The Effects of a Group Intervention Including a Parent Education Component on Mealtime Behaviors of Young Children

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Abstract

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Mealtime challenges commonly occur in young children with and without disabilities. Mealtime challenges can lead to adverse health outcomes and parental stress. The high occurrence of mealtime challenges calls for the need for interventions including a parent education component. This study investigated the effects of a group intervention with a parent education component on the mealtime behaviors of young children. Results suggest that a group intervention with a parent education and training component can improve mealtime behaviors in children and feeding practices in parents, as well as decrease parental stress. Implications for families and children are discussed and suggestions for future research are presented.

Table of Contents

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Dedication

To my husband, Lucas Veverka, and our three children, Kara, Gabriel, and Edwin.

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List of Figures

List of Tables

Chapter 1

Mealtime challenges are commonly reported in young children with and without disabilities. Challenges such as selective acceptance of food or refusal to eat certain types or textures of food often occur with no known medical explanation (Budd et al., 1992; Ledford & Gast, 2006). Mealtime challenges can be detrimental to a child's health, social development, and family functioning. Severity and persistence of mealtime challenges can lead to poor health outcomes (Nicholls, Christie, Randall, & Lask, 2001). Persistence of food selectivity may put children at risk for inadequate caloric intake and nutritional deficiencies. Such outcomes can adversely affect nutritional status (Sharp et al., 2013; Zimmer et al., 2012) and health (Budd et al., 1992; Luiselli, 1989). Mealtime challenges can have negative impacts on the entire family. A positive correlation has been demonstrated between food selectivity and undesirable mealtime behaviors and parental stress (Curtin et al., 2015). Parents of children who demonstrate food selectivity report feeling anxiety over mealtimes and their child's health (Rogers, Magill-Evans, & Rempel, 2012; Suarez, Nelson, & Curtis, 2014). These feelings could negatively influence child-parent interactions and relationships.

Problem Statement

Mealtime challenges are commonly encountered by parents of young children. The literature has demonstrated repeatedly that mealtime challenges can lead to negative health impacts (Budd et al., 1992), negative effects on the parent-child relationship (Curtin et al., 2015), and negative impacts on parent mental health (Rogers et al., 2012). Despite a recurring discussion in the literature about the need to educate families on appropriate feeding practices, research on interventions conducted in

schools and/or homes and that include parent education are lacking. Interventions described in the literature are primarily conducted in clinical settings with the clinician as the service provider rather than in the natural environment settings such as homes and schools where mealtimes typically take place. Studies discussing feeding interventions mostly include older, school-aged children whose feeding issues have progressed to a point where negative impacts are being experienced. Little to no research is focused on young children when these challenges are first observed. The importance of prevention of health challenges is well documented (U.S. DHEW, PHS, 1979), but the literature on mealtime interventions is overwhelmingly focused on intensive, reactive interventions. It is important to redirect this focus to proactive, preventative interventions with very young children and their parents to decrease the issue of parent stress and before mealtime challenges develop to the point of requiring intensive, clinical interventions.

Research Questions

The purpose of this study was to address gaps in the literature on early intervention for mealtime challenges in toddlers. The intervention, a toddler lunch group, called "Lunch Bunch" with a parent education component consisted of (A) modeling intervention strategies for parents to try during home mealtimes, (B) parent education on applying basic strategies rooted in Applied Behavior Analysis (ABA) to mealtime behaviors, and (C) individualized intervention for each child in the lunch bunch group. This group occurred just before or after regularly scheduled play group attendance.

The study aimed to answer the following research questions:

(A) What effect will a group treatment package have on mealtime behaviors in young children with mealtime challenges?

(B) What effect will parent education and training have on parent feeding practices?

(C) Will a mealtime intervention including parent education decrease parental stress surrounding mealtimes?

(D) Can intervention conducted in a small group be effectively differentiated to lead to different skill acquisition for each participant?

The aim of this study was to develop an intervention to provide parents with strategies that can be easily embedded into home mealtimes to effectively increase appropriate mealtime behaviors and decrease inappropriate mealtime behaviors.

Chapter 2

Literature Review

This chapter provides an overview of the current literature on mealtime challenges in children with and without disabilities and identify the limitations of the literature. An overview is provided of what is known about typical and atypical selective eating, the prevalence of this phenomenon, and the development and maintenance of the issue of selective eating. An overview of identified effects on parents is provided. Next, a review of the current interventions for mealtime challenges for children with and without disabilities is provided. Finally, this chapter summarizes the gaps in the literature and the significance of filling these gaps.

Selective Eating

Defining Selective Eating

Many families experience the phenomenon of selective eating, more commonly referred to as picky eating, at some point during their child's early development.

Defining selective eating has proven difficult in the literature across disciplines. The most common behaviors that are associated with selective eating in the literature include unwillingness to try new foods (neophobia) and avoidance of certain foods (Dovey, Staples, Gibson, & Halford, 2008). Children who are described as selective eaters tend to especially avoid foods from the fruit and vegetable food groups (Cooke, Wardle, & Gibson, 2003; Dovey et al., 2008). Some studies have also included the presence of aberrant eating behaviors such as requiring food to be presented in a certain way or spitting food out as a trait of selective eating (Cardona Cano et al., 2015).

It has been argued that the lack of clear definitions for the phenomenon of selective eating is due to the lack of uniform assessments for mealtime behaviors (Dovey et al., 2008). Many studies on mealtime behaviors rely on parent reports or food records to identify children with selective eating (Jacobi, Agras, Bryson, & Hammer, 2003). Parents have reported on child behaviors such as longer feeding times or length of meals, lower nutritional variety, a limited number of foods consumed, and strong preferences concerning food presentation and preparation (Jacobi et al., 2003). It has been speculated that parental concern about intake could lead to higher parental reports of selective eating (Cooke et al., 2003). Jacobi and colleagues (2003) compared parental reports of selective eating to a standardized home feeding observation. The results showed that parentally reported selectivity is associated with a lower number and lower variety of foods consumed during the observation (Jacobi et al., 2003).

With the application of the current definitions of selective eating, it appears that these are relatively common behaviors seen in early childhood. However, differences lie in the persistence and severity of the behaviors relating to selective eating (Cardona

Cano et al., 2015). The behaviors included in current definitions apply to a heterogeneous group of children, including both children who fall within a developmentally typical range of selective eating and children who could be classified with the DSM-5 category of having avoidance/restrictive food intake disorder (ARFID) and fall into the range of selective eating being a clinical concern. Some have argued that it is important to differentiate between children with transient selective eating behaviors and those who are at risk for developing a feeding or eating disorder (Cardona Cano et al., 2015).

Prevalence of selective eating

Though many have attempted to report prevalence of selective eating in children, the lack of clear definitions make this a difficult task. While the research on prevalence has not identified an agreed upon percentage of young children with selective eating behaviors due to the lack of clear definitions and assessment strategies, it has been helpful in providing information about the incidence of parental reports and persistence of the behaviors. Parents identify selective eating as early as the first introduction to solid foods. Carruth, Ziegler, Gordon, and Barr (2004) found that 19% of children were perceived as selective eaters by their parents at age 4 months and this number increased to 50% at 24 months. In addition to the challenge of defining the behaviors associated with selective eating, another possible explanation for the variation in prevalence numbers is that studies differ in the ages included and in the definition of selective eating used (Mascola, Bryson, & Agras, 2010). In one study (Dubois, Farmer, Girard, Peterson, & Tatone-Tokuda, 2007), 1498 children were assessed for selective eating between ages 2.5 and 4 years. Thirty percent of the children were identified as

selective eaters at some point during the 18 months of the study. However, only 5.5% were identified as selective eaters across all three intervals. Mascola et al. (2010) assessed the course of selective eating between ages 2 and 11 years. The results showed that the prevalence of selective eating is at its highest during early childhood from ages 2.5 to 4.5 years. The incidence declined to low levels by 6 years of age. Children whose selective eating persisted at age 6 tended to remain high for the remainder of the study (Mascola et al., 2010). Despite the variation in prevalence estimates, other studies have confirmed these findings of selective eating being predominantly present during the preschool years (Cardona Cano et al., 2015).

Development and maintenance of selective eating

It is hypothesized that transient selective eating is a part of normal child development. Selective eating, however, can persist and lead to the development of clinical disorders (Cardona Cano et al., 2015). Because both trajectories present similarly in early childhood, the long term course of selective eating is not clear. Mascola et al. (2010) found that while selective eating declined after two years in over half of children in their study, 40% of children demonstrated selective eating behaviors that persisted past two years. Cardona and colleagues (2015) suggest that two thirds of children with selective eating behavior remit without intervention within three years. However, in other cases selective eating behavior might persist and/or intensify into adulthood or might develop after the preschool years (Cardona et al., 2015).

Mealtime Challenges in Children with Disabilities

Though the literature has described mealtime challenges as a developmentally typical phenomenon, special attention has been given to mealtime challenges in

children with disabilities. The prevalence of mealtime challenges in children with disabilities is thought to be significantly higher than children who are typically developing (Lukens & Silverman, 2014). However, as described above, the lack of definitions leads to vast discrepancies in the estimated prevalence in this population as well, ranging from 40-80% (Clawson & Elliott, 2014).

Mealtime challenges in children with disabilities have been discussed in the context of their specific diagnosis. There has been a great deal of research addressing the mealtime challenges of children with autism spectrum disorders (ASD). Common difficulties specific to children with ASD include food selectivity by texture, taste, brand, presentation, or appearance (Nicholls & Bryant-Waugh, 2009). Specific mealtime challenges are attributed to features of ASD such as attention detail, perseveration, fear of novelty and sensory impairments (Nicholls & Bryant-Waugh, 2009). In comparing eating behaviors and preferences of children with ASD and typically developing children, significant differences were found which showed that children with ASD have a narrower diet than typically developing peers (Schreck, Williams, & Smith, 2004).

Parents and Mealtime Challenges

A challenge resulting from the lack of uniformity in terminology and definitions surrounding mealtime challenges is a discrepancy between concern about mealtimes in parents and the views of professionals (Cardona Cano et al., 2015). Professionals view the majority of selective eating as a typical developmental phenomenon that typically resolves on its own by six years of age (Cardona Cano et al., 2015). Parents, however, express frustration at the dismissal of their concerns brought to the attention of healthcare providers. In a study by Kerwin and colleagues (2005), a majority of parents

surveyed about their children's mealtimes reported unusual eating habits. Within their findings, 30.3% of parents reported that mealtimes were stressful, and 38.2% of parents reported that their child's eating had negatively impacted their lifestyle. While 20.2% of parents reported that they sought help for a feeding difficulty, only 6.7% of parents stated that their child had a feeding problem. (Kerwin, Eicher, & Gelsinger, 2005).

When discussing mealtime challenges, it is crucial to discuss how these difficulties impact the entire family. Not only do mealtime challenges have an impact on parental stress levels and mental health, but also the relationships and interactions involved in the mealtime process can be negatively impacted (Mitchell, Farrow, Haycraft, & Meyer, 2013). For example, selective eating may cause conflict between parents regarding how their mealtime behaviors are handled (Jacobi et al., 2003). Parents who report selective eating in their child often also report behavioral challenges in interactions with their child and more general struggles in the family (Jacobi et al., 2003).

Persistent mealtime challenges can lead to significant strain on parents. Possible impacts include increasing burden of caregiving, stress, and social isolation (Greer, Gulotta, Masler, & Laud, 2008). The stress experienced by parents may be a source in the development and maintenance of feeding practices that maintain undesirable mealtime behaviors. Families experiencing mealtime challenges that are not defined as clinical problems typically will not receive professional help and may maintain negative

feeding practices (Mitchell et al., 2013). Figure 1 demonstrates the negative cycle that develops and maintains as a result of these factors.

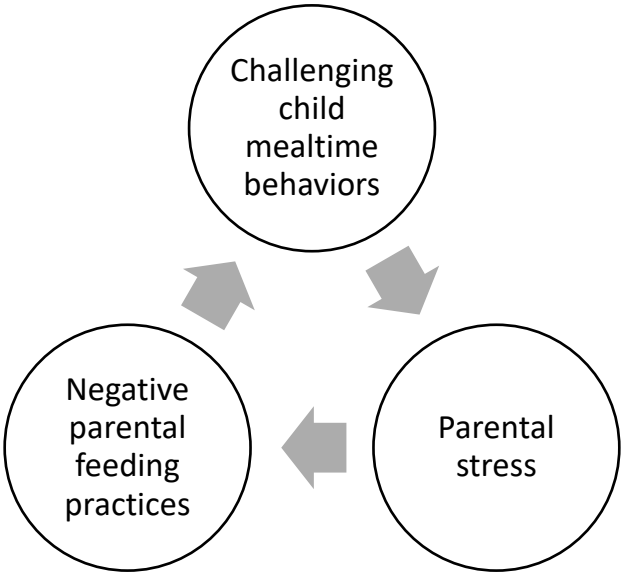

*Figure 1:*Negative Parent-Child Feeding Cycle

Many inappropriate feeding practices by parents have been identified in the literature. Mothers who were struggling with selective eating in their children reported using more pressure to get their child to eat, less monitoring of intake, and less variety offered to their child (Powell, Farrow, & Meyer, 2011). These practices are thought to stem from thoughts that the child is not eating enough at mealtimes or not receiving a healthy, balanced diet. However, these feeding practices were found to increase food avoidance behaviors (Powell et al., 2011). For example, if a child refuses to eat vegetables, the parent may feel increased stress about the child not receiving a balanced diet and pressure the child to eat the food, leading to an increase in refusal behaviors. This demonstrates the maintenance of the negative feeding cycle described above and can lead to mealtime being a negative experience for both child and parent (Powell et al., 2011).

Intervention for Mealtime Challenges

Interventions across disciplines

In a systematic review of the literature on the treatment of pediatric feeding disorders, Sharp and colleagues found that most children were treated at multidisciplinary, clinical feeding programs (Sharp, Jaquess, Morton, & Herzinger, 2010). All of the studies that met the inclusion criteria for the review indicated behavioral intervention as a main component of treatment. Lukens and Silverman (2014) also conducted a review of interventions utilized for the treatment of pediatric feeding challenges and found that many studies reported the use of multidisciplinary interventions. Effective interventions were shown to use behavioral, nutritional, oral-motor, and psychological interventions. This section will review intervention methods utilized in the treatment of mealtime challenges and disorders.

Applied Behavior Analysis in the Treatment of Mealtime

There has been a growing emphasis on behavioral treatment for mealtime challenges rooted in the field of Applied Behavior Analysis (ABA). The behavioral literature on interventions for mealtime behaviors is largely focused on consequence based strategies. These include reinforcement, punishment, and extinction interventions. Reinforcement is the presentation or removal of a stimulus that will increase the future likelihood of a behavior (Cooper, Heron, & Heward, 2007). In positive reinforcement, a stimulus is added to the environment following a behavior and the future occurrence of that behavior increases. An example of positive reinforcement during mealtime is providing praise for taking a bite and seeing the behavior of taking a bite increase. Or, a child might be reprimanded for throwing food on the floor and the

throwing behavior increases. In both scenarios, a stimulus is added to the environment (e.g., positive praise, negative attention) and the behavior increases. In the literature on interventions for mealtime challenges, positive reinforcement such as praise and access to highly preferred items has been used to increase acceptance of bites (Kahng, Boscoe, & Byrne, 2003; Luiselli, 2000).

Negative reinforcement has also been successfully used in mealtime interventions. In negative reinforcement a stimulus is removed from the environment following a behavior and the future occurrence of that behavior increases. A common application of this in the research on mealtime interventions is allowing escape from mealtime demands contingent on taking bites of a food (Kahng et al., 2003).

Though many studies use reinforcement in interventions for mealtime challenges, it has been argued that reinforcement alone is insufficient to effectively treat food refusal and increase consumption (Piazza, Patel, Gulotta, Sevin, & Layer, 2003). The general consensus among behavioral researchers in the area of feeding is that food refusal behaviors most frequently function to escape or avoid the demand of consuming food and therefore escape extinction is a necessary component (Piazza et al., 2003). However, studies have shown that in some cases reinforcement alone is sufficient (Casey, Cooper-Brown, Wacker, & Rankin, 2006). In two studies by Casey and colleagues (2006; 2009), schedules of reinforcement were manipulated to effectively increase consumption and decrease refusal behaviors. Parents were able to follow instructions to provide more reinforcement for desirable mealtime behaviors such as acceptance (Casey et al., 2006; Casey et al., 2009) .

In conjunction with the use of reinforcement in interventions, punishment and extinction have been widely utilized. By definition, punishment is a consequence that decreases the likelihood of a behavior happening again. One type of punishment procedure is positive punishment, in which a stimulus is added into the environment and behavior decreases (Cooper et al., 2007). An example of positive punishment for refusal behaviors is physical guidance to take a bite (W. H. Ahearn, Kerwin, Eicher, & Lukens, 1996). In this intervention, contingent on a child refusing food, the child is physically guided to bring the bite of food to their mouth and accept a bite following refusal behaviors (Kerwin, Ahearn, Eicher, & Burd, 1995). In a similar example, a chin prompt, in which gentle pressure was applied to the child's chin and lower lip for expulsion of foods, was used (Wilkins, Piazza, Groff, & Vaz, 2011). In negative punishment, a stimulus is removed from the environment following the occurrence of a behavior and the future likelihood of the behavior decreases. In one study, a child with refusal behavior was provided with access to highly preferred items which were removed when he engaged in refusal behaviors (Kahng et al., 2003). Other examples of punishment procedures used in clinical settings include hands down prompting in which the child's hands are physically guided down for aggressive food refusal behaviors, food representation when expelled, and the presentation of non-preferred foods contingent upon packing (holding food in the mouth without swallowing) behaviors (Babbit et al., 1994).

The most commonly used consequence based strategy in the literature on mealtime challenges is escape extinction. In extinction procedures, previously available reinforcement for a behavior is no longer provided in order to extinguish a behavior. In

an escape extinction procedure, the refusal behavior no longer is reinforced with escape from mealtime demands. A common example of escape extinction is referred to as non-removal of the spoon (Hoch, Babbitt, Coe, Krell, & Hackbert, 1994). In this procedure, the bite of food is presented in front of the child's mouth and not removed following instances of refusal behavior. Instead, the spoon is held at the child's mouth until the bite is accepted. Some have argued that the use of physical guidance should also be thought of as an escape extinction procedure rather than punishment because it is based on discontinuing access to escape (Ahearn et al., 1996). Expanding on this use of escape extinction, Tarbox and colleagues implemented a Non-Removal of the Meal procedure (NRM) in which a child getting up from the table was contingent upon finishing his meal (Tarbox, Schiff, & Najdowski, 2010). In this procedure, the mother was instructed to present a meal and deliver the instruction that her child can go play upon finishing the whole meal. If he did not finish the meal by bedtime or time for a scheduled activity, the food was represented during the following mealtime. The participant's behavior of acceptance and finishing the meal increased with this intervention.

In addition to the consequence based strategies discussed above, antecedent based strategies have been utilized in mealtime interventions. Antecedent based interventions involve manipulating stimuli in the environment before challenging mealtime behaviors occur.

Antecedent strategies for mealtime interventions typically involve manipulating the presentation of food. For example, the texture, taste, composition, and even brands and packaging could be changed systematically to encourage children to try different

foods (Luiselli & Luiselli, 1995). While some children may prefer crunchy foods, others may initially only be able to tolerate purees. Initially presenting foods in ways that are preferable for the child can decrease the probability of food refusal behaviors. Quantity of food presented can also effect mealtime behaviors. Some children consistently reject food when the quantity on the plate or spoon is large (Luiselli & Luiselli, 1995), but are more likely to accept foods when a spoon is just dipped in a puree or one small bite at a time is presented. Pacing is also an important consideration. Parents often present food at rapid rate. When the pace of bite presentations is slowed down, some children's acceptance may increase (Luiselli & Luiselli, 1995). Utensils used can make a difference. For example, the use of a Nuk brush has been effective in reducing expulsion when used in place of a regular spoon (Girolami, Boscoe, & Roscoe, 2007; Sharp, Harker, & Jaquess, 2010). Using the Nuk brush allows therapists or parents to distribute food around in the mouth, taking out the extra step for the child and therefore lessening the response effort required.

Some studies have considered stimulus fading procedures to blend preferred and non-preferred textures and flavors. In stimulus fading interventions, a food is gradually and systematically changed over time until the target stimulus is reached (Luiselli & Luiselli, 1995) For example a fading procedure can be used in which case thickening agents and food particles are slowly introduced and gradually increased in a puree or smooth food such as yogurt. Composition is gradually increased until the child is accepting coarser textures. Quantity can also be faded by first presenting a taste on the spoon and gradually increasing the quantity of food on the spoon (Luiselli & Luiselli, 1995) Similar procedures include fading from juice to applesauce by gradually adding

small amounts of applesauce onto a spoon with juice or gradually fading the spoon distance at which a therapist held a spoon from a child's lips (Bachmeyer, Gulotta, & Piazza, 2013; Rivas, Piazza, Patel, & Bachmeyer, 2010).

Gaps in the Literature

As previously discussed, a recurring theme in the literature on mealtime challenges is a call for an operationalized definition and an emphasis on placing selective eating on a continuum to separate typical development from clinical feeding disorders. Many studies have considered the development of selective eating and the different trajectories that the problem can take. The literature is lacking when it comes to discussing how to intervene proactively. Regardless of where a child falls on the continuum, early intervention is of utmost importance to consider. Although not all mealtime challenges lead to negative health outcomes and negative effects for parents, the lack of distinctive features and behaviors between children whose selectivity remits independent of intervention and those whose selectivity persists and develops into clinical disorders calls for early intervention to prevent the persistence of food selectivity and the development of concomitant negative outcomes (e.g., increased parent stress).

An overwhelming amount of literature provides support for interventions once children are referred to clinical settings for their mealtime challenges. However a large gap remains when it comes to identifying challenges early and intervening immediately. This section will outline the gaps in the literature and discuss how this study attempts to fill those gaps.

Intervention Strategies

It has been repeatedly stated in the literature that positive reinforcement procedures are typically not sufficient alone, calling for the use of escape extinction and/or punishment procedures (Ahearn, Kerwin, & Eicher, 2001). However, antecedent based interventions have rarely been discussed in the behavioral feeding literature. It is important to realize that it is not as simple as deciding between reinforcement, punishment, and extinction procedures. Less intrusive antecedent strategies warrant attention and consideration as well. Antecedent based interventions are an evidence-based strategy for changing behavior in a variety of domains. Though there are some examples of effective, antecedent based strategies in the literature, many gaps remain in how to best utilize such strategies.

There are aspects of presentation methods that have been anecdotally shown to be effective in increasing consumption that future research should consider. Previous research has not considered the effect of providing food choices to a child instead of the parent making all meal time decisions. Also, it would be beneficial to consider whether using certain utensils, plates, or other materials makes a difference in consumption for some children.

The existing literature shows promising results for the use of stimulus fading interventions. The stimulus fading procedures have almost always been paired with an aversive escape extinction procedure. It would be interesting to investigate the power of stimulus fading and other antecedent strategies on their own. It is important to conduct further research to determine behaviors and child characteristics for which fading alone would be sufficient. It would be beneficial for future research to look deeper into methods of combining and fading flavors to determine the effect on consumption of

new foods. Fading may also be an effective way to decrease rigidity surrounding mealtime. For example, children who insist on eating foods in a certain wrapper or with a certain brand may benefit from fading procedures to gradually change those stimuli.

In addition to stimulus fading, shaping is another technique that could be used for mealtime behaviors. In a shaping procedure, the antecedent stays the same and the required response gradually changes. For example, in a child who has total or near total food refusal, starting by teaching them to tolerate touch to their lips and gradually working up to the placement of food in their mouth may increase acceptance and decrease refusal behaviors. They may first receive reinforcement for tolerating a touch of a finger to their lips, then touch with a spoon, the placement of the tip of the spoon between the lips, the placement of the spoon into the mouth, and the placement of the spoon on the tongue (Luiselli & Luiselli, 1995). The response required gradually changes in order to receive reinforcement. In a procedure such as this one, small responses are reinforced and increased in small steps to prevent undesirable refusal behaviors.

Though shaping procedures are commonly utilized in the field of ABA, the research to support these procedures for mealtime behaviors is lacking. It would be beneficial to empirically test the use of this method to determine its effectiveness in increasing food consumption, willingness to try new foods, and other mealtime behaviors. Shaping may be an effective procedure for children who exhibit undesirable behaviors when asked to sit at the table by gradually requiring a longer time sitting at mealtime. It is important to test the utility of shaping methods without the use of escape extinction or punishment to determine if less intrusive methods can be used.

Non-contingent reinforcement (NCR) is another technique that has been discussed in the behavioral feeding literature. In non-contingent reinforcement, free access is provided to preferred stimuli regardless of refusal or acceptance behaviors. The idea behind NCR is to prevent the problem behavior from occurring. For example, children may receive access to favorite toys and play activities or attention while sitting at the table for mealtime (Cooper et al., 1995). However, because food refusal behaviors are often thought to be escape maintained, NCR has not been used in isolation of escape extinction in the literature. Parents have shown preference for NCR over other reinforcement procedures (Allison et al., 2012) when utilized with consequence based procedures. It is important for future research to further consider when NCR is most effective and how to utilize it to make interventions the least intrusive possible.

Modeling interventions have been mentioned in the literature as a possible method to avoid the necessity of intensive interventions. In one study, a peer model demonstrated consumption behaviors as well as encouraging the child to take bites. The results showed that the modeling increased consumption and the modeling with peer-mediation was more effective than modeling alone (Greer, Dorow, Williams, Mccorkle, & Asnes, 1991). Another study (Sira & Fryling, 2012) demonstrated the effects of a peer modeling procedure to increase consumption in a child with food selectivity in the natural environment. A sibling was used as a model to demonstrate consumption and receiving reinforcement. Maintenance data demonstrated that parents were able to implement the package in the home environment. Though modeling is

used often with socially significant behaviors, there has been little focus on using modeling for mealtime behaviors.

Intervention Settings and Providers

Many studies on interventions for mealtime challenges take place in either inpatient clinical settings or outpatient day-treatment settings (Linscheid, 2006). Few have described the implementation of interventions in outpatient settings, and a scarce number of studies have been implemented in natural environment settings such as home, child care, or school. Given the percentage of parents who report mealtime challenges, it is important to consider interventions that can be implemented in the natural environment.

Because intervention typically occurs on an in-patient basis, it is common for the intervention to be implemented by the professional rather than by the parent. In fact, parents are often absent from the treatment room initially (Linscheid, 2006). One rationale for this is that it is difficult for parents to watch intrusive interventions and remain calm while their child is distressed. Another reason is that therapists hypothesize that parents can serve as a discriminative stimulus for challenging mealtime behaviors (Linscheid, 2006). Some studies have demonstrated successful generalization of mealtime behaviors to the parent in the clinic after some parent coaching occurs. Though intensive programs in highly structured clinical settings have been shown effective in the literature, the logistics of getting children into such a program prove challenging. It is important to develop alternative treatment avenues to increase access to care for families who either cannot work out the logistics of attending an in-patient

program or for those whose feeding concerns are more mild and do not require intensive intervention (Sharp, Burrell, & Jaquess, 2014).

Parent Education

Parent education and training has been successfully utilized to change a variety of commonly reported childhood concerns such as behavioral challenges, toileting, and anxiety. Parents who experience challenges with their child at mealtime often report seeking out information from various sources. Though some turn to health professionals for help, many will seek support from friends and family members, the internet, and books (Mitchell et al., 2013). Advice that parents receive may be inaccurate, confusing, or ineffective. For example, a common piece of advice found on the internet and given by friends and family is to disguise healthy foods in preferred foods. However, though such a strategy may increase intake of healthy foods in the short term, children do not learn to eat the disguised food in the long-term. Many parents report self-managing their child's feeding needs due to the perceived lack of available information and professional expertise available (Mitchell et al., 2013).

Despite the knowledge of how prevalent mealtime challenges are and the adverse consequences they can lead to, parents typically do not receive information on feeding problems that can arise in childhood and what they can do in order to intervene on such challenges to develop a healthy, balanced diet (Mitchell et al., 2013). Pediatric feeding programs are not always accessible to families geographically or financially. Also, mild mealtime concerns do not necessitate participation in clinical feeding programs. Parent training is a possible venue for alternative treatment for families who would not otherwise receive services(Sharp et al., 2014). Feeding advice is often given

too late, once challenges have already developed and an aversive feeding relationship has developed. Ideally, families should be given information and be equipped with strategies proactively, before the transition to solid foods. Besides the possibility of parent training improving mealtime behaviors, involving parents in intervention may also enhance well-being, reduce stress, and improve self-efficacy (Sharp et al., 2014).

There are some studies to support success in involving parents in mealtime interventions. In the "Tiny Tastes" program, parents were given instructions to ask their child to try a tiny piece of one vegetable daily outside of mealtimes. They were given a progress chart and stickers as a way to reward the child for trying the food. This intervention showed an increase in the acceptance of disliked foods (Remington, Anez, Cooke, & Wardle, 2011). This was a relatively inexpensive intervention that did not require direct intervention by a professional.

Another program, called "Fun not Fuss with Food" taught parents techniques about giving verbal instructions, role modeling, and positive reinforcement to change mealtime behaviors (Fraser, Wallis, & St. John, 2004). This program was a single 2.5 hour parent education session. Parents rated child behaviors pre- and post-intervention and comparisons showed a decrease in the overall total problem eating scores. The fact that parent reports of challenges decreased after one educational session in a small group setting is promising. However, child behaviors were not actually measured and the sustainability of the results was unknown. Nevertheless, these results are encouraging for the effect on parental stress.

Another intervention that focused on parent education, "Fun with Food" (Haywood & McCann, 2009) served families of children under age 5 who were

experience a wide range of mealtime challenges such as unvaried diet, reluctance to try new foods, self-feeding challenges, and excessive milk consumption. This program consisted of four weekly sessions of parent education and interactions with food as well as setting weekly goals. The goal of this group intervention was prevention of mealtime challenges. Results showed a decrease in parent ratings of food problems and an increase of range of food eaten and enjoyment of food. A recurring theme in the studies on group interventions was the advantage of the social support that occurred as a result of the group setting (Mitchell et al., 2013). This suggests that presenting information in a group could be advantageous to participating families.

Sharp and colleagues (2014) developed a standardized curriculum for parents to apply to mealtime challenges specifically in children with ASD called the "Autism MEAL Plan." The purpose of this curriculum was specifically developed to manage eating aversions and low intake in children with ASD. The intervention consisted of 8 weeks of one hour long group parent training sessions. Structured content rooted in applied behavioral analysis was presented during each meeting. A homework assignment accompanied each weekly lesson to encourage parents to apply strategies with their children. The curriculum used broad examples and principles but parents were encouraged to individualize strategies for their specific situations. The program did not include live feeding activities with the child participating and was strictly focused on parent education. The results of this study showed a reduction in parenting stress but did not demonstrate improved feeding outcomes in children based on parent report on a questionnaire. The authors brought attention to the discordance between positive social validity ratings and lack of improved mealtime outcomes in children. While parents

enjoyed their participation and felt that the program led to a decrease in stress, they reported that their children's mealtime behaviors did not improve.

Studies that discuss incorporating parents in intervention are mostly conducted in home-based ABA treatment or in day-treatment intervention settings. Research on effective parent training in outpatient feeding therapy is lacking despite the fact that it may be especially relevant to consider in such programs (Murphy & Zlomke, 2016). Studies that have successfully included parents have shown success with incorporating live parent feedback and coaching during mealtimes (Anderson & Mcmillan, 2001; McCartney, Anderson, English, & Horner, 2005; Najdowski, Wallace, Doney, & Ghezzi, 2003; Pizzo et al., 2009; Seiverling, Williams, Sturmey, & Hart, 2012; Tarbox et al., 2010). These studies have primarily included consequence based strategies such as escape extinction. Also, most studies rooted in ABA which incorporate parents as interventionist achieve initial positive outcomes with the trained professional first before teaching the parent the strategy (Anderson & McMillan, 2001). Further, interventions in which parents were taught to implement intervention consisted of teaching very specific interventions (e.g. escape extinction, differential reinforcement) rather than teaching parents how to apply basic behavioral strategies to mealtime behaviors in general.

Though there is support for the efficacy of various interventions for mealtime challenges, there is little discussion about ways to disseminate this information to parents of children with difficulties at mealtimes or the effect that parent education has on child mealtime behaviors. Further, research on a preventative approach to educate and equip parents with strategies before first starting the feeding relationship is lacking.

Studies in which parents are taught intervention strategies typically achieve improved mealtime behaviors with the trained professional serving as the interventionist first before transferring effects to the parent. There is a gap in the literature when it comes to teaching parents strategies so they can be the initial change agent to intervene on the behavior to create desirable outcomes.

Early Intervention

The importance of early intervention for children with or at risk of disability has been repeatedly demonstrated in the literature (Fox, Dunlap, & Cushing, 2002). Research has shown that children who are at risk of a disability diagnosis are also more likely to develop challenging behaviors (Fox et al., 2002). Early intervention is the provision of services to children who have a diagnosed disability or are at risk of future diagnosis and their families. Early behavioral intervention has been well documented to decrease challenging behaviors through teaching appropriate alternative behaviors and manipulating the environment in ways that make problem behaviors unnecessary (Dunlap & Fox, 1999).

Early intervention has been found to be most effective when implemented in inclusive community environments and when the family is treated as a system (Fox et al., 2002). Behavior support should include strategies to prevent problem behavior as well appropriate replacement skills (Fox et al., 2002).

Despite documented success of using an early intervention approach to intervene on challenging behaviors, mealtime behaviors have seldom been included in early intervention discussions. Most of the research on mealtime interventions begins with children past the preschool age after challenging mealtime behaviors have

persisted for years. A gap in the current research remains on utilizing evidence based early intervention strategies to target challenging behaviors at mealtime in young children.

Small Group Intervention

Families who receive services for mealtime challenges often receive one-to-one instruction by a trained professional. Though these interventions have been shown to be effective, there are many limitations to one-to-one intervention. In educational settings, one-to-one instruction has been deemed costly (Ledford, Lane, Elam, & Wolery, 2012) because it requires more staff to maintain the necessary staff ratios (Kamps, Walker, Maher, & Rotholz, 1992), specialized settings, and more materials. Another issue is that studies have shown challenges with skill generalization across people or settings when students are taught in a one-to-one format (Kamps et al., 1992). Perhaps one of the biggest concerns with one-to-one instruction or intervention is that it restricts social integration (Ledford, Gast, Luscre, & Ayres, 2008) and reduces participation in mainstream activities (Kamps et al., 1992). For mealtime, intervention in clinical settings could mean reduced access and participation in family and school mealtimes and other events. This leads to restricted access to social opportunities.

One response to the limitations presented with one-to-one instruction has been to implement and research effective small group instruction strategies. One benefit of small group instruction is that it provides opportunities for social interactions among peers (Ault, Wolery, Gast, Doyle, & Martin, 1990). This is beneficial for the modeling of appropriate skills for children by their peers. In the research on small group instruction, observational learning is often discussed as a beneficial outcome (Ledford & Wolery,

2013). Observational learning occurs when one student learns another student's target skill or behavior without any direct instruction or reinforcement of that skill (Ledford et al., 2008).

Small group instruction also naturally embeds skills such as turn-taking, waiting for a turn, waiting for attention, and socialization (Ault et al., 1990). Small group instruction has been shown to be effective for a variety of academic skills (Ledford et al., 2008) but little is known on small group instructional practices for adaptive skills, such as mealtime behaviors.

Small group instruction involving parents may have social advantages for parents dealing with mealtime challenges. However, research on the effects of small group intervention on parental stress and feeding practices is lacking.

Ethical Considerations

Although the research has shown escape extinction, particularly non-removal of the spoon, to be effective in the reduction of refusal behaviors and increase of food acceptance, there are gaps in the current literature that are of concern. First, it is concerning that there is a lack of consensus on whether non-removal of the spoon and physical guidance are extinction procedures or punishment procedures. This is an important distinction to make. If these interventions are effective because they are punishment procedures, children learn to consume food in order to avoid the aversive of the physical prompt or the spoon following their mouths. This can be associated with unwanted side effects and ethical issues.

Punishment is sometimes associated with the increase of other undesirable behaviors (Cooper et al., 2007). Mealtime sessions utilizing non-removal of the spoon

are often longer and allow for more corollary behaviors such as negative vocalizations and disruptions (Ahearn et al., 2001). It is also important to consider that parents may find such procedures unacceptable and be less likely to implement them with fidelity (Allison et al., 2012).

The ethics code of the Behavior Analyst Certification Board (BACB) specifically discusses consideration of punishment procedures (BACB, 2014). The ethics code states that “behavior analysts recommend reinforcement rather than punishment whenever possible (4.08a).” Further, the code states that “before implementing punishment-based procedures, behavior analysts ensure that appropriate steps have been taken to implement reinforcement-based procedures unless the severity or dangerousness of the behavior necessitates immediate use of aversive procedures (4.08c).” The BACB ethics code also states that “behavior analysts review and appraise the restrictiveness of procedures and always recommend the least restrictive procedures likely to be effective (4.09).” In the behavioral research on the use of aversive strategies for mealtime behaviors, there is no discussion relating to the BACB ethics code. Research studies that utilize aversive procedures seldom include discussion of why such procedures are necessary and documentation that reinforcement-based procedures have been unsuccessful.

There is little discussion about when the use of punishment procedures is acceptable. For example, questions about the severity of the mealtime challenge and how much time to give other, less intensive procedures should be considered prior to making a decision to use an intensive intervention. Another concern for the use of punishment procedures in treating mealtime challenges is that eating meets a biological

need. If children learn to eat to avoid aversive stimuli, their ability to respond to hunger cues and self-regulate could potentially be affected. Collaboration with medical professionals seems necessary to further research this issue and take it into account when choosing an intensive intervention.

Social validity

In the field of ABA, an important measure of the efficacy of an intervention is its social validity. Social validity looks at social significance of the goals, social appropriateness of the procedures, and social importance of the effects (Wolf, 1978) Social validity is a secondary outcome measure. It does not address the effectiveness of the intervention, rather it is a strategy to evaluate the acceptability and therefore the chances for sustainability of an intervention (Schwartz & Baer, 1991). There has been a lack of discussion in the literature of social validity when it comes to interventions for mealtime challenges. As previously discussed, feeding interventions are commonly implemented in clinical settings with clinicians implementing the intervention. However, parents may find these intrusive interventions difficult to watch and even more so to implement themselves (Tarbox et al., 2010). Eventually, parents are the ones who will need to be able to implement intervention so their acceptance of it is crucial to the maintenance of improved outcomes.

Generalization and Maintenance of Intervention Outcomes

Generality is one of the defining dimensions of applied behavior analysis. Generality means that a behavior is durable over time and appears in a wide variety of environments (Baer, Wolf, & Risley, 1968). This is particularly important for mealtime interventions because they need to be able to generalize from clinical settings to natural

environments or from implementation by feeding therapists and clinicians to implementation by parents and caregivers. An effective behavioral approach to mealtime interventions should take generalization into account in the planning and implementation of interventions. However, despite generality being a central characteristic of ABA, there is little discussion about generalization of improved mealtime behaviors to home environments and maintenance over time after intervention has ended.

Addressing Gaps in the Literature

The Lunch Bunch intervention package utilized in this study was designed with the aforementioned gaps in the literature in mind. Table 1 provides an overview of current knowledge, unanswered questions, and the way in which this study aimed to address these gaps in the literature.

Table 1

Gaps in the Literature Addressed by this Study

	Current Knowledge	Unanswered Questions	How this Study Addresses the Gaps
Intervention Strategies	Strategies rooted in ABA are effective in treating mealtime challenges Many interventions utilize escape extinction procedures	What antecedent strategies can be implemented to change mealtime behaviors? Can shaping procedures be utilized to increase desirable mealtime behaviors?	Antecedent strategies were included in intervention Shaping procedures were utilized
Environment	Intervention has shown to be effective mostly in inpatient day-treatment settings Typically, intervention is implemented by a professional, rather than a parent	Can mealtime interventions be implemented in natural environment settings? Can parents effectively implement mealtime interventions?	Intervention was implemented in school setting Parents were trained to implement mealtime interventions
Parent Education	Parent education has been successful in a wide variety of childhood concerns but there is limited discussion about parent education for mealtime.	What role does parent education play in the delivery of mealtime interventions?	Parent education component was included in treatment package
Early Intervention	Mealtime intervention typically occurs after the preschool years Mealtime challenges typically develop in toddlerhood or earlier Early intervention has been shown to be effective for many behaviors	What role does early intervention play in improving mealtime behaviors?	Intervention was implemented with toddlers
Small Group Intervention	Children are able to acquire skills taught within small group settings. Small group instruction can allow for naturally embedded social opportunities and observational learning to occur.	Can mealtime interventions be implemented through small group instruction?	Parent education and mealtime sessions were held in small groups
Social Validity	Social validity can provide information about parent perceptions of interventions.	What leads to increased social validity of mealtime interventions?	Parents were asked about their stress levels and confidence pre- and post- intervention Parents filled out a satisfaction questionnaire about their experiences

Chapter 3

Method

A single case design was used to visually analyze changes in dependent variables after the implementation of intervention. A questionnaire to measure parent stress about mealtime was also implemented and an end of study satisfaction survey was utilized in order to gather information about parental experiences and perceptions of the intervention.

Prior to beginning the study, a qualification of exempt status was received from the University of Washington Human Subjects Division. All participants signed informed consent (Appendix A) before participating.

Participants

Six children and their mothers participated in this study. Participants were recruited from an existing larger group attending toddler play group at an inclusive birth to three program. Children, with and without disabilities, between the ages of 15 months and 3 years old, attended playgroups at the program. A flyer was sent home to all families with children enrolled in play groups. The flyer invited families with any mealtime concerns to participate in the group. Three Lunch Bunch groups were formed with two targeted participants in each group. An additional one or two peers was present in Groups 1 and 2, and an older sibling joined Lunch Bunch groups for Group 3.

Inclusion and exclusion criteria

Children were included in the study if a mealtime challenge that caused stress or concern to the parent was identified. Parents were asked to commit to having one

parent attend each intervention session with the child, and were included if the child had a record of at least 80% attendance during the previous month of the playgroup program. After parents expressed interest in participating in Lunch Bunch groups, informed consent was obtained.

Children were not included in the study if the target mealtime challenge was known to be caused by a medical issue that interferes with the ability to eat (e.g., cleft palate). Further, children who were participating in outside feeding therapy at the time of the study were also excluded.

Hailey was a two and a half year old, Caucasian girl who lives with her mother, father and two older siblings. The primary language spoken in Hailey's home was Arabic, followed by English. Hailey qualified for an Individual Family Service Plan (IFSP) in the area of language delay. Hailey's mother expressed interest in participating in Lunch Bunch due to concerns about Hailey not staying at the table during mealtimes and extreme food selectivity. Hailey's mother reported that Hailey was very rigid about mealtimes. She typically needed to sit on a parent's lap and be spoon fed, refused to try new foods, and had a limited food repertoire of approximately ten foods. Hailey's mother was 35 years old. Her highest level of completed education was a Bachelor's degree.

James was a two and a half year old Caucasian boy who lives with his mother and father. The primary language spoken in James' home is English. James qualified for an IFSP in the area of motor skills. Upon beginning Lunch Bunch groups, James' mother reported that her biggest mealtime challenges was his refusal to try new foods and refusal to eat vegetables. She reported stress about finding foods that were

nutritionally adequate that James would accept. James' mother declined to provide her age. Her highest level of completed education was a Bachelor's degree.

John was a two year old Korean boy who lives with his mother, father, and two older siblings. The primary language spoken in John's home is English, but the family also spoke Korean at home. John qualified for an IFSP in the areas of language and motor skills. John's mother reported concerns about food selectivity, refusal to try new foods, and not staying at the table during mealtimes. John's mother was 37 years old. Her highest level of completed education was a Bachelor's degree.

William was a two and a half year old Caucasian boy who lives with his mother, father and older sibling. The primary language spoken in William's home is English. William was a typically developing peer in the infant toddler classroom and was not on an IFSP. William's mother expressed interest in participating in Lunch Bunch because of William's unwillingness to try new foods, particularly vegetables. William's mother was 38 years old and her highest level of education was a Master's degree.

Nicky was a two year old Caucasian and Asian girl who lives with her mother, father, and older sibling. The primary language spoken in Nicky's home is English. Nicky qualified for an IFSP in the areas of speech and social/adaptive skills. Nicky's mother expressed concern about her food selectivity and lack of vegetable consumption. Nicky's mother was 34 years old. Her highest level of education was a Master's degree.

Tina was a two year old South Asian girl who lives with her mother, father and two older sisters. The primary language spoken in Tina's home is English. Tina was not on an IFSP. Tina's mother expressed concerns about Tina leaving the table and not

following instructions to try foods. She was also concerned about her unwillingness to try new foods.

During baseline for Tina's group, her mother asked if her other daughter, Helen could attend groups as well. She expressed concerns about Helen's rigidity at mealtime and unwillingness to try new foods, particularly vegetables. Helen was a 4 year old without a disability. Helen was included in the remainder of the study. Helen and Tina's mother was 35 years old and had a Master's degree.

Setting and Materials

All study activities (i.e., mealtime, parent meetings) took place at the school. For each Lunch Bunch session, two child-sized tables were pushed together and a place was set for each child. Each spot had a divided plate and a cup. A child sized chair was placed at each spot at the table. Adult sized chairs were available behind the child chairs. A variety of silverware and extra plates and cups and a pitcher of water were placed in the middle of the table. Food was placed into bowls in the center of the table with serving spoons inside. In each session, food from each of the following categories was presented; main dish, meat, dairy, vegetable, fruit, snack. The foods were randomly selected each week to simulate a typical mealtime experience. Examples of foods that were presented during the course of this study can be found in Table 2. Two cameras were set up on surrounding bookshelves in the room. Bins of toys were available on the floor near the tables and throughout the classroom.

Table 2

Examples of Foods Presented from Each Category

Food Category	Examples
Main dish	Macaroni and cheese, pesto pasta, gnocchi, fried rice, taquitos
Meat	Roasted turkey, meatballs, chicken nuggets, sausage patty
Dairy	Yogurt, cheese sticks, cheese slices
Vegetable	Steamed broccoli, edamame, peas, baby carrots, steamed carrots, snap peas
Fruit	Bananas, mandarin oranges, blueberries, raspberries, assorted melon, dried fruit
Snack	Goldfish crackers, animal crackers, vanilla wafers, graham crackers

Study Design

A multiple baseline across participants design was utilized. Data was collected each of the two participants and their parent in each group. Children in Group 2 and Group 3 remained in baseline while Group 1 received intervention. After half of the intervention sessions for Group 1 had been implemented, intervention began for Group 2, and Group 3 remained in baseline. After half of the intervention sessions for Group 2 had implemented, intervention began for Group 3. Intervention for each group consisted of a total of six sessions. Each group received information in parent education sessions in the same order.

Independent variable

The intervention consisted of a treatment package with multiple components including (a) parent education and training, (b) modeling strategies with children and (c) individualized feedback and coaching for each child's intervention. The Lunch Bunch intervention was delivered over six hour-long sessions. Table 3 provides an overview of the structure of the session. Participants in Groups 1 and 2 (Hailey, James, John,

William) attended morning play group sessions. Therefore, their parents received parent education prior to picking them up for Lunch Bunch. Group 3 participants (Nicky and Tina) attended afternoon play group sessions. Their parents received parent education after Lunch Bunch sessions, so new strategies were practiced in the following session.

Parent education was centered on basic behavioral strategies as applied to mealtime. In the first four sessions of Lunch Bunch, parents received information on one strategy each session. These strategies included using reinforcement; providing choices; shaping; and prompting. An overview of these strategies and examples of how parents were instructed to use them is provided in Table 4. In the last two weeks, parents practiced putting all the skills together. During parent education sessions, parents were provided with a handout (Appendix B) with information about using strategies during mealtime, examples specific to mealtime, and answering parent questions. Other strategies rooted in ABA were discussed as applicable to specific questions from the parents.

Table 3

Overview of Intervention Session Components

Session Component	Description	Time Spent
Parent education	Parents met as a group with the interventionist while children are in playgroup. Strategies were presented and parents asked questions and planned for how to apply strategies to their child.	30 minutes
Mealtime probe	Parents applied what they learned to mealtime with their child. Interventionist observed.	10 minutes
Modeling	Interventionist modeled strategies directly with children to further build on developing skills.	10 minutes
Feedback and/or coaching	Interventionist gave parents feedback about applying strategies at home and next steps to take and/or coached parents as they practiced modeled strategies.	10 minutes

Table 4

Overview of Strategies Taught to Parents

Behavioral Strategy	Definition	Examples
Reinforcement	Increasing the likelihood of desirable behaviors increasing in the future	Parent provides praise following acceptance of a new food
Providing Choices	Providing opportunities for children to make a choice during mealtime	Parent asks child if they would like to lick the food or take a small bite
Shaping	Reinforcing small steps towards a desired goal behavior	Parent provides instructions to take small steps towards taking a bite of a new food (touch, smell, lick, small bite)
Prompting	Providing a form of assistance to a child to help acquire or use a skill	Parent gives an instruction to touch a food and then physically guides the child to touch the food

Dependent variables

Child variables

The primary dependent variable that was measured for each child was *following mealtime related instructions*. This was defined as complying with the mealtime instruction given by the parent within 3 seconds of the instruction with no additional prompts. Examples include complying with instructions such as “sit in your seat,” “take a bite,” “use your fork,” “take a lick,” etc. Instructions were only counted if they were specific to mealtime, including sitting at the table and interacting with foods. Unrelated instructions such as asking children to label items, answer questions, or engage in other actions (e.g. “wipe your nose”) were not included. Other behaviors that were measured for children include the following:

Food acceptance: The act of eating including placing food in the mouth, chewing, swallowing

In-seat: Child sits in his or her designated seat at the table.

Eating vegetables: Putting vegetable in mouth, chewing, swallowing.

Trying new food: Putting novel food (identified by the parent as a food the child has not eaten before) in mouth, chewing, swallowing.

Elopement: Moving more than one foot away from the table.

Parent Variables

The primary dependent variable that was measured for the parents was *closing an instructional loop*. This was defined as following through with a mealtime instruction by either reinforcing compliance with the instruction or providing an error correction for noncompliance with the instruction. For example, after a child complies with an instruction to “take a bite,” the parent would provide praise or other reinforcement. If a child does not comply with an instruction, such as “come sit down,” the parent would physically guide the child to their seat and follow with reinforcement. Other behaviors that were measured for parents include the following:

Delivering a mealtime-related instruction: Parent provides an instruction related to mealtime without a choice. (e.g. "take a bite," "try your milk," "use your fork"). If a choice is provided, only "provide a choice" is scored.)

Behavior specific praise: Parent praises a mealtime behavior using language specific to the desirable behavior (e.g. "nice job staying in your seat at the table," or "good work saying 'no thank you.'")

General reinforcement: Parent provides general praise, toys, or an activity following a desirable mealtime behavior (“good job,” tickles, etc.)

Providing a choice: Parent provides a choice about mealtime (e.g. "Would you like to try your carrots or yogurt next?" "You can use your fork or your fingers.")

The choice can be in the form of a question or statement but cannot be an open ended question such as “which one should we try next?”.

Parent stress ratings and a questionnaire asking about satisfaction with the intervention outcomes and process were also collected. Parent stress was measured pre- and post- intervention using questionnaire about parental experiences during mealtime. A parent satisfaction questionnaire was administered at the end of the study.

Data collection

Probes occurred during the first 10 minutes of mealtime during each lunch bunch group. During both baseline and subsequent probes, parents were asked to feed their children as they typically would. No feedback or coaching was provided during this time.

A 20 second partial interval recording system was used to code for child and parent behaviors. The occurrence and non-occurrence of dependent variables was recorded for each interval and percentage of occurrence of behaviors was calculated. Child following mealtime instructions and parent closing the loop after giving an instruction were calculated by dividing the occurrence by the number of intervals during which mealtime instructions were given.

Inter observer agreement

IOA data was taken and reported for 20% of each phase of the study (baseline and treatment). An independent observer who was blind to the phase in each video was trained in coding of the dependent variables. The number of agreements were divided by the number of agreements plus disagreements for the two observers.

Data analysis

Data on the dependent variables was graphed and visually analyzed on an ongoing basis after each probe session. Visual analysis was conducted to determine a functional relationship between independent and dependent variables and between parent and child behaviors. To measure effect size, percent of non-overlapping data (PND) was calculated.

The mealtime questionnaire ratings were compared pre- and post-intervention. The parent satisfaction questionnaire was analyzed for themes across parent responses.

Social validity

At the end of the intervention parent participants were asked to rate of the usefulness and effectiveness of their participation in Lunch Bunch groups by completing questionnaires.

Procedural Fidelity

An intervention and data collection protocol was referenced to ensure procedural fidelity in the study. A checklist for each session was used to ensure that the intervention components were implemented for each participant and that data was coded and analyzed consistently.

Chapter 4

Results

The results of this study demonstrate that the Lunch Bunch intervention had an effect both on child and parent behaviors during mealtime. Further, this study demonstrates high social validity among the parents who participated in Lunch Bunch groups. In this section, baseline and intervention measures of dependent variables for

both children and parents are reported. Data from parent stress questionnaires and the post study satisfaction survey and questionnaire are also included.

Child variables

The primary child dependent variable that was measured was following mealtime instructions. Results are presented in Figure 2. Gaps in Hailey's data indicate absences due to illness. Every child demonstrated a higher rate of following instructions during intervention than they did in baseline. Four children (John, Nicky, Tina, and Helen) demonstrated levels of 0% of instructions followed during baseline and increased to average percentages of 73%, 77%, 75%, and 56%, respectively. During baseline, Hailey followed an average of 6.6% of given instructions. During intervention, she followed an average of 63% of instructions. James followed an average of 32% of instructions during baseline and 76% during intervention. William increased instruction following from an average of 31% during baseline to 89% during intervention.

Secondary dependent variables were measured for each child based on parent concerns and goals for mealtime. A summary of each child's measured goals, in order of parent priorities, are presented in Table 5.

Table 5

Secondary Child Dependent Variables

Child	Secondary Dependent Variables
Hailey	In seat, eating novel foods
James	Eating vegetables, eating novel foods
John	Eating novel foods, eating vegetables
William	Eating novel foods, eating vegetables
Nicky	Eating vegetables, eating novel foods
Tina	Eating novel foods, eating vegetables
Helen	Eating novel foods, eating vegetables

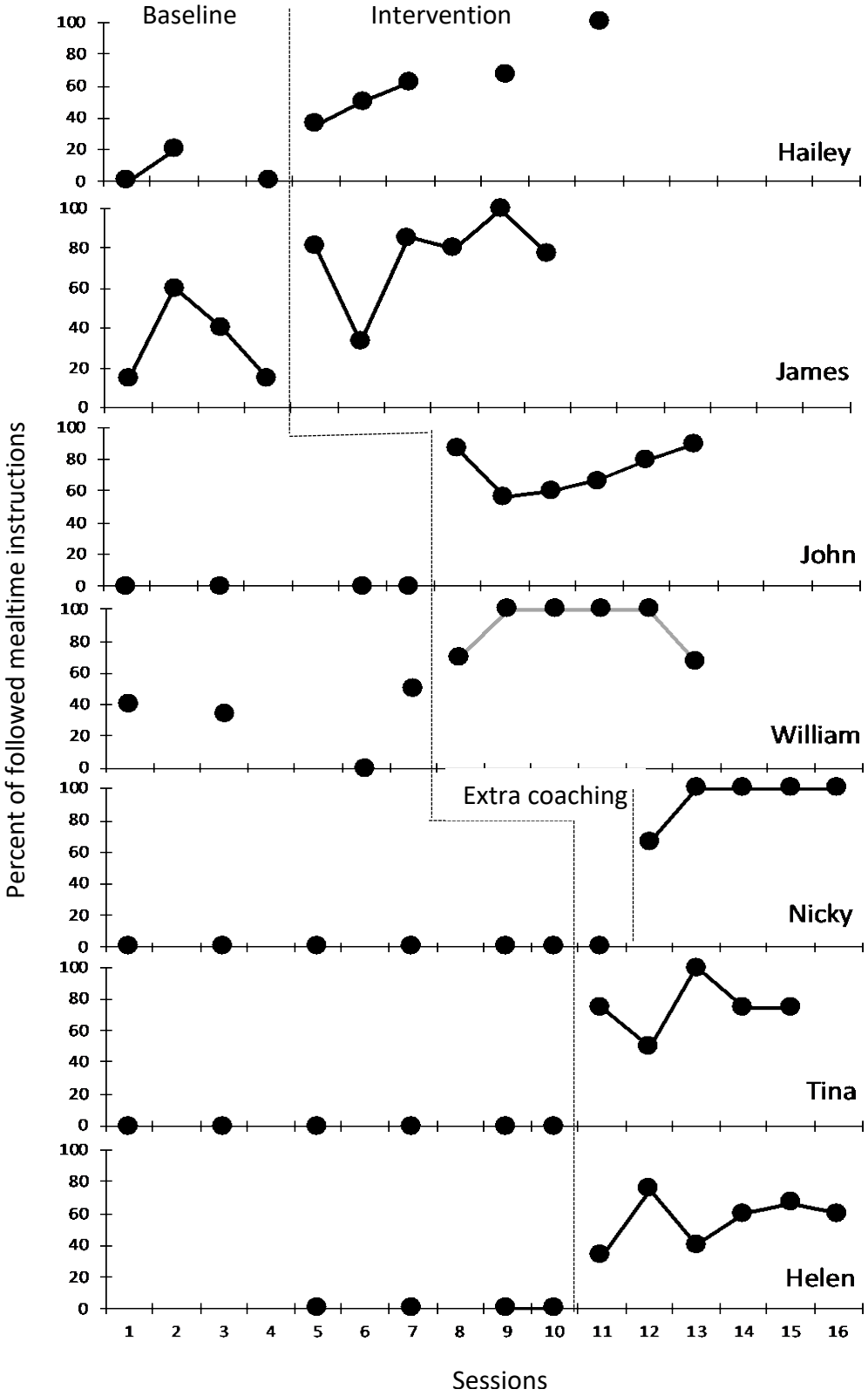

Figure 2. Child Primary Dependent Variable: Following Instructions

An overview of average baseline and intervention measurements for each dependent variable is presented in Figure 3 (first variable) and Figure 4 (second variable).

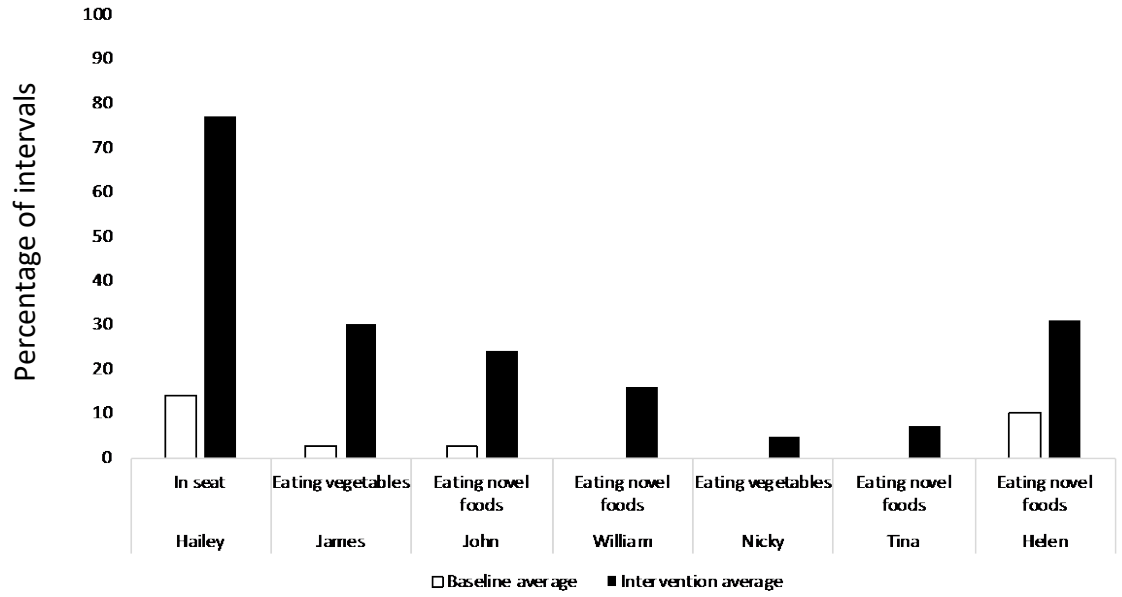

Figure 3. Secondary Child Variable 1

During baseline, Hailey stayed in her seat for an average of 14% of intervals. During intervention, her in seat behavior increased to an average of 77% of intervals. Hailey's eating novel foods increased slightly from an average 1% of intervals during baseline to an average of 2% of intervals during intervention.

James' behavior of eating vegetables increased from an average of 2.5% of intervals during baseline sessions to an average of 30% of intervals during intervention sessions. James' eating novel foods increased from an average of 7.5% of intervals during baseline to an average of 28% of intervals during intervention.

John's eating novel foods increased from an average of during 2.5% of intervals during baseline to an average 24% of intervals during intervention. His eating vegetables increased from 0% during baseline to an average 5.5% during intervention.

William's consumption of vegetables increased slightly from 5% during baseline to 8% during intervention. His consumption of novel foods increased from 0% during baseline to an average of 16% of intervals during intervention.

Nicky's eating vegetables increased from 0% during baseline to an average of 5% of intervals during intervention. Her trying new food increased from an average of 2% of intervals during baseline sessions to an average of 33% of intervals during intervention.

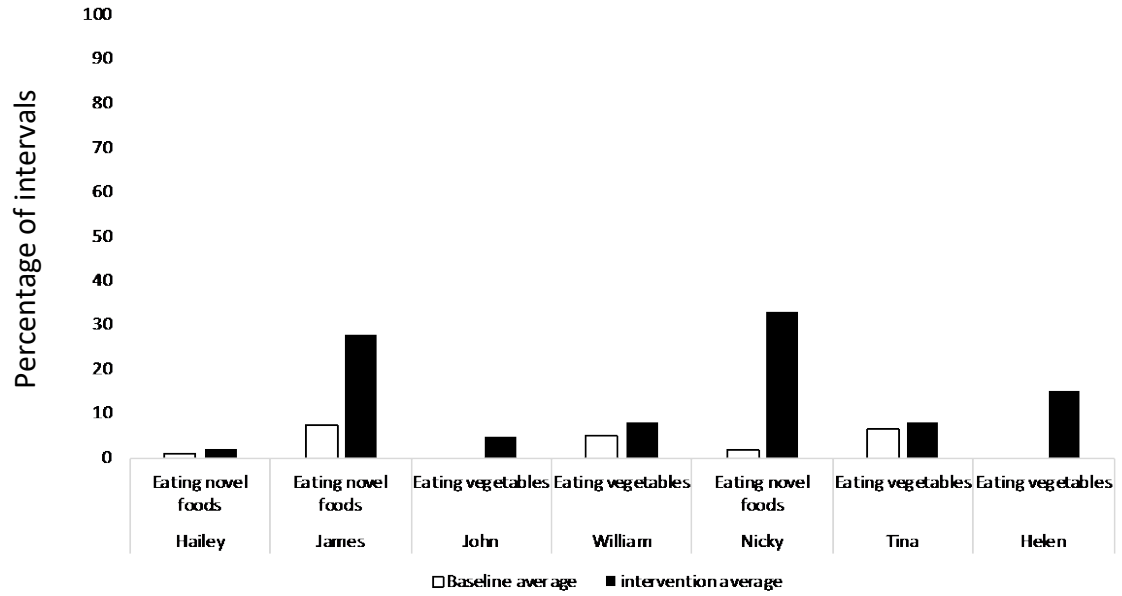

Figure 4. Secondary Child Variable 2

Tina's consumption of new foods increased from 0% at baseline to an average of 7% of intervals during intervention. Tina's consumption of vegetables showed a slight

increase from an average of 6.5% of intervals during baseline to an average of 8% of intervals during intervention.

Helen's eating novel foods increased from an average of 10% during baseline sessions to an average of 31% during intervention. Her eating vegetables increased from 0% at baseline to an average of 15% during intervention.

Parent variables

The primary parent variable that was measured was closing the instructional loop after giving the child a mealtime related instruction and is presented in Figure 5. All parents who participated in the study demonstrated in an increase in closing the loop. In all cases except for William, baseline levels of closing the instructional loop were at 0% of instructions given. William's mother closed the instructional loop after 20% of instructions given during the first baseline session by praising compliance with instructions. Hailey's mother increased closing the loop to an average of 45% during intervention sessions with a range of 20% to 67%.

James' mother increased closing the loop to an average of 41% during intervention sessions with a range of 22% to 82%. John's mother increased closing the loop to an average of 65% with a range of 50% to 80% during intervention sessions. William's mother increased closing the instructional loop from an average of 5% during baseline sessions to 74% during intervention sessions with a range of 50% to 100%. During intervention, Nicky's mother closed the loop at an average of 55% with a range of 42% to 100%. Tina and Helen's mom closed the instructional loop at an average of 47% for both girls. For Tina, the range was 25% to 60% and for Helen, the range was 33% to 75%.

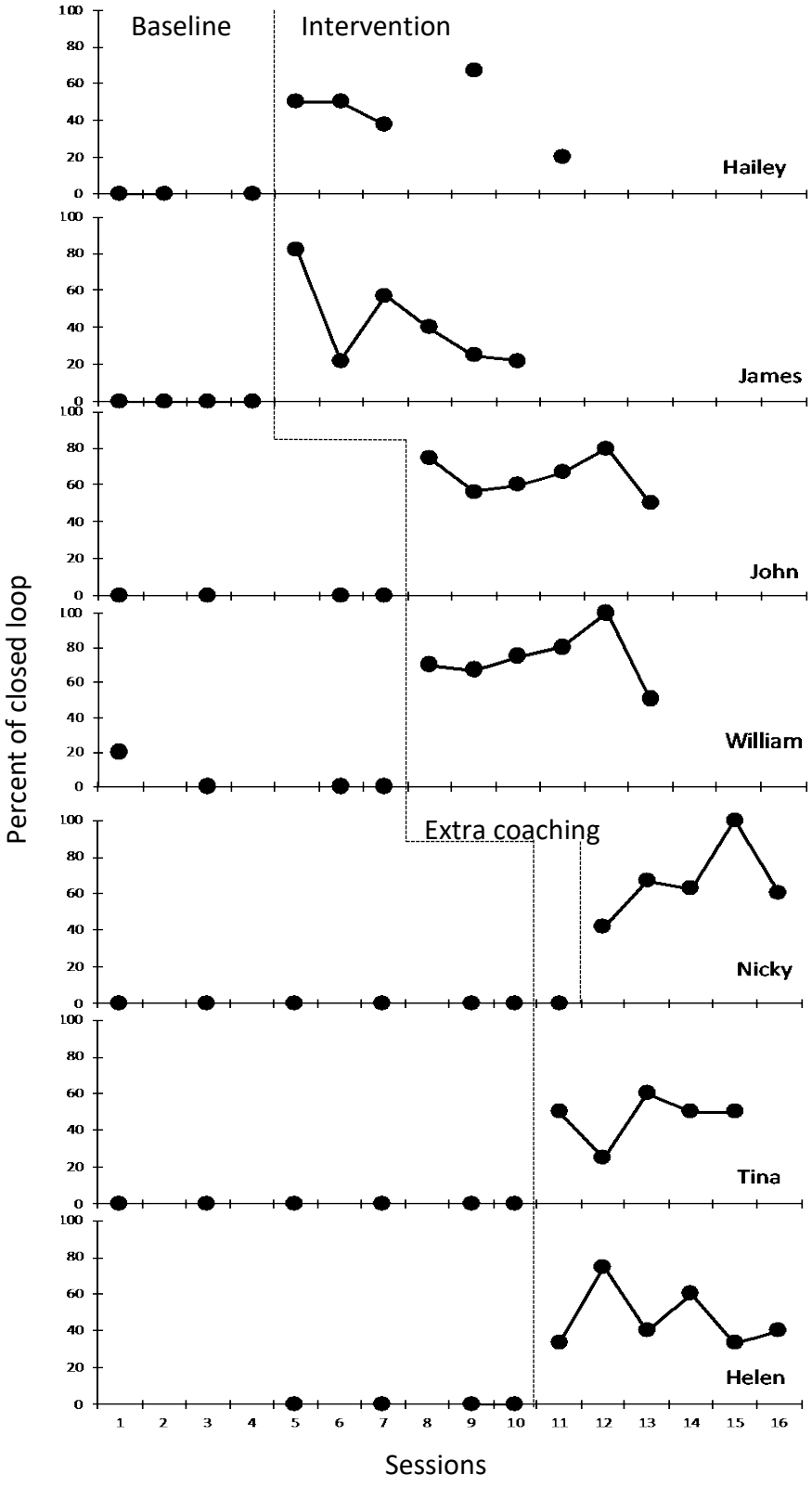

Figure 5. Parent Primary Dependent Variable: Closing Loop

Parental delivery of reinforcement also increased for every participant, as demonstrated in Figure 6. Other than William's mom, who demonstrated the use of reinforcement an average of 2.5% of intervals, all parents demonstrated 0% in baseline. Hailey's mother's use of reinforcement increased to an average of 12% of intervals during intervention. James' mother increased to providing reinforcement in an average of 19% of intervals during intervention sessions. John's mother's use of reinforcement increased to an average of 26%. William's mother's reinforcement increased to an average of 19%. During intervention, Nicky's mother delivered reinforcement in an average of 14% of intervals during intervention sessions. Tina and Helen's mother increased the use of reinforcement to an average of 8% for Tina and an average of 13% for Helen.

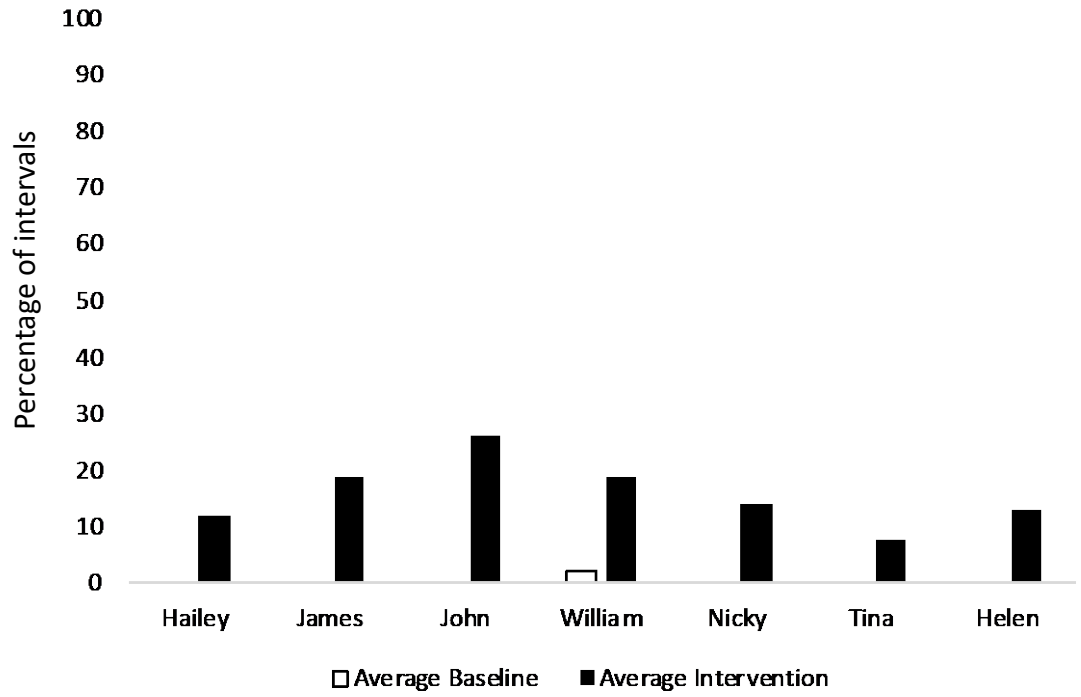

Figure 6. Parental Delivery of Reinforcement

Figure 7 shows the relationship between the primary child variable and primary parent variable. Overall, child following instructions and parent closing the loop followed a similar pattern. Hailey's following instructions consistently increased throughout the course of the study and remained high while her mother's closing the loop decreased. James' following instruction followed a similar pattern at a slightly higher level than his mother's closing the loop. Following instructions remained high, about 75%, as his mother's closing the loop decreased to under 25%. John's percentage of following instructions was identical to his mother's percentage of closing the loop in 4 of 6 intervention data points and remained high at 90% during the last session when his mother's closing the loop dropped to 50%. William's following instructions reached 100% in the second intervention session and remained at 100% until the final session, when his mother's closing the loop decreased to 50%. In this session, William's following instructions decreased to 66%.

In the first intervention session, Nicky's mother closed the loop for 0% of instructions given and Nicky followed 0% of instructions. After an additional coaching session, Nicky's mother's closing the loop increased to 41% and Nicky's following instructions increased to 67%. Nicky's following instructions was at 100% for the final four sessions while her mother's closing the loop remained above 60%, reaching 100% in the fifth session. Tina's following instructions consistently remained at a slightly higher level than her mother's closing the instructional loop. Helen's following instructions was identical to her mother's following the instructional loop for the first four sessions and slightly higher in the last two sessions.

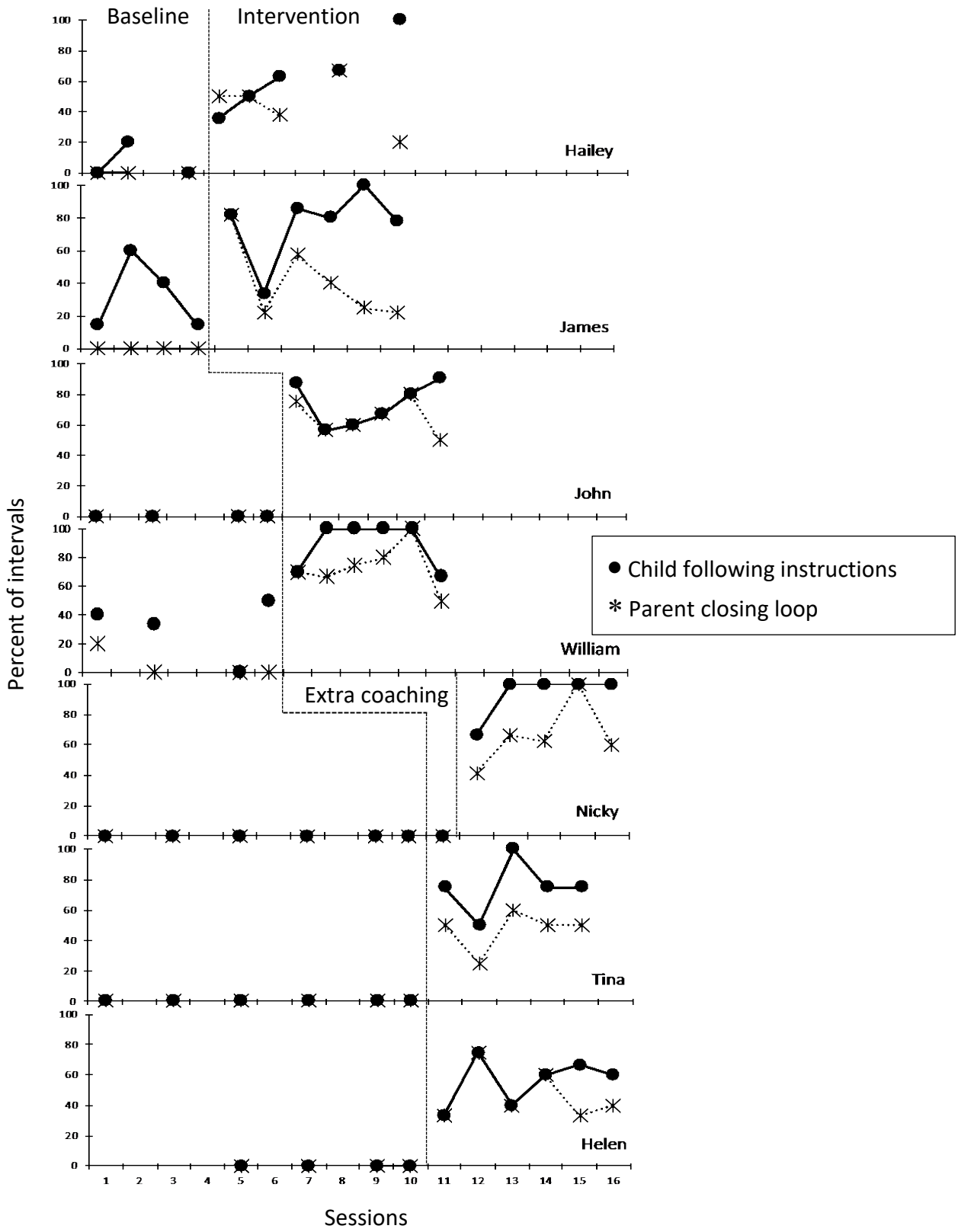

Figure 7. Relationship Between Parent and Child Primary Variables

Effect size

Percentage of nonoverlapping data (PND) was calculated for primary child and parent variables to determine effect size. With the exception of James' following instructions, in which PND was 83%, PND was 100% for all other primary child and parent measures. Mean PND for the primary child dependent variable was 97.5% and was 100% for the primary parent dependent variable, which is deemed effective (Scruggs & Mastropieri, 1998).

Interobserver agreement

An independent observer, blind to the conditions of the study, coded child and parent behaviors for 20% of baseline and intervention sessions. IOA was 93%.

Procedural fidelity

A checklist was utilized for each probe session to ensure consistent environmental arrangement. Procedural fidelity was 100%.

Parent stress questionnaire

A summary of the results of the parental mealtime stress questionnaire is presented in Figure 8. Helen and Tina's mother only completed a form for Tina due to Helen joining the study late. Changes were seen in every measure of the questionnaire in the post-intervention responses. Parents responded on a five point scale with a score of 1 meaning "strongly disagree" and a score of 5 meaning "strongly agree" In the question, "I avoid serving foods that have previously led to challenging mealtime behaviors," the average pre-test measure was 3.2 and post-test measure decreased to 2.2. Hailey, John, and Tina's mothers all rated this measure as "agree" pre-intervention and "disagree" post-intervention.

Feelings of their child's mealtime behaviors and eating habits harming overall health decreased from an average rating of 2.3 to an average rating of 1.3. Hailey and John's mothers rated this measure as "neutral" before intervention and "strongly disagree" following the completion of the study. James and William's mothers changed their ratings from "disagree" to "strongly disagree" after participating in Lunch Bunch and Nicky and Tina's mothers scored it as "disagree" both times.

Average rating on confidence in managing their child's mealtime behaviors increased from 2.8 to 3.7. Similarly, average parent ratings on their confidence in their ability to serve their child a balanced diet increased from an average of 2.8 to an average of 3.8. For both questions on confidence, most participants ratings increased by one point with the exception of Hailey's mother increasing from a score of 1 to 3 on confidence in feeding a balanced diet, and Tina's mom's score staying the same for both measures of confidence at "agree" for confidence in behavior management and "neutral" for confidence in feeding a balanced diet.

In response to "I serve my child's favorite foods to make sure he/she eats" the average pre-intervention score of 4.3 decreased to 3.2. Most considerably, James' mother's score decreased from "agree" to "strongly disagree." Hailey's mother and Tina's mother's scores didn't change at "strongly agree," and "agree," respectively. John's mother's score decreased from "strongly agree" to "neutral," and William and Nicky's mother's scores both decreased from "agree" to "neutral."

Feeling anxious or stressed when feeding their child decreased from an average of 2.7 to an average of 1.8. Hailey and James' mother's both rated feelings of anxiety and stress about feeding their child as "neutral" and decreased to "strongly disagree." John's mother rated this as "agree" prior to intervention and "disagree" afterwards. William and Tina's mother's scores remained the same both times at "disagree" and "neutral," respectively. Nicky's mother's score increased from strongly disagree to disagree.

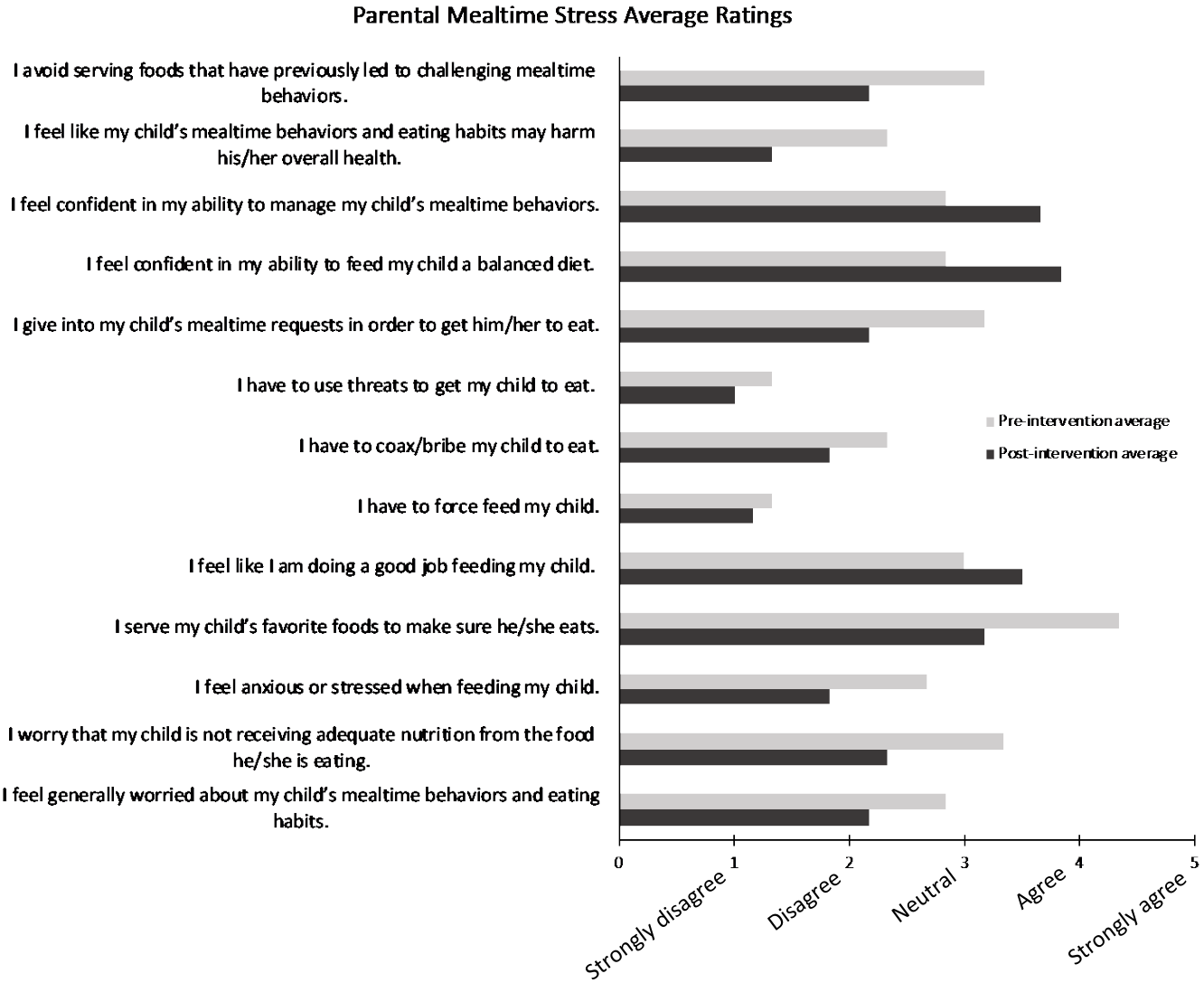

Figure 8. Average Parent Mealtime Stress Ratings Pre- and Post-Intervention

Scores on parental worries of their child not receiving adequate nutrition from the food he or she is eating decreased from 3.3 to 2.3 post-intervention. Hailey's mother's score decreased from "strongly agree" to "agree." James' mother's score decreased from "agree" to "strongly disagree." John and William's mother's scores decreased from "neutral" to "disagree" and Nicky and Tina's mother's scores remained the same at "neutral" and "disagree," respectively.

Social validity

Upon completion of participation in Lunch Bunch, parents were asked to fill out a satisfaction questionnaire about their experience. Parents rated whether the intervention was effective at improving their child's mealtime behaviors (Figure 9). Sixty six percent of parents indicated a rating of "strongly agree" that mealtime behaviors improved and the other 33% indicated a rating of "agree."

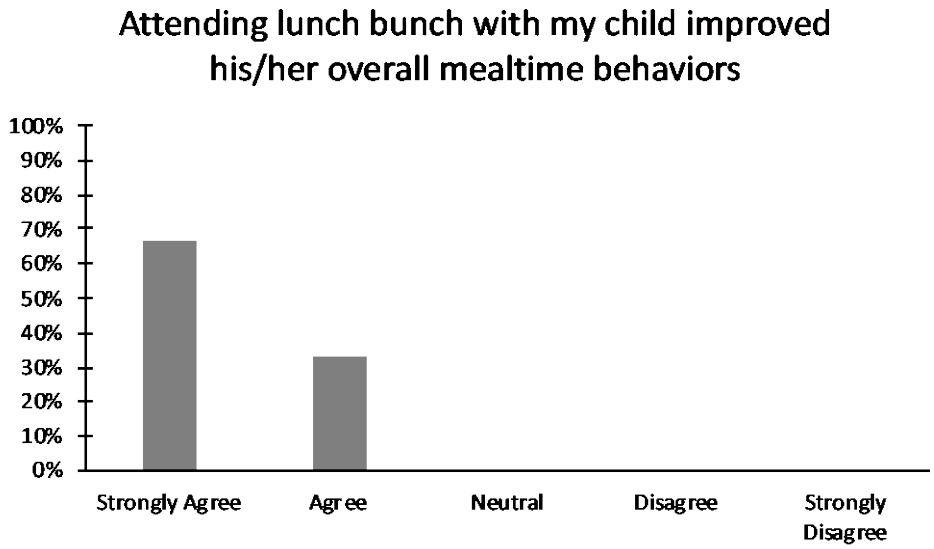

Figure 9. Parent Views on Whether Intervention Improved Mealtime Behaviors

Parents rated their ability to implement the strategies they were taught during Lunch bunch during their home mealtimes. When reflecting on their ability to use the strategies at home, 66% indicated that they strongly agreed that they were able to implement the strategies and the other 33% indicated that they agreed (Figure 10).

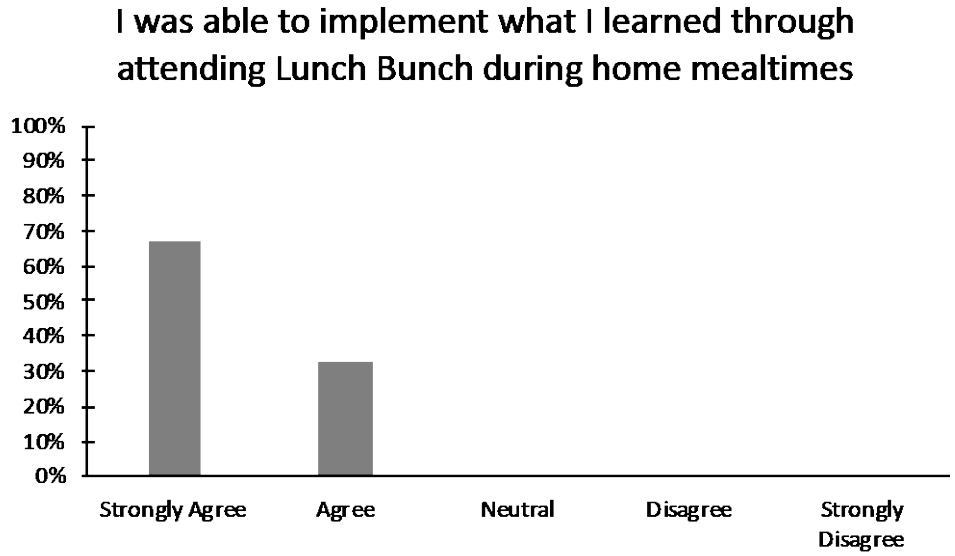

Figure 10. Parent Views on Ability to Implement Intervention During Home Meals

When asked to rate whether the changes made during Lunch Bunch in child's mealtime behavior transferred to the home environment, 66% of parents indicated that they agreed, while 33% indicated that they strongly agreed (Figure 11).

When parents were asked about their confidence in teaching others how to implement the strategies, 33% indicated that they strongly agreed that they felt confident in teaching others, 33% indicated that they agreed, and 33% stated they felt neutral (Figure 12).

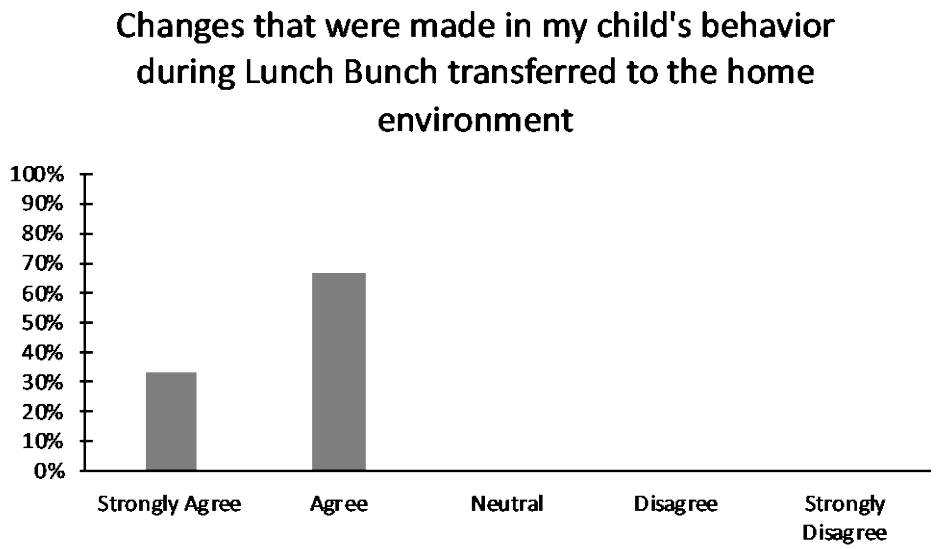

Figure 11. Parent Views on Transfer of Learned Skills to Home Environment

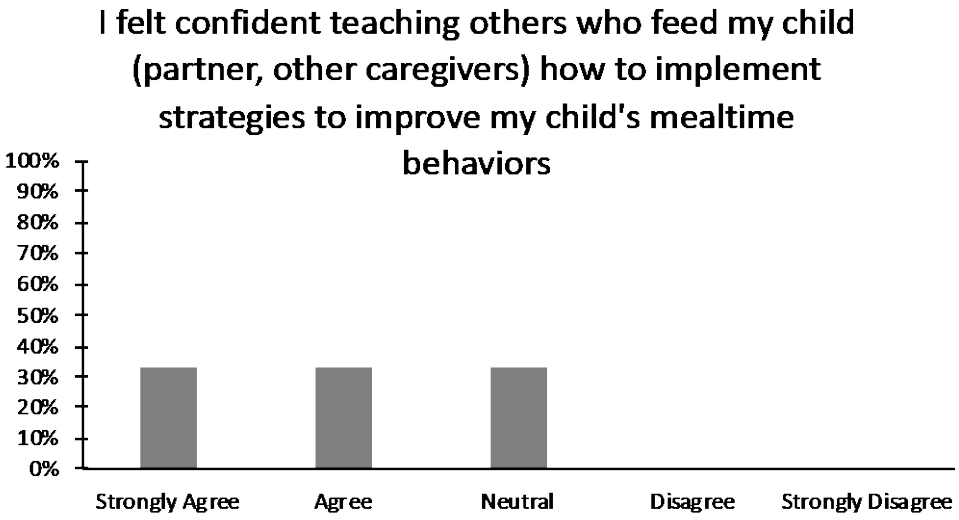

Figure 12. Parent Confidence in Teaching Strategies to Other Caregivers

Parents were asked about whether other caregivers effectively used strategies that were taught in Lunch Bunch (Figure 13). Thirty three percent of parents stated that they strongly agreed that other caregivers were able to effectively utilize strategies, 33% felt neutral, 17% agreed, and 17% disagreed.

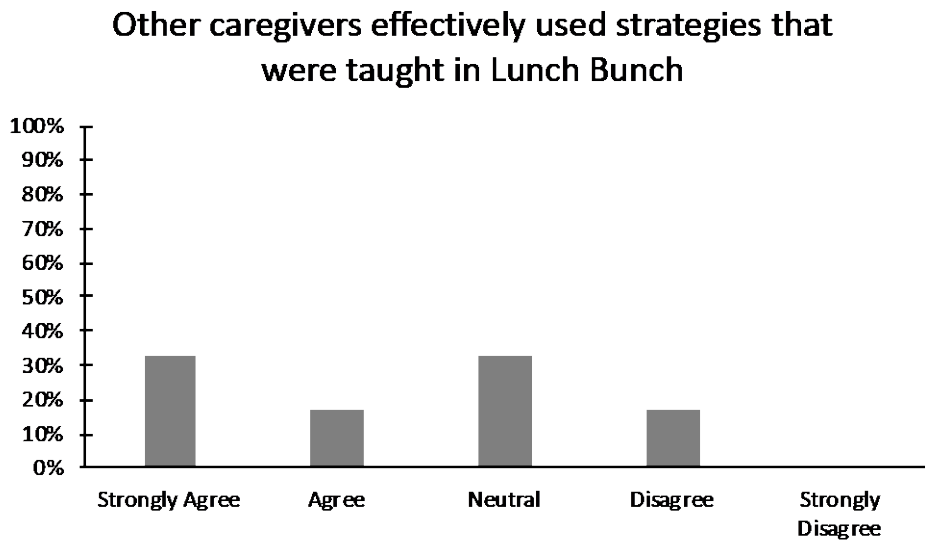

Figure 13. Parent Views on Whether Other Caregivers Effectively Used Taught Strategies

Finally, parents were asked about the value of the socialization with other parents during Lunch Bunch (Figure 14). 100% of parents who participated indicated that they strongly agreed that they found value in the socialization with other parents.

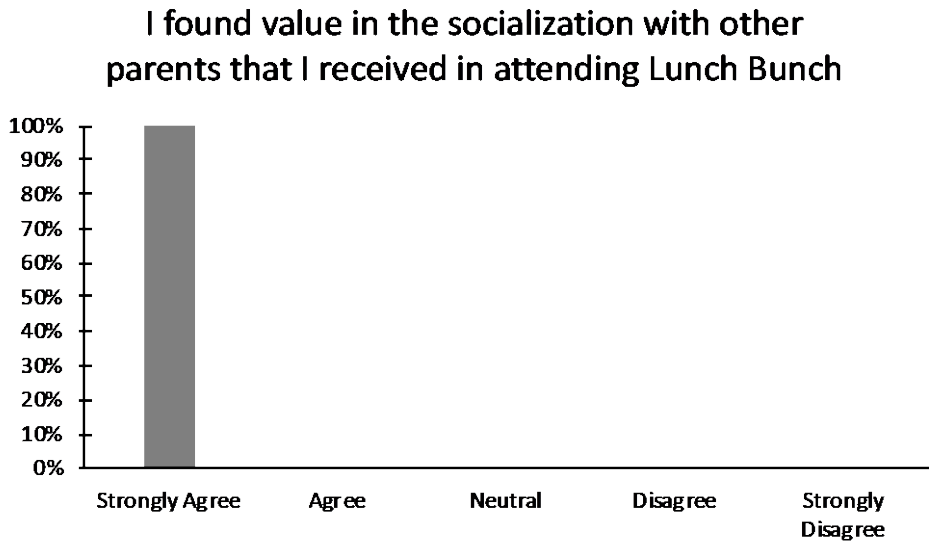

Figure 14. Parent Views on Value of Socialization

Parents were asked to comment on other aspects of their experiences participating in Lunch Bunch as well. When asked how their participation changed their feeding practices, parents provided a variety of answers. William and Tina's mothers both commented on changing goals of meal times. Williams mom stated that she stepped back goals to ensure success. Tina's mom commented,

> I added the use of incentives which I had never used in feeding before. I also added setting realistic food goals (just sitting at the table, putting new foods on their plate, etc.) to mealtime.

Nicky and John's mothers both commented on their levels of comfort and confidence. Nicky's mother stated,

> Rather than only offering preferred foods, I feel more comfortable offering something novel and don't have to worry about it causing a tantrum.

John's mother discussed the increase in her confidence because she saw strategies work in Lunch Bunch and was able to learn about the different ways to implement them at home.

Parents were also asked to comment how participation in Lunch Bunch changed their child's mealtime behaviors. Five mothers reported an increase in sitting at the table at home. Hailey's mother commented that Hailey was now sitting at the table instead of in a parent's lap and trying to eat independently. William, John, James, and Nicky's mothers commented that their children stay in their seat longer and noticed an increase willingness to try new foods. James' mother stated,

> James sits down to meals. He will ask for more food, he will try the food and if he does not like it he will verbalize that he does not like it. When he is full he will say he is done and ask to be excused.

John's mother commented,

> It is still difficult at home but I feel like I have the tools to keep at it. He's able to sit longer at mealtimes, he will try (lick) almost everything I offer him.

When asked about what the most beneficial components in participating in Lunch Bunch were, parents commented on the information and tools they received. William's mother commented that the laminated chart she received to take home to work on shaping trying new food was very useful. John's mom found it beneficial to have guidance while implementing strategies during Lunch Bunch and being able to come back and reflect on what worked and what did not work. Tina and Nicky's mothers both commented on the usefulness of techniques that were given to help avoid power struggles. James' mother commented on the group aspect of Lunch Bunch,

> Being part of a group with other parents who were having challenges as well and knowing you are not alone. James saw other kids eat and he wanted to do the same as them.

Tina's mom also commented that "knowing that other parents have the same mealtime struggles was very beneficial." John's mom also mentioned that she enjoyed the social interactions with other parents.

Parents were asked to reflect on the information they received specifically during parent education sessions and how this information may have changed their practices at home. A recurring theme was an increase in confidence in managing mealtime. Hailey's mom commented that she "started to be more confident with the tools to help her try new food." Tina's mom stated that her confidence in her ability to manage mealtime had increased. John and William's mothers commented on using the strategies that were taught with their other children. John's mom stated,

> It was so beneficial that I was able to use with the other kids right away at home. And using them to motivate each other. I can almost guarantee that all of them

> will at least lick everything I offer them which is the beginning of many great eaters to come.

James' mother talked about an increase in patience and decrease in stress,

> I am less stressed and making meals is now enjoyable. James even likes to go to the grocery store and help me pick out the food. As parents, [Dad] and I are more patient now and go through the eating steps with him when we try new foods. We actually have fun at mealtime now.

Finally, parents were asked if they could think of anything that would have added to their experience in participating in Lunch Bunch groups. Tina's mother commented on the difficulty in trying the strategies with both of her children at the same time and thought it would be beneficial to have time one on one with each child before participating in a group. John's mother suggested more practice opportunities after each parent education session to increase confidence to implement strategies at home. Hailey's mother commented that she would have liked a longer period than six weeks to participate.

Chapter 5

Discussion

The Lunch Bunch intervention improved child mealtime behavior, parent feeding practices, and parent confidence and stress levels. Following instructions increased dramatically for each child who participated in the study. Though at first glance it may appear that secondary variables did not increase in a meaningful way, it is important to consider these changes in the context of a ten minute mealtime. For example, trying a new food or eating vegetables during 10% of a ten minute probe is actually a significant amount of time for a child to be engaging in a goal behavior.

Parent feeding practices also improved during this intervention. The ability to close an instructional loop by providing a consequence (i.e., error correction or reinforcement) after giving an instruction increased from zero or near zero levels for every parent participant. Parents also increased their use of general reinforcement during mealtime.

One of the most interesting findings was the relationship between parents closing the instructional loop and children following instructions. The data demonstrates that these two variables depend on each other, as they tended to follow similar patterns in most of the dyads. It also appears that in a few cases, once a certain level of responding in the child is reached, it is not necessary for parents to close the loop as frequently to maintain the compliance with instructions. For example, for Hailey, James, John, and Nicky, in the final session closing the loop dropped but child following instructions remained high. For William, both closing the loop and following instructions dropped. Future research could consider at what point child variables maintain naturally without parents following behavioral contingencies.

Parental mealtime stress ratings improved after participation in the Lunch Bunch intervention groups. The most noteworthy findings in relation to parental stress were increased confidence in managing mealtime behaviors and decreased feelings of anxiety, stress, or worry about what their child is eating. Parents also indicated changes in their feeding practices such as no longer avoiding serving foods that previously led to challenging behaviors, not giving into requests in order to get their child to eat, and not needing to serve favorite foods in order to make sure their child eats.

Parents reported high levels of satisfaction with their participation in the Lunch Bunch intervention. All parent participants noted an improvement in their child's overall mealtime behaviors. The parents all also stated that they were able to implement the strategies they learned during home mealtimes and saw changes from Lunch Bunch sessions transfer to the home environment. Two parents felt neutral about their confidence in teaching other caregivers how to implement strategies while four agreed that they were confident in teaching the strategies. Half of the parents who participated saw other caregivers effectively use the strategies that were taught. All parent participants strongly agreed that the aspect of socialization with other parents was a benefit of attending the group. The comments that were made in the questionnaire about parents feeling better knowing they weren't alone in mealtime challenges demonstrated the benefits of bringing parents together in a group teaching setting.

Addressed gaps in the literature

This study successfully addressed some of the presented gaps in the literature while also identifying areas for future research. Parents were taught strategies that were rooted in Applied Behavior Analysis to apply to their individualized goals at mealtime. As previously discussed, few studies on mealtime interventions have focused on antecedent strategies, reinforcement strategies, and shaping procedures. In Lunch Bunch education groups, parents learned about how to effectively use reinforcement, how to set up a behavioral contingency proactively, how to shape behaviors, and other individualized strategies such as using visuals, providing choices, or modeling. Strategies such as extinction or punishment were unnecessary in achieving desirable outcomes in this study.

Lunch Bunch was successfully implemented in the children's existing natural school environment rather than in an outside clinical setting as are the majority of mealtime interventions. Further, while the interventionist was available to coach parents, provide feedback, and model interventions, parents were primarily responsible for producing behavior change in their children. Parents successfully applied the strategies that they learned to produce desirable mealtime changes in their children. Parents and children had opportunities to model after appropriate peer behavior, demonstrating the potential impact of the availability of peer models in a natural, group setting.

Though parent education has been shown an important component in various interventions with children, there has been limited discussion about how parent training and education can be applied to mealtime. In the Lunch Bunch intervention package, parent education was successfully incorporated. Parents expressed satisfaction with the strategies they learned during parent education sessions and stated that they enjoyed coming to sessions to problem solve and talk to other parents.

It is important to note that this study had 100% participant retention. Every parent who came to the first parent education session continued to participate in the remainder in the study. Three of the mothers (Hailey, William, and John) brought their husbands along to one session and one mother (Hailey) brought a friend to another session. Other parents in the infant and toddler program who were unable to participate in Lunch Bunch occasionally asked to join parent education sessions to get ideas for strategies. Though these attendees weren't provided with a formal questionnaire about their experiences, they anecdotally mentioned seeing improvement after trying strategies at home.

Most interventions in the literature are implemented with children after the preschool years when challenging mealtime behaviors have persisted for years and children may be at risk for poor health outcomes. Though early intervention is well documented to be important in children at risk for delays, little has been discussed about an early intervention approach to mealtime challenges. This study was conducted with two-year-olds, most of whom had some type of developmental disability and were just beginning to show signs of selective eating and challenging mealtime behaviors.

Small group interventions have been underutilized for teaching adaptive skills, such as mealtime skills. The Lunch Bunch intervention showed that both child and parent behaviors can be successfully improved in small group settings. Further, parents indicated that this aspect of their participation was highly beneficial. Though data was not taken on children's observational learning, parents anecdotally reported that their child was more willing to try certain foods when they saw their peers engage in those behaviors. Another anecdotal observation was that as children spent more time in Lunch Bunch, an increase in play among children was seen. While at the beginning of the study children would play separately around the room or only engage with their parents, by the end of the study, children often went to the play kitchen as a group and pretended to cook and eat play food.

A final way this study attempted to close the gaps of mealtime interventions was to put a strong emphasis on the social validity of the study. Because parents are the primary caregivers responsible for feeding their children, it is crucial that they view the intervention as successful and feasible. Parents who participated in Lunch Bunch

groups all rated that they were able to implement the strategies they were taught and saw desirable changes in their children.

Implications

At the onset of the study, active refusal behaviors (swatting at spoon, yelling, crying, etc.) were expected due to the common occurrence of these behaviors in the previous research on mealtime interventions. However, these behaviors very rarely occurred with preventative, antecedent-based intervention strategies in place. This is consistent with previous discussions in the literature that suggest that food refusal is a result of an ongoing cycle of inappropriate parent feeding practices and inappropriate child mealtime behaviors. As the parent persists, the child increases the intensity of refusal behaviors. Early intervention before this cycle is fully established is crucial to establish positive feeding practices and prevent the occurrence of the more intense child behaviors. It is also important to treat mealtime challenges as a combination of child and parent behaviors and intervene on both.

In addition, the data suggests that focusing on establishing child compliance with mealtime instructions appears to be the first step in changing overall mealtime behaviors, such as increasing consumption of foods of nutritional value and willingness to try a variety of foods. Increasing a child's compliance behavior is dependent on a parent changing the way instructions are presented and followed through.

One of the biggest implications of this study is the importance of including parent education in order to change mealtime behaviors. It is important to note that parents weren't taught one specific intervention to change one specific behavior. Rather, they were provided with a set of strategies to apply to behavior at mealtime in general. This

distinction is important because it may give parents the necessary strategies to generalize intervention techniques when presented with new challenges at mealtime. Providing a curriculum with a set of strategies also allowed for differentiated instruction in Lunch Bunch groups. While each parent received the same basic information about how to effectively utilize a strategy, the way it was applied to their child's behavior was individualized. Intervention dosage was also individualized. For example, after the first intervention session, Nicky's mother was not correctly presenting the behavioral contingency. She came in for an extra coaching and modeling session, which immediately increased her ability to close the instructional loop in the next session. On the other hand, William's mom needed very little modeling after the first session and benefitted from in the moment feedback instead.

Another important implication to consider is the issue of treatment fidelity. The importance of high treatment fidelity is often discussed in the research on behavioral intervention (Eames et al., 2009). However, the data on parent implementation of strategies shows that they typically did not respond with high levels of fidelity in closing the instructional loop or using other strategies. However, even with only closing the instructional loop after 50% of instructions, mealtime behaviors significantly improved. This suggests that parents do not have to implement strategies with 100% accuracy to create change in mealtime behaviors.

Discussions about better defining mealtime challenges are repeatedly seen in the literature. An argument for the importance of having clearer definitions is to better distinguish between a transient mealtime challenge and a clinical feeding problem. However, the results of this study show that regardless of a labeled clinical feeding

problem in the study participants, improvement was seen in behaviors that were indicated as a parental stressor prior to participation. Therefore, an important implication of these results is that preventative intervention can be provided in natural settings without requiring a clinical diagnosis and can lead to positive outcomes for children and their parents. Because there is not an established way to decide whether concerns will resolve on their own or continue and increase in intensity, it is worthwhile to provide intervention for families who are experiencing stress surrounding mealtimes.

Limitations

Though this study successfully demonstrated improved outcomes on both child and parent variables, it is important to note the limitations. The first limitation is that the intervention was delivered as a package with multiple components. Therefore, it is unclear which components are most salient and necessary for the success of the intervention.

Second, the measurements of closing the loop were not broken up into the two different techniques of reinforcement for compliance with instructions and providing an error correction for noncompliance but rather lumped into one variable. It would have been beneficial to determine if parents were applying one strategy more consistently than the other.

Third, maintenance and generalization data was not collected in this study. Information on generalization of change to the home environment was only reported by parents anecdotally and in the satisfaction survey but not directly measured. Maintenance data to determine if both child and parent behaviors maintained over time after the conclusion of the study was also not collected.

Finally, though this study was conducted in a natural birth to three school setting, it is not representative of general school settings for toddlers. While parents are involved in this setting and were able to access the Lunch Bunch intervention, this doesn't take into account parents whose schedules do not permit working out the logistics to attend sessions. Many young children attend childcare settings while parents work, in which case the set-up of this program would not be feasible. This intervention demonstrated an effect on mealtime behaviors in children without severe refusal behaviors or an established history of mealtime challenges. It is unclear if the intervention would be effective with children who demonstrate mealtime challenges of higher severity.

Future research

While this study has begun to fill the gaps in the research on mealtime interventions, there are many directions for future research. First, it would be beneficial to determine long-term outcomes of providing families with early intervention during toddlerhood. A longitudinal study on the future development of mealtime challenges in children who do versus those who do not receive early intervention would provide important information about the maintenance of effects over time.

Further, it would be beneficial to determine the efficacy and feasibility of adding a home component to the intervention. This could be implemented either by providing an extra session for parents who report struggling with generalizing skills to the home environment, or including a component where all participants take video of home mealtimes to receive coaching and feedback. It would also be beneficial to determine how to involve other caregivers who participate in mealtime with the child. Research

could also be conducted on best practices to teach primary participants to pass learned information on to other caregivers.

More research could be conducted on how to get the most benefit out of the small group setting both for children and parents. For example, it would be interesting to determine whether observational learning occurs and children increase skills that are not directly taught to them. It would also be beneficial to determine if peer modeling could be utilized to increase positive outcomes. For parent participants, it would be beneficial to determine which aspects of attending with other parents are most helpful to increasing skills and confidence and decreasing stress. Future studies could also consider how to best utilize peer modeling strategies within mealtime interventions.

Though the purpose of this study was to provide early intervention for young children, Helen's successful participation suggests that a similar group intervention can be conducted with older children, such as preschoolers. It would be beneficial to determine how Lunch Bunch would look for children of different ages. Future research could consider implementing similar interventions with other caregivers, childcare providers, and teachers.

Finally, future studies could consider the issue of treatment fidelity to determine at what level of accuracy a parent has to implement intervention in order to produce significant behavior changes at mealtimes.

Conclusion

To conclude, the Lunch Bunch intervention group successfully improved child mealtime behaviors, parental feeding practices, and levels of parent stress and confidence. As demonstrated in Figure 15, this comprehensive package consisting of

behavioral strategies, parent education and training, and a small group format changed the negative mealtime cycle to a positive cycle of desirable mealtime behaviors, increased parental confidence, and positive feeding practices. This is a promising change for the many families with young children who struggle with mealtime challenges.

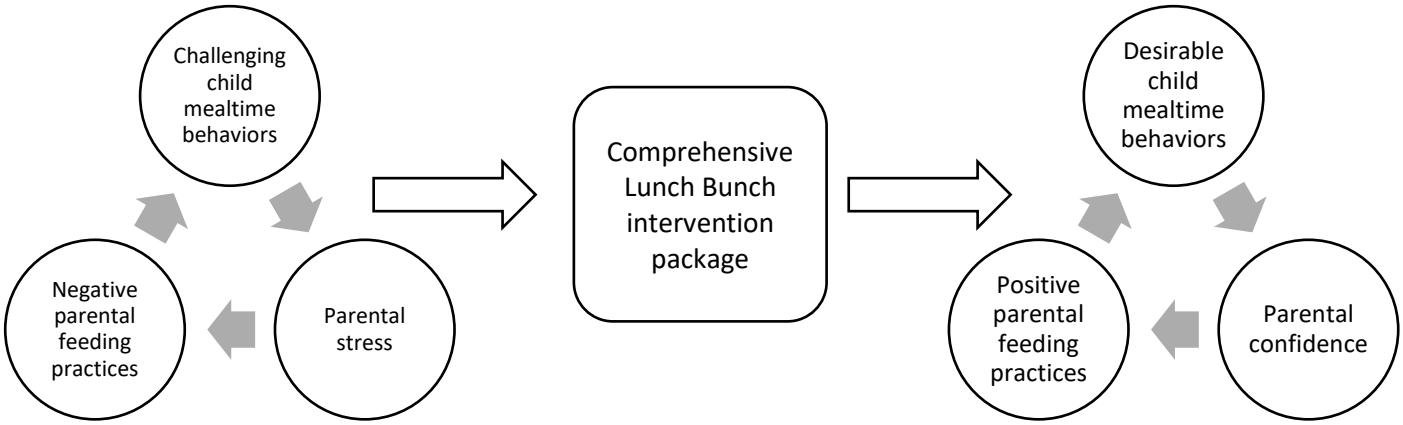

Figure 15. Change in Parent-Child Feeding Cycle with Intervention

Appendix A: Informed Consent

UNIVERSITY OF WASHINGTON

CONSENT FORM

The Effects of a Group Intervention Including a Parent Education Component on Mealtime Behaviors of Young Children

Researchers: Yevgeniya Veverka
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Special Education,
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(425) 765-7004

Faculty Advisor: Dr. Ilene Schwartz,
Ilene@uw.edu
(206) 543-4011

Researchers' statement

We are asking you to be in a research study. The purpose of this consent form is to give you the information you will need to help you decide whether to be in the study or not. Please read the form carefully. You may ask questions about the purpose of the research, what we would ask you to do, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When we have answered all your questions, you can decide if you want to be in the study or not. This process is called "informed consent." We will give you a copy of this form for your records.

PURPOSE OF THE STUDY

The purpose of this study is to address gaps in the literature on intervention for mealtime challenges and disorders in toddlers. This study aims to answer the following research questions:

(a) What effect will a group treatment package have on food acceptance and inappropriate mealtime behaviors in toddlers with mealtime challenges? (B) Will a mealtime intervention including parent education decrease caregiver stress surrounding mealtimes? (C) Can intervention conducted in a small group be effectively differentiated to lead to different skill acquisition for each participant?

STUDY PROCEDURES

If you choose to be in this study, you will be asked to fill out a questionnaire about your mealtime experiences and stress levels regarding mealtime two times – once before the study begins, and once after it has ended. You will also be asked to attend weekly lunch groups with your child. These sessions will be video recorded to code for mealtime behaviors throughout the study. All child data will be stored on a password-protected computer, in a locked office. Recordings may be utilized for presentation of the research.

RISKS, STRESS, OR DISCOMFORT

Some people feel that providing information for research is an invasion of privacy. Some people feel self-conscious when notes are taken during observations, or when sessions are video recorded.

BENEFITS OF THE STUDY

You and your child may benefit from participating in this study. One possible benefit would be your child improving mealtime behaviors that are of concern to you. Another benefit is that you may learn strategies to apply to behaviors at home. One final benefit is that lunch will be provided during each session.

OTHER INFORMATION

You may refuse to participate and you are free to withdraw from this study at any time without penalty or loss of benefits to which you are otherwise entitled. If the results of this study are published or presented, I will not use your name or any other identifying information. I may use this data as a foundation for my doctoral dissertation.

If you have any questions about this research study, place contact Yevgeniya Veverka at the telephone number or email on the top of this form.

Printed name of researcher Signature of researcher Date

Participant's statement

This study has been explained to me. I volunteer to take part in this research. I have had a chance to ask questions. If I have questions later about the research, I can ask one of the researchers listed above. . If I have questions about my rights as a research subject, I can call the Human Subjects Division at (206) 543-0098 or call collect at (206) 221-5940. I will receive a copy of this consent form.

Printed name of participant Signature of participant Date

Appendix B: Parent Education Handouts

Reinforcement

What is it?

Anything that increases the likelihood that the behavior will increase in the future

"What's in it for me?"	• Make sure your child knows what they are earning. • Use first/then statements Ex: "First let's touch the banana. Then, we can play with the ball."
Be specific!	• Point out exactly what your child is doing correctly. Ex: "Great sitting down at the table!" "You touched the banana!" "Wow! I love how you're trying the new food!"
Reinforcement is immediate	• Provide reinforcement as soon as the desired behavior occurs. Don't ask your child to do the behavior again. Reinforce right away!
Reinforcement is contingent	• Your child only gets the reinforcement when they engage in the behavior you are trying to increase. Don't give in!
Catch the good!	• Don't wait to have to correct behaviors. Catch your child engaging in desirable behaviors.

Examples of reinforcers:

- Edibles
- Activities: coloring, jumping on trampoline, going for walk
- Social: high fives, tickles, praise
- Toys

Providing Choices

What is it?

Providing opportunities for children to make a choice to increase desirable behaviors such as engagement and compliance.

Make it simple	• Use visuals to supplement langague (pictures or holding up objects) • Provide 2 or 3 choices
Be specific!	• Instead of asking an open-ended question ("what do you want to try?"), provide specific choices ("Do you want to try the turkey or the cheese?")
Making a choice is a choice	• What if your child doesn't choose? "Do you want to make a choice, or should I make it for you?"
Give easy choices for difficult tasks	• For a task that seems difficult to a child, break it down into smaller tasks that are simple. For example, instead of asking your child to take a bite of a new vegetable, ask "do you want to lick the brocolli or touch it?"

Examples of Choices for Mealtime:

- Which chair?
- Which utensil?
- How to interact with food?
- What to put on their plate?
- How many scoops?

Shaping

What is it?

Reinforcing small steps towards a desired goal behavior

Present small, achievable steps	• Break down an end goal into many small components (Ex: touching a new food, licking, taking a nibble, etc.)
Reinforce the baby steps!	• Don't forget to reinforce each step towards the end goal.
Only reinforce the best response	• Once one behavior is established, stop reinforcing it and move on to only reinforcing the next behavior (ex: stop reinforcing touching and only reinforce food to lips)
Take a step back when necessary	• Be careful not to move through steps too fast! Each step needs to become well established before moving on to the next. It's ok to take a step back!

Example of a shaping procedure:

End goal behavior: Eating a serving size of peas

Steps: 1. Touching peas, 2. Picking up and smelling peas, 3. Putting peas to lips, 4. Licking peas, 5. Taking a nibble of a pea, 6. Eating one pea, 7. Eating 3 peas, 8. Eating 8 peas, 9. Eating a serving size of peas
depending on each individual child, there may be more or less necessary steps to achieve the end goal behavior

Procedure:

1. Start with the first step in the sequence and reinforce all occurrences of that step.
2. Once the first step is successfully achieved over multiple consecutive attempts, move onto the next step.
3. Continue this process, reinforcing each new step and discontinuing reinforcement for previous steps, until the end behavior is reached.

Prompting

What is it?

A form of assistance given to a child to help acquire or use a skill.

Provide a prompt before repeating the instruction	• If your child does not respond to your instruction, or incorrectly responds to your instruction, prompt the correct response right away.
Reinforce the prompted behavior	• Even though you are assisting the child in performing the behavior, reinforce each occurrence initially to establish the skill
Prompts should be faded	• After your child successfully responds with a prompt multiple times, fade the prompt out to avoid prompt dependence.

Types of Prompts to Use at Mealtime:

1. Physical prompt: physical contact to guide the child through the behavior
   Ex: You say "touch the pea" and then guide your child's hand to touch the pea

2. Visual prompt: photograph, drawing, video to show the child what to do
   Ex: You say "touch the pea" and then show your child a photo of a hand touching food

3. Model: somebody demonstrates the behavior to the child
   Ex: You say "touch the pea" and then you touch the pea

Appendix C: Child Mealtime Behaviors and Parental Mealtime Stress Questionnaire

Child's Name _____ Date of Birth ____/____/_____ Today's Date ____/____/_____

Name of Person Completing Form_____ Relationship to Child_____

Child Mealtime Behavior Questionnaire

Directions: Circle the rating that best fits each statement about your child's mealtime behaviors. Check the box on the right if this behavior is a concern to you or your family.

Mealtime Skills *2 = Usually or Often, 1 = Sometimes, 0 = Never*	Check box if this is a concern
Sits in designated seat for duration of mealtime	2 1 0
Comes readily to mealtime	2 1 0
Tolerates new foods on his/her plate	2 1 0
Tries a new food when it's offered	2 1 0
Self-feeds with spoon	2 1 0
Self feeds with fork	2 1 0
Self-feeds finger foods	2 1 0
Drinks out of an open cup	2 1 0
Eats a variety of different foods	2 1 0
Finishes meal within approximately 20 minutes	2 1 0
Appropriately communicates when he/she is hungry	2 1 0
Appropriately communicates when he/she is full or all done	2 1 0
Eats at designated mealtimes	2 1 0
Foods Consumed *2 = Usually or Often, 1 = Sometimes, 0 = Never*	Check box if this is a concern
Eats fruits	2 1 0
Eats vegetables	2 1 0
Eats proteins (meat, fish, beans)	2 1 0
Eats starches (potato, noodles)	2 1 0
Eats a sufficient amount throughout the day	2 1 0
Social and Communicative Behaviors at Mealtime *2 = Usually or Often, 1 = Sometimes, 0 = Never*	Check box if this is a concern
Engages in social interactions with others during mealtime	2 1 0
Appropriately makes choices about what to eat	2 1 0
Appropriately communicates food preferences	2 1 0
Maladaptive Mealtime Behaviors *2 = Usually or Often, 1 = Sometimes, 0 = Never*	Check box if this is a concern
Only eats food of certain textures (ex: puree, crunchy)	2 1 0
Cries at mealtimes	2 1 0
Has tantrums at mealtimes	2 1 0
Gets up from the table during meal	2 1 0

Holds food in mouth without swallowing	2 1 0	
Gags during mealtimes	2 1 0	
Takes a long time to finish meal	2 1 0	
Has problems chewing food	2 1 0	
Engages in undesirable behavior when presented with nonpreferred food **Describe behavior:**	2 1 0	
Refuses food that doesn't have certain qualities (texture, color, temperature)	2 1 0	
Requires a distraction to eat (TV, toys, singing, etc.)	2 1 0	
Needs to be fed by somebody else	2 1 0	
Snacks or grazes throughout the day	2 1 0	
Eats non-food items	2 1 0	
Other:	2 1 0	

Parental Mealtime Stress Questionnaire

Directions: Using the scale below, circle the rating that best fits each statement about your experiences with mealtime and feeding your child.

5 = Strongly Agree 4 = Agree 3 = Neutral 2 = Disagree 1= Strongly Disagree

1. I feel generally worried about my child's mealtime behaviors and eating habits.	5	4	3	2	1
2. I worry that my child is not receiving adequate nutrition from the food he/she is eating.	5	4	3	2	1
3. I feel anxious or stressed when feeding my child.	5	4	3	2	1
4. I serve my child's favorite foods to make sure he/she eats.	5	4	3	2	1
5. I feel like I am doing a good job feeding my child.	5	4	3	2	1
6. I have to force feed my child.	5	4	3	2	1
7. I have to coax/bribe my child to eat.	5	4	3	2	1
8. I have to use threats to get my child to eat.	5	4	3	2	1
9. I give into my child's mealtime requests in order to get him/her to eat.	5	4	3	2	1
10. I feel confident in my ability to feed my child a balanced diet.	5	4	3	2	1
11. I feel confident in my ability to manage my child's mealtime behaviors.	5	4	3	2	1
12. I feel like my child's mealtime behaviors and eating habits may harm his/her overall health.	5	4	3	2	1
13. I avoid serving foods that have previously led to challenging mealtime behaviors.	5	4	3	2	1

References

Ahearn, W. H., Kerwin, M. E., Eicher, P. S., & Lukens, C. T. (1996). An alternating treatments comparison of two intensive interventions for food refusal. *Journal of Applied Behavior Analysis, 29*(3), 321-32. doi:10.1901/jaba.1996.29-321

Ahearn, W., Kerwin, M., & Eicher, P. (2001). An ABAC comparison of two intensive interventions for food refusal. *Behavior Modification, 25*(3), 385-405. doi:10.1177/0145445501253002

Allison, J., Wilder, D. A., Chong, I., Lugo, A., Pike, J., & Rudy, N. (2012). A comparison of differential reinforcement and noncontingent reinforcement to treat food selectivity in a child with autism. *Journal of Applied Behavior Analysis, 45*(3), 613-617.

Anderson, C. M., & Mcmillan, K. (2001). Parental use of escape extinction and differential reinforcement to treat food selectivity; *Journal of Applied Behavior Analysis, 34*(4), 511-515. doi:10.1901/jaba.2001.34-511

Ault, M. J., Wolery, M., Gast, D. L., Doyle, P. M., & Martin, C. P. (1990). Comparison of predictable and unpredictable trial sequences during small-group instruction. *Learning Disability Quarterly, 13*(1), 12-29. doi:10.2307/1510389

Bachmeyer, M. H., Gulotta, C. S., & Piazza, C. C. (2013). Liquid to baby food fading in the treatment of food refusal. *Behavioral Interventions, 28*(4), 281-298. doi:10.1002/bin.1367

Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis 1. *Journal of Applied Behavior Analysis, 1*(1), 91-97. doi:10.1901/jaba.1968.1-91

Behavior Analyst Certification Board, (BACB). (2014). Behavior analyst certification board professional and ethical compliance code for behavior analysts

Budd, K. S., Mcgraw, T. E., Farbisz, R., Murphy, T. B., Hawkins, D., Heilman, N., et al. (1992). Psychosocial concomitants of children's feeding disorders. *Journal of Pediatric Psychology, 17*(1), 81-94. doi:10.1093/jpepsy/17.1.81

Cardona Cano, S., Tiemeier, H., Van Hoeken, D., Tharner, A., Jaddoe, V. W., Hofman, A., et al. (2015). Trajectories of picky eating during childhood: A general population study. *International Journal of Eating Disorders, 48*(6), 570-579. doi:10.1002/eat.22384

Carruth, B. R., Ziegler, P. J., Gordon, A., & Barr, S. I. (2004). Prevalence of picky eaters among infants and toddlers and their caregivers' decisions about offering a new food. *Journal of the American Dietetic Association, 104*, 57-64. doi:10.1016/j.jada.2003.10.024

Casey, S. D., Cooper-Brown, L., Wacker, D. P., & Rankin, B. E. (2006). The use of descriptive analysis to identify and manipulate schedules of reinforcement in the treatment of food refusal. *Journal of Behavioral Education, 15*(1), 39-50. doi:10.1007/s10864-005-9001-7

Casey, S. D., Perrin, C. J., Lesser, A. D., Perrin, S. H., Casey, C. L., & Reed, G. K. (2009). Using descriptive assessment in the treatment of bite acceptance and food refusal. *Behavior Modification, 33*(5), 537-558. doi:10.1177/0145445509341457

Clawson, E. P., & Elliott, C. A. (2014). Integrating evidence-based treatment of pediatric feeding disorders into clinical practice: Challenges to implementation. *Clinical Practice in Pediatric Psychology, 2*(3), 312-321. doi:10.1037/cpp0000076

Cooke, L., Wardle, J., & Gibson, E. L. (2003). Relationship between parental report of food neophobia and everyday food consumption in 2-6-year-old children. *Appetite, 41*(2), 205-206. doi:10.1016/S0195-6663(03)00048-5

Cooper, John O., Heron, Timothy E., Heward, William L. (2007). *Applied behavior analysis* (2nd ed.) Pearson.

Cooper, L. J., Wacker, D. P., Mccomas, J. J., Brown, K., Peck, S. M., Richman, D., et al. (1995). Use of component analyses to identify active variables in treatment packages for children with feeding disorders. *Journal of Applied Behavior Analysis, 28*(2), 139-153. doi:10.1901/jaba.1995.28-139

Curtin, C., Hubbard, K., Anderson, S., Mick, E., Must, A., & Bandini, L. (2015). Food selectivity, mealtime behavior problems, spousal stress, and family food choices in children with and without autism spectrum disorder. *Journal of Autism and Developmental Disorders, 45*(10), 3308-3315. doi:10.1007/s10803-015-2490-x

Dovey, T. M., Staples, P. A., Gibson, E. L., & Halford, J. C. G. (2008). Food neophobia and 'picky/fussy' eating in children: A review. *Appetite, 50*(2), 181-193. doi:10.1016/j.appet.2007.09.009

Dubois, L., Farmer, A., Girard, M., Peterson, K., & Tatone-Tokuda, F. (2007). Problem eating behaviors related to social factors and body weight in preschool children: A longitudinal study. *International Journal of Behavioral Nutrition and Physical Activity, 4*(1), 9. doi:10.1186/1479-5868-4-9

Dunlap, G., & Fox, L. (1999). A demonstration of behavioral support for young children with autism. *Journal of Positive Behavior Interventions, 1*(2), 77-87. doi:10.1177/109830079900100202

Eames, C., Daley, D., Hutchings, J., Whitaker, C. J., Jones, K., Hughes, J. C., et al. (2009). Treatment fidelity as a predictor of behaviour change in parents attending group-based parent training. *Child: Care, Health and Development, 35*(5), 603-612. doi:10.1111/j.1365-2214.2009.00975.x

Fox, L., Dunlap, G., & Cushing, L. (2002). Early intervention, positive behavior support, and transition to school. *Journal of Emotional and Behavioral Disorders, 10*(3), 149-157. doi:10.1177/10634266020100030301

Fraser, K., Wallis, M., & St. John, W. (2004). Improving children's problem eating and mealtime behaviours: An evaluative study of a single session parent education programme. *Health Education Journal, 63*(3), 229-241. doi:10.1177/001789690406300304

Girolami, P. A., Boscoe, J. H., & Roscoe, N. (2007). Decreasing expulsions by a child with a feeding disorder: Using a brush to present and re-present food. *Journal of Applied Behavior Analysis, 40*(4), 749-753. doi:10.1901/jaba.2007.749-753

Greer, A. J., Gulotta, C. S., Masler, E. A., & Laud, R. B. (2008). Caregiver stress and outcomes of children with pediatric feeding disorders treated in an intensive interdisciplinary program. *Journal of Pediatric Psychology, 33*(6), 612-620. doi:10.1093/jpepsy/jsm116

Greer, R. D., Dorow, L., Williams, G., Mccorkle, N., & Asnes, R. (1991). Peer-mediated procedures to induce swallowing and food acceptance in young children. *Journal of Applied Behavior Analysis, 24*(4), 783-790. doi:10.1901/jaba.1991.24-783

Haywood, P., & Mccann, J. (2009). A brief group intervention for young children with feeding problems. *Clinical Child Psychology and Psychiatry, 14*(3), 361-372. doi:10.1177/1359104509104046

Hoch, T., Babbitt, R. L., Coe, D. A., Krell, D. M., & Hackbert, L. (1994). Contingency contacting. Combining positive reinforcement and escape extinction procedures to treat persistent food refusal. *Behavior Modification, 18*(1), 106-128. doi:10.1177/01454455940181007

Jacobi, C., Agras, W. S., Bryson, S., & Hammer, L. D. (2003). Behavioral validation, precursors, and concomitants of picky eating in childhood. *Journal of the American Academy of Child & Adolescent Psychiatry, 42*(1), 76-84.

Kahng, S. W., Boscoe, J. H., & Byrne, S. (2003). The use of an escape contingency and a token economy to increase food acceptance. *Journal of Applied Behavior Analysis, 36*(3), 349-353. doi:10.1901/jaba.2003.36-349

Kamps, D., Walker, D., Maher, J., & Rotholz, D. (1992). Academic and environmental effects of small group arrangements in classrooms for students with autism and other developmental disabilities. *Journal of Autism and Developmental Disorders, 22*(2), 277-293. doi:10.1007/BF01058156

Kerwin, M. E., Ahearn, W. H., Eicher, P. S., & Burd, D. M. (1995). The costs of eating: A behavioral economic analysis of food refusal. *Journal of Applied Behavior Analysis, 28*(3), 245-260. doi:10.1901/jaba.1995.28-245

Kerwin, M. E., Eicher, P. S., & Gelsinger, J. (2005). Parental report of eating problems and gastrointestinal symptoms in children with pervasive developmental disorders. *Children's Health Care, 34*(3), 217-234. doi:10.1207/s15326888chc3403_4

Ledford, J. R., & Gast, D. L. (2006). Feeding problems in children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 21*(3), 153-166. doi:10.1177/10883576060210030401

Ledford, J. R., Gast, D. L., Luscre, D., & Ayres, K. M. (2008). Observational and incidental learning by children with autism during small group instruction. *Journal of Autism and Developmental Disorders, 38*(1), 86-103. doi:10.1007/s10803-007-0363-7

Ledford, J. R., Lane, J. D., Elam, K. L., & Wolery, M. (2012). Using response-prompting procedures during small-group direct instruction: Outcomes and procedural variations. *American Journal on Intellectual and Developmental Disabilities, 117*(5), 413-434. doi:10.1352/1944-7558-117.5.413

Ledford, J. R., & Wolery, M. (2013). Peer modeling of academic and social behaviors during small-group direct instruction. *Exceptional Children, 79*(4), 439-458. doi:10.1177/001440291307900404

Linscheid, T. R. (2006). Behavioral treatments for pediatric feeding disorders. *Behavior Modification, 30*(1), 6-23. doi:10.1177/0145445505282165

Luiselli, J. K. (1989). Behavioral assessment and treatment of pediatric feeding disorders in developmental disabilities. *Progress in Behavior Modification, 24*, 91-131.

Luiselli, J. K. (2000). Cueing, demand fading, and positive reinforcement to establish self-feeding and oral consumption in a child with chronic food refusal. *Behavior Modification, 24*(3), 348-358. doi:10.1177/0145445500243003

Luiselli, J. K., & Luiselli, T. E. (1995). A behavior analysis approach toward chronic food refusal in children with gastrostomy-tube dependency. *Topics in Early Childhood Special Education, 15*(1), 1-18. doi:10.1177/027112149501500103

Lukens, C. T., & Silverman, A. H. (2014). Systematic review of psychological interventions for pediatric feeding problems. *Journal of Pediatric Psychology, 39*(8), 903-917. doi:10.1093/jpepsy/jsu040

Mascola, A. J., Bryson, S. W., & Agras, W. S. (2010). Picky eating during childhood: A longitudinal study to age 11years. *Eating Behaviors, 11*(4), 253-257. doi:10.1016/j.eatbeh.2010.05.006

McCartney, E. J., Anderson, C. M., English, C. L., & Horner, R. H. (2005). Effect of brief clinic-based training on the ability of caregivers to implement escape extinction. *Journal of Positive Behavior Interventions, 7*(1), 18-32. doi:10.1177/10983007050070010301

Mitchell, G. L., Farrow, C., Haycraft, E., & Meyer, C. (2013). Parental influences on children's eating behaviour and characteristics of successful parent-focused interventions. *Appetite, 60*, 85-94. doi:10.1016/j.appet.2012.09.014

Murphy, J., & Zlomke, K. R. (2016). A behavioral parent-training intervention for a child with avoidant/restrictive food intake disorder. *Clinical Practice in Pediatric Psychology, 4*(1), 23-34. doi:10.1037/cpp0000128

Najdowski, A. C., Wallace, M. D., Doney, J. K., & Ghezzi, P. M. (2003). Parental assessment and treatment of food selectivity in natural settings. *Journal of Applied Behavior Analysis, 36*(3), 383-386. doi:10.1901/jaba.2003.36-383

Nicholls, D., & Bryant-Waugh, R. (2009). Eating disorders of infancy and childhood: Definition, symptomatology, epidemiology, and comorbidity. *Child and Adolescent Psychiatric Clinics of North America, 18*(1), 17-30. doi:10.1016/j.chc.2008.07.008

Nicholls, D., Christie, D., Randall, L., & Lask, B. (2001). Selective eating: Symptom, disorder or normal variant. *Clinical Child Psychology and Psychiatry, 6*(2), 257-270. doi:10.1177/1359104501006002007

Piazza, C. C., Patel, M. R., Gulotta, C. S., Sevin, B. M., & Layer, S. A. (2003). On the relative contributions of positive reinforcement and escape extinction in the treatment of food refusal. *Journal of Applied Behavior Analysis, 36*(3), 309-324. doi:10.1901/jaba.2003.36-309

Pizzo, B., Williams, K. E., Paul, C., & Riegel, K. (2009). Jump start exit criterion: Exploring a new model of service delivery for the treatment of childhood feeding problems. *Behavioral Interventions, 24*(3), 195-203. doi:10.1002/bin.285

Powell, F. C., Farrow, C. V., & Meyer, C. (2011). Food avoidance in children. The influence of maternal feeding practices and behaviours. *Appetite, 57*(3), 683-692. doi:10.1016/j.appet.2011.08.011

Remington, A. M., Anez, E. V., Cooke, L. J., & Wardle, J. (2011). Tiny tastes: A home based intervention promoting acceptance of disliked vegetables. *Appetite, 57*(2), 564

Rivas, K. D., Piazza, C. C., Patel, M. R., & Bachmeyer, M. H. (2010). Spoon distance fading with and without escape extinction as treatment for food refusal. *Journal of Applied Behavior Analysis, 43*(4), 673-683. doi:10.1901/jaba.2010.43-673

Rogers, L., Magill-Evans, J., & Rempel, G. (2012). Mothers' challenges in feeding their children with autism spectrum disorder: Managing more than just picky eating. *Journal of Developmental and Physical Disabilities, 24*(1), 19-33. doi:10.1007/s10882-011-9252-2

Schreck, K. A., Williams, K., & Smith, A. F. (2004). A comparison of eating behaviors between children with and without autism. *Journal of Autism and Developmental Disorders, 34*(4), 433-438. doi:JADD.0000037419.78531.86

Schwartz, I. S., & Baer, D. M. (1991). Social validity assessments: Is current practice state of the art? *Journal of Applied Behavior Analysis, 24*(2), 189-204. doi:10.1901/jaba.1991.24-189

Scruggs, T. E., & Mastropieri, M. A. (1998). Summarizing single-subject research. *Behavior Modification, 22*(3), 221-242. doi:10.1177/01454455980223001

Seiverling, L., Williams, K., Sturmey, P., & Hart, S. (2012). Effects of behavioral skills training on parental treatment of children's food selectivity. *Journal of Applied Behavior Analysis, 45*(1), 197-203.

Sharp, W. G., Burrell, T. L., & Jaquess, D. L. (2014). The autism MEAL plan: A parent-training curriculum to manage eating aversions and low intake among children with

autism. *Autism: The International Journal of Research and Practice, 18*(6), 712-722. doi:10.1177/1362361313489190

Sharp, W. G., Harker, S., & Jaquess, D. L. (2010). Comparison of bite-presentation methods in the treatment of food refusal. *Journal of Applied Behavior Analysis, 43*(4), 739-743. doi:10.1901/jaba.2010.43-739

Sharp, W. G., Jaquess, D. L., Morton, J. F., & Herzinger, C. V. (2010). Pediatric feeding disorders: A quantitative synthesis of treatment outcomes. *Clinical Child and Family Psychology Review, 13*(4), 348-365. doi:10.1007/s10567-010-0079-7

Sharp, W., Berry, R., McCracken, C., Nuhu, N., Marvel, E., Saulnier, C., et al. (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. doi:10.1007/s10803-013-1771-5

Sira, B. K., & Fryling, M. J. (2012). Using peer modeling and differential reinforcement in the treatment of food selectivity. *Education and Treatment of Children, 35*(1), 91-100.

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

Tarbox, J., Schiff, A., & Najdowski, A. C. (2010). Parent-implemented procedural modification of escape extinction in the treatment of food selectivity in a young child with autism. *Education and Treatment of Children, 33*(2), 223-234.

U.S. Department of Health, Education, and Welfare, Public Health Service. (1979). Healthy people: The surgeon general's report on health promotion and disease prevention. Washington, D.C.: U.S. Government Printing Office.

Wilkins, J. W., Piazza, C. C., Groff, R. A., & Vaz, P. C. M. (2011). Chin prompt plus re-presentation as treatment for expulsion in children with feeding disorders. *Journal of Applied Behavior Analysis, 44*(3), 513-522. doi:10.1901/jaba.2011.44-513

Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis, 11*(2), 203-214. doi:10.1901/jaba.1978.11-203

Zimmer, M., Hart, L., Manning-Courtney, P., Murray, D., Bing, N., & Summer, S. (2012). Food variety as a predictor of nutritional status among children with autism. *Journal of Autism and Developmental Disorders, 42*(4), 549-556. doi:10.1007/s10803-011-1268-z