A Snack Time Intervention for Children with Developmental Disabilities:
Steps to Increase Exploration, Communication, and Participation

A Thesis
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By
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Research tells us that nutrition is a crucial component of health throughout our lifetime. Up to 80% of children with developmental disabilities have been reported to have one or more feeding issues. Research tells us that food preferences and dietary habits are established between the ages of two and five years old and has additionally established that the food choices and eating behaviors of others influence young children’s food preferences. Meal times in schools and at home offer the opportunity for children to develop social skills and learn to participate in a mealtime routine with others. It is estimated that approximately two out of three children ages 6 years or younger in the US are in non-parental child-care programs. Feeding studies in children with developmental disabilities have been clinically focused and address the meal time relationship between the child and parental caregiver or the child and a clinician. These feeding interventions, although successful, are individualized for each child. This process to meet specific individual needs would prove to be unrealistic in a childcare setting where the ratio of caregiver to child is often 1:4 or more. The aim of this research was to determine if a family style dining approach to snack time in an inclusive classrooms for children with neurodevelopmental and related disabilities aged 2-4 years old would impact interest and exploration of a variety of foods as well as improve interest in social interaction and engagement in meal time practices of all
children involved. A convenience sample of 4 subjects was chosen from an inclusive preschool classroom at the Early Childhood Education center of The Ohio State University. The snack time intervention lasted for eight days over a two-week period. Videos were taken on the first and last day of the intervention for data collection. Results showed an increase in exploration and communication between the first and last day of the intervention. Participation in the snack time routine decreased due to successful implementation by a particular caregiver paired with a particular subject during the first day of the intervention. Overall qualitative analysis indicated an increase in participation measured by passing of bowls and plates increased on behalf of the entire group participating in the intervention period. Family style dining is an effective approach to increasing exploration of food, participation in snack time routines, and communication with peers due to the nature of the meal time design. It encourages children to take an active role in the meal time routine and increases their interest in trying new foods. With thorough teacher or caregiver training and practice, family style dining is a successful approach to increasing food exploration, communication with others, and participation in the meal time routine. This study reinforces the importance for teacher training in nutrition in childcare.
For my always supportive parents and family.

Thank you for all you have given me.
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Chapter 1: Introduction and Background

Research tells us that nutrition is a crucial component of health throughout our lifetime. If we want to reach optimal health it is even more important to realize that our food preferences and dietary habits are established between the ages of two and five years old\(^1\). It is during this time when physiological changes as well as oral and fine motor development allow for the introduction of new foods to a child.

Research additionally has established that the food choices and eating behaviors of others influence young children’s food preferences\(^4\). Hendy and Raudenbush measured the usefulness of caregiver modeling on children’s acceptance of new foods and found that children were more likely to accept new foods if caregivers enthusiastically modeled eating the foods\(^5\). Meal times additionally offer the opportunity for children to develop social skills and learn to participate in a mealtime routine with others. Children are able to practice requesting items from one another, showcase their autonomy in choosing which foods to eat, practice serving and cleaning up after themselves among many other life skills. Participating in family meals has shown to increase children’s performance academically, emotionally, socially, and nutritionally and have more of a positive influence over children than extracurricular activities including church, tutoring, and music lessons\(^6\).

Today, as well as for the previous two decades, more families rely on non-parental day care services while caregivers go to work. It is estimated that approximately
2 out of 3 children ages 6 years or younger in the US are in non-parental child-care programs\textsuperscript{7}. And on average, preschool children spend 25 hours per week in childcare settings\textsuperscript{2,3}. This puts more responsibility on non-parental caregivers to offer sound nutritional support and guidance to children at a young age. In fact, meal times in childcare settings are so common now that the current national guidelines have recommended, “caregivers sit at the table with children during meals and snacks, consume foods and beverages that meet nutritional standards in the presence of children and have conversations with children about trying and enjoying healthy foods.”\textsuperscript{2} With this understanding, opportunities to introduce healthful foods and habits at home and at school present a unique time for children to build on social skills, communication, independence and responsibility along with the development of optimal nutritional intake at meal times.

Feeding and eating difficulties are commonplace within the pediatric population. Up to 25\% of typically developing children and 13-80\% of children with developmental disabilities have been reported to have some form of feeding or eating difficulty at some point in early childhood\textsuperscript{8}. Neophobia, or fear of new things, is commonly expressed during young childhood years. Mealtime is a typical situation in which families and caregivers may see children demonstrate a ‘fear’ or disinterest in new foods. A child’s refusal of certain foods at the table can cause parental distress and can often interfere with the enjoyment of family meals. This stress may be so much so that family meals may be all together eliminated from the family routine. Many caregivers are not aware that it can take up to 10-15 exposures to a new food before a child becomes comfortable or interested in trying it\textsuperscript{6}. It is important that caregivers are aware of a child’s natural
apprehension toward new foods and that exposure and role modeling are the most effective ways to positively influence a child’s nutritional intake\textsuperscript{1,2,5,6,9–11}.

Family style dining has shown to be an effective approach to increasing typically developing children’s interest in a variety of foods as well as improving the development of social skills and interest in the mealtime routine. This approach utilizes mealtime as an opportunity to socialize with one another, serve oneself from a common serving bowl in the middle of the table, request items from others around the table, expose children to new foods, and encourage play, touch, smell, and taste of foods presented. The eating experience has much to do with the way we perceive our food, our environment, and the attitudes of those around us. It begins with socializing, and then the smell, sight, touch, feel, and taste of foods. If our company at mealtime is pleasant, we are likely to perceive the mealtime as being an enjoyable experience. Likewise, if the food is enjoyable, we are likely to find the mealtime experience to be a pleasant one. Family style dining uses this approach to allow children to feel comfortable at the table, to develop independence and autonomy in deciding for themselves how much of what they will put on their plate and eat, and allows children to play an important role in mealtime practices.

Typically developing children follow a sequence of growth and developmental benchmarks related to feeding that can be reasonably predicted and accounted for by caregivers during their childhood years. Children with developmental disabilities, however, demonstrate delays in reaching developmental milestones. The variability in the development of children with disabilities can make an approach to mealtime less straightforward for parents and caregivers\textsuperscript{8,12}. 
Eating irregularities in children with disabilities can be related to numerous factors. These include medical or nutritional conditions, oral and fine motor developmental delays and behavioral problems. Manifestations that fall under the medical/nutritional category include gastrointestinal issues, food allergies, metabolic abnormalities, feeding tube placements, pre-existing nutrient deficiencies, and/or nutrition-related medication side effects. GI distress such as chronic constipation or diarrhea can cause a child to be apprehensive toward eating. Children who were on tube feedings in the hospital for a prolonged period of time or are currently relying on feeding tubes (Gastronomy tubes, Jejunostomy tubes, or otherwise known as “G-J-tubes”) for nutrient supplementation often have a difficult time accepting food in their mouth or are often too full from tube feeding formulas to be interested in eating solids. Oral and fine motor delays include difficulties with manipulating food in the mouth or transporting food to mouth. In particular, children with oral motor difficulties may have a hard time keeping food in his mouth, may be more likely to choke, and are at risk for aspiration.

Behavioral problems that effect eating and mealtimes for children with disabilities include difficulties transitioning from one activity to the next, rigidity about food preferences, and difficulty communicating preferences. Oral or gustatory hypersensitivities can contribute to behavioral problems. These complications are often termed “problem” or “disruptive” eating behaviors as the child’s behavior can be distracting or overwhelming to the other children and adults participating in mealtime. Difficulties transitioning to the table are a common behavioral threat to mealtime cooperation, which can sometimes be ignited by sensory processing difficulties, and environmental factors. Sensory processing difficulties that may disrupt a child’s
mealtime include hypersensitivities to tastes, textures, and smells. Hypersensitivity can be distracting for a child to be able to enjoy a particular food as he becomes overwhelmed by the smell, taste or texture. Extreme hypersensitivity can lead to fussiness or hostility toward having to be around that particular food. Environmental factors, such as noise level, light intensity, and other distractions, can overwhelm a child and prevent participation in mealtime.

Sixty to seventy percent of children with DD have one or more feeding difficulties. Mealtime or feeding inefficiencies may not always be directly linked to a disability but rather a combination of structural, behavioral and or sensory issues. Each category of feeding abnormalities in children with developmental delays can present on their own or in combination with another. The complexity of mealtime feeding issues for a child with a disability makes interventions complex.

Few studies have been published that address food acceptance, interaction with others at mealtime, and engagement or participation in the mealtime routine in children with developmental disabilities. The majority of the research has aimed at improving meal times with parents based on a child’s individual need. Many of these interventions manipulate the eating environment so that the child feels comfortable with his surroundings. Several interventions have used a reward system for eating a novel food once avoided. And other interventions use a persistence technique to get a child to eat. Although these individualized interventions in children with developmental disabilities have proven to be effective, it is unrealistic in a childcare setting to manipulate a mealtime approach for every individual child. The aim of this research is to determine if the family style mealtime approach that has been proven to be effective in
typically developing children will show to be equally effective in children with special needs.

1.1 Objectives

The primary objective of this research is to determine if a family style dining approach to snack time in an inclusive classrooms for children with neurodevelopmental and related disabilities aged 2-4 years old will impact their exploration of a variety of foods, increase their participation in the mealtime routine, and improve their interest in social interaction with others during meal time.

1.2 Methods

One classroom was conveniently selected from the Early Childhood Education program within the Nisonger Center for Excellence in Developmental Disabilities. The study sample participated in snack time with the primary investigator 8 times in a two-week period. During each session, two foods were presented to the children and placed into serving bowls. Children were asked to take a plate and pass it along to their neighbor and then begin serving themselves. Other adult caregivers sat around the table participating in the snack time routine as well. Caregivers acted as role models by eating, asking children to pass items along, interacting with the foods and enjoying the company at the table. A blinded observer observed snack time on the days that were recorded during intervention period. The role of the blind observer was to evaluate whether the researchers involved in the study were acting in compliance with the study protocol. The blind observer was given a checklist to use that was adapted from the Optimal Caregiver Mealtime Behavior checklist published in the Journal of the American Dietetic
Internal consistency for the Optimal Caregiver Mealtime Behavior Checklist was 0.69 (Cronbach's Alpha) and Inter-Rater reliability ranged from 96 to 100%.

The first day and the last day of the intervention were taped for data collection. The primary investigator reviewed the videos using the measurement tool developed for this study. The measurement is located in Appendix I. Content validity was established by review from three professionals representing special education, nutrition and occupational therapy. Visual and qualitative analysis were used to interpret data.

1.3 Participants

The sample for this study was a classroom of ten, 2-4 year old children with developmental disabilities in the Early Childhood Education Center. Exclusion criteria for this study included: lack of parental consent, medical complications that cause the child to have a restrictive diet or other medical conditions interfering with the ability to participate, children who are unable to feed themselves and children who have not yet transitioned to table foods. Inclusion criteria included: a student in the treatment group classroom with a developmental or intellectual disability, between the ages of 2-4 years old, with ability to participate and a parental consent form submitted before the initiation of the intervention.

1.4 Data collection and analysis

The first and the last day of the intervention were recorded for data collection. The primary investigator reviewed the videos using a time sampling technique and the
measurement tool developed for this study (See Appendix I). The first ten minutes of each video were considered for data collection. Every 15 seconds the primary investigator recorded which of the target behaviors form the measurement tool were observed of each subject. The primary investigator then used visual analysis from data collected to analyze the data.

The measurement tool was created using items that were identified from specific components of the research protocol that represented the targeted behaviors within the family style eating intervention. Content validity was established by review from three professionals representing special education, nutrition and occupational therapy. After their review, revisions for the instrument were made on two separate occasions. Inter-rater reliability was established by independent reviewers scoring the behavior checklist while observing video-taped sessions of the snack time. Inter-rater reliability was 97.5%.

1.5 Summary

Children with developmental disabilities are often in non-parental day care settings where they can receive directed support and education. Most interventions that include children with developmental disabilities take place in a clinical or home setting where the focus is on the parent-child feeding relationship. More investigation into a system for mealtime in day care settings that will help support an interest in mealtime, new foods, and proper mealtime behavior is needed. This study is aimed at determining if an approach that has shown to be effective at increasing typically developing children’s interest in new foods and in the meal time routine will be equally effective the developmentally disabled pediatric population.
Chapter 2: Literature Review

2.1 Etiology of eating irregularities in typically developing children and children with developmental disabilities

Eating is complex; it involves using all five senses and employing oral motor and fine motor skills as well as gastrointestinal functionality and a sense of decision-making. Full term children are born with an innate desire to eat and with the essential skills to feed successfully from the breast. However, after 6 months of age eating becomes a learned behavior.\textsuperscript{12,14,16} Feeding issues are common in young children, both typically developing and even more so in children with developmental disabilities. Up to 80% of children with developmental disabilities have been reported to have some sort of feeding issue\textsuperscript{8}. Feeding problems were once thought of as either organic or inorganic dichotomies. However, today we know that feeding behaviors issues can present as a complex interplay between biological, structural, social, sensory, and/or behavioral factors\textsuperscript{13}.

Typically developing children follow a sequence of growth and developmental benchmarks related to feeding that can be reasonably predicted and accounted for by caregivers during their childhood years. Oral motor skills of all children develop in the neonatal period during the third trimester of pregnancy\textsuperscript{12,14,16}. This is the time when a child develops reflexive suck-swallow, rooting reaction, gag reflux and lip seal so that he
is able to begin feeding the day he is born. A child will continue to build oral and fine motor skills with every day and with each meal. Learning how to manipulate his head, neck, tongue, lips, and jaw for a more efficient mealtime. By 7-8 months a child will have developed the skills to finger feed and by 12-18 months a typically developing child will be able to stabilize his jaw on the rim of a cup, lick his lips and maintain a coordinated rotary-like chew. At this point, a child has developed the motor skills and cognitive acuity that allow for him to play an elemental role in the family meal.

Children with developmental disabilities, however, do not follow the same sequence of growth and developmental advancements as their typically developing peers. As previously mentioned, reasons for feeding disorders in children with developmental disabilities can be related to medical/ biological, sensory, social, and behavioral factors. Children with developmental disabilities may or may not have been born prematurely and unable to experience the intrauterine period essential for the development of the skills or physiological structures necessary to feeding. Aside from prematurity, children with developmental disabilities may have other indicators responsible for problem eating. Some children may have been on ventilators and/or feeding tubes as infants that could have desensitized them to the sensation of eating. Some children may have gastronomy or jejunostomy tubes in which they rely on for supplemental feedings. This could cause them to feel full and uninterested in oral feeds. In addition to medical conditions that cause feeding problems, sensory processing issues can cause discomfort when eating. Additionally, particular lighting, noises, or chaos in the room can influence a child’s perception of mealtime. Some children have a hard time grasping foods and bringing food to mouth, making meal times discouraging. Most children with disabilities
demonstrate a combination of issues that influence eating. It is important to realize that each child is unique in his ability to eat, desire to eat, tastes and comfort with food, mealtime behavior, and impression of a mealtime routine. Each child is equally unique in his readiness for foods based on physiological, and oral or fine motor skill level. These distinctive characteristics make it far more challenging for families and caregivers to understand how to approach feeding problems in this population.

2.2 The need for a universal approach to problem feeding in daycare and preschool settings for children with developmental disabilities

In most cases, a child classified as a problem feeder by either a parent, physician or caregiver will seek help from a specialist. Feeding specialists include physicians, dietitians, occupational therapists, speech and language pathologists, and psychologists. Some feeding specialists work together as part of an interdisciplinary team, while others may work independently.

With the understanding of an interdisciplinary team approach, there have been several studies that utilize a feeding team of a physician, dietitian, occupational therapist, speech and language pathologist, and psychologist to address feeding concerns. Most of these interventions have focused on the parent-child feeding relationship or on specific behavioral, sensory or motor issue that seems to be posing a threat to a typical mealtime routine. Most interventions have taken place in a hospital inpatient or a day treatment setting\textsuperscript{15,17-23}. Interventions have focused on positive reinforcement, escape extinction, planned ignoring, representation, swallow induction, drip feeding, medication for motility, visceral pain and non-specific arousal, but no studies to date have focused on
group setting child focused mealtime routines despite individual and varying problem eating behaviors.\textsuperscript{10,13,17,18,20–27}

Parent-child interventions have evidence of positive benefit. However, it is estimated that approximately 2 out of 3 children ages 6 years or younger in the US are in non-parental child-care programs.\textsuperscript{7} And on average, preschool children spend 25 hours per week in childcare settings.\textsuperscript{15} As of 2006, upward of 60% of mothers of children with disabilities were employed and relied on childcare at the same rate as mothers with typically developing children did.\textsuperscript{15} This puts more stress on non-parental caregivers to offer sound nutritional support and guidance to children at a young age. In a childcare setting where the ratio of adult caregiver to child is 1:3 or more, it is unrealistic to develop an individualized feeding approach for each child.

In order to address feeding in child care settings, national guidelines have been established to ensure children who eat meals and snacks in school or child care settings receive proper nutrition.\textsuperscript{2,3} Additional guidelines have also recognized the importance of caregiver role modeling. Caregivers are encouraged to sit at the table with children during meals and eat foods and beverages that meet nutritional standards while in the presence of children. Not only should caregivers’ role model these healthy behaviors, but they are also anticipated to carry conversations with children about trying and enjoying healthy foods.\textsuperscript{1,2,4,6}

With more children with disabilities away from home during meal and snack time hours, a multifaceted meal time needs structure for a group of children with developmental disabilities and needs to be addressed so that caregivers and teachers are able to be successful with the introduction of healthful foods into a child’s diet. Research
has shown that parents, caregivers, and peers have strong influence on a child’s eating habits. Karl Duncker was the first to study social effects on food preferences in children in his study, “Experimental modification of children's food preferences through social suggestion” (1938). Dunker paired two peers with different food preferences. After the children observed others making food choices, their food choices began to change to match those of their peers\textsuperscript{10}. In 1980 Birch again investigated the influence of peer models’ food selection in a naturalistic setting. After children’s food preferences were determined she paired peers that had differing preferences toward two different vegetables. The target peer was to select his preferred vegetable on day 1. Day 2, 3, and 4 the control peer was to select his. By day 4 the targeted peer was selecting the preferred food of the peer and this effect lasted several weeks after the intervention\textsuperscript{11}. Repeated exposure and interaction with foods is known to help improve children’s interest in foods offered\textsuperscript{6,9,28}. Research additionally has established that the food choices and eating behaviors of caregivers directly correlate with young children’s food preferences\textsuperscript{1–3,5,11}. Several studies have measured the usefulness of caregiver modeling on children’s acceptance of new foods and found that children were more likely to accept new foods if caregivers enthusiastically modeled eating the foods\textsuperscript{1–3,5,11}.

### 2.3 Studies related to problem feeding in children with developmental disabilities

At present, few studies have been done in group settings with children who have developmental disabilities. Most studies that have been conducted have been parent-child focused and individualized to a child’s particular needs. One study, however, has focused on child feeding interventions using a multifaceted and interdisciplinary
approach with parents and children in a group setting. This study, conducted in Canada, involved an occupational therapist, a dietitian, a speech pathologist, and a psychologist. It addressed feeding barriers occurring as a result of the interplay between biological, social, and behavioral factors rather than only focusing on organic or non-organic as mutually exclusive barriers. The study took place over a four-month period. Parents and the interdisciplinary team met initially for 120 minutes and then for 90 minute weekly sessions as a group. The first two sessions focused on the emotional implications that feeding problems have on families, nutrition guidelines for infants and children, the introduction of foreign tastes and textures to a child, and strategic attention gathering from a child. The third group visit was a picnic held with all of the children and their caregivers. During this time the feeding team was able to make assessments and individual recommendations for parent and child dyad. During the 4th session, communication and motor development of the child were assessed by the speech therapist. Upon conclusion of the study, the team reviewed the material presented to the families encouraged them to continue using the strategies identified in the intervention at home. Results of this study indicated that parents found that implementing the suggestions provided in the sessions was challenging at first but ultimately proved to be effective. An important result from this study indicated that parents found this intervention to help in reducing stress and eliminating pressure tactics at the table. Parents noted that the intervention helped them to understand how their attitudes and behaviors at the table can affect their child’s eating behaviors, attitudes, and behaviors at the table as well. Parents reported feeling more confident in feeding their child and in knowing that not every meal will be perfect and that it is typical for children to have
erratic intake at times\textsuperscript{28}.

### 2.4 Studies related to problem feeding in typically developing children

Successful studies including typically developing children as subjects have shown to improve a child’s interest in tasting a variety of foods as well as promoting a healthy relationship with food and the meal time routine. An investigation using family style meal service comparing situations in which children received pre-served plates to situations where children were allowed to serve themselves from bowls and plates placed on the table in front of them indicated that children will eat more than one portion at snack when they are allowed to self-select their intake\textsuperscript{4,29}. Ellyn Satter, a Registered Dietitian and distinguished author in the field of pediatric nutrition and child feeding practices has proposed a division of responsibility in feeding children that has remained the most influential model in its field today. Satter recognizes that it is the caregiver’s responsibility to provide an opportunity to eat a variety of healthful foods, however it is the child’s responsibility to determine if and how much he will eat at that time\textsuperscript{6,30}. She notes that children who experience family meals in this structure grow up to have better relationships with food. A child’s intake will vary from meal to meal depending on how hungry he is and how interested he is in the foods offered. Despite an inconsistent intake from meal to meal, Birch et. al. found that children’s daily energy intake is relatively consistent\textsuperscript{31}. When children are given the opportunity to help themselves to foods, they will eat as much as their body requires at that time. Through providing a variety of healthful foods in such a setting, children will consume a variety of nutritious foods at each mealtime\textsuperscript{32}. 
Through family style dining, caregivers and peers are able to act as models at mealtime. The way the family style dining is structured offers an opportunity for children to develop interest in new foods, engagement, and interaction through facilitating experiences that have been shown to be effective. The Head Start program, funded through the US Department of Health and Human Services, has adopted family style dining as one of its core policies. When bowls of food are placed in the center of the table and children can see one another serving themselves and enjoying other foods, they are given the opportunity to become more interested in trying that same food as well. Deciding whether and how much of that food to place on their plates gives the child a sense of comfort in knowing that it is his choice to eat the food or not. This allows them to develop a sense of independence and autonomy. Encouraging children to ask others to pass food and plates along to them allows for them to practice initiating interactions with others and participating in the mealtime routine. This style of dining also provides the opportunity for the children to practice autonomy in food selection to help increase the variety of healthful foods eaten\textsuperscript{4,6}. 
Chapter 3: Methodology

3.1 Introduction

Food choices and eating behaviors of others influence young children’s food preferences\textsuperscript{1,2,5,6,9–11}. Typically developing children follow a sequence of growth and development related to eating that children with developmental disabilities may not\textsuperscript{8}. Most feeding interventions take place in a home or clinical setting and are parent-child focused\textsuperscript{15}. With 60\% of children with disabilities in non-parental care services during the day, more responsibility is put on caregivers to provide nutritionally adequate meals and snacks as well as an environment to foster healthy mealtime routines and relationships with food\textsuperscript{7}. Up to 80\% of children with developmental disabilities are reported to have one or more feeding disorders, making it often times more challenging for caregivers to address all the needs of each child at meal or snack times in a preschool setting\textsuperscript{8}.

3.2 Purpose

This study was developed to determine if family style dining snack time techniques provide support for development of food exploration measured by touch, smell, taste, play or consumption of foods. Additionally, the study’s purpose sought to determine if family style dining would improve participation and communication among children with developmental disabilities. The intervention was modeled after family style dining
routines identified within the literature and nutritional standards of care for preschool children.

3.3 Research questions

Research questions included the following:

1. Does the incorporation of a family style snack routine increase the child’s exploration of food at snack time?
2. Does the incorporation of a family style snack time routine increase the child’s participation in the mealtime routine?
3. Does the incorporation of a family style snack routine increase the child’s communication with others at the table?

3.4 Participants

An application was submitted to The Ohio State University Institutional Review Boards – Office of Responsible Research Practices (Behavior and Social Sciences) on January 31, 2012 and was approved on February 17, 2012. The sample of convenience for this study included children who are members of one of the early childhood classrooms at the Nisonger Center’s Early Childhood Education program at The Ohio State University. Consent forms were sent home to all of the ten students in the selected classroom. Four consent forms were returned prior to the beginning of the intervention allowing for data collection on those 4 subjects. All of the students who attended class that day participated in snack time with the subjects, but information was only gathered on the 4 children with consent forms that were returned prior to the beginning of the intervention. All of the participants had a neurodevelopmental or related disability.
Exclusion criteria included the following: parental refusal, medical complications that cause the child to have a restrictive diet or other medical conditions interfering with the ability to participate, children who are unable to feed themselves and children who have not yet transitioned to table foods. Inclusion criteria for the study included the following: a student in the intervention group classroom with a developmental or intellectual disability, between the ages of 2-4 years old, with physical ability to participate and a consent form returned to the primary investigator before the initiation of the intervention.

3.5 Research design

The research design for this study was a quasi-experimental design with a non-randomized sample of convenience. Data collection used a time sampling technique and the measurement tool created for this study. Data was collected from the videos taken on the first and last day of the intervention and analyzed using visual and qualitative analysis. One classroom of 2-4 year old children was selected by the center Director of the Early Childhood Education center at The Ohio State University. The intervention group participated in snack time with the primary investigator for a total of 8 times over a sixteen day period (Tuesday, Thursday, Friday, Monday, Tuesday, Thursday, Friday and the following Monday). This was according to the preschool schedule. Videos were taken of the first and the last day of the intervention for data collection. A blind observer was present on the first and last day of the intervention to ensure the caregivers were acting in accordance to the intervention protocol. A Caregiver Observation Checklist was adapted from the Optimal Caregiver Mealtime Behavior checklist published in the Journal of the American Dietetic Association 1997\(^1\). Internal reliability for the Optimal
The Caregiver Mealtime Behavior Checklist had a Cronbach's Alpha of 0.69 with an Inter-Rater reliability of 96-100%. The blind observer rated caregiver behavior as 100% in accordance with the intervention protocol using the Optimal Caregiver Mealtime Behavior Checklist.

### 3.6 Instrumentation

A measurement tool was created using items that were identified from specific components of the research protocol that would represent the targeted behaviors within the family style eating intervention.

The three research questions were measured using an instrument created for this study. The tool was created using items that were identified from specific components of the research protocol that would represent the targeted behaviors within the family style eating intervention. Content validity was established by review from three professionals representing special education, nutrition and occupational therapy. After their review, revisions for the instrument were made on two separate occasions. Inter-rater reliability was established by independent reviewers scoring the behavior checklist while observing video-taped sessions of the snack time. Inter-rater reliability was 97.5%. After assessing the inter-rater reliability, changes were made to numbers 5 and 6 to clarify that the child could interact with both a caregiver and a peer to be considered to be performing one of the targeted behaviors described in number 5 and 6 of the measurement tool. Numbers 7 and 8 were clarified by defining “taste” as the first taste or bite of a food and the word “touch” as touching a food with hands rather than with a utensil. The measurement tool is located in
<table>
<thead>
<tr>
<th>Behavior</th>
<th>Measurement tool item number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Child eats</td>
<td>Item number 3</td>
</tr>
<tr>
<td>2. Child tastes a food</td>
<td>Item number 7</td>
</tr>
<tr>
<td>3. Child touches a food</td>
<td>Item number 8</td>
</tr>
<tr>
<td>4. Child smells a food</td>
<td>Item number 9</td>
</tr>
<tr>
<td>5. Child plays with a food</td>
<td>Item number 10</td>
</tr>
</tbody>
</table>

Table 1: Target behaviors to measure exploration of food in the meal time routine

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Measurement tool item number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Child signs or asks for more</td>
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</tr>
<tr>
<td>2. Child communicated with adult or child at the table using eye contact, point, smiling, laughing, talking</td>
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</tr>
</tbody>
</table>

Table 2: Target behaviors to measure communication in the mealtime routine

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Measurement tool item number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Child serves himself</td>
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<tr>
<td>2. Child passes bowls or plates</td>
<td>Item number 2</td>
</tr>
<tr>
<td>3. Child observes other interact with the food eating/playing/exploring foods on their own plate</td>
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</tr>
</tbody>
</table>

Table 3: Target behaviors to measure participation in the mealtime routine

Appendix I. Tables 1, 2 and 3 indicate the target behaviors listed within the measurement tool that were used to evaluate the three research questions posed.

3.7 Study Procedure

Prior to the study, all caregivers who participated in data collection were trained on the family style snack time routine intervention and the use of the data collection
The Primary Investigator created the menu based on guidelines from the Department of Agriculture’s National School Lunch Program as well as the Child and Adult Care Food Program created the menus.

Menu Guidelines:

**Snack Components:**

Two different components from the four listed must be offered/served and adjusted for family style serving and age differences:

A. Milk fluid – 1 cup  
B. Meat or Meat Alternative – 1 ounce  
C. Fruit or Vegetable or full strength juice- 1 3/4 cup  
D. Whole grains/breads - 1 serving

**Additional Guiding Principles:**

I. Food selections that are considered high in Vitamin A and Vitamin C will be included at a minimum of once a week  
II. Whole grain choices will be preferentially chosen  
III. All considerations to minimize choices high in sugar will be made  
IV. New or novel foods will be introduced at a minimum of once per month  
V. Culturally diverse food choices will be preferentially included and introduced each week

<table>
<thead>
<tr>
<th>Day</th>
<th>Food 1</th>
<th>Food 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday, March 26th</td>
<td>Whole Wheat Waffles</td>
<td>Strawberries</td>
</tr>
<tr>
<td>Thursday, March 28th</td>
<td>Sliced apples</td>
<td>Cheese sticks**</td>
</tr>
<tr>
<td>Friday March 29th</td>
<td>Pita</td>
<td>Hummus</td>
</tr>
<tr>
<td>Monday, April 2nd</td>
<td>Yogurt **</td>
<td>Sliced grapes</td>
</tr>
<tr>
<td>Tuesday, April 3rd</td>
<td>Applesauce</td>
<td>Wheat Sticks</td>
</tr>
<tr>
<td>Thursday, April 5th</td>
<td>Cheese sticks**</td>
<td>Mangos</td>
</tr>
<tr>
<td>Monday, April 9th</td>
<td>Nutri-Grain bars</td>
<td>Yogurt**</td>
</tr>
</tbody>
</table>

Food allergies: Egg, fish  
Food intolerances: Dairy  
**Cheese sticks and yogurt have low lactose content and are typically appropriate for dairy intolerance.

**Table 4: Picky Eaters Team Snack Schedule**
The study began on Tuesday March 27th within the intervention classroom and was recorded. The foods for snack were selected and prepared prior to the snack time for the intervention group. Foods were portioned into bowls with child-appropriate serving spoons. Children in the selected classroom in the ECE transitioned themselves to the table for snack time when their teacher announced that it was time. Each child found his seat where he routinely sat for snack time period. The entire class was seated together at one table. Pre-prepared bowls of the snack foods with serving spoons were placed on the table. Once the children were seated, the investigator instructed the children to take a plastic plate and pass them along to the child sitting next to them at the table. When a child had a plate he was encouraged to help himself to whichever foods he wanted to eat at the able. There were no rules about how much a child had to take, taste, or eat. Four adult research investigators sat at the table and participated in the snack time routine. The child to adult ratio was 2:1 for the intervention group. Each adult took a plate so that they could serve themselves the snack foods and serve as role models for eating, playing, passing, and tasting throughout the snack time. Foods were described positively and were related to colors, textures, smells, tastes, and actions or other concepts at the developmental level that was appropriate for the three year old children participating in the study.

Teachers, aides, and co-investigators were present at all times to monitor for choking or safety hazards as well as to carry out the strategies that the PI was implementing. Words and phrases used include, “yum, crunchy, red, soft, square, triangle” and other descriptors. Students were encouraged to help themselves to food, use words or signs to request a peer to please pass the desired food item and were also
encouraged to engage with their peers and caregivers around them. Children were encouraged to playfully interact with their food, friends, and caregivers. When a child determined he was finished he was permitted to leave the table and empty his or her leftovers into the garbage according to typical snack time routine.

3.8 Avoiding and Minimizing Participant Risks

Risks included choking and allergic reaction to new foods. To avoid these risks, we recorded all allergies reported by caregivers before we began our study and did not provide any of these foods throughout our study. To prevent choking we cut all foods offered into bites that were half the size of a grape or smaller. Ample supervision was present at all times to monitor students while eating.

3.9 Data Collection

Videos were recorded on the first and last day of the intervention. The primary investigator reviewed the videotapes using the measurement tool and tallied the 10 target behaviors on the data collection instrument at every 15-second mark of the snack time. This was done for each child participating in the intervention whose consent form was returned prior to the start date of the intervention. Each of the 10 target behaviors listed within the measurement tool represented one of the three research questions (Exploration, Participation, and Communication). Once data for each subject was collected using the measurement tool, the data was analyzed to determine the outcome for each of the three research questions using visual and qualitative analysis.

A blind observer was present to observe the intervention group during both videotaping sessions. The blind observer was given a checklist to use that was adapted
from the Optimal Caregiver Mealtime Behavior checklist published in the Journal of the American Dietetic Association 1997. Internal reliability for the Optimal Caregiver Mealtime Behavior Checklist was 0.69 (cronbach's Alpha) with an Inter-Rater reliability of 96-100%.
Chapter 4: Results and Discussion

Video recordings were taken on the first and last day of the intervention period for data collection. The subjects were a sample of convenience from the Early Childhood Education Center within the Nisonger Center at The Ohio State University. Ten students participated in snack; however there were only four subjects considered for this study. Subjects were chosen based on inclusion criteria and receipt of the consent form before the start of the intervention. The videos were assessed using a time sampling data collection technique and using the measurement tool created and validated for this study. Information regarding the subject behavior was recorded every 15 seconds based on the measurement tool items. Visual and qualitative analysis were used to analyze data from the measurement tool and videos. A blind observer was present on the first and last day to ensure caregivers were acting according to protocol. Using the Optimal Caregiver Behavior Checklist, the blind observer found the caregivers to be following study protocol 100% both days.

The research questions were:

1. Does the incorporation of a family style snack routine increase the subject’s exploration of food at snack time?

2. Does the incorporation of a family style snack time routine increase the subject’s participation in the mealtime routine?
3. Does the incorporation of a family style snack routine increase the subject’s communication with others at the table?

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Table 1: Target behaviors to measure exploration of food in the meal time routine

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Table 2: Target behaviors to measure communication in the mealtime routine
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<tr>
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<td>Item number 6</td>
</tr>
</tbody>
</table>

Table 3: Target behaviors to measure participation in the meal time routine

4.1 Results

The typical snack time in this classroom before the intervention took place was led by one caregiver who sat at the center of a horseshoe-shaped table with the children sitting around the outside. The caregiver handed the foods to the children from a large serving platter. Children were not given an opportunity to help themselves to foods at the table. The same food was offered for all children at snack time. They were encouraged to use their words or sign “yes” or “no” when the caregiver asked if they wanted a particular food when asked. Children used laminated placemats or paper towels to eat from during their typical snack time with their teacher. The caregivers did not encourage or support direct interaction between children during the typical snack time routine in this classroom. Children interacted with the caregiver if they wanted more of a particular food item.

Visual analysis found that exploration of food increased with the introduction of the intervention protocol. Eating, tasting, touching, smelling or playing with a food measured exploration. Participation in snack time decreased on the last day of the
intervention due to a particular caregiver’s success with the intervention protocol on the first day of the intervention. Communication increased between the first and last day. A depiction of the results is displayed in Table 5 and Figures 1 and 2.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Research question</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exploration</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Participation</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>Exploration</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Participation</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Exploration</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Participation</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Exploration</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Participation</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>All</td>
<td>Exploration</td>
<td>76</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>Participation</td>
<td>62</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>24</td>
<td>26</td>
</tr>
</tbody>
</table>

Table 5: Visual analysis of exploration, communication and participation of subjects 1, 2, 3 and 4 and all subjects combined both pre and post
Figure 1: Visual analysis of exploration, communication and participation of subjects 1, 2, 3 and 4 pre and post.
Figure 2: Visual analysis of exploration, communication and participation of all subjects pre and post

On the first day of the intervention, the preschool director, the dietetics’ faculty member, the dietetics’ student and the occupational therapy student were present to carry out the snack time intervention. The preschool teacher, a volunteer and the assistant teacher were present, but did not participate in snack as they had not been trained on the intervention protocol at that time.

When the children were ready for snack on the first day of the intervention, they came to the horseshoe-shaped table where they typically ate snack and found a seat. Once seated, the primary investigator described what was being served for snack in a neutral tone. Sliced strawberries and whole grain waffles were served in serving bowls
for snack on the first day. During the intervention, snack time consistently began with the primary investigator asking the children to please take a plate and pass the rest to their neighbor, who was identified by name during the intervention.

On the first day of the intervention, the children did not understand the concept of taking a plate and passing the rest down the table. Rather, the child continued to take a single plate and pass it down the table until each child had one. The caregivers helped the children understand the concept of passing the stack of plates by placing their hands over the child’s to help him pass the stack along. By the third day of the intervention, the majority of children had learned to take a plate and pass the rest down the table.

After each child had a plate, the primary investigator announced: “Please help yourself to any of the foods you would like.” The primary investigator placed the serving bowls in arms reach for the children and they began to serve themselves. After a child had served himself from a serving bowl, the caregivers at the table encouraged the child to then pass the bowl to the next person at the table. Initially, the children did not understand the concept of passing. Rather than passing the entire bowl, children served a neighbor from the serving bowl or ignored the request altogether. The caregiver helped the child better understand the action by placing her hands over the child’s to help him pass the bowl while saying, “We’re going to pass the bowl to (name of child).” By the third day of the intervention, the majority of the children were able to successfully pass the serving bowl to one another whether they were asked to do so or not.

Once a child had served himself, he was able to begin eating; children were not required to wait for all to be served to begin eating. When a child finished a food on his plate and wanted more, he helped himself if the bowl was in arms reach. If not, he asked
the caregiver for more of a food by using his words or using sign language. The caregiver asked the nearest classmate to please pass the bowl to the child who asked for it and assisted him in passing until the child adopted the new act on his own.

This protocol was carried out in the same fashion every day for two weeks. Each caregiver that made up the research team participated twice except for the primary investigator who was present every day. There were a total of 8 researchers.

**Exploring, participating and communicating among all participants**

**Exploration:**

The nature of the intervention encouraged children to participate in snack time and explore foods offered more so than their typical snack time routine allowed for. Children participating in the intervention took foods that were offered and placed them on their plates even if they were not interested in eating them. Although children with textural aversions to foods often did not take a food in which they did not like the texture of (i.e. yogurts and applesauces).

**Participation:**

The children learned the new snack time routine quickly. By the third day participation in the new routine was understood by all of the children at the table. They each understood the concept of passing the plates and serving bowls to others at the table by the third day. Additionally, they understood to serve themselves from the serving bowl using the serving spoon and using their own spoon to eat with. The children enjoyed passing the serving bowls around to one another so much so that there was a
continuous flow of food circulating the table. Children rarely had to ask for more, as they were able to serve themselves while the bowls continuously circulated the table.

**Communication:**

On the first day, if a child wanted something he got out of his seat to get it. By the third day, all children understood to ask a caregiver for more of something rather than getting out of their seats. By the last day of the intervention, most children participating in snack announced when they wanted more of a particular food. The request was neither directed toward a caregiver or a particular child. To the child, it seemed as though it was understood that someone would pass whatever was requested toward his way when he signed or asked for more. When the child was unsuccessful at receiving what he wanted, he would direct his request for more to a caregiver.

**Case Studies**

**Case Study 1:**

Subject 4, given the name Daniel for the purpose of this paper, is the subject of this case study. This is a depiction of the first day of the intervention and the way the director of the preschool was able to interest the child in his non-preferred food item at the table. This day, strawberries and waffles were being served for snack.

The Director of the preschool was paired with Daniel. Of the food being served, his preferred food item was strawberries. He helped himself to both the strawberries and the waffles, but continued to serve himself more strawberries until there were no longer any left at the table. At that point, the Director used her experience in early childhood intervention and the intervention protocol for this study to engage Daniel in imaginative
play with the waffles. She flew the waffle around as though it was an airplane. She took bites of her waffles and displayed enthusiasm with her facial expressions, but continued to speak in a neutral tone about the food. Daniel began to play with his food mimicking the Director’s behavior. Each time the she took a bite, Daniel put the waffle into his mouth, recognizing that he did not like either the taste or texture of the food. He was not, however, discouraged to continue interacting and playing with the waffles as long as the Director was showing enthusiasm with him. The child put the waffle in his mouth a total of four times in three minutes while playing with the Director. Each time, recognizing he did not prefer the taste of the waffle, but did enjoy playing and interacting with his caregiver and the food.

This scenario strengthens the literature that indicates that repeated exposure and interaction with foods is known to help improve a child’s interest in the foods offered. The imaginative play the Director used to gain the child’s interest proved to be effective at interesting the child to continually try tasting the less preferred food item. He was able to avert his attention from wanting more strawberries and was able to move onto a new food with her help. Although he did not prefer that food, he was able to remain interested and engaged with it as long as his caregiver was able to model enthusiasm about it with him. This further strengthens the understanding of caregiver influence over children’s eating behaviors.

Case Study 2:

In contrast to the scenario in Case Study 1, this case study illustrates a scenario between the same subject, Daniel, and a student researcher participating in the
intervention who was unable to interest him in his non preferred food item. On this day, strawberry and vanilla yogurt were served with blueberry and strawberry Nutri-Grain bars.

Daniel’s preferred food item this day was yogurt. He served himself both the yogurt and the Nurtri-Grain bars, but he focused on eating the yogurt and continued to help himself to more while ignoring the Nutri-Grain bars already on his plate. The student researcher participating as a caregiver this day attempted to avert his attention to the Nutri-Grain bars in a neutral way, but was continuously unsuccessful. She called his name to get his attention, and he briefly looked at her, but quickly averted his attention back to eating his yogurt. The student researcher tried to play with her Nutri-Grain bars so that he would see her, she pointed out other children eating and playing with their Nutri-Grain bars, but was continuously unsuccessful at interesting Daniel in his non preferred food item.

There are two perceived reasons for this student researcher’s lack of success in this scenario. The first is that there was an ample supply of yogurt throughout the entire snack time period. There was never a moment when the child would have to avert his attention to another food item if he was still hungry. Secondly, the student researcher in this situation was less experienced not only with Daniel, but with children with disabilities and early childhood interventions in general.

4.2 Discussion and conclusion

Comparing the differences between Case Study 1 and Case Study 2:
There are at least three reasons for the different responses both caregivers received from Daniel in Case Study 1 and Case Study 2. The first difference is the amount of experience and expertise both caregivers had in early childhood interventions and with children with developmental disabilities in general. The Director of the preschool had a Masters and a PhD as well as work experience in early interventions implemented by parents, teachers, and university clinicians and in assessing the transportability of university evidence-based early childhood interventions to home and school. Additionally, she had built a relationship and rapport with all of the subjects well before the intervention started. The caregiver in the second scenario was a student researcher who has little experience with children with developmental disabilities. Daniel knew the Director of the preschool and was very comfortable with her. He enjoyed her attention and really valued her presence with him at the snack time table. He however did not know the student researcher very well, and was far less interested in gaining her attention throughout snack time. The third reason for the different responses both caregivers elicited from the child is that the preferred food item was available at the table for the entire snack time period. Despite the student researchers attempt to direct the subject’s attention to the other food item, the preferred food item was continuously available. In Case Study 1, Daniel was unable to serve himself any more strawberries because they were gone. In Case Study 2, Daniel continued to serve himself yogurt the entire time because it was available. In this scenario, the caregiver had a difficult time gaining his attention while he was eating the yogurt.

The comparison of these two scenarios strengthens Ellyn Satter’s theory in the division of responsibility that exists between caregivers and children. It is the caregiver’s
responsibility to provide healthful foods at the table, but it is the child’s responsibility to decide how much of what he would like to eat. In Case Study 1 and 2, the caregivers provided Daniel with two foods that were healthful. Of the two foods, he had one preferred food item. If a child is given the opportunity to only eat his preferred food item at the table, he will do so. If the food item is gone but the child is still hungry, he will move on to another food item provided by his caregiver.

The Director in scenario one was successful in gaining Daniel’s interest in the waffles for several reasons. First, she was capable of strictly following the intervention protocol throughout the entire snack time period. She never pressured him to try the second food. She recognized every opportunity to role model her enjoyment of the food and spoke in neutral tones the entire time, never allowing for the child to feel pressured or overwhelmed with the task of eating. The Director was additionally successful in a large part to her experience and relationship with Daniel. She is a familiar and trusted person to the children within the preschool and for this reason, Daniel was able to relax and trust her actions at the table. Her knowledge and expertise in early childhood intervention allowed her to be extremely successful as a caregiver during this intervention. Lastly, the fact that the preferred food item was gone in scenario one offered a perfect opportunity for the director to gain the child’s attention and interest him in the waffles. It is important to note the various circumstances that allowed the Director to be so successful.

The skills to implement a universal snack time approach in a classroom for children with developmental disabilities must be taught and practiced. The importance of
teacher and caregiver training about nutrition is invaluable when establishing a universal snack time routine for a classroom of children with developmental disabilities

**The reality of snack time periods and the need for teacher training**

On the last day of the intervention, the children had been out of the classroom for their annual eye exam. They arrived later than their regularly scheduled snack time and were noticeably distracted and disoriented. They rushed to the table to begin snack reaching for plates and bowls before others made it to the table which disrupted the passing standardization of the protocol. The beginning of snack was hectic. There were spills and tantrums that lasted a few minutes into the beginning of the snack time period.

During this session, caregivers were the student researchers that were helping with the intervention. The dietetics faculty and the preschool Director were not present this day. There was a very definite difference in the way the student researchers were able to engage with the children in comparison to the ways in which the director and the dietetic faculty member were able to do so. The student researchers had little experience with children with developmental disabilities in comparison to the dietetic faculty member and the preschool Director who have extensive experience with children, child eating behaviors, and children with developmental disabilities. As previously mentioned, the Director of the preschool had built strong relationships with the children throughout their attendance at the preschool. For this reason, the children were evidently more relaxed with her at the table on the first day of the intervention in comparison to the last day with people the children did not know or trust as well.
The last day of the intervention speaks to the reality of a snack time period in a classroom of children with developmental disabilities. Accidents do happen, children do have tantrums, class time does become off schedule, and this all affects child behavior and interest during snack time. Additionally, the last day of the intervention speaks to the importance of teacher and caregiver training surrounding this snack time protocol. One cannot assume that caregivers do this naturally or automatically. The skills to be able to distract a child’s attention from a tantrum elsewhere in the room, to avert attention to a new food, or to regain focus on the food and eating experience when a child begins to display attention-seeking behaviors all the while maintaining a neutral tone about the food provided are skills that need to be taught and practiced. The importance of teacher and caregiver training about nutrition is invaluable when trying to establish a universal snack time routine for a classroom of children with developmental disabilities.

Through family style dining, caregivers and peers are able to act as models at mealtime. The family style dining intervention was structured to offer an opportunity for children to develop interest in new foods, participation, and interaction through facilitating experiences that have been shown to be effective. Encouraging children to ask others to pass food and plates along to them allows for them to practice initiating interactions with others and participating in the mealtime routine. This style of dining also provides the opportunity for the children to practice autonomy in food selection to help increase the variety of healthful foods eaten. In addition, it takes the pressure away from food so that children are able to enjoy the meal time experience.

**Strengthening the literature**

40
This study’s findings strengthened the findings of current published literature. Research has shown that peers have strong influence over a child’s eating habit. This study found that as a whole, the opportunity for children to observe their peers interacting with food or participating in snack time was higher than that of a typical snack time routine in the same classroom. The nature of the intervention protocol allows for the children to interact with one another and observe one another more so than in the typical snack time routine. The emphasis by caregivers to observe how other children are eating or playing, the task of passing bowls and plates, and the encouragement of asking others at the table to pass more of a particular food allowed the children an opportunity to interact with one another and to see what other children are interested in eating.

Research additionally has established that the food choices and eating behaviors of caregivers directly correlate with young children’s food preferences. Case Study 1 illustrates this premise quite well. Although Daniel did not enjoy the food or want to eat it, he was willing to taste the food without request by the caregiver. The Director’s expression of enjoyment and enthusiasm for the food herself are what influenced the child to play and taste his less preferred food item.

Case Study 1 and 2 strengthen Ellyn Satter’s belief in the division of responsibility between caregivers and children at the table. Satter recognizes that it is the caregiver’s responsibility to provide an opportunity to eat a variety of healthful foods, however it is the child’s responsibility to determine if and how much he will eat at that time. It was the caregivers’ responsibility to offer the children healthful snacks, but it was their responsibility to decide of which and how much they would eat. In scenarios one and two, Daniel chose which and how much of the foods he would eat. In Case
Study 1, the preferred food item was gone, so he was able to move on with the guidance of the Director. In Case Study 2, Daniel was able to continuously serve himself his preferred food item, and for this reason had no interest to move on. Neither scenario is superior over the other because of the fact that all food options were healthful. However, both scenarios strengthen the notion that the child will choose which foods he will eat and a caregiver will offer healthful options without pressuring him to try the less preferred item. Allowing the child to practice independence and autonomy allows him to feel more comfortable and confident in making his own decisions. It also allows for him to feel more comfortable at the table with caregiver knowing that pressure will not be there to face him.

An investigation using family style meal service comparing situations in which children received pre-served plates to situations where children were allowed to serve themselves from bowls and plates placed on the table in front of them indicated that children will eat more than one portion at snack when they are allowed to self-select their intake29. Children have hunger and satiety cues that are stronger than those of adults. Birch found that there is great variability in the amount of food a child may eat from meal to meal, but from day to day a child’s intake is reasonably the same31. She found that children may eat a lot at one meal if their body is requesting the energy for growth, but will eat less at a following meal when their body no longer requires the extra energy or still has enough from the previous meal. Combined, these findings suggest that a child will serve himself as much as his body requires for growth and maintenance when given the opportunity.
4.3 Limitations

This study focused primarily on identifying a feeding intervention that could be implemented universally in a classroom of children with developmental disabilities. The focus of feeding intervention was on exploration of food, participation in the meal time routine, and communication with others at the meal time table. There were multiple factors that were not considered for this study. These factors are capable of altering the outcome of the results. This researcher recognizes the need for further research that includes the factors that were not included in this study.

A video was taken of the first and the last day of the intervention for data collection purposes. These videos were used to measure the effect the intervention had over the two week period it took place. Video recordings of every session could have been taken and used to determine if the success of the intervention was progressive rather than coincidence.

The menus for the first day of the intervention and the last day of the intervention were not the same. Serving the same foods would have helped the researcher determine if it was the intervention or the food that affected the subjects’ interest and participation in snack time.

Several of the student researchers had experience working with the children in the Early Childhood Education Center. These researchers spent around 4 hours per week in a preschool classroom and additionally participated in a leadership project focused on perceived picky eaters in the ECE classrooms. The experience these researchers gained over the researchers who did not have previous experience with the children in the ECE was invaluable. The researchers who had previous experience were at a tremendous
advantage to feeling comfortable with the environment, the people, and the nature of the intervention protocol.

This intervention lasted two weeks. The researchers saw a remarkable improvement in participation by all of the subjects in the snack time routine. Additionally, the children who participated in the intervention showed a greater interest in the snack time experience, the foods, and the company at the table. With a longer intervention period and video tapes throughout the entire intervention, the researcher would see even more improvements in the children’s participation in snack and interest in new foods.

The measurement tool created for this study consisted of ten target behavior items. Each of these items was divided up into three categories to address the three research questions established; exploration, communication and participation in the snack time period. A limitation noted when analyzing the data and creating Figure 1 was that there are an uneven number of items between the three categories or research questions. For example, there are 5 target behaviors to measure exploration of food in the meal time routine while there are 2 to measure the communication during the meal time routine and 3 to measure participation throughout the mealtime routine. Having an equal number of items under each category would allow the researchers and reader to better see the differences between exploration, communication, and participation throughout the snack time period.

Lastly, each day of the intervention two new foods were served. With a longer intervention period a researcher could continue to serve a particular food that children do not prefer. By the end of the intervention the researcher could better determine if this
snack time routine had an effect on the child’s acceptance of the non-preferred food item. The researcher could identify non-preferred foods before the intervention to incorporate them strategically. Additionally, with video recordings taken every day of the intervention, the researcher could determine a particular child’s rate of progression toward food acceptance.

This was a pilot study aimed at gaining a better understanding of how to implement a universal feeding intervention in a preschool setting for children with developmental disabilities. The study aimed to address all children at the table under one study protocol rather than individualizing the protocol for each individual child. Future research should be conducted in the absence of the limitations presented in order to further the understanding of an effective universal feeding intervention for children with developmental disabilities.
Chapter 5: A snack time intervention for children with developmental disabilities: 
Steps to increase Exploration, Communication, and Engagement

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Syracuse University

Marcia Nahikian-Nelms

Jane Case-Smith

Kathleen Lawton

5.1 Abstract

Background: Feeding issues are common in young children, both typically developing and even more so in children with developmental disabilities. Up to 80% of children with developmental disabilities have been reported to have some sort of feeding issue. Research tells us that food preferences and dietary habits are established between the ages of two and five years old and has additionally established that the food choices and eating behaviors of others influence young children’s food preferences. Meal
times in schools and at home offer the opportunity for children to develop social skills and learn to participate in a mealtime routine with others. It is estimated that approximately three quarters of children ages 3 to 6 years in the US are in non-parental child-care programs. Few studies have been published that address food acceptance, interaction with others at mealtime, and engagement in the mealtime routine in children with developmental disabilities. The aim of this research was to determine if a family style dining approach to snack time in an inclusive classrooms for children with neurodevelopmental and related disabilities aged 2-4 years old would impact interest and exploration of a variety of foods as well as improve interest in social interaction and engagement in meal time practices.  

**Materials and Methods:** Data were collected using recorded sessions of the intervention. A video was taken of the intervention at the beginning and at the end of the intervention period. The videos were then reviewed by the primary investigator using the measurement tool developed for this study. Content validity was established by review from three professionals representing special education, nutrition and occupational therapy. After their review, revisions for the instrument were made on two separate occasions. Inter-rater reliability was established by independent reviewers scoring the behavior checklist while observing video-taped sessions of the snack time. Inter-rater reliability was 97.5%. Visual and qualitative analysis were used to develop results for this study.  

**Results:** Exploration and communication both increased between the first and last day of the intervention. Participation in the snack time routine decreased due to successful implementation by a particular caregiver paired with a particular child during the first day of the intervention. Overall qualitative analysis indicated an increase in participation measured by passing of
bowls and plates increased on behalf of the entire group participating in the intervention period. Conclusion: Our preliminary analysis suggests that family style dining is an effective approach to increasing exploration of food, participation in snack time routines, and communication with peers and adults at the snack time table in a preschool classroom for children with developmental disabilities. The approach is most effective when caregivers thoroughly understand the principles, techniques, and foundation for family style dining. One cannot assume the skills for implementation come naturally. The skills required to execute the family style dining approach must be taught and practiced. This study reinforces the importance for teacher training in nutrition in childcare.

5.2 Introduction

Research tells us that nutrition is a crucial component of health throughout our lifetime. If we want to reach optimal health it is even more important to realize that our food preferences and dietary habits are established between the ages of two and five years old. Research additionally has established that the food choices and eating behaviors of others influence young children’s food preferences. Meal times offer the opportunity for children to develop social skills and learn to participate in a mealtime routine with others. Children are able to practice requesting items from one another, showcase their autonomy in choosing which foods to eat, practice serving and cleaning up after themselves among many other life skills. Participating in family meals has shown to increase children’s performance academically, emotionally, and socially, to improve nutrition, and to positively influence children’s participation in extracurricular activities.
Feeding issues are common in young children, both typically developing and even more so in children with developmental disabilities. Up to 80% of children with developmental disabilities have been reported to have some sort of feeding issue\textsuperscript{8}. Reasons for feeding disorders in children with developmental disabilities can be related to medical/biological, sensory, social, and behavioral factors\textsuperscript{13}. These distinctive characteristics make it far more challenging for families and caregivers to understand how to approach feeding problems in this population.

Today, as well as for the previous two decades, more families rely on non-parental day care services while caregivers go to work. It is estimated that approximately three quarters of children aged 3-6 in the US are in non-parental child-care programs\textsuperscript{3,7}. This puts more responsibility on non-parental caregivers to offer sound nutritional support and guidance to children at a young age. With this understanding, opportunities to introduce healthful foods and habits at home and at school present a unique time for children to build on social skills, communication, independence and responsibility along with the development of optimal nutritional intake at meal times.

Few studies have been published that address food acceptance, interaction with others at mealtime, and engagement in the mealtime routine in children with developmental disabilities. The majority of the research has aimed at improving meal times with parents based on a child’s individual need. Many of these interventions manipulate the eating environment so that the child feels comfortable with his surroundings. Several interventions have used a reward system for eating a novel food once avoided. And other interventions use a persistence technique to get a child to eat\textsuperscript{15}. Although these individualized interventions in children with developmental disabilities
have proven to be effective, it is unrealistic in a childcare setting to manipulate a mealtime approach for each individual child.

Family style dining has shown to be an effective approach to increasing typically developing children’s interest in a variety of foods as well as improving the development of social skills and interest in the mealtime routine\(^4\). This approach utilizes mealtime as an opportunity to socialize with one another, serve oneself from a common serving bowl in the middle of the table, request items from others around the table, expose children to new foods, and encourage play, touch, smell, and taste of foods presented.

### 5.3 Objectives

The primary objective of this research was to determine if a family style dining approach to snack time in an inclusive classrooms for children with neurodevelopmental and related disabilities aged 2-4 years old will impact their interest and exploration of a variety of foods as well as improve their interest in social interaction and participation in meal time practices.

Research questions included the following:

1. Does the incorporation of a family style snack routine increase the child’s exploration of food at snack time?
2. Does the incorporation of a family style snack time routine increase the subject’s participation in the mealtime routine?
3. Does the incorporation of a family style snack routine increase the subject’s communication with others at the table?
Move this to the description of the instrument. These three research questions were measured using the measurement tool created for this study. Tables 1-3 indicate the target behaviors that were assessed under each of the three research questions.

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Measurement tool item number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Child eats</td>
<td>Item number 3</td>
</tr>
<tr>
<td>2. Child tastes a food</td>
<td>Item number 7</td>
</tr>
<tr>
<td>3. Child touches a food</td>
<td>Item number 8</td>
</tr>
<tr>
<td>4. Child smells a food</td>
<td>Item number 9</td>
</tr>
<tr>
<td>5. Child plays with a food</td>
<td>Item number 10</td>
</tr>
</tbody>
</table>

Table 1: Target behaviors to measure exploration of food in the meal time routine

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Measurement tool item number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Child signs or asks for more</td>
<td>Item number 4</td>
</tr>
<tr>
<td>2. Child communicated with adult or child at the table using eye contact, point, smiling, laughing, talking</td>
<td>Item number 5</td>
</tr>
</tbody>
</table>

Table 2: Target behaviors to measure communication in the mealtime routine
<table>
<thead>
<tr>
<th>Behavior</th>
<th>Measurement tool item number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Child serves himself</td>
<td>Item number 1</td>
</tr>
<tr>
<td>2. Child passes bowls or plates</td>
<td>Item number 2</td>
</tr>
<tr>
<td>3. Child observes other interact with the food eating/playing/exploring foods on their own plate</td>
<td>Item number 6</td>
</tr>
</tbody>
</table>

Table 3: Target behaviors to measure participation in the mealtime routine

5.4 Methods

One classroom was conveniently selected from the Early Childhood Education program within the Nisonger Center for Excellence in Developmental Disabilities. The menus were created based on guidelines from the Department of Agriculture’s National School Lunch Program as well as the Child and Adult Care Food Program. The study sample participated in snack time with the primary investigator 8 times in a two-week period. During each session, two foods were presented to the children and placed into serving bowls. Children were asked to take a plate and pass it along to their neighbor and then begin serving themselves from bowls placed in the center of the table. Six graduate student researchers and three Ohio State University faculty members who had been trained on the intervention protocol participated in the study as well. Four researchers were present each day to participate in the research as a caregiver. These four caregivers sat at the table participating in the snack time routine with the children; eating, asking children to pass items along, interacting with the foods and enjoying the company at the table. A blinded observer observed snack time on the same days that were video taped during intervention period. The role of the blind observer was to evaluate whether the
researchers involved in the study were acting in compliance with the study protocol. The blind observer was given a checklist to use that was adapted from the Optimal Caregiver Mealtime Behavior checklist published in the Journal of the American Dietetic Association 1997\(^1\). Internal reliability for the Optimal Caregiver Mealtime Behavior Checklist was 0.69 (cronbach's Alpha) with an Inter-Rater reliability of 96-100%.

Sessions were recorded of the control group and of the intervention group at the beginning and at the end of the study. The videos were used to collect data after the intervention was complete. The primary investigator reviewed the videos using the measurement tool developed for this study using a time sampling data collecting technique. Visual and qualitative analysis were used to interpret the data.

The first ten minutes of the recorded snack time were considered for data collection. Every 15 seconds of the snack time, the primary investigator recorded which of the target behaviors were observed according to the target behaviors listed within the measurement tool for this study. Content validity was established by review from three professionals representing special education, nutrition and occupational therapy. After their review, revisions for the instrument were made on two separate occasions. Inter-rater reliability was established by independent reviewers scoring the behavior checklist while observing video-taped sessions of the snack time. Inter-rater reliability was 97.5%.

5.5 Participants

The sample for this study was a classroom of ten, 2-4 year old children with developmental disabilities in the Early Childhood Education Center. Subjects were identified based on inclusion and exclusion criteria as well as the return of a consent form
prior to the beginning of the intervention. Exclusion criteria for this study included:
parental refusal, medical complications that cause the child to have a restrictive diet or
other medical conditions interfering with the ability to participate, children who are
unable to feed themselves and children who have not yet transitioned to table foods.
Inclusion criteria include: a student in the treatment group classroom with a
developmental or intellectual disability, between the ages of 2-4 years old, with parental
consent and ability to participate.

Four parents or guardians returned the intervention consent forms before the start
of the intervention. Therefore, four students were the subjects considered for data
collected during the study. All ten students, however, were able to participate in the
snack time intervention without being considered for data collection.

5.6 Data collection and analysis

Videos were recorded on the first and last day of the intervention. The primary
investigator reviewed the videos using the measurement tool and a time sampling
technique. Targeted behaviors were noted on the data collection instrument at every 15-
second mark of the snack time. This was done for each of the four subjects considered
for this study. Each of the 10 target behaviors listed within the measurement tool
represented one of the three research questions (Exploration, Participation, and
Communication). Table 1, 2 and 3 illustrate which target behaviors from the
measurement tool were used to evaluate the research questions posed. Visual and
qualitative analysis were used for interpretation of the data to determine the outcome of
the three research questions.
A blind observer was present to observe the intervention group during both video taping sessions (the first and last day of the intervention). The blind observer was present to verify that the caregivers participating in the study were carrying out the study protocol correctly.

5.7 Results

Visual analysis indicated an increase in food exploration and communication during the intervention. Participation decreased between the first and last day of the intervention. Participation was thought to decrease due to a particular caregiver’s success with Subject 4 during the first day of the intervention.

Qualitative analysis of the videos demonstrated an improvement in food exploration, participation, and communication among the intervention group as a whole.

The blind observer used the Optimal Caregiver Behavior Checklist and rated the caregiver behavior as 100% in accordance with the intervention on both days.
<table>
<thead>
<tr>
<th>Subject</th>
<th>Research question</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exploration</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Participation</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>Exploration</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Participation</td>
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<td>11</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
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<td>27</td>
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<tr>
<td></td>
<td>Participation</td>
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<td>12</td>
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<td></td>
<td>Communication</td>
<td>4</td>
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<tr>
<td></td>
<td>Participation</td>
<td>62</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>24</td>
<td>26</td>
</tr>
</tbody>
</table>

Table 5: Visual analysis of exploration, communication and participation of subjects 1, 2, 3 and 4 and all subjects combined both pre and post

Pre Post Responses for Outcomes Measures

[Bar chart showing comparison of pre and post responses for outcomes]
Figure 1: Visual analysis of exploration, communication and participation of subjects 1, 2, 3 and 4 pre and post
5.8 Discussion

Data between the first and last day of the intervention was not as predicted. The primary investigator predicted that exploration, communication and participation would all increase during the intervention due to the nature of the meal time routine. The caregivers at the table with children were encouraged children to explore the foods through tasting, playing touching and smelling. They additionally encouraged the children to pass food along to peers, and ask one another for more of a particular item. Through data analysis, however, several factors became evident that may have effected the data outcomes.
Case studies 1 and 2 explain two scenarios between two different caregivers and the same subject. In Case Study 1, the caregiver is successful at interesting Subject 4, Daniel, in his non-preferred food item. In Case Study 2, the caregiver is unsuccessful at interesting Daniel in his non-preferred food item. Case Study 1 occurs on the first day of the intervention while Case Study 2 occurs on the last day. The differences in these two scenarios are what is thought to have caused the major decrease in participation within the group on this day.

**Case Study 1:**

Subject 4, given the name Daniel for the purpose of this paper, is the subject of this case study. This is a depiction of the first day of the intervention and the way the director of the preschool was able to interest the child in his non preferred food item at the table. This day, strawberries and waffles were being served for snack.

The Director of the preschool was paired with Daniel. Of the food being served, his preferred food item was strawberries. He helped himself to both the strawberries and the waffles, but continued to serve himself more strawberries until there were no longer any left at the table. At that point, the Director used her experience in early childhood intervention and the intervention protocol for this study to engage Daniel in imaginative play with the waffles. She flew the waffle around as though it was an airplane. She took bites of her waffles and displayed enthusiasm with her facial expressions, but continued to speak in a neutral tone about the food. Daniel began to play with his food mimicking the Director’s behavior. Each time the she took a bite, Daniel put the waffle into his mouth, recognizing that he did not like either the taste or texture of the food. He was not, however, discouraged to continue interacting and playing with the waffles as long as the
Director was showing enthusiasm with him. The child put the waffle in his mouth a total of four times in three minutes while playing with the Director. Each time, recognizing he did not prefer the taste of the waffle, but did enjoy playing and interacting with his caregiver and the food.

**Case Study 2:**

In contrast to the scenario described in Case Study 1, this case study illustrates a scenario between the same subject, Daniel, and a student researcher participating in the intervention who was unable to interest him in his non preferred food item. On this day, strawberry and vanilla yogurt were served with blueberry and strawberry Nutri-Grain bars.

Daniel’s preferred food item this day was yogurt. He served himself both the yogurt and the Nurtri-Grain bars, but he focused on eating the yogurt and continued to help himself to more while ignoring the Nutri-Grain bars already on his plate. The student researcher participating as a caregiver this day attempted to avert his attention to the Nutri-Grain bars in a neutral way, but was continuously unsuccessful. She called his name to get his attention, and he briefly looked at her, but quickly averted his attention back to eating his yogurt. The student researcher tried to play with her Nutri-Grain bars so that he would see her, she pointed out other children eating and playing with their Nutri-Grain bars, but was continuously unsuccessful at interesting Daniel in his non preferred food item.

There are two perceived reasons for this student researchers lack of success in this scenario. The first is that there was an ample supply of yogurt throughout the entire snack time period. There was never a moment when the child would have to avert his
attention to another food item if he was still hungry. Secondly, the student researcher in this situation was less experienced not only with Daniel, but with children with disabilities and early childhood interventions in general.

A qualitative analysis showed that overall; all children participating in the intervention period become more interested and skilled after implementation of the intervention protocol on the first day. Children learned quickly to participate in the snack time routine by passing bowls and plates, asking one another for more of a particular food, and observing others interacting with foods at the table. Children appear to become more interested in communicating with one another and with caregivers at the table when caregivers showed interest and enthusiasm about participating in the snack time routine. Food exploration increased when children were able to serve themselves the foods they wanted at the table. The opportunity to express autonomy and independence encouraged the children to take active roles in the snack time routine.

This study’s findings strengthened the findings of current published literature. Research has shown that peers have strong influence over a child’s eating habit⁴. This study found that as a whole, the opportunity for children to observe their peers interacting with food or participating in snack time was higher than that of a typical snack time routine in the same classroom. The nature of the intervention protocol allows for the children to interact with one another and observe one another more so than in the typical snack time routine. The emphasis by caregivers to observe how other children are eating or playing, the task of passing bowls and plates, and the encouragement of asking others at the table to pass more of a particular food allowed the children an opportunity to interact with one another and to see what other children are interested in eating.
Research additionally has established that the food choices and eating behaviors of caregivers directly correlate with young children’s food preferences. Case Study 1 illustrates this premise quite well. Although Daniel did not enjoy the food or want to eat it, he was willing to taste the food without request by the caregiver. The Director’s expression of enjoyment and enthusiasm for the food herself are what influenced the child to play and taste his less preferred food item.

Case Study 1 and 2 strengthen Ellyn Satter’s belief in the division of responsibility between caregivers and children at the table. Satter recognizes that it is the caregiver’s responsibility to provide an opportunity to eat a variety of healthful foods, however it is the child’s responsibility to determine if and how much he will eat at that time. It was the caregivers’ responsibility to offer the children healthful snacks, but it was their responsibility to decide of which and how much they would eat. In scenarios one and two, Daniel chose which and how much of the foods he would eat. In Case Study 1, the preferred food item was gone, so he was able to move on with the guidance of the Director. In Case Study 2, Daniel was able to continuously serve himself his preferred food item, and for this reason had no interest to move on. Neither scenario is superior over the other because of the fact that all food options were healthful. However, both scenarios strengthen the notion that the child will choose which foods he will eat and a caregiver will offer healthful options without pressuring him to try the less preferred item. Allowing the child to practice independence and autonomy allows him to feel more comfortable and confident in making his own decisions. It also allows for him to feel more comfortable at the table with caregiver knowing that pressure will not be there to face him.
An investigation using family style meal service comparing situations in which children received pre-served plates to situations where children were allowed to serve themselves from bowls and plates placed on the table in front of them indicated that children will eat more than one portion at snack when they are allowed to self-select their intake\textsuperscript{29}. Children have hunger and satiety cues that are stronger than those of adults. Birch found that there is great variability in the amount of food a child may eat from meal to meal, but from day to day a child’s intake is reasonably the same\textsuperscript{31}. He found that children may eat a lot at one meal if their body is requesting the energy for growth, but will eat less at a following meal when their body no longer requires the extra energy or still has enough from the previous meal. Combined, these findings suggest that a child will serve himself as much as his body requires for growth and maintenance when given the opportunity.

\section*{5.9 Limitations}

Due to the small number of subjects and the subjective nature of this study, the data collected using the recordings and measurement tools are unable to illustrate an accurate picture of the effects of the intervention protocol. Qualitative analysis was used to better illustrate the intervention outcomes and results. A larger group with more data or a smaller group case study design would prove to be a better study design for the intent of this research.

There were multiple factors that were not considered for this study. These factors are capable of altering the outcome of the results. This researcher recognizes the
need for further research that includes the factors that were not included in this study.

Video recordings of each snack time session could have been taken and analyzed to determine if the success of the intervention was progressive rather than coincidence.

The experience each researcher had as a caregiver in addition to implementing the protocol varied drastically. Several of the student researchers had experience working with the children in the Early Childhood Education Center. These researchers spent around 4 hours per week in a preschool classroom and additionally participated in a leadership project focused on perceived picky eaters in the ECE classrooms. The experience these researchers gained over the researchers who did not have previous experience with the children in the ECE was invaluable. Additionally, the Director of the preschool and the nutrition and occupational therapy faculty researchers had experience and understanding of the protocol that exceeded those who did not. The researchers who had previous experience were at a tremendous advantage to feeling comfortable with the environment, the people, and the nature of the intervention protocol. A group of researchers with experience in a classroom of children with disabilities and a thorough understanding of the intervention protocol would prove to have been more effective.

This intervention lasted two weeks. With a longer intervention period and video recordings throughout the entire intervention, the researcher would see even more improvements in the children’s participation in snack and interest in new foods.

The measurement tool created for this study consisted of ten target behavior items. Each of these items was divided up into three categories to address the three research questions established; exploration, communication and participation in the snack
time period. A limitation noted when analyzing the data and creating Figure 1 was that there are an uneven number of items between the three categories or research questions. For example, there are 5 target behaviors to measure exploration of food in the meal time routine while there are 2 to measure the communication during the meal time routine and 3 to measure participation throughout the mealtime routine. Having an equal number of items under each category would allow the researchers and reader to better see the differences between exploration, communication, and participation throughout the snack time period.

Lastly, each day of the intervention two new foods were served. With a longer intervention period a researcher could continue to serve a particular food that children do not prefer. By the end of the intervention the researcher could better determine if this snack time routine had an effect on the child’s acceptance of the non-preferred food item. The researcher could identify non-preferred foods before the intervention to incorporate them strategically. Additionally, with video recordings taken every day of the intervention, the researcher could determine a particular child’s rate of progression toward food acceptance.

This was a pilot study aimed at gaining a better understanding of how to implement a universal feeding intervention in a preschool setting for children with developmental disabilities. The study aimed to address all children at the table under one study protocol rather than individualizing the protocol for each individual child. Future research should be conducted in the absence of the limitations presented to further the understanding of an effective universal feeding intervention for children with developmental disabilities.
5.10 Conclusion

Implementation of family style dining into a classroom of children with developmental disabilities is an effective approach to increase food exploration, participation in the snack time routine, and communication among children at the snack time table. Adopting this protocol additionally allows for reducing stress and removing pressure from the meal time routine.

Thorough understanding of family style dining principles and practice must be understood in order to effectively implement the snack time approach. Teacher training and practice is invaluable to the success of a family style dining approach to snack time. One cannot assume that the skills to implement and carry out this snack time approach will come naturally. Comfort with the population, the protocol and the environment are vital to success of the intervention.

5.11 Summary

Proper nutrition plays a vital role in health throughout our lifetime. Research shows that food behaviors and preferences are established before the age of 5 years old\(^1,14\). With many children in non-parental day care settings by this age, the recognition of caregiver’s influence at meal times and over attitudes toward food and meal times is important. Children with developmental disabilities are often in non-parental day care settings where they can receive directed support and education. Most interventions that include children with developmental disabilities who are considered picky eaters or problem feeders take place in a clinical or home setting where the focus is on the parent-child feeding relationship\(^15\). More investigation into a system for a meal time in day care
settings that will help support an interest in meal time, new foods, and proper meal time behavior is needed.

This study’s main objective was to determining if a family style dining approach to snack time in a preschool classroom of children with developmental disabilities would prove to be an effective way to increase food exploration, participation in the snack time routine, and communication with others around the table. The study found that family style dining was effective in gaining children’s interest in foods, participating in the snack time routine and communicating with others at the table. The importance of caregiver training and practice was exemplified through qualitative analysis of child to caregiver interaction and success with the intervention protocol. Teachers and caregivers must be trained and must practice the family style dining approach in order for the intervention to prove to be successful. One cannot assume knowledge and skill surrounding a family style dining meal time approach will come naturally. Familiarity with the children, the protocol, and the principals of proper nutrition will prove to add to a successful meal time approach in a classroom of children with developmental disabilities.
References


APPENDIX
A snack time intervention for children with developmental disabilities: Steps to increase Exploration, Communication and Engagement

Measurement Tool

<table>
<thead>
<tr>
<th>Behavior</th>
<th>0:15</th>
<th>0:30</th>
<th>0:45</th>
<th>1:00</th>
<th>1:15</th>
<th>1:30</th>
<th>1:45</th>
<th>2:00</th>
<th>2:15</th>
<th>2:30</th>
<th>2:45</th>
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</thead>
<tbody>
<tr>
<td>Child serves himself</td>
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<td>Child passes bowls or plates</td>
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<td>Child eats</td>
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<td>Child signs or asks for more</td>
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<td>Child communicates with adult or child</td>
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<td>(eye contact, pointing, smiling, laughing, talking)</td>
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<td>Child observes others interact with the food</td>
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<td>eating/playing/exploring foods on their own plate</td>
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<td>Child tastes a food</td>
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<td>Child touches a food</td>
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<tr>
<td>Child smells a food</td>
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<td>Child plays with a food</td>
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