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USING A TREATMENT PACKAGE TO TEACH REQUEST BEHAVIOR TO YOUNG CHILDREN WITH COMPLEX COMMUNICATION NEEDS

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USING A TREATMENT PACKAGE TO TEACH REQUEST BEHAVIOR TO YOUNG
CHILDREN WITH COMPLEX COMMUNICATION NEEDS

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
College of Education at the University of Kentucky

By

Kimberly Yates Clayton

Lexington, Kentucky

Director: Dr. Jennifer Grisham-Brown, Professor of Special Education

Lexington, Kentucky

2015

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ABSTRACT OF THESIS

USING A TREATMENT PACKAGE TO TEACH REQUEST BEHAVIOR TO YOUNG CHILDREN WITH COMPLEX COMMUNICATION NEEDS

Three preschoolers with limited or no verbal language were taught to request preferred objects using an adapted Picture Exchange Communication System (Bondy & Frost, 1998) and elements of peer mediated instruction and intervention (Neitzel, 2008) (PECS/PMII). These two interventions have been established as evidence based practices, but have not previously been taught and implemented by one adult and a preschool child in a preschool classroom. Same-aged peers were the communicative partners for the picture exchange. A teacher served as the facilitator of the exchanges. A multiple probe (days) across participants design was utilized to determine the effectiveness of the intervention. The percentage of successful exchanges/requests made by the target child using the adapted PECS/PMII method was evaluated to determine the effectiveness of the intervention when implemented by a same-aged peer. The target children not only made requests to the criterion level, two of the three increased their appropriate verbal responses. The same-aged peers were able to effectively implement the steps for PECS phase 1.

KEYWORDS: Autism Spectrum Disorder; Picture Exchange Communication System; Peer Mediated Instruction and Intervention; preschool; naturalistic.

Kimberly Clayton

July 25, 2015

USING A TREATMENT PACKAGE TO TEACH REQUEST BEHAVIOR TO
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Chapter One

Literature Review

Children with disabilities and their typically developing peers benefit from participating in quality blended early childhood education programs. When Hamre-Nietupski, Nietupski, and Strather (1992) surveyed parents, they found that developing friendships and positive relationships with peers was a top priority for parents of children with moderate to severe disabilities (Wall & Gast, 1997). Developing friendships with children of different backgrounds and abilities encourages acceptance of others and positive attitudes towards differences (Allen & Schwartz, 2001). Children diagnosed with autism spectrum disorder (ASD) often lack the social skills to initiate conversation or play with others. Repeated peer rejection may further discourage attempts at interaction and cause greater delays in social skill development (Ledford & Wolery, 2013). These negative experiences, combined with difficulties in understanding social nuances in play and other interactions, put children with ASD at an increased risk of behavior problems in school as well as difficulties in relationships later in life (DiSalvo & Oswald, 2002; Wolfberg, Bottema-Beutel, & DeWitt, 2012).

Autism Spectrum Disorder

Autism spectrum disorder (ASD) is a broad term which describes a condition that presents itself in many different ways and at varying degrees of severity. The American Psychiatric Association (2013) describes ASD as persistent deficits in social communication and social interaction across multiple contexts both currently or by history. Individuals may have difficulty with social-emotional reciprocity including, for

example, a failure to initiate or respond to social interaction or an inability to carry on a normal back and forth conversation. They may have deficits in nonverbal communicative behaviors as well. These may include a lack of facial expressions, abnormal eye contact as well as difficulty understanding the gestures of others. They may also have delays in establishing or maintaining relationships. Sharing, imaginative play, and making friends may be challenging. They may also have restricted or repetitive patterns of behavior. Some examples of this include repetitive motor movements, inflexible adherence to routines, fixated interests with abnormal intensity, and hyper-reactivity to sensory input. The symptoms of ASD must be present in the early development period, cause clinically significant impairment, and not be better explained by an intellectual disability for a diagnosis.

According to Centers for Disease Control (CDC) research, the prevalence of autism is increasing. A study conducted to examine ASD diagnosis among 8-year-old children in the United States who lived in the 14 surveillance sites targeted by the CDC, found a marked rise in diagnosis. In 2002, 1 in 150 children in the target communities were diagnosed with an ASD. In 2008, that number was 1 in 88. In 2014, that number was estimated to be 1 in 68 (Baio, 2014).

Although children diagnosed with ASD may potentially display a wide range of delays, the severity of their communication delay is often the most significant predictor of outcomes (Georgiades et al., 2007; Lord & Risi, 1998; Mancil, Conroy & Haydon, 2009). The added complication of social delays may further impede development. The lack of social motivation and willing social partners for interaction discourages improvement in social skills (Chan et al., 2009; Liber, Frea, & Symon, 2008). Some of

the challenging behaviors displayed by children on the spectrum have been identified as attempts at communication (Sigafoos, 2000). Research has demonstrated the need for alternate means of communication and innovative strategies for facilitating communication and positive peer interaction. Interventions not only need to be flexible, but they need to be inexpensive and easily incorporated into typical daily classroom routines.

Language Development

A child's language development is critical to their overall development and to promoting positive school outcomes with regards to their independence and integration. (Paul, Campbell, Gilbert, & Tsiouri, 2013). Language delays in young children can put them at risk for communication, cognitive, social, academic, behavioral, and psychiatric difficulties (Bashir & Scavuzzo, 1992; Carson, Klee, Perry, Muskina & Donaghy, 1998; Paul & Kellogg, 1997). Receptive language skills are critical for following directions, heeding warnings, and many other important life skills. Expressive language skills are necessary to communicate wants and needs as well as to interact with others. Children who struggle with language and or speech can become frustrated with their inability to communicate. A language delay can have a substantial impact on the life of a child and their development. Furthermore, impaired speech development has been linked to challenging behaviors (Mancil & Boman, 2010). Language development is a precursor for literacy skills and learning to read (King et al., 2005). Conversely, a lack of language development is associated with increased difficulty with reading, writing, attention, and socialization (McLaughlin, 2011).

The prevalence of language delays in children has been researched but estimates vary based upon criteria, age groups, and definition of delay. Some studies have estimated anywhere between 7% and 17% of children between the ages of 2 and 7 years have some type of language delay (Horwitz et al., 2003; King et al., 2005; McLaughlin, 2011; Tomblin et al., 1997). That number may increase or decrease based upon the cohort of children involved. Children who are considered at risk due to other contextual factors such as poverty, low parent education levels, or high levels of parental stress have a higher risk of developing a language delay (King et al., 2005). For this reason, it is important to develop language interventions that can be used in many different settings, by a variety of caregivers who interact with the children, and with minimal expense and materials.

Social Skills

Social skills are intricately linked with communication skills in that communication facilitates effective interaction. Inappropriate behaviors are not only problematic for adults but for peers as well. Peer relationships are built upon common interests and shared experiences. Children in quality inclusive environments learn to value others with differences as equal members of the classroom, not just as “different” or possibly as lesser members of society (Howard, Williams, Port, & Lepper, 2001). Physically including all children in combined early childhood programs is not enough to facilitate meaningful interactions and friendships (Vakil, Freeman, & Swim, 2003). Children with ASD, without some type of intervention, are unlikely to attend to the behavior of peer models (DiSalvo & Oswald, 2002). In some cases, the individual with ASD desires social interaction but just does not have the necessary skills to initiate it. One example of an

evidence based intervention is peer mediated instruction and intervention (PMII) (Chan et al., 2009). It can help facilitate meaningful, appropriate interactions. Language intervention methods, such as PMII, which can be implemented in the natural environment and incorporate peer models, can serve a dual purpose of encouraging both language and social development.

Naturalistic Interventions

Naturalistic interventions apply a variety of strategies to teach developmentally appropriate skills in the natural environment while utilizing natural contingencies (Schreibman, Dawson, Stahmer, Landa, Rogers, McGee, Kasari, Ingersoll, Kaiser, Bruinsma, McNerney, Wetherby, & Halladay, 2015). Learning which occurs during naturally occurring routines and experiences, with naturally occurring reinforcers, is more likely to be generalized and maintained over time (Kaiser, Hancock, & Hester, 1998). Naturalistic intervention uses toys and classroom materials that will encourage a child to engage in a target behavior and help facilitate the generalization of desired behaviors or skills (Franzone, 2009). Research has shown that children with ASD learn faster, with better generalization, when there is a more natural, rather than random, relationship between a response and the reward for that response. For example, saying “truck” and obtaining a toy truck instead of saying truck and being rewarded with candy (Schreibman et al., 2015). Naturalistic intervention includes a variety of techniques, some of which include environmental arrangement and responsive interaction techniques. Environmental arrangement involves setting up the environment so a child must initiate or interact with someone to obtain something such as an object, activity, or other reinforcer (Schreibman et al., 2015). Responsive interaction techniques involve contingent responsiveness,

language modeling, and expansions of child utterances. (Kaiser & Roberts, 2013; Kong & Carta, 2013). Naturalistic interventions also meet the criteria to be considered an evidence-based practice (Wong, 2013).

One type of naturalistic intervention is enhanced milieu teaching (EMT; Franzone, 2009). EMT includes environmental arrangement, prompting, and responsive interactions, which are embedded in a typical classroom learning experience. EMT methods usually include an inviting environment full of potential communication opportunities, consistent routines, and embedded communicative opportunities within the daily schedule (Ogletree, Davis, Hambrecht, & Phillips, 2012). Interactive play based interventions such as these, that are less intrusive than traditional methods involving expensive equipment or interruptions in the child's daily routines, have been effectively used with children with disabilities (Iacono, 1999). Learning new skills in a less contrived environment can facilitate the generalization of skills to novel environments (McGee, Almeida, Sulzer-Azaroff, & Feldman, 1992). Research has shown that naturalistic techniques are effective with young children (Ogletree et al., 2012). The social environment, including the quality of interactions with caregivers and peers, is critically important in the development of communication skills in young children. New language skills are better facilitated by competent communicative partners (Kaiser, Hester, & McDuffie, 2001). Early intervention and preschool environments lend themselves well to techniques like EMT that are interactive and encourage responsive teaching which research has shown to be beneficial for children in those age groups.

EMT is a behavioral intervention that focuses on teaching children new communication skills in their natural environment (Mancil et al., 2009). It provides

opportunities to practice new language in a functional context (Hemmeter & Kaiser, 1994). It has been proven an effective method of working with young children in the development of language skills (Fey et al., 2006; Warren & Brady, 2007; Yoder & Stone, 2006). Three commonly used EMT techniques include incidental teaching, mand model, and naturalistic time delay (Center for Excellence in Early Childhood Research and Training, 2009; Warren & Yoder, 1997). In the incidental teaching technique, the teacher arranges the environment to encourage an initiation or interaction by the child to request an object, assistance, or activity. The teacher then requests an expansion by the child. The child either expands the request or the teacher models the expansion. The child is then reinforced by obtaining the desired object/activity (Alpert & Kaiser, 1992; CEECRT, 2009). In the mand model procedure, the adult initiates the interaction. The adult makes a request of the child in order to attempt to elicit a response. If the child does not respond, the teacher provides a model. Correct responses are reinforced with praise, attention, or access to a desired object or activity. Incorrect responses are followed by a second mand or a model (Alpert & Kaiser, 1992; CEECRT, 2009). Time delay can be used in child or adult initiated interactions but involves a pause by the facilitator to encourage the target child to respond in some way before obtaining a response from the adult, verbal expansion, materials, assistance, or reinforcement. Incorrect responses are followed by a second time delay, a model, or a mand (Alpert & Kaiser, 1992; CEECRT, 2009). All of these methods encourage language development and can be used by many potential communicative partners.

Request Behavior

There are a myriad of benefits in using naturalistic techniques to teach request behavior. First, these procedures require very few additional materials beyond what is typical in a child's natural environment. The classroom, home, or other space is arranged to increase the probability that the child will need to attempt to communicate and reinforcement comes in the form of obtaining the desired object, interaction, or praise (Kaiser, Roberts, Oetting, & Loeb, 2013). The functional effectiveness of making requests and having needs met encourages future requests. Second, these techniques have been effective with children with a variety of types of disabilities and backgrounds including those with intellectual delays (Fey et al., 2006), autism (Hancock & Kaiser, 2002; Mancil et al., 2009; Olive et al., 2007; Yoder & Stone, 2006), and Down syndrome (Hemmeter & Kaiser, 1994; Trent, Kaiser, & Wolery, 2005), as well as others. In a study examining the effects of EMT on children prenatally exposed to cocaine, Bolzani Dinehart, Kaiser and Hughes (2009) found EMT to be effective, increasing the overall number of spontaneous utterances and length of utterances of the four children. Paul et al. (2013) conducted research with 10 preschoolers with severe autism and minimal speech and compared a discrete trial approach with a more play-based EMT mand model approach. These researchers found that both treatments were effective. Both groups made comparable improvement in the number of spontaneous words used. Half of the children in each group reached their benchmark goals. However, there were some differences noted in the effectiveness of the intervention. They determined that children who began the intervention with higher receptive language scores did better with the more naturalistic approach. The children with better joint attention skills before the study

began did better in both groups. Since it is important to design intervention to meet the individual needs of each child, those differences are important. Finally, the versatility of play based techniques and adaptability for use in a variety of environments by interventionists of varied backgrounds makes the interventions a good option for use with young children.

Communication

Naturalistic interventions have been found beneficial in improving the interactions between children and other communicative partners. Family members can be trained to use the techniques in the home for the benefit of the entire family. Parent responsiveness has been shown to be a key element in the development of language skills and EMT training has been used effectively to increase parent responsiveness (Yoder & Warren, 2002). This is done by following the lead of the child and responding effectively to the child's communicative attempts (Hemmeter & Kaiser, 1994). In a study in which parents were trained in a clinical setting to use EMT techniques with their children, Kaiser and Hemmeter (1994) found that parents could implement the interventions to criterion. Even when interventions were taught in a clinical setting, parents were able to generalize the techniques to their home environment. Arrangement of the environment to elicit requests or encourage responses can be utilized by anyone who interacts with the child in the natural environment. Family members have been trained to effectively use these techniques in the home and other natural environments (Kaiser et al., 2013).

Studies have shown that communicative partners can maintain these techniques over time (Alpert & Kaiser, 1992; Kaiser et al., 2013). Furthermore, parent participants

express satisfaction and a sense of ownership and empowerment when they are trained and become implementers of an effective intervention (Hancock & Kaiser, 2002; Hemmeter & Kaiser, 1994). Interventions that are family friendly and easily fit into daily routines are more likely to be utilized and effectively implemented (Alpert & Kaiser, 1992). The potential for use in homes and the community is limitless. The strong social validity makes naturalistic interventions a valuable tool for all interventionists including parents, teachers, therapists, and peers.

Peer-Mediated Interventions

The practice of using peers as interventionists has been well researched and validated as an evidence-based practice (Chan et al., 2009; Katz & Girolametto, 2013). Incorporating the targets for social interaction and communication into intervention may facilitate better generalization and potentially eliminate an unnecessary step in the generalization process. When adults implement interaction strategies that are ultimately targeted to facilitate interaction among peers, making the transition from adults to peers can sometimes be difficult for a child with ASD or other disability. Training peers as intervention agents eliminates this extra hurdle and increases the number of potential communicative facilitators, which may also produce an added benefit in the reduction in the demand on teachers and other professionals (Chan et al., 2009). Research has demonstrated that peers can be trained as interventionists and they can effectively fulfill their intervention roles with minimal adult support (Robertson, Green, Alper, Schloss, & Kohler, 2003). PMII helps to create meaningful, natural interactions and helps to facilitate effective inclusion. The potential for practicing skills with multiple people and

in various settings also provides more opportunities to generalize skills (Chan et al., 2009).

PMII has the approval for use with individuals with ASD by the National Professional Development Center on Autism Spectrum Disorders (Fettig, 2013). The steps for implementation of PMII for early childhood include: selecting peers, training and supporting peers, structuring peer and focal child interaction in a play setting, implementing in classroom settings, and extending initiations across the day (Neitzel, 2008). Odom and Strain (1986) developed criteria for the selection of peers at the preschool level for the purpose of identifying good candidates for implementing interventions. These include: (a) compliance with requests made by teachers, (b) regular attendance, (c) age-appropriate play skills, (d) no or positive social history with the target children, (e) member of the same class as the target child, and (f) expressed willingness to participate. Research has demonstrated the positive impact PMII can have on academic, interpersonal, and personal-social development in young children and also may be the most empirically supported social intervention for children with ASD (Bass & Mulick, 2007; Maheady, Harper, & Mallette, 2001; McConnell, 2002; Neitzel, 2008). Utilizing peers as interventionists may not only foster more effective inclusive environments, but it may also create more effective interventions when evidence-based practices are used in a peer mediated format.

Picture Exchange Communication System (PECS)

The Picture Exchange Communication System was developed as an instructional technique to teach children who have acquired little or no spoken language to participate

in communicative exchanges (Bondy & Frost, 1998; Ogletree, et al., 2012) . One significant benefit of PECS is the social interactive component. Children diagnosed with ASD who sign or use other augmentative communication devices have been observed attempting to communicate without directing their attempt towards a particular communicative partner (Bondy & Frost, 2001). PECS is exclusively taught as an interactive communication tool in which a picture card is physically handed from the target child to the communicative partner. PECS also teaches the target child to initiate the communicative act rather than always just responding (Cannella-Malone, Fant, & Tullis, 2010).

Bondy and Frost (1998) developed the PECS system which includes six training phases. In the first phase, a child is physically prompted to hand a single picture to a communicative partner to obtain a reinforcer. In the second phase, the target child is taught to persist in communicative attempts. The steps include reaching for a photograph, walking to approach the communicative partner, and finally, going to get the picture they need to use to communicate. Phase three involves discriminating between pictures and making choices using pictures. Phase four utilizes a sentence strip and teaches the child to use phrases for requesting. Phase five teaches the child to answer a direct question such as, “What do you want?” Phase six teaches the child to comment by asking them a question such as, “What do you see?” and prompting them with a visual cue to use a sentence starter such as, “I see ____.” The stages are very specific and the child is gradually weaned from the use of visual prompts as much as possible (Ogletree, et al., 2012). PECS is an intervention approach with a strong literature base as well as empirical evidence of its effectiveness (Bock, Stoner, Beck, Hanley, & Prochnow, 2005).

One disadvantage of PECS is that it requires two clinicians, one to present communication opportunities and another to prompt the responses of the target child (Ogletree, et al., 2012).

Garfinkle and Schwartz (1994) developed a protocol for implementing PECS with peers. Their study utilized two adults for the six phases of PECS training. Three children were able to perform exchanges with a peer and also increased their appropriate social interactions. In another study by Schwartz and Garfinkle, once the target children had mastered the sentence building phase, they were taught to exchange symbols with their peers. Thirty one children were able to effectively use picture exchange as a means to communicate with peers. Sixteen of those children had been diagnosed with ASD, others had been diagnosed with Down's Syndrome, Angelman's Syndrome, or other developmental disabilities. All of the children had severe social, communication, and cognitive delays and qualified for special education services. In a study conducted by Paden, Kodak, Fisher, Gawley-Bullington, and Bouxsein (2012), two young boys diagnosed with ASD, ages 7 and 9 years, were taught to use picture exchange to communicate with one another. Both of the boys in the study participated in the interactions as both the communicative partner in the picture exchange, and as the target child of the exchange. The boys increased their interactions with peers and their initiations with adults. In another study by Cannella-Malone, et al. (2010), two girls, ages 14 and 6 years, were taught to use PECS to initiate interactions with a peer. The older of the two girls had been diagnosed with pervasive developmental disorder- not otherwise specified (PDD-NOS) and mood disorder-NOS. The younger of the girls had been diagnosed with severe autism. Both participants not only increased their picture exchange

interactions, but they also increased their interactions using signs, gestures, and verbal utterances. In addition, some of the research has suggested that use of a graphic symbol may assist with the production of speech or as a more efficient means of responding (Canella-Malone, et al., 2010; Ogletree, et al., 2012).

At first glance, EMT and PECS are seen as dissimilar and have been compared in studies of effectiveness (Yoder & Stone, 2006). The PECS training with students is typically structured, takes place in a controlled environment, and strictly follows the principles of applied behavior analysis (ABA; Ogletree, et al., 2012). While EMT does incorporate many ABA principles, it is more flexible, follows the lead of the target child, utilizes the child's interests and motivations, and typically takes place in the natural environment. It would seem that the two interventions would not be easily utilized in combination. Ogletree et al. (2012) hypothesized that for children who present a strong aversion to being directed and demonstrate frequent idiosyncratic communicative behaviors, EMT strategies provide a less confrontational context while allowing for the structured application of a prompt sequence. The combination of these two interventions could potentially increase the willingness of the target child to participate due to a more naturalistic approach.

Ogletree et al. (2012) completed a study using the EMT and PECS strategies in combination. The target child was a 7 year-old boy diagnosed with ASD. A speech therapist interacted with the boy and set up the environment to encourage communicative attempts. For instance, while rolling a ball back and forth with the boy, the interventionist would pause and wait for the child to attempt to communicate. When he did, she would ask him what he wanted. The communication board would be presented to him and the

therapist would prompt him by saying, “What do you want?” The results of the research were increased communicative attempts by the child and reduced idiosyncratic communicative behaviors.

Mancil, Conroy, and Nakao (2006) used a “modified” EMT and functional communication training to implement picture exchange to replace tantrum behaviors in a 4 year-old boy diagnosed with pervasive developmental disorder. His mother was concerned because he had frequent tantrums and rarely used spontaneous verbal communication. He had been receiving speech and ABA therapies in a clinical setting but his mother reported that the skills were not generalizing to his home. The researchers conducted a preference assessment to identify preferred tangible items to serve as motivators to increase the likelihood the child would actively participate. They also completed a functional behavioral analysis to determine the function of the idiosyncratic communicative behavior (i.e., tantruming). The intervention was performed in the boy’s home using familiar materials and techniques available to his family. The results were a significant decrease in the number of tantrums from several per session to zero, a decrease in the child’s latency to respond, and a significant increase in spontaneous communication. The child also began to be able to distinguish new picture cards more quickly in the later phases than he did in the initial phase. These results were significant because they demonstrated that training in the natural environment was not only feasible, but it helped the target child generalize the communication skills from the researcher to his mother. The ability to generalize useful skills and apply them in a functional way is the ultimate goal of any classroom intervention strategy.

Generalization of Skills

Generalization of a skill occurs when the skill or behavior can be performed effectively in an environment or in the presence of stimuli other than the conditions it was initially taught (Scheeler, 2008). If a student learns to multiply double digit numbers in class but cannot learn to take that skill into real life situations, the student is missing out on the many benefits of having that particular skill in their repertoire. Implementing interventions within the natural environment eliminates the need to generalize a skill from a therapy setting into a classroom or home setting.

Developing intervention strategies for young children with ASD must take into account their unique needs and specific areas of delay. The increasing need for intervention in the general education classroom creates challenges and opportunities for special educators. Interventionists need a variety of effective, evidence-based intervention strategies to utilize (Bock et al., 2003). Sometimes it takes trial and error to determine what will work best for a particular child. Helping a child to develop functional communication and the ability to interact effectively with others is often a top priority for families (Schwartz & Garfinkle, 1998). It is important to investigate potential interventions and strategies to determine their potential and best use.

Although PECS or a modified picture exchange intervention has been used successfully in previous studies in a naturalistic format (Mancil et al., 2006; Ogletree et al., 2012), phase 1 of PECS has not been implemented by one adult and a same-aged peer with preschool children. This combination approach may be beneficial for some children who have not made progress with the traditional PECS approach or who may not be

generalizing their communication attempts to novel communicative partners outside of the controlled therapy environment. The current study addresses the need for research to provide evidence that a picture exchange intervention can be utilized in the natural environment using one interventionist and a peer as facilitators. This approach not only encourages the development of communication skills, but social skills with peers as well. The research questions this project sought to explore include: (1) Can elements of the PECS and PMII be used in a typical preschool classroom by one adult and a peer to teach children with developmental delays to make requests of a same age peer as a communicative partner? (2) Can a typically developing peer reliably implement phase 1 of PECS in a preschool classroom?

Chapter Two

Methods

General Procedures

The purpose of this study was to determine if elements of PECS can be used effectively with a same-aged peer as a communicative partner, during normal daily routines, to encourage children with limited verbal ability to communicate in the classroom. It was conducted in four phases. The first phase consisted of baseline sessions performed with the target children to establish a baseline. During the second phase the intervention was implemented. The third phase was the maintenance phase. The fourth and final phase consisted of generalization sessions. Each of the phases included reliability procedures to establish reliable data collection and analysis.

A multiple probe (days) across participants design was used in this study. The percentage of successful exchanges by a target child to request an item from a peer using the PECS method was evaluated to determine the effectiveness of the intervention when implemented by a same aged peer. The location and daily routine during which the exchanges took place were noted to document any trends and/or generalization of the behavior across routines. The independent variable of this study was the use of the modified PECS/PMII intervention by the target child and same aged peer in the preschool classroom. The dependent variable was the completion of the PECS request by the target child. The request included independently picking up the PECS symbol from the table, reaching across the table to the peer, and independently releasing the card into the peer's hand.

This study used some steps of the PECS to teach target children to request an item from a peer communicative partner. Exchanging a picture for a desired object was the targeted behavior. The principal investigator conducted a reinforcer sampling/assessment with each target child to determine the most desired and effective reinforcers to be used during the intervention. The six items for the reinforcer sampling/assessment were items suggested by the teachers and parents of the target children as highly desirable objects. They included a light up ball, a light up truck that played music, an animal puzzle that played animal sounds, a bubble blowing toy, a musical light up drum, and an iPad with the children's favorite games. The steps for the reinforcer sampling included: (1) Gather a selection of items that may be desirable to the learner based upon observations or caregiver suggestions. (2) Present the learner with pairs of choices, being sure to match each item at least once with the other items being sampled (this is to determine relative preference). Also, vary left and right presentation throughout to minimize the effects of a side preference on the part of the learner. (3) Document the items chosen most often, least often, or that produce a notable response (e.g., learner throws item rather than playing with it) (Collet-Klingenberg, 2008; Frost & Bondy, 2002).

The Bondy & Frost steps (2011) for PECS Implementation were used to execute the picture exchange component of the intervention (Collet-Klingenberg, 2008). The steps used to implement the PMII strategies were selecting a peer, training and supporting peer, and implementing in classroom settings. This was an adaptation of the steps developed by the National Professional Development Center on Autism Spectrum Disorders (Neitzel, 2008). A verbal response was not required to obtain the desired object in this intervention, but was reinforced if attempted or correctly performed.

For this study, the classroom paraprofessionals/teachers were taught by the principal investigator to serve as the facilitators. Peer communicative partners were taught by the principal investigator to play in close proximity to the target child, entice the target child with the reinforcing item, and gain joint attention. The classroom paraprofessional was taught to redirect any attempts by the target child to obtain the object without exchanging the picture/symbol. The peers were taught to state the name of the object once the picture/symbol had been exchanged. The exchanges were made during table/fine motor time, center time, small group, and library.

Participants

Target children. Three boys, all diagnosed with a developmental delay and an expressive speech delay, were the target children for this study. Two of the boys, Carl and Trip had been diagnosed with ASD. Christopher displayed multiple behaviors commonly associated with ASD such as language delay, an aversion to many food textures, crying or protesting when exposed to loud noises, repetitive physical behaviors (head banging or banging on flat surfaces), as well as a lack of eye contact or initiation of any interaction with others, but he had not been diagnosed with ASD. All three boys met the receptive language criteria for this study, which included having an expressive language delay and higher receptive language scores than expressive language scores on the Assessment, Evaluation and Programming System (AEPS, Bricker, 2002).

Trip is bi-racial, African American and Caucasian, and was 4 years old at the beginning of the study. He lives in rural southern Illinois with his mother. His mother and father are together as a couple but are not married and do not live together. He does see

his father on a regular basis. He attended a center based Early Head Start program for 2 years. He was enrolled in his first year of preschool Head Start at the time of the study. He received speech therapy, occupational therapy, and developmental therapy. He had a diagnosis of ASD. His strengths included an ability to follow a one-step direction, at best, inconsistently and matching/sorting skills on the iPad. He had no verbal vocabulary. He used a picture schedule in his classroom to help him transition from one activity to another. He made activity choices by pointing to pictures on his schedule. He had no means of communicating with his peers. His scores on the AEPS were below the cutoff (a score indicating a delay in development and the potential need for intervention) in fine motor, cognitive, adaptive, social communication and social domains.

Carl is an African American male and was 4 years old at the beginning of the study. He lives with his mother and two brothers in rural southern Illinois. He attended center based Early Head Start for a year and center based Head Start for a year. He had no spontaneous verbal vocabulary. He occasionally repeated words and he could follow a one-step direction somewhat consistently. He received occupational therapy, speech therapy, and developmental therapy. He had a diagnosis of ASD. His strengths included the fine motor skill of using utensils to feed himself and a willingness to imitate sounds. He was not potty trained at the time of the study. He would sometimes hit peers if they tried to take a toy from him. He would cry and scream if he got upset. He sometimes pointed to things he wanted. He did not have an effective means of communicating with his peers. Carl scored below the cutoff in all areas of the AEPS including fine motor, gross motor, cognitive, adaptive, social communication, and social domains.

Christopher is Caucasian and was 3 years old at the beginning of the study. He lives in rural southern Illinois with his mother, father, and older brother. He had been diagnosed with a developmental delay. He had been receiving speech therapy and developmental therapy services through early intervention and the public schools but was not enrolled in a center based program until three months before this study began. He repeated some words but he had no spontaneous language. His teacher reported that he did not make any verbalizations in the classroom. He would sometimes sing parts of songs such as “Twinkle, Twinkle Little Star.” He would not interact with the other students in his classroom at all. He frequently screamed and threw his head back to hit therapists or teachers if they were sitting or standing behind him. He would smile to communicate that he liked something including music or going outside. He had no effective means of communicating his wants and needs or interacting with his peers. His strengths included an ability to entertain himself for 20 minutes independently and fine motor/adaptive skills of feeding himself with a fork or spoon once an adult has put the food on the utensil for him. Christopher scored below the cutoff in all areas of his development on the AEPS.

All three of the target children have passed a hearing screening conducted by a certified audiologist. None of them have any physical disabilities or limitations. Each child has an Individualized Education Program goal to use pictures as a means of communication. All three of them scored higher in receptive language than in the expressive domain on the AEPS. Their parents are all receptive to the idea of using the PECS intervention and have given permission for their child to participate in the study.

Communicative partners/peers. The researcher chose the peers based upon the Odom and Strain (1986) peer selection criteria and recommendation of the teacher. They were typically developing children attending the same center and in the same classroom as one of the target children.

The target children were paired with a peer in their classroom. Shayna (peer) was paired with Carl (target student). She was 4 years of age at the time of the study. Shayna has excellent expressive language skills. She is a leader in their classroom. She scored well above her age range in all areas on the AEPS. She also has excellent behavior and follows classroom rules and routines. Paula (peer) was paired with Trip (target child). She was 4 years old at the time of the study. She scored above her age range in all areas on the AEPS. She has excellent verbal and social skills. She follows all classroom rules and often offers to help the teacher. Reggie (peer) was paired with Christopher (target child). He was 4 years old at the time of the study. He scored at or above his age range in all areas on the AEPS. He has excellent verbal skills. He follows all classroom rules and routines. The second peer who requested to take part in the study when Reggie no longer wanted to participate was Dylan. He had excellent verbal skills, followed all classroom rules and routines, and had a desire to help his friend, Christopher. All peer models were recommended by their teachers based upon verbal skills and positive classroom behavior. All peers were asked if they would like to participate in the study. They all enthusiastically gave their assent when presented with the opportunity to help teach their classmate a new way to communicate.

Teachers/paraprofessionals. All three of the target children were enrolled in the same Head Start program but attended two different centers. Two of the children attended

the same center but were in different classrooms. In two of the classrooms, paraprofessionals facilitated the intervention. In one classroom, the teacher was the facilitator. One of the paraprofessionals has done some college coursework in child development but has not obtained a degree. One of the paraprofessionals has an associates degree in child development and the teacher has a bachelors degree in early childhood education. All of the teachers and paraprofessionals are familiar with the PECS intervention and are interested to see how it will help in their classrooms.

Others. The author was the principal investigator for this study. She is a graduate student completing a masters thesis in Interdisciplinary Early Childhood Education with the University of Kentucky. The principal investigator trained the teachers and peers in this study in the implementation of the intervention.

A second observer assisted in collecting the procedural reliability data. One session in each phase was observed or recorded and data were collected by a certified occupational therapy assistant with 15 years professional experience working with young children and collecting data on special education goals and objectives.

Each person participating in this study signed a consent form and in the case of a minor/child, the child's legal guardian was required to sign the consent form. The consent form for children can be found in Appendix A. The consent form for adult participants can be found in Appendix B.

Instructional Setting

The instructional setting for this study was each target student's natural environment. The intervention was implemented in the regular classroom during typical

daily routines and in the center during regularly scheduled activities. The peers would play with the desired objects in the same center or area of the classroom where the target child was playing. The target children were given the freedom to choose desired areas in the same way they did on any other day. The peers understood they would need to go to the area the target child chose. The routines in which the picture exchanges were embedded included (a) center time, because it is a natural time during the day for peers to interact; (b) small group time, because the peer can serve as a partner to the target child; (c) table/fine motor time, because all of the students were working at their seats, and (d) library, because a story/video was an appropriate activity and reinforcer during that time of day. Two daily activities were chosen for each child in which to embed the intervention. For Trip, these activities were center time and table time/fine motor activities. His generalization activity was conducted during small group time. Carl's two activities were also centers and table time/fine motor activities. His generalization activity was in his small group, which included occupational and speech therapy. Christopher's two daily activities were also centers and table time/fine motor activities. His generalization activity was library.

Materials and Equipment

The materials for this study included the preferred objects for each of the target children (i.e., a light up ball, bubbles, an iPad, or a favorite short video, iPhone), the picture/symbol card for each item, a clipboard for each classroom, and data sheets for data collection in each classroom. An iPad was used to video some of the sessions.

Data Collection

During the baseline phase of the study, data were collected on the interaction between the target child and the same-aged peer. The principal investigator indicated with a + or a – if the target child acknowledged the peer, if the peer presented the preferred item, and if there was a response by the target child. The responses were recorded with the following notations: gestured (g), reached for object (r), vocalized (v), or made no attempt to communicate or try to obtain object (-). The baseline session procedure form can be found in Appendix C.

During the intervention phase of the study, data were collected to document the routine in which the exchange took place, if the picture was exchanged between the target child and the same-aged peer (+ or -), and any response made by the target child (gesture or verbalization). A minimum of five trials were completed in each intervention session. Five was the minimum goal set but if time and the participants allowed, more trials were completed. The instructional/maintenance/generalization data sheets can be found in Appendix D.

Data were collected on procedural reliability during the baseline, intervention, and maintenance phases of the research. The principal researcher and a second observer observed for it. A checklist (found in Appendix E) was used to observe the following steps during the baseline phase to ensure they were implemented correctly by the peer.

1. Materials ready (reinforcing object)
2. Peer moves near target child w/ object
3. PECS picture/symbol/Notebook visible

4. Peer says name of object when target child reaches for it.

The researcher observed each pair of peer and target child during one of the sessions in the intervention phase of the study to document procedural reliability. The peer was observed and a checklist was completed for the following behaviors. The checklist can be found in Appendix F.

1. Materials ready (reinforcing object)
2. Peer moves near target child w/ object
3. PECS picture/symbol/Notebook visible
4. Peer holds out open hand to target child (after target child initiates interaction)
5. Peer says name of reinforcing object

Baseline

Baseline sessions were conducted with each dyad of target child and peer before the PECS exchange was taught to the target child. The sessions began with the first dyad and continued until a stable data trend of 5 data points was established. Baseline sessions were conducted at differing intervals with the other dyads, once every few days, until it was appropriate for them to start the intervention. The peer began playing with the desired object in close proximity to the target child, acted like they were really having fun with the preferred item, and obtained joint attention with the target child. The PECS picture was visible in front of the target child. The principal researcher then documented any response made by the target child including gesturing, reaching for the object, or making a verbal response. If the target child reached for the object, it was handed to them by the peer and the name of the object was said. When the data trend was stable for that

dyad, they began the intervention phase. When the first dyad had obtained an ascending data trend, the intervention sessions with the second dyad began. Once the second dyad's data showed an ascending trend, intervention sessions with the third dyad began.

Training Sessions

Teachers/paraprofessionals. A brief training session for each of the teachers/paraprofessionals was conducted before the baseline sessions began to give an overview of the benefits of the PECS and PMII strategies in the classroom. A more detailed training session was conducted with each teacher/paraprofessional before the intervention phase including an instructional video created by the researcher, to prepare all participants to implement the PECS strategies. The teacher/paraprofessionals participating as the adult communicative facilitators were trained during their normal workday. Each training was conducted separately so no testing threats to internal validity occurred. Also, most of the teachers/paraprofessionals were located at different center/sites. The two paraprofessionals located in the same site worked in different classrooms and were trained separately on different days. The trainings were scheduled at the convenience of the teacher/paraprofessional.

Each training session followed the order of the outline for teacher training found in Appendix G. The outline checklist was followed to ensure and document fidelity of training implementation across teacher participants. The training was divided into two parts in the interest of time. The teacher/paraprofessionals had limited time during their work day to dedicate to training. The first part of the training was conducted prior to starting the baseline phase of the study and included an explanation of the PECS system

and the potential benefits in the classroom (i.e., increased communication, decreased frustration, and decreased inappropriate/aggressive behaviors). The second part of the training included a discussion about the steps for the implementation of the first phase of PECS and the role that the adult communicative facilitator would play. The author also explained the role of the same-aged communicative peer and the importance of facilitating communication among peers in the classroom. This part of the training also included watching a training video of an adult and two children performing the steps of the intervention. The author also facilitated a discussion about other times during the school day when the intervention strategy could potentially be implemented.

Peers. The training sessions for the peers were conducted after the baseline phase and before the intervention phase. The training sessions consisted of the author reviewing the steps in the communicative interaction during the intervention. A picture checklist on a clipboard was given to the peer to serve as a reminder of the steps he/she needed to complete. The picture checklist can be found in Appendix H. The author, the adult communicative facilitator, and the peer then role played the steps of the communicative interaction. The steps include:

1. Materials ready (reinforcing object)
2. PECS picture/symbol/Notebook visible
3. Peer moves near target child w/ object
4. Peer plays with object, making it look like they are having fun
5. Target child initiates interaction (reaches for object or picks up picture)
6. Peer holds out open hand to target child

7. Peer names the desired object as he/she hands desired object to target child

The author, teacher, and peer practiced the steps until the peer reached 100% accuracy of implementation. The paraprofessional was also encouraged to assist the peer with verbal reminders of the intervention steps as needed.

Intervention Procedures

The adult facilitators and the peers used the modified PECS intervention to teach the target children to effectively interact with a peer (Collet-Klingenberg, 2008). The steps they used in conducting the intervention included:

- 1.) Have reinforcer/object ready and PECS picture in view.
- 2.) Peer moves close to target child, begins playing with reinforcer/desired object out of reach of target child and obtains joint attention with target child.
- 3.) Paraprofessional/teacher places picture/symbol in between target child and peer.
- 4.) Target child initiates interaction (reaches for object or picks up picture).
- 5.) Paraprofessional/teacher guides target child's hand towards picture/symbol if he does not independently pick it up.
- 6.) The paraprofessional/teacher physically prompts the target child to hand the picture/symbol to the peer if the target child does not do it independently.
- 7.) Peer opens one hand and holds it out to receive picture/symbol from target child
- 8.) The peer names the desired object and hands it to the target child.
- 9.) The object is removed from the target child after 5 seconds and the entire sequence is repeated.

The intervention phase consisted of a minimum of five communicative interchanges per session depending on the classroom schedule and the opportunities to conduct an interchange. Criterion for this stage was met when the target child successfully completed the requests/interchanges with no physical prompts during 80% of the opportunities for three days. If the target child was incorrect in implementing the intervention, the session was recorded as attempted but not valid.

Procedural and Interrater Reliability

The author and another reliability data collector collected procedural reliability data. They observed at least one session during each phase of the study. They used the Probe Session Reliability Data form (Appendix E) during the baseline sessions to document the steps the peer follows during one session. They used the Instructional and Maintenance Session Reliability Data form during the instructional phase and the maintenance phase to document the peer's implementation of the steps. The number of steps completed correctly divided by the number of total steps planned was the formula used to determine the percentage of steps completed correctly (Billingsley, White, & Munson, 1980). The paraprofessional or the data collector prompted the peer as needed and the data sheet reflects independent and/or prompted responses by the target child.

In addition to collecting procedural reliability, the author and reliability data collector also collected interobserver agreement data. They each independently completed a data form simultaneously during a session in each phase. The data forms they completed were compared and a formula was used to determine the percent of

agreement. The formula that was used divided the number of agreements by the number of agreements plus disagreements and multiplying by 100 (Ledford & Gast, 2014). All student responding data were collected by the principal investigator.

Maintenance Procedures

Maintenance data were collected for each child each week (when possible) after the final instructional session. Absences due to illness and spring break affected maintenance sessions. Five trials were conducted with the target child and the data were recorded by the principal investigator using the maintenance data sheet. The sessions were conducted using the same steps as the baseline sessions. Interobserver agreement was also calculated for a percentage of the maintenance sessions.

Generalization Procedures

Generalization sessions were conducted with each target child as necessary and were interspersed with the maintenance sessions. The intervention sessions were conducted during center time and table time/fine motor activities. The generalization sessions were conducted during small group time and library. The same procedures were followed in the generalization sessions as in the baseline sessions. Each session had a minimum of five trials. Some sessions were conducted with a different peer if the consent form could be obtained from the parent. If the instructional and maintenance sessions were conducted during three or more routines (i.e., center time, table time, small groups), in three or more environments (i.e., classroom, playground, gym, and office), or with more than one peer, generalization was considered to have been established.

Experimental Design

A multiple probe design across days was used to determine the effectiveness of the training package with a target child (Gast & Ledford, 2014). This design was appropriate because the skills required in the PECS sequence have not previously been acquired by the children. The design is experimentally sound in that the intervention began at a staggered interval. Each target child began the intervention after the previous target child had reached criterion level. This limited the possibility that maturation or history influenced the results of the study. The intervention was replicated across three participants. There was no threat of co-variation due to each participant attending a different classroom. There were 4 phases in this study (a) baseline phase, (b) intervention phase, (c) maintenance phase, and (d) generalization phase. Experimental control was demonstrated by the change in the data trend when and only when the intervention was applied.

Chapter Three

Results

Effectiveness Data

A visual analysis of the data can be seen in figure 1. In the graph, the percentage of unprompted requests made by each target child during baseline, intervention, maintenance, and generalization sessions is represented. The blue diamonds represent the baseline sessions. The red triangles represent the intervention sessions. The green triangles represent the maintenance sessions. The red circles represent the generalization sessions. The sessions in which an appropriate verbalization was made by the target child are noted with a plus sign inside the shape.

Each target child demonstrated a stable data trend in the baseline phase before the intervention was implemented. Each child maintained a 0% correct response level during that phase. They all showed significant interest in the motivating object, often reaching for it, but none picked up the PECS symbol. An ascending data trend was noted with each target child in the intervention phase soon after the intervention was applied. All three of the target children reached criterion.

The research question this study asked was: Can elements of the Picture Exchange Communication System and Peer Mediated Instruction and Intervention be used in a typical preschool classroom by one adult and a peer to teach children with developmental delays to make requests of a same age peer as a communicative partner? The data would suggest the answer to that question is yes.

Child A, Trip, began with 0% correct in the baseline phase. He reached criterion within two sessions. He reached 100% correct responses within three sessions. He maintained 100% correct responses during the maintenance and generalization phases as well. His baseline and instructional sessions occurred across two routines, center time and table time/fine motor. His generalization sessions took place during small group activities. He also generalized the intervention across peers, correctly responding with two different little girls from his class. During his first maintenance session he said, “A ball” while handing the card to the peer during two of the six trials. A blue light up ball was the reinforcing object being used during the session. That session was nine days after his last intervention session. During another maintenance session, he said, “a ball” again during a trial.

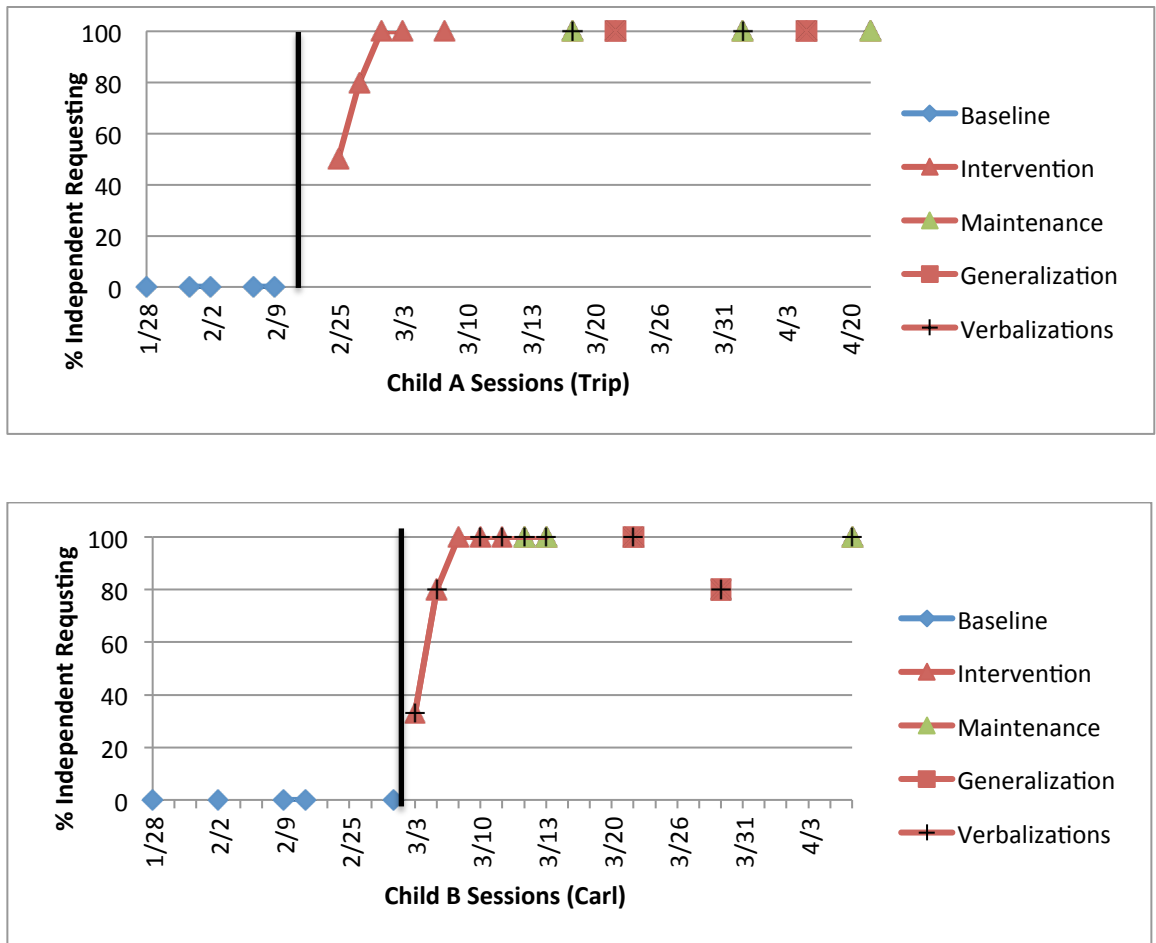
Child B, Carl, also began with 0% correct in the baseline phase. He began the intervention phase 12 days after child A. He reached criterion within two sessions. He reached 100% correct responses within three sessions. His correct responses fell to 80% in one of his generalization sessions when a different peer was introduced. He returned to 100% correct independent responses in the following session. His baseline and instructional sessions occurred across two routines, including center time and table time/fine motor. His generalization sessions took place during his small group activities, which included occupational therapy and speech. He was able to reach criterion with two different peer communicative partners. He began verbally repeating “iPad” after the peer said it at the end of the first intervention session (1/6 trials in that session). In the second intervention session, he repeated “iPad” during 40% of the trials (2/5). By the fourth intervention session, he was saying, “iPad”

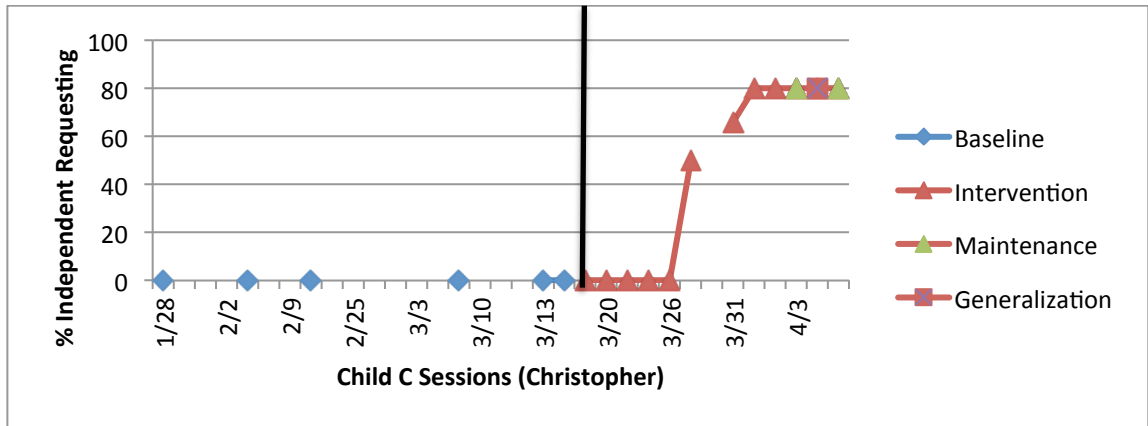
100% of the time and often he said it as he handed the peer the PECS symbol, before she could say it.

Child C, Christopher, also began and ended the baseline phase with 0% independent, correct requesting. He began the intervention phase fourteen days after child B. He took the most sessions to reach criterion. He reached criterion in his eighth intervention session. He had the most stemming behavior out of the three target children and was the most difficult to keep focused. The peer working with him also began to ask to leave and do something different after four intervention sessions. He was offered rewards of stickers or an edible treat but he said he no longer wanted to participate. A different peer was chosen and trained in the intervention procedure. In the fifth intervention session, the researcher and paraprofessional noticed a lack of interest in the reinforcing object (a light up ball) from the target child. Another reinforcement assessment was conducted to determine a new reinforcing object. The subject has a programmable shunt, so the iPad could not be used as a potential reinforcing object (He, Murphy, Limbrick, & Roland, 2013). The subject had recently begun saying, "George" while watching Peppa Pig at home, so the researcher wanted to incorporate this if at all possible into the requesting intervention. It was determined that an iPhone 4 would be safe for use near a programmable shunt, so the researcher obtained a Peppa Pig video on an iPhone 4. In the first session using the video as the reinforcing object, the target child independently handed the peer the PECS symbol with the picture of Peppa Pig correctly in 50% of the trials. He reached criterion within four sessions with the video as the reinforcer. His baseline and intervention sessions were completed during the daily routines of center time and table time/fine

motor. His generalization sessions took place during library time when the class was preparing for lunch. . He would say, “George” randomly during the intervention sessions but never said it meaningfully to request the video. He did begin to say, “George” when he would see the researcher enter the room.

Figure 1-Percentage of successful communicative exchanges to request desired object





Reliability

The principal investigator of this study collected the independent variable reliability data for this study. The interobserver agreement (IOA) data on the steps of the procedure followed by the peers were collected by another observer working with the children as an occupational therapy assistant and by the principal investigator. Reliability data were collected during the baseline, instructional and maintenance phases of this study, but not in the generalization sessions.

Procedural reliability. The principal investigator and another data collector collected procedural reliability data during one session of each phase of the study. In the baseline phase, the steps observed included (a) materials ready, (b) peer located near target child playing with desired object, (c) PECS picture/symbol visible, (d) peer gives target child desired object when he reaches for it, (e) peer says name of reinforcing object. For Trip and his peer, procedural reliability was observed in 20% of the baseline sessions and was calculated to be 96%. Carl and his peer were observed in 20% of their sessions as well and the reliability was 94%. Christopher and his peer had 100% procedural reliability in 20% of their baseline sessions.

The steps in the instructional phase included (a) materials ready, (b) peer located near target child playing with desired object, (c) PECS picture/symbol visible, (d) peer takes card from target child (exchange completed), and (e) peer says name of reinforcing object. The steps in the maintenance phase included (a) materials ready, (b) peer located near target child playing with desired object, (c) PECS picture/symbol visible, (d) peer gives target child desired object when he reaches for it, (e) peer says name of reinforcing object. The procedural reliability was 100% for all three pairs in the instructional and maintenance phases. Procedural reliability was observed in 20% of Trip and Carl's instructional and maintenance sessions. Due to time constraints of the second observer, procedural reliability was only observed in 13% of Christopher's instructional sessions and 50% of his maintenance sessions.

Interobserver agreement. The interobserver agreement data for this study were collected by the principal investigator and a second observer. The reliability data sheets were then compared and the IOA formula was used to calculate the agreement. The researcher required IOA of 90% or greater to be acceptable. The IOA in the baseline phase for Trip and his peer was 96%. The IOA in the baseline phase for Carl, Christopher and their peer partners was 100%. The IOA in the instructional phase for all three pairs was 100%. The IOA in the maintenance phase for all three pairs was also 100%. The visual checklist served as an effective reminder for the peers. It was used as a nonverbal cue in training and at the beginning of the baseline phase by the researcher and the adult communicative partner as needed.

Chapter Four

Discussion

Significance of this Study

The research questions this study attempted to answer were: (1) Can elements of the Picture Exchange Communication System and Peer Mediated Instruction and Intervention be used in a typical preschool classroom by one adult and a peer to teach children with developmental delays to make requests of a same age peer as a communicative partner? (2) Can a typically developing peer reliably implement phase 1 of PECS in a preschool classroom? A review of the data from this study provides the answer to both of these questions. Yes, this intervention package can be used to teach a child with limited verbal abilities to communicate with a peer. As well, this intervention was effectively implemented by an adult and a peer. All three target children in this study were able to attain the 80% independent exchange criterion level and maintain that level over time. All three target children were able to use this newly acquired skill across different routines and/or with more than one communicative partner in their classroom. All of the peers included in this study were able to follow the steps to effectively implement the intervention. They occasionally needed to be reminded to say the name of the desired object as the target child gave them the PECS symbol, but practice and prompting in the earlier stages of implementation eventually helped the intervention go smoothly.

An important point to note is that some peers experienced frustration and impatience with a target child who needed more sessions to reach the criterion of 80%

independent/non physically prompted exchanges. One observable difference in this particular pair of students included a male/male pair. The other two pairs included a male/female pairing. The target child in this pair also scored significantly lower cognitively than the other two target children. He also had been enrolled in school a much shorter amount of time prior to the beginning of the study. The other two target children had a year of maturity and school experience the third subject, Christopher, did not possess. Christopher's stemming behaviors and lack of interest in the first identified desired object after a short period of time also influenced the number of sessions he required to meet criterion. After a new reinforcing object was identified, he made faster progress.

Another significant discovery in this study was the increase of verbal responses by the target children. The first target child, Trip, began verbally requesting the ball in his maintenance sessions. He said, "A ball" in two of those sessions. The second target child began saying, "iPad" in his first instructional session, (1 out of 6 trials in that session) and by his fifth instructional session was verbally requesting the item in 100% of the trials. He continued to request verbally 100% of the time through all but one of his maintenance and generalization sessions. In one generalization session, his percentage of unprompted requesting was 80%. He was interacting with a new peer in that particular session. The third subject, Christopher, did not meaningfully verbally request the desired video at the moment he handed the card to the peer, but he did begin randomly saying, "George" which was the word the peer would say as they handed him the iPhone to watch the video. With more sessions, he may have been able to get the timing correct to verbally request the video as he handed the PECS symbol to the peer. The Head Start program the

students attended began their summer break a month before the public school system, so more sessions were not possible.

This study expands the previous literature on PECS and PMII in that the two interventions were used in a modified means as a treatment package. It is the only study using these two interventions with such young children as communicative partners to implement phase one of the PECS intervention. Previous studies had used two adults to train the target children in the PECS phases and then generalized the intervention for use with peers. Others had utilized these two interventions with school-aged children, but this is the first research to implement the intervention exclusively with preschoolers.

Limitations

Some limitations of this study included the time, distance, adult buy-in regarding the time and effort required, and maturity of the peer communicative partners. Time was a constraint in this study because the principal investigator could not be present in all of the classrooms on a daily basis. Due to other job duties, distance (57+ miles between sites), snow days, child absences, and spring break, sometimes 2-3 days might pass between sessions. The principal investigator had to be present to collect all data, so there were times when it would have been more effective to have sessions on a daily basis to reinforce the intervention or promote faster mastery but it was physically impossible. Reliability data was only collected in 13% of the intervention sessions with child C, Christopher, due to time constraints. Completing observations with the second observer, an itinerant therapist, became difficult when the target child was often absent. Observations were scheduled and rescheduled. The primary researcher had to video some

sessions to make it possible to obtain reliability data. Adult buy-in was a limitation of this study because although the adult communicative partners were trained in the benefits of this intervention, the time required for training became a negative and was seen as a burden by some of the participants. Once the intervention was implemented and the positive effects were observed and experienced, the adult comments were much more positive in nature and their participation was more enthusiastic. At the beginning of the study, some of the adult participants were hesitant and there were a few complaints regarding taking time away from their other duties. The maturity of the peers became a constraint when some wanted longer turns with the desired object than would be effective while implementing the PECS intervention. One peer began to complain about desiring more time to play games on the iPad. She was given extra time to play with it by herself during center time as a reward for being such a good friend and teacher. That was enough incentive and she became a much more effective communicative partner. Another peer would complain that, "It is taking too long" or "It is boring." He was asked if he wanted to continue participating in the intervention. He said he did not so another peer was asked if he would like to participate. He said yes and effectively finished out the study.

Future research in this area should focus on a couple of things. First, due to the small size of this study, future research should look at larger numbers of children to determine if the intervention would be effective. Also, all of the subjects in this study attended a rural Head Start program. A broader base of children from urban and suburban areas and different types of programs such as public school preschool programs, center based daycare, home based daycare, and church preschool programs would be a good comparison model to determine if implementation would be effective in various

programs. This study also focused on using this intervention with children with ASD or non-diagnosed behaviors similar in nature to ASD. Future research should focus on children with other disabilities that have limited verbal abilities.

Conclusions

The current study was effective in what it set out to accomplish. Young children can successfully assist with implementing a PECS/PMII intervention package in an early childhood classroom to increase picture exchange to make requests and verbalizations as a means of communication for a peer. Although there were limitations, overall the information gained from this study was useful and relevant.

APPENDIX A

Consent to Participate in a Research Study for Children

Using the Picture Exchange System intervention with peers as communicative partners

Why has your child been selected to participate in this research?

Your child has been selected to take part in a research study using the Picture Exchange System with peers as communicative partners. Your child was chosen because he could potentially benefit from the intervention and the structured social interaction with other children in his classroom. If you decide to allow your child to take part in the study he will receive individualized interventions that only 3-4 other students will receive.

Who is conducting this study?

Kim Clayton, a third year graduate student in Early Childhood Interdisciplinary Education with the University of Kentucky is the person conducting this research. Dr. Jennifer Grisham-Brown of the University of Kentucky is guiding the research process.

What is the purpose of this study?

The purpose of this study is to determine if same-aged peers can be effective communicative partners for children with limited communication skills using the Picture Exchange System. We hope to encourage children to communicate with friends in their classroom.

Where will this study take place?

The study will be conducted in your child's regular classroom during normal daily routines.

What will you be asked to do?

You will be requested to complete a short survey at the end of the study to give your impression of the research and any progress your child has made at that time.

Are there any potential risks to your child should you choose to participate?

The study will consist of activities that would be present during your child's normal daily activities at school. There should be no additional risks.

Are there any potential benefits for your child should you choose to participate?

There are no guarantees that there will be a benefit to your child by participating in this study. The hope is that it will improve interactions between children in preschool classrooms, your child and many others in the future.

Does your child have to take part in this research?

Your child is not required to take part in this research. Your child will not lose any benefits or services he would normally receive by not participating. If you choose to volunteer to take part in the study, you can stop participating at any time. It will not influence your child's ability to attend preschool or receive services.

Will there be any charge or payment for services?

There will be no charge for the additional services your child receives by taking part in this study. There will also be no payment of any kind for participation.

Will your identity and private information be protected?

Your personal information will be kept confidential. All of the participant's names will be kept private to the extent that the law allows. No actual names will be included in any of the written or published documents. Names of participants may be disclosed to University of Kentucky personnel to verify the research was completed correctly.

Could the study or your child's participation end early?

If for any reason you decide you no longer want your child to participate you may withdraw him at any time. If the researcher or other school personnel determine that your child is at any risk from his participation they may decide to discontinue your child's participation. There will be no consequences for your child if this should happen.

Other important information:

Should you choose to participate; the principal investigator for this study will be looking at your child's file at JAMP Special Education Cooperative including previous assessment information. Your child's background information and Individualized Education Plan goals may also be included in the study.

The data from this study could also be shared with other researchers in the future. Information identifying you or your child will not be provided without your written consent.

What should you do if you have questions or concerns?

Any questions or concerns you may have are very important to us. You may contact the researcher at any time. Please call Kim Clayton at 270-559-2125. Any questions you may have regarding your rights as a volunteer in this research may be directed to the Office of Research Integrity at the University of Kentucky at 859-257-9428 or toll free at 1-866-400-9428. You will be provided with a copy of this consent form.

Name of child taking part in this study

Signature of parent/legal guardian giving consent for child to participate

_____ date

Printed name of parent/legal guardian giving consent for child to participate

Name of authorized person obtaining informed consent date

APPENDIX B

Consent to Participate in a Research Study for Teachers

Using the Picture Exchange System intervention with peers as communicative partners

Why have you been selected to participate in this research?

You have been selected to take part in a research study using the Picture Exchange System with peers as communicative partners. You were chosen because there is child in your classroom who could potentially benefit from the intervention and the structured social interaction with other children in his classroom. If you decide to take part in the study you will receive training on using PECS in the classroom.

Who is conducting this study?

Kim Clayton, a third year graduate student in Early Childhood Interdisciplinary Education with the University of Kentucky is the person conducting this research. Dr. Jennifer Grisham-Brown of the University of Kentucky is guiding the research process.

What is the purpose of this study?

The purpose of this study is to determine if same-aged peers can be effective communicative partners for children with limited communication skills using the Picture Exchange System. We hope to encourage children to communicate with friends in their classroom.

Where will this study take place?

The study will be conducted in your classroom during normal daily routines.

What will you be asked to do?

You will be requested to attend 45 minute training on using PECS in your classroom. A same-age peer from your classroom will also be trained to use PECS. You will then facilitate/supervise the communicative exchanges between the two students and record what you observe on a brief observation recording form.

Are there any potential risks to you should you choose to participate?

The study will consist of activities that would be present during your normal daily activities at school. There should be no additional risks.

Are there any potential benefits for you should you choose to participate?

There are no guarantees that there will be a benefit to you by participating in this study. The hope is that it will improve interactions between children in preschool classrooms, your classroom and many others in the future.

Do you have to take part in this research?

You are not required to take part in this research. You will not be penalized if you choose not to participate. If you choose to volunteer to take part in the study, you can stop participating at any time.

Will there be any charge or payment for services?

There will be no charge for the training or services you receive by taking part in this study. There will also be no payment of any kind for participation.

Will your identity and private information be protected?

Your personal information will be kept confidential. All of the participant's names will be kept private to the extent that the law allows. No actual names will be included in any of the written or published documents. Names of participants may be disclosed to University of Kentucky personnel to verify the research was completed correctly.

Could the study or your participation end early?

If for any reason you decide you no longer want to participate you may withdraw at any time. If the researcher or other school personnel determine that you or any of the children are at any risk from your participation they may decide to discontinue your participation. There will be no consequences for you if this should happen.

Other important information:

Should you choose to participate the principal investigator for this study will be looking at your child's file at JAMP Special Education Cooperative including previous assessment information. Your child's background information and Individualized Education Plan goals may also be included in the study.

The data from this study could also be shared with other researchers in the future. Information identifying you or your child will not be provided without your written consent.

What should you do if you have questions or concerns?

Any questions or concerns you may have are very important to us. You may contact the researcher at any time. Please call Kim Clayton at 270-559-2125. Any questions you may have regarding your rights as a volunteer in this research may be directed to the Office of Research Integrity at the University of Kentucky at 859-257-9428 or toll free at 1-866-400-9428. You will be provided with a copy of this consent form.

Printed name of person taking part in this study

Signature of person participating

date

Name of authorized person obtaining informed consent

date

APPENDIX C

Baseline Procedure

Target child: _____ Peer: _____

Date: _____ Time of day/routine: _____ Session #: _____

Researcher: Kimberly Clayton

Procedure:

- 1.) Have reinforcer/object ready and PECS notebook in view.
- 2.) Peer moves close to target child and begins manipulating the desired object to get their attention.
- 3.) Make sure target child sees reinforcer/object.
- 4.) Children establish joint attention.
- 5.) Indicate if target child gestured (g), reached for object (r), vocalized (v), handed card to peer (h), or made no attempt to communicate or try to obtain object (-).

Target child will gain access to desired object for any of the above responses.

Trial	Object presented (ball, iPad, truck, bubbles or puzzle +or-)	Target child looks at or acknowledges peer (+ or -)	Object presented by peer (+ or -)	Target child response (g, r, v, or -)
1				
2				
3				

4				
5				
6				

APPENDIX D

Data Sheets

Instructional/Maintenance Data Sheet

Target child: _____ Peer: _____

Date: _____ **Center Time** Session #: _____

Researcher: Kimberly Clayton

Trial	Center/object	Picture exchanged (+ or -) (p= physical prompt, i=independent)	Gesture or vocalization by target child
1			
2			
3			
4			
5			
6			
7			
8			

Instructional/Maintenance Data Sheet

Target child: _____ Peer: _____

Date: _____ **Table time/fine motor** Session #: _____

Researcher: Kimberly Clayton

Trial	Object	Picture exchanged (+ or -) (p= physical prompt, i=independent)	Gesture or vocalization by target child
1			
2			
3			
4			
5			
6			
7			
8			

Generalization Data Sheet

Target child: _____ Peer: _____

Date: _____ **Small group** Session #: _____

Researcher: Kimberly Clayton

Trial	Small group activity/object	Picture exchanged (+ or -) (p= physical prompt, i=independent)	Gesture or vocalization by target child
1			
2			
3			
4			
5			
6			
7			
8			

Generalization Data Sheet

Target child: _____ Peer: _____

Date: _____ Time of day/routine: _____ Session #: _____

Researcher: Kimberly Clayton

Procedure:

1. Have reinforcer/object ready and PECS notebook in view.

2. Peer moves close to target child and begins playing with reinforcer/desired object out of reach of target child.
3. Teacher places picture/symbol in between target child and peer.
4. Peer opens one hand and holds it out to receive picture/symbol from target child after target child initiates interaction.
5. Teacher guides target child's hand towards picture/symbol if he does not independently pick it up.
6. The teacher physically prompts the target child to hand the picture/symbol to the peer if the target child does not do it independently.
7. The peer names the object.
8. Target child is given the desired object and is reinforced for the exchange.

Trial	Setting/Routine	Picture exchanged (+ or -) (p= physical prompt, i=independent)	Gesture or vocalization by target child
1			
2			
3			
4			
5			
6			
7			
8			

APPENDIX E

Baseline Session Reliability Data

Target child: _____ Peer: _____

Teacher: _____ Observer: _____

Date: _____ Session #: _____

Researcher: Kimberly Clayton

Trials	Materials ready (reinforcing object)	Peer located near target child w/ object	PECS picture/symbol/ Notebook visible	Peer gives desired object to target child when they reach for it
1				
2				
3				
4				
5				
6				
7				

Summary Data

#observed/ Total planned				
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%Accuracy				
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APPENDIX F

Instructional and Maintenance Session Reliability Data

Target child: _____ Peer: _____

Teacher: _____ Date: _____ Session#: _____

Researcher: Kimberly Clayton

Trials	Materials ready (reinforcing object)	Peer is sitting near target child w/ object	PECS picture/symbol/ Notebook visible	Peer takes card from target child (exchange completed)	Peer says name of reinforcing object
1					
2					
3					
4					
5					
6					
7					
8					

Summary Data

#observed/ Total planned				
%Accuracy				

APPENDIX G

Teacher training outline

I. Background information

- A. PECS
- B. Peer Mediated Instruction and Intervention

Benefits of each intervention

- C. PECS
 - i. Improves interaction
 - ii. Helps to reduce unwanted behaviors and frustration
- D. Peer Mediated Instruction
 - i. Facilitates and encourages appropriate peer interaction
 - ii. Will help target child generalize skills to other peers as communicative partners

II. Review intervention steps for peer and role of teacher/paraprofessional

9. Steps for peer to follow

- a. Have reinforcer/object ready and PECS notebook in view.
- b. Peer moves close to target child and begins playing with reinforcer/desired object out of reach of target child (makes it look really fun).
- c. Teacher places picture/symbol in between target child and peer.
- d. After target child initiates interaction, peer opens one hand and holds it out to receive picture/symbol from target child.
- e. Teacher guides target child's hand towards picture/symbol if he does not independently pick it up.

- f. The teacher physically prompts the target child to hand the picture/symbol to the peer if the target child does not do it independently.
- g. Peer says name of reinforcing object as they hand it to the target child.

10. Role of teacher

11. Other potential times to implement intervention during the day

III. Watch video of intervention

A. Discuss each step

B. Watch video again and review Data Sheets

IV. Questions and Answers

APPENDIX H

Peer Picture Checklist



1. Object ready.



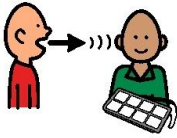
2. Binder out.



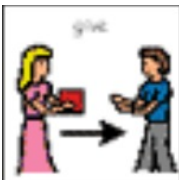
3. Play.



4. Hand out



5. Talk



6. Give

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