. The children also had frequent sensitivities to both smell (2.77, +/- 1.38) and texture of foods (3.1, +/- 1.56);

however, children displayed slightly more sensitivity to the texture of foods. See Figure 4.

Figure 4. The Average Frequency of Occurrence (i.e., 1, Rarely or Never. 2, Less than half the time. 3, About half the time. 4, More than half the time. 5, Always) of Negative Mealtime/Food Behaviors. As shown in blue, this figure depicts that mealtime inflexibility occurs more than half the time. This figure also depicts that the children's sensitivity to textures of foods (as shown in green) occurs more than their sensitivity to the smells of foods (as shown in purple).



Clinical Significance of Picky Eating

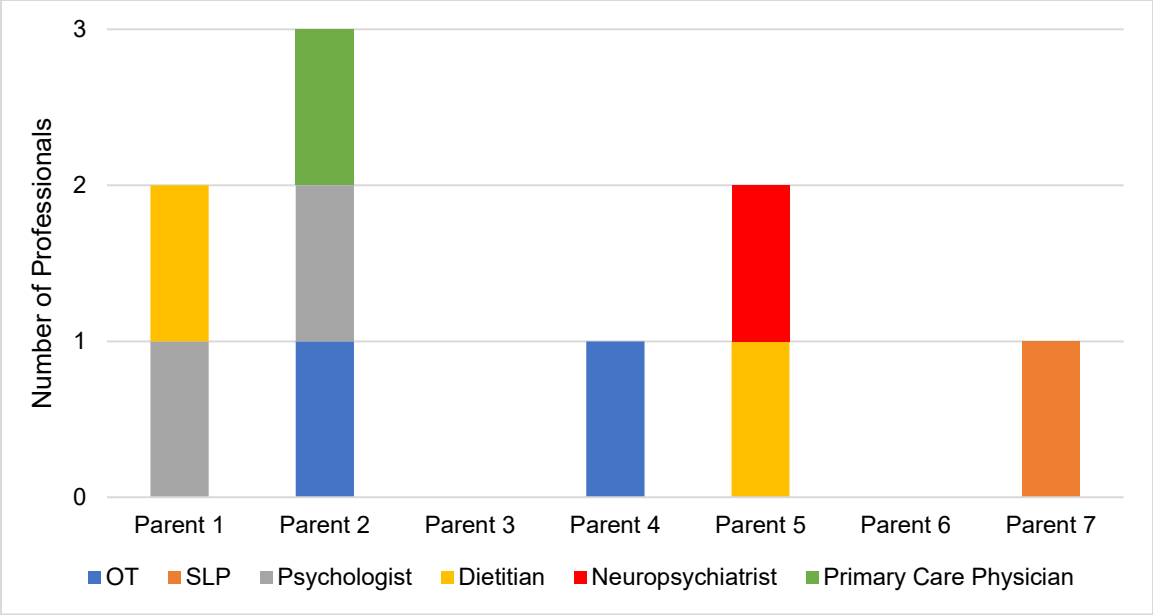
Parents were asked to rate how much their child's picky eating interfered with their daily functioning (e.g., nutritional sufficiency, school functioning, and friendships). Two of the six parents who rated their children as picky eaters, indicated that their child's eating challenges interfered with all of the following: nutritional sufficiency, school

functioning, and friendships. Because their picky eating interfered with everyday functioning, this is highly suggestive of an Avoidant Restrictive Food Intake Disorder (ARFID) diagnosis for these two children.

Professional Consultations

Out of the seven parents, five have consulted with professionals regarding services for picky eating. Three of these five parents have consulted with multiple professionals for picky eating services. Two parents consulted with occupational therapists (OT) weekly; one parent consulted with an OT weekly for one year, and the other parent consulted with the OT for four years. One parent consulted with a speech-language pathologist weekly for 6 months. Two parents consulted with a psychologist; one of these parents consulted with the psychologist weekly for 1 month, and the other parent consulted with the psychologist semi-regularly for four years (while also consulting with an OT weekly during those four years). Two parents consulted with a dietitian. One parent consulted with a neuropsychiatrist. One parent consulted with their primary care physician. See Figure 5.

Figure 5. Parents and the professionals they consulted about their child's picky eating. This figure illustrates that multiple professionals (each professional shown as one color on the graph) were consulted for picky eating. Five of the seven parents consulted with at least one professional.

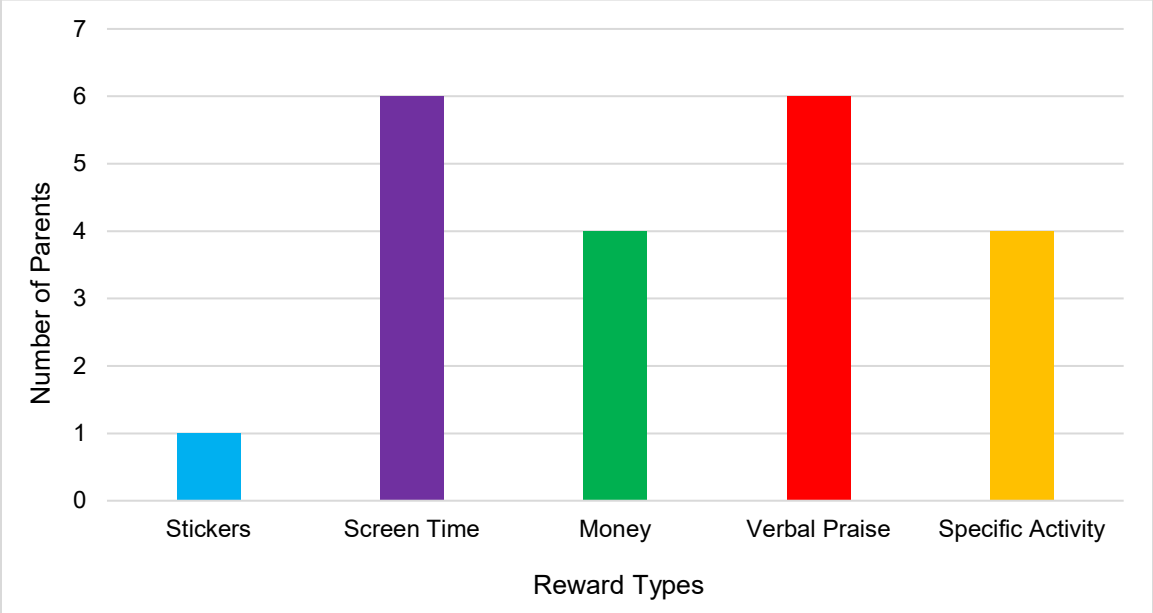


Strategies and Rewards

Six of seven parents currently use strategies to motivate their children to eat. Strategies included positive reinforcement, negative reinforcement, accommodations (e.g., giving the child their preferred food options), and exposure. Parents stated they learned the picky eating strategies they employed from various people and places. Three of the six parents used strategies they were given by professionals. One of the six parents used strategies found on the internet. One of the six parents used strategies given by their own parents (i.e., the child's grandparents). One of the six parents stated they used a multiplicity of strategies they themselves came up with and figured out which ones worked through trial and error. However, only four parents were satisfied with the strategies they used. Even though they are currently using strategies obtained from a variety of sources, including health professionals, these same five (of six) parents who rated their children as being a picky eater indicated they wanted to learn new strategies.

Parents were asked to rate which type of rewards would motivate their child. Three of the seven parents currently use rewards to motivate their children to eat. Rewards included verbal praise, screen time (e.g., videogames, iPad, etc.), and money. Six parents stated that receiving stickers would not motivate their child to try foods. However, it is important to note that the only parent who endorsed stickers as a good motivator had one of the younger children (an 8-year-old) in the sample. See Figure 6.

Figure 6. Number of parents (out of seven) who indicated these rewards would motivate their child to eat. these rewards would motivate their child to eat. Verbal praise (shown in red) and screen time (shown in purple) were both chosen by the most parents, whereas only one parent chose stickers (shown in blue).



Potential for Future Trial Study

Five of the seven parents expressed that they do see a need for a picky eating intervention they can implement at home. All seven parents expressed that they would be

interested in participating in research to develop a parent implemented feeding program. All seven parents stated they could spend the needed time each day (i.e., 5-10 min) to implement this intervention. All seven parents stated they were willing to compile a food diary on their children over a 2-3 week span. When asked about their preferred method of data collection for a picky eating intervention, three parents stated they would use either a smartphone/tablet app or a paper booklet to record data. Three parents stated they'd prefer using a smartphone/tablet app, while one parent stated they'd prefer recording data with a paper booklet.

Chapter 4: Discussion

People with ASD often have difficulties associated with eating and feeding (Sharp et al., 2013). Currently there are no easily accessible or widely implemented interventions that address the needs of children and adolescents with ASD that have mild to moderate eating and feeding difficulties. The aim of this study was to discover whether: 1) key stakeholders (i.e., parents of children with ASD) in the ASD community need/want easily implementable interventions; and 2) if so, what adaptations can be made to existing approaches such as *Tiny Tastes* (Cooke, 2010) which was tested on typically developing children only—that specifically fit the needs of the ASD population; and 3) if a *Tiny Tastes*-type intervention is feasible for parents to implement at home across a short (e.g., two week) period. Overall, this study found that parents expressed a need for a home-based picky eating intervention and that a *Tiny Tastes*-type intervention is feasible for them to implement. The data gathered through this study will lead to further research on the creation of novel programs and adaptation of existing programs to cater to the specific eating and feeding needs of people with ASD.

Desire for More Resources and Clear Sources

It is clear highly educated parents, such as those surveyed here, are consulting professionals to treat their children's selective eating. They are consulting a variety of professionals because there is no one clear resource. Considering that the parents are continuing to seek more help, the current strategies they are receiving are not enough. Additionally, they are seeking advice from other sources beyond professionals, such as family members, internet searches, etc. and trying them out at home. Consistent with this

desire for more information and additional strategies to address this concern around eating, all of the parents endorsed a willingness to participate in future studies on a parent-implemented intervention for food selectivity in ASD. This is perhaps unsurprising, since no such program has been rigorously tested in this population.

Picky Eating Continues Past Developmental Window

Studies have shown that typically developing children may go through a picky eating phase, but they often leave that phase during their later preschool or early school-age years. In contrast, picky eating in children with ASD persists well beyond that early developmental window (Bandini et al., 2017; Kuschner et al., 2015; Suarez et al.,2014). It is important to note that the children in this study ranged between 6 and 14 years of age. Only one of the six picky eating children is within the 3-7 years age range evaluated in the *Tiny Tastes* trials (Cooke, 2010; Fildes et al., 2014). All six of the children with ASD rated as picky eaters by their parents in the current study were well beyond their preschool years. This provides further evidence that many children with ASD in the community are continuing to have picky eating difficulties beyond that of their typically developing peers much later in development and that a need remains for intervention development and implementation.

The current study demonstrates that these children with ASD who are also picky eaters are not consuming the six *Tiny Tastes* vegetables the majority of the time these vegetables are given to them. The fact that these children are not consuming these vegetables, suggests that they remain good candidates for an upcoming trial of *Tiny Tastes* even among older children with ASD.

Negative Mealtime/Food Behaviors

It has been well documented that many children with ASD have sensory difficulties which may be linked to the mealtime inflexibility (e.g., insistence on sameness), and sensitivity to the texture and smells of foods. (Cermack et al.,2014). The data collected in this study indicates that these children have sensitivities to both the textures and smells of foods as well as mealtime inflexibilities. Therefore, it is possible that a *Tiny Tastes* intervention—which is based on increasing the exposure (i.e., consumption) of specific food—could be implemented in the ASD population, but with alterations from the original *Tiny Tastes* trials such as increased time for each food trial (i.e., more than 14 days for each food). Future research is needed to determine the necessary alterations.

Clinically Significant Interference of Picky Eating

Research on picky eating in ASD has shown that restricted food intake can lead to nutritional deficiencies and additional instantiation of barriers to social interactions (Sharp et al., 2013). Two of the six parents of picky eating children indicated that they are worried about their child's nutritional sufficiency and that their child has had social and school functioning difficulties related to their picky eating. It is unclear how a *Tiny Tastes*-esque intervention will fare for those with subclinical picky eating (i.e., no nutritional, school, or social interferences related to picky eating) versus those children with ARFID (i.e., picky eating that interferes with child's nutrition, school, and/or social functioning). Therefore, more research is needed to address these concerns.

Motivating Rewards

In the original research on *Tiny Tastes*, stickers were given as a reward option. However, as the age range for *Tiny Tastes* was for children ages 3-7 years, stickers may not be a viable option older children and adolescents with ASD (Cooke, 2010). When asked if stickers would be a motivating reward for trying foods, six of the seven parents responded that stickers would not be motivating for their children. The only parent who responded that stickers would be motivating, has an 8-year-old child; therefore, stickers may be age appropriate for this child and children of a similar developmental level. Previous research has shown that when coupled with repeated exposure to disliked foods, (non-food) rewards have been shown to increase the consumption of those foods (Remington et al., 2011; Corsini, et al.,2011; Cooke et al., 2011; Fildes et al., 2014). In this study, the two reward types that the majority of the parents stated would be the most motivating for their child were screen time and verbal praise. However, a few problems might arise if screen time is increased. Some parents and their children may have limited access to technology or choose to refrain from increased screen time. Another problem would be increase screen time leading to less exercise which could lead to a decrease in the child's overall health. Therefore, research and in-person trials are needed to determine appropriate and motivating rewards, as well as the possibility of individualizing rewards for each child.

Limitations

Although only an exploratory, pilot study, it is important to keep in mind study limitations and how that might affect interpretation of results. Due to the small sample size, it is difficult to presume that the responses found here are representative of all children with ASD. Along these same lines, because we did not evaluate these children in

person, we do not have a good sense of their language and intellectual abilities; thus, it is unclear how representative the sample is of the broader autism spectrum in terms of their ability level. Additionally, this study relied exclusively on parent report for data collection; thus, it would be helpful for future research to utilize other assessment techniques to provide additional precision in quantification of eating behaviors and traits, in particular.

Future Directions

The data gathered through this study will lead to further research on the creation of novel programs and adaptation of existing programs to cater to the specific eating and feeding needs of people with ASD. Conducting additional studies including those with larger sample sizes, will enable accounting for co-occurring conditions (e.g., the children in this study with diagnoses of anorexia nervosa or ulcerative colitis) that could have affected results. Further research is also needed to identify and pinpoint appropriate and easily distributed rewards that are motivating for both children and adolescents with ASD. Finally, the primary long-term goal, particularly given the overall positive feedback from the current study, is to run a trial that utilizes an adapted *Tiny Tastes*-esque intervention among children with ASD to assess its efficacy and effectiveness.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Authors.

Bandini, L. G., Curtin, C., Phillips, S., Anderson, S. E., Maslin, M., & Must, A. (2017). Changes in food selectivity in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *47*(2), 439-446.

Birch, L. L. (1993) Children, parents and food. *British Food Journal, 95*(9), 11-15. http://doi.org/10.1108/00070709310045013

Cermak, S. A., Curtin, C., & Bandini, L., (2014) Sensory sensitivity and food selectivity in children with autism spectrum disorders. *Journal of the American Dietetic Association, 110*(2) 2061-2076. http://doi.org/10.1016/j.jada.2009.10.032

Chawner, L. R., Blundell-Birtill, P., & Hetherington, M. M. (2019). Interventions for increasing acceptance of new foods among children and adults with developmental disorders: A systematic review. *Journal of Autism and Developmental Disorders*, *49*(9) 3504-3525. http://doi.org/10.1007/s10803-019-04075-0

Cooke, L. J., Chambers, L. C., Añez, E. V., Croker, H. A., Boniface, D., Yeomans, M. R., & Wardle , J., (2011). Eating for pleasure or profit: The effect of incentives on children's enjoyment of vegetables. *Psychological Science*, *22*, 190-196.

Cooke, L. J. (2010). *Tiny Tastes* manual. University College London and Weight Concern. London, UK.

Corsini, N., Slater, A., Harrison, A., Cooke, L., & Cox, D. N. (2011). Rewards can be used effectively with repeated exposure to increase liking of vegetables in 4–6-

year-old children. *Public Health Nutrition, 16*(5), 942-951. http://doi.org/10.1017/s1368980011002035

Fildes, A., Jaarsveld, C. H., Wardle, J., & Cooke, L. (2014). Parent-administered exposure to increase children's vegetable acceptance: a randomized controlled trial. *Journal of the Academy of Nutrition and Dietetics, 114*(6), 881-888. http://doi.org/10.1016/j.jand.2013.07.040

Kanner, L. (1943) Autistic disturbances of affective contact. *Nervous Child, 2*, 217-250.

Kuschner, E. S., Eisenberg I. W., Orionzi B., Simmons W. K., Kenworthy L., Martin A., & Wallace G. L. (2015). A preliminary study of self-reported food selectivity in adolescents and young adults with autism spectrum disorder. *Research in Autism Spectrum Disorders, 15*(16), 53-59. http://doi.org/10.1016/j.rasd.2015.04.005

Kuschner, E. S., & Wallace, G. L. (2020). Eating issues in autism spectrum disorder. In S. White, B. Maddox, & C. Mazefsky (Eds.) *Oxford Handbook of Autism and Co-Occurring Psychiatric Conditions*. In press.

Maenner, M. J., Shaw, K. A., Baio, J., Washington, A., Patrick, M., DiRienzo, M., Christensen, D. L., Wiggins, L. D., Pettygrove, S., Andrews, J. G., Lopez, M., Hudson, A., Baroud, T., Schwenk, Y., White, T., Robinson Rosenberg, C., Lee, L., Harrington, R. A., Huston, M., . . . Dietz, P. M. (2016). Prevalence of autism spectrum disorder among children aged 8 years –Autism and developmental disabilities monitoring network, 11 sites, United States. *Morbidity and Mortality Weekly Report Surveillance Summaries 2020, 69*(4), 1-12. http://doi.org/10.15585/mmwr.ss6904a1

Remington, A., Añez, E., Croker, H., Wardle, J., & Cooke, L. (2011). Increasing food acceptance in the home setting: A randomized controlled trial of parent-administered taste exposure with incentives. *The American Journal of Clinical Nutrition, 95*(1), 72-77. http://doi.org/10.3945/ajcn.111.024596

Sharp, W. G., Berry, R. C., Mccracken, C., Nuhu, N. N., Marvel, E., Saulnier, C. A., Klin, A., Jones, W., & Jaquess, D. L. (2013). Feeding problems and nutrient intake in children with autism spectrum disorders: a meta-analysis and comprehensive review of the literature. *Journal of Autism and Developmental Disorders, 43*(9), 2159-2173. http://doi.org/10.1007/s10803-013-1771-5

Sharp, W. G., Volkert V. M., Scahill, L., McCracken, C. E. & McElhanon, B. (2017). A systematic review and meta-analysis of intensive multidisciplinary intervention for pediatric feeding disorders: How standard is the standard of care? *The Journal of Pediatrics, 181*(4), 116-124. http://doi.org/10.1016/j.jpeds.2016.10.002

Suarez, M. A., Nelson, N. W., & Curtis, A. B. (2014). Longitudinal follow-up factors associated with food selectivity in children with autism spectrum disorders. *Autism, 18*(8), 924-932. http://doi.org/10.1177/1362361313499457

Zickgraf, H. F., Richard, E., Zucker, N. L., & Wallace, G. L. (2020). Cognitive rigidity and oral texture sensitivity: Independent contributions to picky eating in four samples with typical and atypical development. *Journal of Clinical Child and Adolescent Psychology*. In press.

Feasibility Questionnaire

*Disclaimer: many of the questions below use the term "picky eating" to encompass a range of feeding difficulties including: "selective eating", "food refusal", "being afraid to try new foods", etc. *

Question	Answer Choices
1. Do you currently or have you previously consulted with an Occupational Therapist (OT) for picky eating	Yes No
1b. How often are/were your sessions with the OT (e.g., weekly, monthly, etc.)	Fill in
1c. At what age were these services used?	Drop down list/fill in
1d. How long (in months/years) were you consulting the OT for picky eating?	Fill in
2. Do you currently or have you previously consulted with a Speech-Language Pathologist (SLP) for picky eating?	Yes No
2b. How often are/were your sessions with the SLP (e.g., weekly, monthly, etc.)?	Fill in
2c. At what age were these services used?	Drop down list/fill in
2d. How long (in months/years) were you consulting the SLP for picky eating?	Fill in
3. Do you currently or have you previously consulted with a Psychologist for picky eating?	Yes No
3b. How often are/were your sessions with the Psychologist (e.g., weekly, monthly, etc.)?	Fill in
3c. At what age were these services used?	Drop down list/fill in
3d. How long (in months/years) were you consulting the Psychologist for picky eating?	Fill in
4. Do you currently or have you previously consulted with a Dietitian for picky eating?	Yes No
4b. How often are/were your sessions with the Dietitian(e.g., weekly, monthly, etc.)?	Fill in
4c. At what age were these services used?	Drop down list/fill in

4d. How long (in months/years) were you consulting the Psychologist for picky eating?	Fill in
5. Do you currently or have you previously consulted with any other type of professional for picky eating?	Yes No
5b. What other type of professional do you/ have you consulted with regarding picky eating?	Fill in
5c. How often are/were your sessions with this professional (e.g., weekly, monthly, etc.)?	Fill in
5d. At what age were these services used?	Drop down list/fill in
5e. How long (in months/years) were you consulting this other type of professional for picky eating?	Fill in
6. Do you currently or have you previously used any strategies to address picky eating?	Yes No
6b. If you do use or have used a strategy for picky eating, describe the strategy.	Fill in N/A
6c. If you do use a strategy for picky eating, where did you learn that strategy from?	Fill in N/A
6d. If you currently or have used strategies in the past, have you been satisfied with those strategies?	Yes No N/A
7. Would it be helpful to learn more strategies to help with picky eating?	Yes No
8. Which of these rewards motivate your child?	Stickers Screen Time Money Praise (e.g., telling them "great job!", etc.) Specific Activity (e.g., going to the park, going to the movies, etc.)
9. Are there any other rewards you use to motivate your child?	Fill in
10. Do you currently reward your child to motivate them to try new foods?	Yes No
10b. What rewards do you currently use to motivate your child to try new foods?	Fill in
11. Would receiving stickers motivate your child enough to try/eat new foods?	Yes No
12. Do you see a need for an intervention that you can complete on your own at home to address picky eating?	Yes No

13. Would you be interested in participating in a study that examines the effectiveness of a new parent implemented intervention to address picky eating?	Yes No
14. Would you be willing to spend 5-10 minutes a day outside of meal times over 2-3 weeks in order to complete this type of intervention to address picky eating?	Yes No
14b. If not, what are the barriers that limit your participation for this type of study and time commitment?	Fill in
15. Would you be likely to use: 1) a smartphone or tablet app, 2) a paper booklet sent to you in the mail, or 3) both to gather data?	App Booklet Both
16. Would you be willing to compile a food diary of your child's eating habits everyday over a 2-3 week period as part of this type of study?	Yes No

Background Questionnaire

*Disclaimer: many of the questions below use the term "picky eating" to encompass a range of feeding difficulties including: "selective eating", "food refusal", "afraid to try new foods", etc. *

Question	Answer Choices
1. What is your child's age?	Drop Down List (Ages 4-17)
2. What is your child's sex?	Male Female Other
3. What is your child's gender identification?	Male Female Non-Binary Other
4. What is your child's race/ethnicity?	Asian or Pacific Islander Black or African American Hispanic or Latino Native American or American Indian White or Caucasian Other (please specify)
5. What is the highest level of education completed by one or both parents?	Some High School High School or GED Some College Bachelor's Degree (BA, BS)

	Master's Degree (MA, MS, MEd) Doctorate Degree (PhD, EdD) Other (please specify)
6. What was your child's diagnosis?	Autism Spectrum Disorder (ASD) Autism/Autistic Disorder Asperger's Syndrome Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS)
7. At what age was your child diagnosed?	Drop Down List (ages 2-17)
8. Which medical professional diagnosed your child?	Pediatrician Psychologist Psychiatrist Neurologist Other (please specify)
9. What is your child's height? (in inches)	Fill in
9b. How confident are you regarding the accuracy of your child's height?	Sliding scale (percentage %)
10. What is your child's weight? (in pounds)	Fill in
10b. How confident are you regarding the accuracy of your child's weight?	Sliding scale (percentage %)
11. Does your child have any food allergies?	Yes No
11b. Which food allergies does your child have?	Fill in
12. Does your child have any gastrointestinal conditions?	Yes No
12b. What gastrointestinal condition does your child have?	Gastrointestinal Esophageal Reflux Disease (GERD) Crohn's Disease Celiac's Disease Irritable Bowel Syndrome (IBS) Other (please specify)
13. Does your child have Temporomandibular Joint Dysfunction (TMJ)?	Yes No

13b. Does TMJ cause your child difficulties with eating/feeding?	Yes No
13c. What eating/feeding difficulties does TMJ cause for your child?	Fill in
14. Does your child require a special diet? (e.g., gluten free, etc.)	Yes No
14b. What is your child's special diet (i.e., what food restrictions are part of this diet)?	Fill in
15. Has your child been diagnosed with an eating/feeding disorder?	Yes No
15b. What eating/feeding disorder was your child diagnosed with?	Fill in
16. Has your child experienced significant weight loss in the past month? (e.g., lost 5 lbs. or more?)	Yes No
17. Is your child willing to try new foods?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
18. Does your child dislike certain foods and won't eat them?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
19. Do you consider your child to be a picky eater?	Yes No
19b. If yes, when did your child start becoming a picky eater?	From birth 1 year 2 years 3 years 4 years 5 years 6 years 7 years
19c. Does your child's picky eating keep them from participating in social gatherings with food?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
20. Are you concerned that your child's picky eating is affecting their health?	Yes No

20b. Which of the following are you concerned about?	Inadequate Nutrition Weight Loss Weight Gain Overall Poor Health
21. How often does your child eat carrots?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
21b. If never, what is the reason your child never eats carrots?	1-Never been offered carrots 2-Child always refuses carrots
22. How often does your child eat celery	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6- Never
22b. If never, what is the reason your child never eats celery?	1-Never been offered celery 2-Child always refuses celery
23. How often does your child eat red peppers?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6- Never
23b. If never, what is the reason your child never eats red peppers?	1-Never been offered red peppers 2-Child always refuses red peppers
24. How often does your child eat cucumbers?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
24b. If never, what is the reason your child never eats cucumbers?	1-Never been offered cucumbers 2-Child always refuses cucumbers
25. How often does your child eat cabbage?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
25b. If never, what is the reason your child never eats cabbage?	1-Never been offered cabbage 2-Child always refuses cabbage
26. How often does your child eat sugar snap peas?	1-Always 2-More than half the time 3-About half the time

	4-Less than half the time 5-Rarely 6-Never
26b. If never, what is the reason your child never eats sugar snap peas?	1-Never been offered sugar snap peas 2-Child always refuses sugar snap peas
27. How often does your child eat vegetables?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
27b. If never, what is the reason your child never eats vegetables?	1-Never been offered vegetables 2-Child always refuses vegetables
28. How often does your child eat fruits?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
28b. If never, what is the reason your child never eats fruits?	1-Never been offered fruits 2-Child always refuses fruits
29. How often does your child drink vegetable juice?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
29b. If never, what is the reason your child never drinks vegetable juice?	1-Never been offered vegetable juice 2-Child always refuses vegetable juice
30. How often does your child drink fruit juice?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
30b. If never, what is the reason your child never drinks fruit juice?	1-Never been offered fruit juice 2-Child always refuses fruit juice
31. How often does your child eat salty and crunchy bread products (e.g., crackers)?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
31b. If never, what is the reason your child never eats salty and crunchy bread products (e.g., crackers)?	1-Never been offered salty and crunchy bread products (e.g., crackers) 2-Child always refuses salty and crunchy bread products (e.g., crackers)

32. How often does your child eat sweet and crunchy bread products (e.g., cookies)?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
32b. If never, what is the reason your child never eats sweet and crunchy bread products (e.g., cookies)?	1-Never been offered sweet and crunchy bread products (e.g., crackers) 2-Child always refuses sweet and crunchy bread products (e.g., crackers)
33. How often does your child eat salty and soft/chewy bread products (e.g., bagel, bread, pasta)?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
33b. If never, what is the reason your child never eats salty and soft/chewy bread products (e.g., bagel, bread, pasta)?	1-Never been offered salty and soft/chewy bread products (e.g., bagel, bread, pasta) 2-Child always refuses salty and soft/chewy bread products (e.g., bagel, bread, pasta)
34. How often does your child eat sweet and soft/chewy bread products (e.g., cake with frosting)?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
34b. If never, what is the reason your child never eats sweet and soft/chewy bread products (e.g., cake with frosting)?	1-Never been offered sweet and soft/chewy bread products (e.g., bagel, bread, pasta) 2-Child always refuses sweet and soft/chewy bread products (e.g., bagel, bread, pasta)
35. How often does your child eat unprocessed meats (e.g., steak, chicken on bone with skin)?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
35b. If never, what is the reason your child never eats unprocessed meats (e.g., steak, chicken on bone with skin)?	1-Never been offered unprocessed meats (e.g., steak, chicken on bone with skin) 2-Child always refuses unprocessed meats (e.g., steak, chicken on bone with skin)
36. How often does your child eat unprocessed meats with skin and bones removed (e.g., fish, boneless chicken)?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
36b. If never, what is the reason your child never eats unprocessed meats with skin and bones removed (e.g., fish, boneless chicken)?	1-Never been offered unprocessed meats with skin and bones removed (e.g., fish, boneless chicken) 2-Child always refuses unprocessed meats with skin and bones removed (e.g., fish, boneless chicken)
37. How often does your child eat processed meats (e.g., cold cuts, chicken fingers, pepperoni)?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time

	5-Rarely 6-Never
37b. If never, what is the reason your child never eats processed meats (e.g., cold cuts, chicken fingers, pepperoni)?	1-Never been offered processed meats (e.g., cold cuts, chicken fingers, pepperoni) 2-Child always refuses processed meats (e.g., cold cuts, chicken fingers, pepperoni)
38. How often does your child drink dairy beverages (e.g., milk)?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
38b. If never, what is the reason your child never drinks dairy beverages (e.g., milk)?	1-Never been offered dairy beverages (e.g., milk) 2-Child always refuses dairy beverages (e.g., milk)
39. How often does your child eat dairy (e.g., cheese, yogurt)?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
39b. If never, what is the reason your child never eats dairy (e.g., cheese, yogurt)?	1-Never been offered dairy (e.g., cheese, yogurt) 2-Child always refuses dairy (e.g., cheese, yogurt)
40. How often does your child eat mixed food (e.g., casserole, pizza)?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely 6-Never
40b. If never, what is the reason your child never eats mixed food (e.g., casserole, pizza)?	1-Never been offered mixed food (e.g., casserole, pizza) 2-Child always refuses mixed food (e.g., casserole, pizza)
41. Does your child prefer to eat the same food at each meal?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
42. Is your child flexible about mealtime routines (e.g., times for meals, seating arrangements, place settings, etc.)?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
43. Does your child prefer to have food *served* in a particular way?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
44. Does your child prefer to have food *prepared* in a particular way?	1-Always 2-More than half the time 3-About half the time

	4-Less than half the time 5-Rarely or never
45. Is your child sensitive to the smells of food?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
46. Does sensitivity to smells keep your child from trying new foods?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
47. Does sensitivity to smells keep your child from eating a variety of foods?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
48. Does sensitivity to smells keep your child from participating in social gatherings with food?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
49. Does sensitivity to food smells make your child gag?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
50. Is your child sensitive to the textures of foods?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
51. Does sensitivity to food textures keep your child from trying new foods?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
52. Does sensitivity to food textures keep your child from eating a variety of foods?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
53. Does sensitivity to food textures keep your child from participating in social gatherings with food?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never
54. Does sensitivity to food textures make your child gag?	1-Always 2-More than half the time 3-About half the time 4-Less than half the time 5-Rarely or never

55. Has your child experienced significant weight loss related to an eating problem?	Yes No
56. Has your child experienced significant weight gain related to an eating problem?	Yes No
57. Has your child experienced significant nutritional deficiency related to an eating problem?	Yes No
58. Has your child experienced interference with their school functioning related to an eating problem?	Yes No
59. Has your child experienced interference with friendships related to an eating problem?	Yes No