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## A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities

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A COMPARISON OF THE EFFECTS OF PEER NETWORKS AND PEER VIDEO  
MODELING ON POSITIVE SOCIAL INTERACTIONS PERFORMED BY YOUNG  
CHILDREN WITH DEVELOPMENTAL DISABILITIES

By

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A dissertation submitted in partial fulfillment  
of the requirements for the

Doctor of Philosophy – Special Education

Department of Educational and Clinical Studies  
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## **Dissertation Approval**

The Graduate College  
The University of Nevada, Las Vegas

April 14, 2016

This dissertation prepared by

Conrad Oh-Young

entitled

A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive  
Social Interactions Performed by Young Children with Developmental Disabilities

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## **ABSTRACT**

### **A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities**

by

Conrad Oh-Young

Dr. John Filler, Doctoral Committee Chair  
Professor of Special Education and Early Childhood Education  
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A concern that parents of children with disabilities have is whether or not their offspring are able to interact and be accepted by children who do not have disabilities. Unfortunately children with developmental disabilities (DD) may experience difficulties when interacting with typically developing peers. One method of addressing this issue has been to ensure that children with DD receive instruction in the same school setting as their peers. However, simply attending the same school as children who are typically developing may not be enough. Hence the need for interventions such as peer network (PN) and peer video modeling (PVM), that educators can use to help facilitate interactions between young children with disabilities and their peers. The purpose of this study was to compare the relative effect of PN versus PVM on positive social interactions performed by young children with DD in an inclusive classroom setting and determine whether or not the effect of the best treatment generalized to the playground setting. Five preschool aged children with disabilities participated in this study. Data were collected in both the classroom and playground settings. Results suggest that PN was more effective for one

young child with autism and that the relative effect of that treatment generalized to the playground setting. Both interventions were found to be effective for a second child with a developmental delay but only in the classroom setting. Neither of the interventions were effective for a third child with autism nor were they effective for a fourth child with a developmental delay. Finally, though not diagnosed with a DD, the PN intervention was found to be more effective for one young child with a speech and language impairment with the relative effect of that treatment generalizing to the playground setting.

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It has been said that one of the advantages to utilizing an alternating treatments design is that it can be used to collect data in a relatively short amount of time (see Barlow, Nock, & Hersen, 2009). What is not overtly stated is that the short amount of time could also be an extremely intense amount of time. Were it not for the assistance and suggestions provided by Jennifer Buchter, Maryssa Kucskar, Dr. Kathleen O'Hara, and Dr. Delilah Krasch, this study would not have been completed in a timely manner.

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## **DEDICATION**

I dedicate this to Janine.

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## **CHAPTER 1**

### **Introduction**

One of the primary concerns that parents of children with disabilities have is social acceptance by peers and the ability to make friends (Westling & Fox, 2009). Some parents even place more emphasis on their children making friends than on learning other skills (Hamre-Nietupski, Nietupski, & Strathe, 1992). Unfortunately for some preschool-aged children with disabilities, interacting with their peers and making friends involves more than simply attending school with children who are typically developing. Odom et al. (2006) found that preschool aged children with disabilities who have impairments that negatively impact their ability to socially interact with peers tended to be socially rejected. These individuals, according to Odom et al. (2006) were usually children with developmental disabilities (DD; e.g., those with autism and/or intellectual disabilities; ID).

### **Social Skills**

Social skills can be defined as, "...social behaviors that help the student (i.e, the individual) to communicate and socialize with others and include both verbal and nonverbal forms of communication" (Spooner, Browder, & Mims, 2011, p. 287). It has been documented that individuals with autism struggle in social situations (American Psychiatric Association [APA], 2000; Batshaw, Pellegrino, & Roizen, 2013; Rogers, 2000; Travis, Sigman, & Ruskin, 2001). The same can be said for individuals with intellectual disabilities (APA, 2000; Batshaw et al., 2013; Matson, Dempsey, & LoVullo, 2009; Embregts & van Nieuwenhuijzen, 2009; Tipton, Christensen, & Blacher, 2013). The seriousness of diminished social skills may be compounded if individuals are diagnosed with both autism and ID (Bennett et al., 2014; Embregts & van Nieuwenhuijzen, 2009; Matson et al., 2009). Not only do individuals with disabilities need

specialized instruction in the form of interventions, they also need opportunities to practice interacting with other individuals (Spooner et al., 2011; Westling & Fox, 2009).

### **Social Skills Interventions**

Fortunately the need for interventions to address these social skill deficits has not gone unnoticed by researchers. The literature contains many examples of social skill interventions for individuals with DD (Bellini & Akullian, 2007; Gillis & Butler, 2007; Rogers, 2000; Utley, Mortweet, & Greenwood, 1997). Among the interventions that have been used to teach social skills to children with DD are self-management, pivotal response training, social stories, peer-mediated instruction and intervention (PMII), and video modeling (VM, Rogers, 2000). Self-management involves teaching an individual the ability, “...to manage his or her own behavior in the absence of a treatment provider for potentially long periods” (L. K. Koegel, Koegel, Hurley, & Frea, 1992; p. 342). Pivotal response training involves teaching a specific foundation, or “pivotal” skill, that when learned, will result in improvement in other areas (Westling & Fox, 2009). Social stories have been described as stories that are written by teachers to assist children to navigate social situations (More, 2012).

**Peer-mediated instruction and intervention.** PMII has been referred to as instruction provided by peers who are at or near the same age as the individual who is receiving the instruction (Odom & Strain, 1984). Adults may teach and monitor the peers who are delivering the instruction, but they do not directly involve themselves in the intervention (Odom & Strain, 1984). PMII has been utilized as an intervention in single case research design (SCRD) studies (Utley et al., 1997) and has been demonstrated to be effective at teaching a variety of skills to individuals with disabilities (Carr & Darcy, 1990; Jimenez, Browder, Spooner, & Dibiase, 2012; Odom & Strain, 1984; Odom & Strain, 1986; Odom, Hoyson, Jamieson, & Strain, 1985; Strain,



Kerr, & Ragland, 1979; Lanquetot, 1989; Strain, Shores, & Timm, 1977; Trembath, Balandin, Togher, & Stancliffe, 2009; Trottier, Kamp, & Mirenda, 2011; Werts, Caldwell, & Wolery, 1996; Yo, Mustian, Brophy, & White, 2011). Four elements of PMII will be discussed: (1) peer modeling (PM); (2) peer initiation training (PIT); (3) peer monitoring (PMN); and (4) peer networking (PN).

*Peer modeling.* PM is a group of strategies that involve having individuals watch peers model target behaviors (Utley et al., 1997). After those behaviors are modeled, the target individuals are then given the opportunity to imitate those behaviors (Utley et al., 1997). In vivo (live) modeling and video modeling (VM) have been referred to as variations of PM (Utley et al., 1997). PM has been demonstrated to be an effective intervention strategy for individuals with DD (Carr & Darcy, 1990; Lanquetot, 1989; Werts et al., 1996).

*Peer initiation training.* PIT is a type of PMII that involves a peer attempting to elicit target behaviors from a child who is the subject of the intervention (Odom & Strain, 1984; Utley et al., 1997). A difference between PIT and other types of PMII is that in addition to training peers, adults may actively participate in the delivery of the intervention by prompting and rewarding the peer while he/she is working directly with the target individual (Odom et al., 1985; Utley et al., 1997). PIT has been shown to be an effective instructional strategy for individuals with disabilities (Odom & Strain, 1986; Odom et al., 1985; Strain et al., 1977).

*Peer monitoring.* PMN is another variant of PMII that involves using peers to monitor the behaviors of individuals targeted for intervention (Utley et al., 1997). During PMN, adults (teachers) may model the appropriate behaviors but it is the responsibility of the peers to work directly with the individuals assigned to them and to provide those individuals with appropriate assistance/feedback when needed (Utley et al., 1997). An example of the effectiveness of PMN

was demonstrated by Sainato, Strain, Lefebvre, & Rapp (1987). These researchers instructed six typically developing peers to monitor the behaviors of three preschool-aged children diagnosed with autism during transition time. They found that PMN led to an increase in the movement speed of participants between activity settings, and a decrease in the number of times teachers would have had to intervene to keep participants on task (Sainato et al., 1987).

*Peer network.* PN, yet another variant of PMII, has been defined as a network of peers who prompt, model, encourage, and reinforce socially appropriate behaviors (Gardner et al., 2014; Kamps, Potucek, Lopez, Kravits, & Kemmerer, 1997; Utley et al., 1997). Similar to other versions of PMII, adults (teachers) may train peers to interact with individuals targeted for intervention, but usually do not directly participate during delivery of the PN intervention (Utley et al., 1997). PN has been demonstrated to be an effective intervention strategy for individuals with DD (Gardner et al., 2014; Haring & Breen, 1992) and has been used to teach social skills to children with DD (Garrison-Harrell, Kamps, & Kravits, 1997; Kamps et al., 1992; Kamps et al., 1997; Kamps et al., 2014; Kamps et al., 2015; Mason et al., 2014; McFadden, Kamps, & Heitzman-Powell, 2014; Parker & Kamps, 2011).

**Video modeling.** VM has been defined as an intervention that involves showing an individual video of actors who model appropriate behaviors, and then providing opportunities for that individual to imitate the behaviors performed in the video (Banda, Matuszny, & Turkan, 2007; Bellini & Akullian, 2007; Ganz, Earles-Vollrath, & Cook, 2011; Mason, Davis, Boles, & Goodwyn, 2013; Ogilvie, 2011). VM interventions typically involve having an individual sit and watch the entire video before they are asked to imitate what they saw (Sigafoos et al., 2005; Sigafoos et al., 2007). This process has been referred to as “whole task presentation” (Sigafoos et al., 2005, p. 190). Experimental studies have been conducted in which VM has been used as an

intervention with preschool aged children with disabilities to successfully teach a variety of skills (Apple, Billingsley, & Schwartz, 2005; Boudreau & D'Entremont, 2010; Buggey, 2012; Buggey, Hoomes, Sherberger, & Williams, 2011; Cihak, Smith, Cornett, & Coleman, 2012; D'Ateno, Mangiapanello, & Taylor, 2003; Hine & Wolery, 2006; Kleeberger & Mirenda, 2010; Maione & Mirenda, 2006; Palechka & MacDonald, 2010; Wert & Neisworth, 2003; Wilson, 2013).

Variations of different types of VM include: (a) peer video modeling (PVM); (b) self-video modeling (SVM); (c) point-of-view video modeling (POVM); and (d) video prompting (VP).

*Peer video modeling.* PVM is a variation of VM that involves having peers of a similar age to the individual for whom the video is intended, serve as actors who role-play the target behaviors (Marcus & Wilder, 2009). The peer actor may be known (Cihak, Smith, Cornett, & Coleman, 2012; Marcus & Wilder, 2009) or unknown (Kourassanis, Jones, & Fienup, 2015; Sani-Bozkurt & Ozen, 2015) to the individual receiving the intervention. The effectiveness of PVM for individuals with DD has been demonstrated numerous times (Marcus & Wilder, 2009; Nikopoulos & Keenan, 2003; Nikopoulos & Keenan, 2004; Sani-Bozkurt & Ozen, 2015; Sherer et al., 2001) and has been used to teach social skills to young children with DD (Apple et al., 2005; Cihak et al., 2012; Gena, Couloura, & Kymissis, 2005; Kourassanis et al., 2015; Rudy, Betz, Malone, Henry, & Chong, 2014; Simpson, Langone, & Ayers, 2013).

*Self-video modeling.* SVM, also referred to as video-self modeling, is a variation of VM in which the individual for whom the video is meant to be used also serves as an actor in the video performing the desired target behavior (Bellini & Akullian, 2007; Dowrick, 1999; Gelbar, Anderson, McCarthy, & Buggey, 2012; Ogilvie, 2011). SVM has been demonstrated to be an effective intervention strategy for individuals with DD (Buggey et al., 1999; Decker & Buggey, 2014; Marcus & Wilder, 2009; Sherer et al., 2001; Ozkan, 2013) and has been used to teach

social skills to young children with DD (Buggey, 2005; Buggey et al., 2011; Wert & Neisworth, 2003).

*Point-of-view video modeling.* In POVM, video of an actor performing a target behavior is recorded from the perspective of the actor (Ganz, et al., 2011; Mason et al., 2013; Sigafoos et al., 2005; Sigafoos et al., 2007). Usually this involves recording from the same height as the individual whom the video is intended with appropriate items (e.g., toys, utensils, other objects) in plain view similar to how the individual would see them in vivo (Hine & Wolery, 2006). POVM has been demonstrated to be an effective instructional strategy for individuals with DD (Hine & Wolery, 2006; Mason et al., 2013; Shipley-Benamou, Lutzker, & Taubman, 2002; Tetreault & Lerman, 2010).

*Video prompting.* VP is a variation of VM in which the steps that comprise a given task are shown individually (Ogilvie, 2011; Sigafoos et al., 2005; Sigafoos et al., 2007). At the end of each step, the individual watching the video is expected to imitate the task before viewing the next task (Sigafoos et al., 2005; Sigafoos et al., 2007). Displaying videos in separate steps, as opposed to showing one video that contains an entire sequence of events, may be beneficial for situations in which it is difficult for the individual who is watching the video to concentrate for a lengthy period of time (Sigafoos et al., 2007). VP has been implemented successfully as an intervention strategy with individuals with DD (Sigafoos et al., 2005; Sigafoos et al., 2007). Both studies utilized a format of VP in which the video that was used was recorded from the perspective (point-of-view) of an individual who was performing the task (Sigafoos et al., 2005; Sigafoos et al., 2007).

## **Statement of the Problem**

It has been suggested that quality of life is directly related to the social relationships between individuals with disabilities and their peers (Westling & Fox, 2009) where, “The presence or absence of close relationships can have a significant impact on an individual’s quality of life” (Spooner, Browder, & Knight, 2011, p. 284). Previous findings suggest that poor social skills may negatively impact social acceptance among peers (Odom et al., 2006) and academic achievement (Parke et al., 1998; Welsh, Parke, Widaman, & O’Neil, 2001).

## **Purpose of the Study**

In order to develop social relationships, Individuals with DD need exposure to environments (e.g., receiving instruction in inclusive classroom settings) that provide them with opportunities to practice interacting with other individuals (Westling & Fox, 2009; Spooner et al., 2011). They also need be taught the skills necessary to interact in ways that are socially appropriate (Spooner et al., 2011). Therefore the purposes of this research study are to:

- compare the relative effect of PN versus PVM on positive social interactions in young children with DD in an inclusive classroom setting; and
- determine whether or not the effect of the best treatment generalizes to a playground setting.

## **Research Questions**

1. Is peer network more effective than peer video modeling at increasing the number of positive social interactions in young children with developmental disabilities in an inclusive classroom setting? I predict that there will be a significant difference between the effects of peer network and peer video modeling on the number of positive social

interactions exhibited by preschool aged children with developmental disabilities in an inclusive classroom setting favoring the peer video modeling intervention.

2. Will the positive effects of the best treatment generalize to the playground setting? I predict that the effects of the peer video modeling intervention will generalize to the playground setting.

### **Significance of the Study**

The literature is filled with reports of experimental SCRD studies that demonstrate the effectiveness of the use of PMII as an intervention with children with disabilities (Jimenez et al., 2012; Kamps et al., 2014; Lanquetot, 1989; McFadden et al., 2014; Odom & Strain, 1986; Odom et al., 1985; Strain et al., 1977; Trembath et al., 2009; Trottier et al., 2011; Werts et al., 1996; Yo et al., 2011). Furthermore, there also exist examples that demonstrate the effectiveness of the use of VM as an intervention with children with disabilities (Bellini & Akullian, 2007). A large portion of these studies involve the use of VM to teach social skills to preschool aged children (Apple et al., 2005; Bugey, 2012; Bugey et al., 2011; Cihak et al., 2012; Gena et al., 2005; Kroeger et al., 2007; Maione & Mirenda, 2006; Simpson et al., 2013; Tetreault & Lerman, 2010; Wert & Neisworth, 2003; Wilson, 2013).

To date no studies have appeared in the literature that have compared the effects of a peer delivered intervention, such as PN, and a peer focused version of VM, PVM, both of which use same-aged peers who the participants are familiar with, in order to identify which is better at teaching social skills to preschool aged children with DD (though it has been suggested as an implication for future research in Kourassanis et al., 2015). There has been one published study that has compared the effects of in vivo modeling and VM in order to identify which is better at teaching social skills to young children with disabilities. However this study, Wilson (2013),

compared the effects of two known adults (the teacher and teaching assistant) modeling appropriate behaviors in person for participants to the same adults modeling those behaviors on VM videos that the participants watched. Wilson (2013) found that out of four participants: (a) in vivo modeling was the most effective treatment in teaching one individual how to request; (b) VM was the most effective treatment in teaching a second individual how to request; (c) both treatments were effective with little difference between them in teaching requesting to a third individual; and (d) that neither interventions were effective at teaching a fourth individual how to make gestures to indicate interest.

### **Limitations of the Study**

The primary limitation to this study is the threat to internal validity from multiple-treatment interference. Multiple-treatment interference, or multi-treatment interference, occurs when the effects of two or more interventions applied to the same participant in a given study impact the behavior that is being measured (Gast, 2014). Gast (2014) identified three types of multiple-treatment interference: sequential confounding, carryover effects, and alternation effects. Sequential confounding occurs when the specific order in which interventions are delivered impacts participant behavior (Gast, 2014). Carryover effect refers to instances in which the effects of a given intervention delivered in one session impact the behavior of a participant during a subsequent session (Gast, 2014). Alternation effects occur due to the rapid alternation of interventions across different treatment conditions (Gast, 2014; Hains & Baer, 1989). Unfortunately Cooper et al. (2007) suggests that multiple-treatment interference is inherent when alternating treatment designs are used. Counterbalancing the order of which interventions are delivered, implementing a baseline only phase, collecting baseline data during the treatment

comparison phase, and utilizing a best of treatment phase, are methodological strategies that can be used to detect the presence of these sources of confounding (Gast, 2014).

Another limitation with this study is related to external validity. This is one of the primary criticisms of SCRD in general as it cannot be presumed that the results from one SCRD study will generalize to other individuals in different settings (Gast, 2014). Gast (2014) suggests that one may minimize the threat to external validity in three ways: (a) intra-subject replication in which the effect of an intervention is demonstrated in more than one instance with one research participant; (b) inter-subject replication in which the effects of an intervention are demonstrated across a minimum of three different participants in a given study; and (c) systematic replication which involves using the same intervention with different participants in different settings.

### **Definition of Terms**

#### **Autism Spectrum Disorder**

ASD refers to a group of neurodevelopmental disorders that are classified over a continuum (Batshaw et al., 2013). Individuals diagnosed with autism exhibit, "...markedly abnormal or impaired development in social interaction and communication and a markedly restricted repertoire of activity and interests" (APA, 2000, p. 70).

#### **Developmental Delay**

According to Batshaw et al. (2013), the term developmental delay is used to refer to an individual who experiences, "...a significant lag in the attainment of milestones in one or more areas of development; milestones are attained in the typical sequence, but at a slower rate" (p. 245).

#### **Developmental Disabilities**



DD is a term used to describe individuals who differ from what is considered, “typical patterns of development” (Batshaw et al., 2013, p. 241). The resulting effects of these impairments are said to limit and/or hinder participation in everyday activities (Batshaw et al., 2013). May be used when referring to individuals with autism, mild to severe ID, and individuals with multiple disabilities (Batshaw et al., 2013; Browder et al., 2011). Young children with DD (e.g., ID) may be classified under developmental delay however not all individuals who are classified as developmentally delayed will be diagnosed as such (Batshaw et al., 2013; Deiner, 2013).

### **Inclusive classroom**

In Cole, Waldron, and Majd (2004), inclusive school is defined as, “...one in which students with disabilities received their reading and math instruction in a general education, age-appropriate classroom” (p. 138). This study utilized a form of that definition by defining an inclusive classroom as an age-appropriate setting in which children with disabilities receive more than 50% of their instruction with typically developing peers.

### **Intellectual Disabilities**

According to the APA (2000), an individual may be diagnosed with an ID if he or she exhibits:

...significantly subaverage general intellectual functioning that is accompanied by significant limitations in adaptive functioning in at least two of the following skills areas: communication, self-care, home living, social/interpersonal skills, use of community resources, self-direction, functional academic skills, work, leisure, health and safety. The onset must occur before age 18 years. (p. 41)

In the past these individuals were classified into different levels (mild, moderate, or severe) based on the severity of their disability (Batshaw et al., 2013; Browder, Spooner, & Meier, 2011).

## **Intervention**

An intervention is a treatment specifically designed and implemented by professionals, with the goal of teaching skills to children (Pretti-Frontczak & Bricker, 2004).

## **Peer Mediated Instruction and Intervention**

PMII is instruction provided by peers who are at or near the same age as the individual who is the recipient of the intervention (Odom & Strain, 1984). In PMIII, adults may train the peers delivering the intervention, but usually do not actively participate while it is being delivered (Odom & Strain, 1984).

## **Peer Network**

A PN is a group of peers who prompt, model, and reinforce socially appropriate behaviors (Gardner et al., 2014; Kamps et al., 2014; Utley et al., 1997). In PN adults provide instruction to peers who then work directly with the child with the disability (McFadden et al., 2014; Utley et al., 1997).

## **Positive Social Interaction**

Buggey and Ogle (2013) define social interactions as, “purposeful physical approaches and vocalizations” (p. 205). According to Buggey and Ogle (2013) this translates moving into the vicinity of another individual and then engaging in eye contact, appropriate touching, playing together, verbal exchanges, or cooperative exchanging of materials (sharing). Pushing, hitting, or using computers are not considered as appropriate social interactions (Buggey & Ogle, 2013).

## **Social Skills**

Social skills has been referred to as verbal and nonverbal behaviors that individuals use to communicate and interact with other individuals (Spooner et al., 2011).

## **Peer Modeling**

An element of PMII, PM is a collection of strategies, such as in vivo (live) modeling and VM, that involves having a peer model appropriate behaviors for a target individual, then having the target individual imitate those behaviors (Utley et al., 1997).

### **Peer Initiation Training**

PIT has been defined as an element of PMII that involves having a peer elicit target behaviors from an individual (Odom & Strain, 1984; Utley et al., 1997). Unlike other elements of PMII, adults sometimes actively participate in PIT by prompting and reinforcing the peer during delivery of the intervention (Odom et al., 1985; Utley et al., 1997).

### **Peer Monitoring**

PM is a variant of PMII, in PMN a peer monitors the behaviors of an individual targeted for intervention and provides assistance when needed (Utley et al., 1997).

### **Peer Video Modeling**

PVM is a variation of VM in which individuals, who are of similar age to the person for whom the video is intended, serve as the actors in the VM video (Marcus & Wilder, 2009).

### **Point-of-View Video Modeling**

POVM is a variation of VM in which performance of a target behavior is recorded from the perspective of an actor performing that behavior resulting in a final product that portrays what an individual watching the video would see if he or she were to perform the target behavior (Hine & Wolery, 2006).

### **Self-Video Modeling**

SVM is a variation of VM where the individual for whom the video is intended also serves as the actor in the video performing the desired target behaviors (Bellini & Akullian, 2007; Dowrick, 1999; Gelbar et al., 2012; Ogilvie, 2011).

## **Video Modeling**

VM is an intervention that involves showing video of actors who model an appropriate behavior to an individual (Bellini & Akullian, 2007; Sigafoos et al., 2005; Sigafoos et al., 2007).

Following the conclusion of the entire video clip, that individual is then tasked with imitating those behaviors that were performed in the video (Bellini & Akullian, 2007; Sigafoos et al., 2005; Sigafoos et al., 2007).

## **Video Prompting**

Similar to VM, VP involves showing video of actors who model appropriate behaviors to an individual (Sigafoos et al., 2005; Sigafoos et al., 2007). However VP varies in that instead of screening the entire video clip to the individual, only a single step in the overall behavioral task is shown (Ogilvie, 2011; Sigafoos et al., 2005; Sigafoos et al., 2007). The individual is then tasked with imitating that single task before moving on to the next step (Ogilvie, 2011; Sigafoos et al., 2005; Sigafoos et al., 2007).

## **Summary**

A major concern that parents of children with disabilities have is whether or not their children will be able to make friends and be socially accepted by their peers. Unfortunately children with DD often times struggle in doing so because they lack the opportunities and/or they lack the necessary skills that are needed in order to interact positively with their peers. PMII in the form of PN, and VM in the form of PVM, are two interventions that have been used to teach social skills to young children with disabilities. However, is PN or is PVM more effective at increasing the number of positive social interactions in preschool aged children with DD in an inclusive classroom setting? Furthermore, will the effects of an effective intervention generalize to the playground setting? This study is intended to address these questions.

## **CHAPTER 2**

### **Introduction**

This chapter will serve two purposes. The first purpose is to provide a systematic review of PMII, with a specific focus on the PN literature. The second purpose is to provide a systematic review of the VM, with a specific focus on the PVM literature. Knowledge of both treatments will serve to determine the appropriateness and approximate the effectiveness of future social skills interventions that use PN and PVM with preschool children with DD. Therefore, this chapter will begin with summarizations and analyses of experimental studies that incorporated PMII in the form of PN and VM in the form of PVM. This chapter will conclude with a synopsis on the two topics: (a) PN; and (b) PVM

### **Literature Review Procedures**

A systematic review of the literature was conducted using the following search engine databases: ERIC, PsycINFO, Scopus, and Academic Search Premier. The keywords that were used in each search engine database to search for PMII references were: peer mediated instruction, peer mediated intervention, peer modeling, peer imitation training, peer monitoring, peer networking, peer networking and preschool, peer networking and autism, peer networking and mental retardation, peer networking and intellectual disabilities, peer networking and disabilities, and peer networking and developmental delay. The keywords that were used in each search engine database to search for VM references were: video modeling, video modeling and preschool; video modeling and autism, video modeling and mental retardation, video modeling and intellectual disabilities, video modeling and disabilities, video modeling and developmental disabilities, video modeling and developmental delay, video prompting, video prompting and autism, video prompting and mental retardation, video prompting and intellectual disabilities,

video prompting and disabilities, and video based instruction. Finally the following keywords were used in each search engine to search for references that may not have been returned in prior searches: social skills and preschool, social skills and autism, social skills and mental retardation, social skills and intellectual disabilities, social skills and disabilities, social skills and developmental disabilities, and social skills and developmental delay.

In addition to the database searches, an ancestral search was performed. The ancestral search was conducted using the reference sections of the PDF or HTML Full Text versions of references that met the selection criteria discussed in the next section. Articles from this search were retrieved using the publishers' websites, PsycINFO, or Academic Search Premier.

### **Selection Criteria**

Studies were included in this systematic review of the literature if: (a) they were published between the years of 1980 and June 2015; (b) they were either quantitative experimental group design studies or quantitative experimental SCRD studies; and (c) included young children (ages 2-9) who were diagnosed with DD as participants with specific focuses on studies in which the purposes were to investigate the effects of PN on young children with DD and PVM on young children with DD. Studies were excluded from this systematic review if: (a) it could not be determined what the procedures were that the researchers used; (b) it could not be determined what the results of the interventions were (e.g., results were not provided in data table, graph, or narrative formats); (c) if PDF or full-text versions were not retrievable; (d) English versions were not available; or (e) if they were quantitative non-experimental (e.g., surveys) or qualitative in nature. Furthermore, if studies were duplicate in nature (e.g., the results were published more than once in different journals or republished in the same journal) then the more recent versions were excluded from the analyses.

## **Review and Analysis of Studies Related to Peer Network**

Kamps et al. (1997) conducted a study with the purpose of evaluating the effects of a PN intervention on increasing the duration of social interaction exhibited by three children with autism using a multiple probe across settings design. All three children received their education in general education elementary school classrooms. The first participant was an eight and a half year old male who was diagnosed with autism. This participant received his education in a general education second grade classroom with services and supports in the form of accommodations and assistance from a paraprofessional. He was able to participate (with assistance) in reading and writing activities, was described as having receptive language skills but struggled with expressive language (limited to mostly requesting and answering questions), communicated mainly with adults, and was interested in a select few peers and would imitate them. Periodically he would initiate a game during recess with peers, but for the most part he usually did not interact with them. He was reported to have score of 32 on the *Childhood Autism Rating Scale (CARS)*. The second participant was an eight-year-old male who was diagnosed with autism. This participant received his education in a general education second grade classroom (different school from the first participant) with services and supports in the form of adaptations and assistance provided by the special education teacher and therapists (speech and occupational). He was able to interact with both adults and peers though often times prompting was necessary for the latter to occur. He was reported to have score of 32 on the *CARS*. The third participant was a six-year-old male who was diagnosed with autism. This participant received his education part-time in a general education kindergarten classroom with assistance from a paraprofessional. He was reported to understand directions, was able to verbally state what he needed (mostly to adults), and performed above grade level in reading and writing. However this

participant would also engage in echolalia, would talk to himself, and socially ignored peers. He was reported to have score of 34 on the *CARS*. In addition to the participants, a rotating cadre of classroom peers at the kindergarten and second grade levels from both genders also participated in this study. This study took place in three different elementary schools.

The DV that was identified by the researchers was duration of social interaction. The researchers defined a social interaction as an initiation followed by a response. If an initiation occurred that was not followed by a response, then the behavior performed was not counted as a social interaction. The IV was the PN intervention and included the following components: (a) occurred for at least 10 minutes up to 3 to 4 times a week; (b) involved a minimum of 1 peer (2 to 5 was preferable); (c) included a supervising adult who provided training, reinforcement, and feedback when necessary; (d) included activities that were fun for both participants and peers and were academic/social related; (e) included peers practicing and modeling appropriate social behaviors; (f) used scripts; (g) included reinforcement (e.g., tokens); and (h) the supervising adult provided feedback. PN sessions were also designed to be individualized and appropriate for each participant and the settings that they were in. Data were collected by one of the researchers during five-minute sessions as probes during baseline and generalization, and twice each week for intervention sessions. A second researcher also collected data in order to calculate percent agreement. The percent agreement was reported to be  $M = 76\%$  (baseline) and  $M = 89\%$  (intervention) for the first participant,  $M = 79\%$  (baseline) and  $M = 90\%$  (intervention) for the second participant, and  $M = 78\%$  (baseline) and  $M = 79\%$  (intervention) for the third participant. Procedural reliability was reported to be 88%.

Baseline sessions occurred in four different settings: academic, centers/games time, lunch, and recess. During baseline, participants were exposed to normally occurring school



related activities. Intervention sessions were individualized to each participant and therefore occurred in different settings. For the first participant intervention sessions were delivered during reading, lunch, seatwork during the latter half of the day, and games time. For the second participant intervention sessions occurred during morning recess, centers time, math, and lunch. For the third participant intervention sessions occurred during games time, centers time, lunch, and recess. Sessions that were conducted during academic settings (e.g., reading and math) were 15-20 minutes in duration and involved dyad or small group peer tutoring and role-playing. Teachers participated by providing prompts and reinforcement (when necessary), providing assistance when needed, and providing feedback when sessions ended. Sessions that were conducted during centers/games time were similar to sessions during academic settings however they also included peer training, peer prompting, and social stories. Sessions that were conducted during lunch time lasted for 30 minutes and involved peers training and prompting participants. Both paraprofessionals and teachers participated by providing prompts and feedback (when needed). Teachers also conducted short practice sessions, about five to ten minutes long, before the students went to the cafeteria. Sessions that were conducted during recess involved peers training participants, role-playing with participants, integrating a social story, and providing reinforcement to participants. Teachers participated by providing prompts and reinforcement (when necessary), modeling appropriate game playing (for one participant), and providing feedback when sessions ended. Generalization sessions were conducted during recess and morning seatwork time for the first participant, during afternoon recess and spelling for the second participant, and during playtime and art for the third participant.

Data collected were presented across three figures and one table. The duration of time the first participant engaged in social interaction during baseline ranged from 0-10 seconds during

reading time (stable, low-level, no trend), 0-93 seconds during lunch (variable, low-level, no trend), 0-21 seconds during afternoon seatwork (stable, low-level, no trend), and 0-291 seconds during game time (variable and possible diffusion of treatment from implementation of the intervention during reading and lunch time). The duration of time the second participant engaged in social interaction during baseline ranged from 0-85 seconds during recess (variable but relatively low-level and with an accelerating then decelerating trend), 0-216 seconds during centers time (variable with duration spiking across two sessions and overall decelerating trend),  $M = 11$  seconds during math (relatively stable, low-level, and no trend), and  $M = 13$  seconds during lunch (relatively stable, low-level, and slight accelerating then decelerating trend towards the end of baseline). The duration of time the third participant engaged in social interaction during baseline ranged from no interactions occurring during both games time and centers time (stable, flat, no trend), 0-19 seconds during lunch (stable, low-level, no trend), and 0-58 seconds during recess (relatively stable, low-level, slight accelerating trend). Data collected during intervention showed an increase in duration time for all three participants. For the first participant, the duration of time engaged in social interaction was  $M = 209$  seconds during reading time (variable at the mid to high level and overall accelerating trend), 33-277 seconds during lunch (variable, low to high level, and an overall accelerating trend), 47-246 seconds during afternoon seatwork (variable at mid level with no apparent trend), and 11-294 seconds during games time (variable, low to high level, overall accelerating trend). For the second participant, the duration of time engaged in social interaction was  $M = 256$  seconds during recess (variable, mid to high level, and no apparent trend),  $M = 241$  seconds during centers time (variable, mid to high level, and a decelerating then accelerating trend),  $M = 266$  seconds during math (variable at high level with a decelerating trend), and  $M = 165$  seconds during lunch

(variable at the mid level with no apparent trend). For the third participant, the duration of time engaged in social interaction was  $M = 227$  seconds during games time (variable at the mid to high level with an overall accelerating trend),  $M = 237$  seconds during centers time (variable at the mid to high level with a decelerating then accelerating trend),  $M = 148$  seconds during lunch (variable at the low to mid level with a decelerating then accelerating trend), and 199 seconds during recess (only one session was conducted during recess). The duration of time participated in social interactions during generalization ranged from 0-96 seconds during morning seatwork (variable, low to high level, with an accelerating then decelerating trend) and 0-285 seconds during recess for the first participant (variable, flat to low-level, with an accelerating then decelerating trend). For the second participant, generalization during afternoon recess ranged from  $M = 56$  seconds during the early sessions and  $M = 152$  seconds during later sessions (variable from low to high level with absence of trend). Generalization during spelling for the second participant ranged from 0-126 seconds for majority of the sessions capped with a brief increase to  $M = 222$  seconds over three sessions for the second participant (variable from low to high level with absence of trend). Little to no interaction was reported to have occurred by the third participant during generalization settings (variable, flat to low-level, and an accelerating then decelerating trend for play time and stable, flat to low-level, and no trend for art).

Overall results suggest that the PN intervention increased the duration of social interaction exhibited by three children with autism across all settings in which it was implemented. In addition, the effects of the intervention generalized to different settings for two of the three participants. The researchers described two limitations to their current study. The first was that the researchers did not collect data that would reveal exactly how much training was needed. The second was that the treatment was implemented inconsistently by school staff

(e.g., certain staff members felt that recess was a time when the child should be allowed to take a break as opposed to participating in the intervention).

Garrison-Harrell et al. (1997) conducted a study with the purpose of evaluating the effects of a PN intervention on increasing the duration of social interaction exhibited by three children with autism. The researchers used a design that was referred to as a, “multiple probe design across settings, nested within a multiple baseline across target students” (Garrison-Harrell et al., 1997, p. 244). The three individuals who participated in this study were diagnosed with autism, experienced difficulties in communicating, and as a result demonstrated poor social skills. The first participant was a seven-year-old male who was educated in a general education classroom setting with pullouts for services. This individual was diagnosed with apraxia, demonstrated both immediate and delayed echolalia, would engage in stereotypic behaviors, and was reported to have scored a 38 on the *CARS* which placed him in the severe range. This individual was able to respond using two to three word phrases. The second participant was a seven-year-old male who was educated in a general education classroom setting on a limited basis. This individual demonstrated delayed echolalia, would engage in stereotypic behaviors, and was reported to have scored a 38 on the *CARS* (severe autism range). He was able to respond to teachers using three to four words but he rarely communicated with peers. The third participant was a six year and seven month old female who was educated in a first grade general education classroom setting with occasional pullouts. This individual was reported to be nonverbal, would engage in stereotypic behaviors, and was reported to have scored a 46 on the *CARS* (severe autism range). However she also demonstrated adaptive behavior (e.g., lining up, sitting in chair, waiting for turn) and was able to respond to adult prompts. In addition to the three participants, fifteen typically developing first grade students served as peers (five peers

were assigned to each participant). The peers were selected based on teacher recommendations and social status in their respective classrooms (social status was determined through a questionnaire distributed by the researchers). This study took place in natural school settings (general education classroom, playground, lunchroom, computer room, and school library).

The primary DV identified by the researchers was duration of social interaction. Social interactions were defined as an initiation followed by a response. Initiations were behaviors the purpose of which to elicit a response. Initiations could be verbal in nature (e.g., greeting, using a peer's name, or providing directions), or they could be nonverbal (e.g., sharing, providing, assistance, or touching). Responses were behaviors resulting from an initiation that were intended for the individual who made the initiation. Responses could be verbal (e.g., commenting or providing an answer to a question) or nonverbal (e.g., accepting shared item). A secondary DV was the duration of time participants used an augmentative communication system (ACS). Proper use of the ACS was defined as an interaction that involved the use of the ACS. Additional DVs were language use and disruptive behaviors. The IV was a PN intervention that included the following components: (a) training in how to use the ACS; (b) social skills instruction; and (c) feedback and reinforcement. Data collection involved the use of the software program Multi-Option Observation System for Experimental Studies (MOOSES) and the Autism Screening Instructional Educational Program (ASIEP). Data were entered using Texas Instrument laptop computers. The percent agreement of the duration of interactions was calculated using MOOSES and was reported to range from 78% to 100% for the first participant, 70% to 89% for the second participant, and 86% to 100% for the third participant. The percent agreement of the frequency of interactions was calculated using MOOSES and was reported to range from 72% to 90% for the first participant, 78% to 86% for the second participant, and 80%

to 89% for the third participant. Procedural reliability was reported to be 90%, 85%, and 97% respectively for the three participants.

The researchers identified three phases in this experiment: (a) pre-baseline; (b) baseline; and (c) intervention. During the pre-baseline phase, the researchers observed the participants for an estimated 30 hours each and attempted to compare their social skills behaviors to their classmates without disabilities. During the baseline phase, the researchers collected data across the different school settings that participants would go to (self-contained classroom, general education classroom, lunchroom, computer lab, library, and playground) using MOOSES and the ASIEP. The researchers assigned participants to peer groups. The groups then participated in naturally occurring activities minus the implementation of instructional prompting and reinforcement. The training of participants on how to use the ACS (20 minute sessions held four times a week) and the training of peers in appropriate social skills and on how to use the ACS (eight 30 minute sessions held four times a week) also occurred during baseline. The intervention phase involved participants and their PN peers (five assigned peers per participant) participating in 20-minute PN group activities. These sessions occurred anywhere from one to three times a day, three to four times a week, and involved playing games (in person games for all participants and computer games only for the second participant), participating in cooperative activities (e.g., flash cards, sentence strips, topic cards, group discussions), and outdoor physical activity games (swinging, climbing, playing chase; for the third participant only). The PN treatment was implemented during: (a) reading, lunch, and language arts for the first participant; (b) language arts, lunch, and computer time (occurred in both the computer lab and in the self-contained classroom) for the second participant; and (c) language arts, lunch, and recess (on the

playground) for the third participant. The researchers did not implement a generalization or maintenance phase.

The researchers visually and statistically analyzed the data collected. Results were presented across three figures and three data tables. The figures depict the duration of social interactions and frequency of social interactions for participants across settings. The first data table displays the average duration of time participants used the ACS. The second data table displays the frequency and types of interactions that occurred. The third data table displays the results of friendship questionnaires that peers were asked to complete. Overall data collected during baseline sessions for the first participant suggest a stable, flat to low-level, zero trend performance of the target behavior with two exceptions. The first exception is that during lunchtime (the second setting for the first participant), the duration and frequency of social interactions begin to demonstrate variability once the PN intervention was introduced in the first setting (reading). This variability continued to be demonstrated for the remainder of the second setting baseline until the introduction of the intervention. The second exception is related to data collected during the third setting (language arts). Data collected demonstrated a stable, small increase from flat to low-level with accelerating trend from the time that the intervention was introduced in the second setting to the time that the intervention was introduced in the third setting. Both exceptions suggest that diffusion of treatment may have occurred. Baseline data collected for the second participant suggest variable performance of the target behavior ranging from flat to low-level and no apparent trend in the first two settings (language arts and lunchtime) and flat to mid level with an accelerating trend for the third setting (computer time). Similar to the first participant, introduction of the intervention during prior settings (language arts and lunchtime) may have impacted performance of the target behavior during a subsequent

setting in which the treatment was not yet implemented (computer time). Baseline data collected for the third participant suggest variable, low-level performance of the target behavior at the beginning of the phase, then stable, flat performance, with zero trend until introduction of the intervention in the first setting (language arts). Baseline data for the second setting (lunchtime) suggests stable, flat to low-level performance of the target behavior with zero trend. Baseline data for the third setting (recess) suggests variable, zero to high-level performance of the target behavior (possible diffusion of treatment as a result of introduction of the intervention in the previous setting) with no apparent trend. Introduction of the PN intervention to the first participant in the first setting (reading) resulted in an increase in both duration of social interactions. The duration of social interaction throughout the intervention phase in the first setting was variable, ranged from mid to high level, and suggests no apparent trend. The frequency of social interaction throughout the first setting was variable, ranged from low to mid level, and also suggested no apparent trend. Introduction of the PN intervention for the first participant in the second setting yielded similar results with the exception that both duration and frequency ranged from low to high levels. Introduction of the PN intervention in the third setting for the first participant resulted in stable, high level duration with zero trend and stable and low-level for frequency also with zero trend. Introduction of the PN intervention to the second participant in the first setting (language arts) resulted in a significant increase in duration that was variable, low to high level, and demonstrated an overall accelerating trend and a small increase in frequency of social interactions that was variable, ranged from low to mid level, and demonstrated no apparent trend. Introduction of the PN intervention for the second participant in the second setting (lunchtime) resulted in a variable, mid to high level duration with an accelerating trend, and a variable, high to low-level frequency with an overall decelerating trend.



Introduction of the PN intervention for the second participant in the third setting (computer time) resulted in a stable, mid to high level duration with zero trend, and a stable, low-level frequency with zero trend. Introduction of the PN intervention to the third participant in the first and second settings (language arts and lunchtime) resulted in highly variable, low to high-level performance of the target behavior (both duration and frequency) with no apparent trend. Introduction of the PN intervention for the third participant in the third setting resulted in stable, high level, and accelerating trend for duration and stable, mid to low-level, and decelerating trend for frequency. Data presented within the first data table, with the exception of the playground setting for the third participant, suggest that use of the ACS increased for all participants across all settings. Data presented in the second table suggest that the types of appropriate interactions increased from baseline to intervention for all participants, and the types of interactions that were labeled as “unintelligible” by the researchers decreased (Garrison-Harrell et al., 1997, p. 250). Finally, data presented in the third data table suggests that peers surveyed were more likely to label participants as friends after the study than before the study.

Overall results suggest that the PN intervention increased the duration of social interactions for all three participants and increased in the use of the ACS. In addition, two out of the three participants experienced an increase in expressive language and peers reported that they would consider the participants as friends during a post intervention questionnaire. Among the limitations that the researchers listed were that multiple instructional techniques were used as a part of the intervention making it difficult to parse out the effectiveness of the individual components, implementation of the intervention was time consuming, the researchers were not able to include generalization and/or maintenance phases, limitations with the MOOSSES system, and the primary researcher was the interventionist (and not school personnel).

In Kamps et al. (2014) the researchers conducted a study with the purpose of evaluating the effects of a PN intervention on teaching communicative acts in four children with autism using a multiple baseline across four participants design. All four participants had either a clinical or educational diagnosis of autism, demonstrated functional communication, were able to request, were able to communicate using phrases that were two to three words, and were able to follow directions. The first participant was a six-year-old male who, with the exception of when he received speech therapy, was educated in a first grade general education classroom. This participant was reported to initiate with peers (though infrequently) and respond to both adults and peers. However when responding, he was reported to not face the individual who was communicating with him. The second participant was a seven-year-old male who was educated for two-thirds of the day in the general education kindergarten classroom, and the other third was spent in the resource room. This individual usually did not communicate with peers and was reported to be, “serious and quiet” (Kamps et al., 2014, p. 232). When he did communicate, it was usually related to something that interested him. The third participant was a seven-year-old male who, due to behavioral issues, spent the majority of his day being educated in a self-contained classroom setting. This individual usually did not communicate with peers but would communicate with adults. The fourth participant was a six-year-old first grade male student who was educated in a self-contained classroom for the majority of the day. This participant was reported to rarely communicate with other individuals. When he did communicate, it was through echolalia, responses that were scripted, or he would speak but not face other individuals. In addition to the four participants, four to six peers from each of the participant’s classrooms/grade levels participated in the study. The peers were selected based on teacher recommendations. Speech language pathologists implemented the intervention for the first,

second, and third participants. Two paraprofessionals implemented the intervention for the fourth participant. The researchers trained the school personnel how to implement the intervention and modeled the appropriate instructional techniques when a new skill was taught. This study took place in natural school settings (classroom and speech therapy room).

The DV identified by the researchers was the number of communicative acts. Communicative acts were defined as combinations of both initiations and responses that were explicitly between participants and peers (communication with adults were not scored as communicative acts). Possible communicative acts were sharing, requesting, taking turns, commenting, and responding to peers. The IV was a PN intervention that included the following components: (a) direct instruction (delivered by the interventionists using scripts); (b) scripted practice (participants practice interacting with the interventionists and with peers); (c) free play with peer mediation (peers prompted the participants); and (d) feedback in the form of reinforcement (a review of what happened during free play and what could be worked on during the next session). Data was collected live using a personal digital assistant (PDA) with Noldus Observer XT software and was also recorded on video. The researchers calculated exact count-per-interval IOA using data collected by two research assistants and was reported to average 86.9% overall. Procedural fidelity was reported to be 84% across participants.

Baseline sessions were 10 minutes in length, were led by the designated interventionists (speech therapist or paraprofessional), and involved participants engaging in free play with peers. Free play involved each participant sitting at a table with two peers in a separate room. At the table were toys, games, puzzles, a book, and at least one preferred item. It was announced to the children that they could begin playing but needed to play appropriately and remain at the table. Once sessions started, the interventionists did not intervene (provide prompts, reinforcement,

etc.) unless absolutely necessary. Procedures used during the PN intervention were similar to during baseline with the exception that: (a) peers were periodically rotated for each session; (b) only one game was made available; (c) sessions lasted 25 to 30 minutes; and (d) instructional strategies were used (direct instruction, scripted practice, peer mediation, and feedback in the form of reinforcement). The PN intervention was introduced to the first participant when the data were stable and did not suggest an accelerating trend. The PN intervention was introduced to the next participant when performance of the target behavior was stable during baseline and behavior was stable for the prior participant who was receiving the intervention. Generalization probes for participants one, two, and four occurred in integrated settings and at different times from when the intervention was delivered. Generalization data were not collected for the third participant.

Data collected were visually and statistically analyzed by the researchers. Results were presented across three figures and five data tables. The figures depict the number of communicative acts, initiations, and responses performed by participants. Three of the data tables display the TauU effect sizes, *p* values, and confidence intervals for the communicative acts, initiations, and responses performed by participants. The other two data tables list the types of interactions that occurred (i.e., initiations, responses, requests, sharing, commenting, turn taking) and who performed them (i.e., participants or peers). During baseline sessions the total number of communicative acts were variable at the low to mid level and demonstrated an accelerating trend for the first participant (ranged from 20 to 37 with a mean of 27), variable at the low to mid level with no trend for the second participant (ranged from 27.8 to 32 with a mean of 27), stable at a low-level with no trend for the third participant (ranged from 0 to 9 with a mean of 4.7), and variable at a low-level with a decelerating trend for the fourth participant

(ranged from 0 to 25 with a mean of 12). During PN intervention sessions the total number of communicative acts were variable at mid to high levels with no meaningful trend for the first participant (ranged from 24 to 61 with a mean of 47), variable at low to high levels with no meaningful trend for the second participant (ranged from 24 to 63 with a mean of 46.9), variable at low to mid levels with an overall accelerating trend for the third participant (ranged from 0 to 44 with a mean of 25.6), and variable at mid to high levels with zero trend overall for the fourth participant (ranged from 31 to 51 with a mean of 40.8). Generalization probe data collected during the baseline phase depict a mid level of performance for the first participant, low-level of performance for the second participant, and a low-level of performance for the fourth participant. Generalization probe data collected during the intervention phase depict high levels of performance for the first participant, mid levels of performance for the second participant, and low to mid levels of performance for the fourth participant. Overall TauU effect size calculations were 0.92,  $p < .00$ , 90% CI [.34, 1.41] for the first participant, 0.84,  $p < .00$ , 90% CI [.38, 1.30] for the second participant, 0.88,  $p < .00$ , 90% CI [.40, 1.34] for the third participant, and 1.00,  $p < .00$ , 90% CI [.50, 1.50] for the fourth participant. The weighted average across all participants was 0.90,  $p < .00$ , 90% CI [.58, 1.57].

Overall results suggest that the PN intervention increased the number of communicative acts performed by for all four participants, with an increase in the number of initiations performed by three of the four participants, and an increase in the number of responses performed by all four participants. The researchers listed variability of the target behaviors performed, the level of familiarity that participants had to peers, and the fact that as time went on peers gained more experience (thus serving as better “interventionists”), as limitations in this study.

The purpose of the study conducted by Mason et al. (2014) was to evaluate the effects of a PN intervention delivered during recess on increasing the number of communicative acts performed by three children with autism using a multiple baseline across participants design. The three children who participated in this study were diagnosed with autism through an educational/clinical assessment, were able to communicate using two or three word phrases, responded to requests, and followed directions. The first participant was an eight-year-old male who was educated in a second grade classroom setting. This individual was described as performing at an average to above average level academically and was reported to have scored a 35 on the *CARS*. However this individual also was reported to experience difficulty when attempting to interact with peers and as a result, infrequently communicated with them. The second participant was a seven-year-old male who was educated in a general education classroom setting for most of the day. This individual was reported to have scored a 34 on the *CARS* and displayed verbal and cognitive abilities that were appropriate to his age. Similar to the first participant, the second participant did not interact with peers often. Instead this participant was reported to spend time during recess wandering alone talking to himself about topics such as pirates. He did, however, communicate with school personnel. The third participant was a six-year-old male who was in the first grade. He was reported to have scored a 35 on the *CARS* and his expressive and receptive language was described as being moderately low. During recess he would go out of his way to avoid peers by either hiding, remaining near school personnel (a special education teacher or paraprofessional would accompany him to recess), or attempting to reenter the school building. When school personnel attempted to get this individual to participate in recess, he was reported to respond aggressively (hitting). In addition, four to six typically developing children per participant served as intervention peers. All peers had already

experienced prior PN intervention training. School personnel served as the interventionists for the first and second participants. One of the researchers implemented the intervention for the third participant. The setting that this study took place in was the playground during recess.

The primary DV identified by the researchers was the number of communicative acts that involve peers. The researchers defined communicative acts as verbal acts performed by participants that were explicitly directed towards peers. The IV was the PN intervention conducted before and during recess and included the following components (a) social skills instruction; (b) priming; (c) peer prompting; (d) role-playing; (e) modeling; and (f) reinforcement. Data were collected live using a PDA with Noldus Observer XT software and were collected during 10-minute trials by researchers and research assistants. Reliability data were collected for at least 20% of the sessions across all phases. The mean exact count-per-interval IOA across all participants was 85% (range 82%-90%). Procedural fidelity data were collected for 13 of the sessions and was reported to average 94% (range 80%-100%).

The researchers implemented two distinct phases during this study: baseline and intervention. Baseline sessions occurred during recess and involved both participants and peers engaging in regularly scheduled activities without the delivery of additional adult related intervention prompts. Intervention sessions were introduced a maximum of three per week and were comprised of three components. The first component was social skills instruction conducted by the interventionist. These instructional sessions involved the interventionist discussing and modeling appropriate social behaviors with both participants and peers. These sessions were conducted in groups of three (one participant with two peers). During this same instructional component the interventionist would allow the group to select an activity that they would participate in during recess and then ask the participants and peers to provide examples of

ways that they could interact with each other appropriately (i.e., play nicely). If a student provided an appropriate example, then the interventionist would verbally praise the student and then record the response on a cue card. If a student did not provide an appropriate example, then the interventionist would ask for a different response. Before going out to recess the interventionist would remind students that if the appropriate behaviors that were discussed were performed, the group would receive a smiley face. If the group received 20 smiley faces by the end of recess, then the group members were allowed to choose a treat from a rewards bag. The children were then allowed to begin the second component of the intervention, which was recess. During recess the interventionist would deliver praise if the participant directed an appropriate communicative act towards a peer. If the participant did not engage in appropriate communicative acts, then the interventionist would prompt peers to engage the target individual. The third component occurred at the end of recess. During this time the interventionist would recap what occurred and provided praise if students performed the target behaviors. Students were then allowed to select from the rewards bag if the criterion of 20 smiley faces were met. Generalization and maintenance sessions were not conducted.

The researchers analyzed data collected visually and statistically. Results were presented in one figure and one data table. The figure depicts the number of communicative acts performed across participants. The data table displays the Tau effect size, *p* value, and confidence interval calculations performed by the researchers on the data collected throughout the study. Baseline data presented on the first participant suggests zero trend, stable, low-level performance of the target behaviors with a mean of 7 (range 5-13). Baseline data presented on the second participant is variable, but reflected a zero trend and low-level performance of the target behaviors with a mean of 4.8 (range 1-11). Baseline data collected on the third participant reflected a stable, zero



trend, low-level performance of the target behaviors with a mean of 3.8 (range 1-8). Introduction of the intervention to the first participant resulted in variable, mid to high-level increase in performance of the target behaviors with a mean of 31 (range 16-55) with zero trend. Introduction of the intervention to the second participant resulted in a similar increase that was variable, mid to high level with a mean of 29.9 (range 22-41) and zero trend. Introduction of the intervention to the third participant resulted in an increase that was variable, ranged from low to high level with a mean of 23.6 (range 6-51) and zero trend. Overall, no overlap in performance of the target behaviors were recorded. These performances are further exemplified in Tau effect size data presented by the researchers in their data table. The reported Tau effect sizes were 1.00, 1.00, and 0.97 for the first, second, and third participants respectively (all  $p < 0.01$ ). Social validity data collected revealed that all three interventionists felt that the intervention benefited the participants. However, it was also reported that it was challenging to adapt the PN intervention when the weather required recess to be held indoors.

Overall, results suggest that the PN intervention increased the number of communicative acts performed by three participants with autism. The researchers listed lack of a maintenance phase, variability in performance of the target behaviors, and lack of measuring the number of inappropriate social interactions as possible limitations.

In McFadden et al. (2014) the researchers conducted a study with the purpose of evaluating the effects of a PN recess intervention (PNRI) on increasing the number of social interactions between four children with autism and their peers using a multiple baseline across participants design. All four individuals who participated in this study were Caucasian males, were between the ages of five through eight, and were reported to have difficulties with engaging in social behaviors during recess. The first participant was educated in a general education

kindergarten classroom with support provided from two paraprofessionals. This participant communicated primarily with adults (request preferred items), was described as having a delay in expressive language, and was reported to have scored a 38 on the *CARS* (severe range). The second participant was educated in a general education second grade classroom with support provided by a paraprofessional. This participant was reported to have scored a 34 on the *CARS* (mild to moderate range), would communicate with adults to let them know that he was being ignored by his peers, and was described as having, “an extensive expressive and receptive language repertoire” (McFadden et al., 2014, p. 1701), that he used to focus primarily on topics he was interested in (videogames). The third participant was educated in the same general education second grade classroom as the second participant. He was described as having a delay in expressive language, and was reported to have scored a 30 on the *CARS* (mild to moderate range). Unlike the other participants, this individual would communicate with his peers, however these types of interactions were classified by the researchers as being negative in nature (e.g., aggressive behavior). The fourth participant was educated for half of the day in a general education kindergarten classroom without paraprofessional support, and spent the other half of his day in a preschool special education classroom. He was described as having a delay in receptive and expressive language and was reported to have scored a 39 on the *CARS* (severe range). In addition to the four participants, four to five children for each participant served as the peers in this intervention. They were selected based on teacher recommendations. A host of other children also participated but they were not the designated implementers of the intervention. This study took place in natural school settings (classroom and playground) in two different elementary schools. Both schools were located in the Midwestern U.S.

The DVs identified by the researchers were the number of social interactions directed by the participants to their peers (both initiation and response behaviors) and the number of social interactions directed by the peers to the participants (both initiation and response behaviors). The IV was the PNRI that included the following instructional components: (a) social skills instruction; (b) priming; (c) peer prompting; (d) use of tokens; (e) group based contingencies; and (f) reinforcement. Data were collected live using a PDA with Noldus Observer XT software and were collected during 10-minute trials with 30-second intervals, 2 to 4 times a week. The mean IOA across all participants was 76% (range 80%-100%) during baseline and 83% during intervention (range 65%-100%). Procedural fidelity data were collected across 25% of the sessions and was reported to average 89% (range 73%-100%).

Baseline sessions were 15-20 minutes in length and occurred during the regularly scheduled recesses. During this phase interactions that occurred between students and adults were naturally occurring (e.g., adults announcing to students that recess was over). Prior to introduction of the intervention the researchers trained interventionists (school personnel) on how to implement all facets of the PNRI: (a) social skills instruction for the entire class; (b) pre-recess group meetings; (c) prompting and feedback provided by peers during recess; (d) feedback provided by interventionists; (e) whistle blows; (f) post-recess group meetings; and (g) classroom parties. For the first, second, and third participants the intervention was implemented by the paraprofessionals who were already assigned to work with them. For the fourth participant, the intervention was implemented by the speech therapist. All interventionists were female. Once the interventionists reported that they were ready to implement the intervention without assistance the PNRI was implemented. A typical social skills instruction session was described as a class-wide discussion on appropriate social behaviors (e.g., how to play with

friends and have fun) and involved all students (participants, peers, and other students) role-playing appropriate social behaviors in groups of three (one participant and two peers). All students earned points for using the target behaviors. The points were recorded on a chart. Students were told that if they earned enough points, then a class party would occur. At the end of the social skills discussion, but prior to the start of recess, a group meeting occurred. During these group meetings interventionists would review the appropriate social behaviors that were discussed previously in the class-wide sessions. Children from other classrooms (non-intervention peers) were allowed to participate in these pre-recess group meetings if they wished to do so. These group meetings lasted about two minutes. At the end of the meeting children were allowed to begin recess. During recess, if participants were not interacting with peers, then interventionists would task peers with interacting with them. Periodically during recess (after five minutes had elapsed), interventionists would blow a whistle. The whistle would alert the children to gather together. Once the children were gathered, the interventionists would ask them if they were using the appropriate social skills that were discussed previously. If children answered in the affirmative, then the interventionists recorded this response and then delivered feedback and praise. If children responded in the negative, then the interventionists would record the response and then review the appropriate social behaviors with the children using modeling and role-playing. Whistle blow sessions were reported to last about two to three minutes. At the end of these sessions students were allowed to resume recess. At the end of recess students were once again asked to group up. During this group meeting, the interventionists, or volunteering students, would transfer affirmative responses recorded during whistle blow sessions to the classroom party chart (the same chart used during the social skills group instruction prior to recess). Once a classroom earned enough points, a party was held (about 10-15 minutes in

length) that included access to preferred activities, food, and praise. All students within the classroom were allowed to participate in the class party. Generalization probes for participants one, two, and three occurred during recesses in which the PNRI was not introduced. Generalization probes for the fourth participant was conducted only during baseline and occurred while he was in preschool settings.

The researchers visually analyzed the data collected. Results were presented across two figures and one data table. The first figure depicts the percentage of intervals in which social interactions took place across participants and between participants and peers. The second figure depicts the percentage of intervals in which social initiations took place across participants and between participants and peers. The data table displays the average responses performed by participants and peers across baseline and intervention phases. Data collected on the first participant suggests a variable, low-level performance of the target behaviors (ranging from 0% to almost 40%) with zero trend. Peer interactions with the first participant were also variable with zero trend, but ranged from low to high levels (ranged from a little above 0% to almost 100%). Social initiation data collected suggests that peers were responsible for performing majority of the initiations. Data collected on the second participant suggests a variable, low to mid level performance of the target behaviors (ranging from 0% to almost 60%) with an accelerating then decelerating trend. Peer interactions with the second participant were also variable ranging from low to mid levels (0% to almost 70%), and reflected an accelerating then decelerating trend. Social initiation data collected suggests that both participants and peers were responsible for performing the initiations. Data collected on the third participant was highly variable, ranged from low to high level performance of the target behaviors (ranging from 10% to almost 100%), and reflected a decelerating, then accelerating, then decelerating trend. Peer

interactions with the third participant were highly variable ranging from low to high levels (0% to almost 90%), and also reflected a decelerating, then accelerating, and then decelerating trend. Social initiation data collected suggests that peers were responsible for performing the majority of the initiations with the exception of one session. During the fifth session the percentage of initiations performed by the third participant increased to almost 80%. Data collected on the fourth participant suggests a variable, low to mid level performance of the target behaviors (ranging from near 0% to almost 40%) with zero trend. Peer interactions with the fourth participant were also variable, at zero trend, and ranged from low to mid levels (0% to almost 40%). Social initiation data collected suggest that both participants and peers were responsible for performing initiations. Generalization probe data collected for the fourth participant suggest a low to mid level performance of the target behaviors. Introduction of the PNRI intervention for all four participants resulted in an increase in the number of social interactions performed by all individuals. For the first participant and his peers, performance of target behaviors were still variable and reflected zero trend, however they increased to mid to high levels. The majority of the initiations were still being performed by peers. However, these behaviors, for the most part, remained at high levels. Generalization probe data suggest high levels of interaction for both participants and peers with one exception. During one probe session the first participant did not initiate at all. Intervention data collected for the second and third participants and their peers suggests performance of target behaviors were variable, reflected zero trend, however they increased to mid to high levels (range from above 40% to almost 100%). Generalization probe data also suggest mid to high levels of interaction and initiation for both participants and peers. Introduction of the intervention to the fourth participant and his peers resulted in performance of target behaviors were variable, ranged from mid to high level (about 40% to almost 100%), but

also suggest an overall accelerating trend. Generalization probe data was not collected for the fourth participant during the intervention phase. Results presented in the data table suggest that all responses increased from baseline to intervention for four participants and their assigned peers.

Overall, results suggest that the PNRI increased the number of social interaction between the four participants with autism and their peers. The researchers listed variability of the data, the limited amount of generalization data collected, and the fact that the second and third participants were in the same classroom as limitations (both second and third participants entered intervention at the same time).

### **Summary of Research Related to PN**

Results from quantitative experimental studies conducted in the field have demonstrated that PN is an effective intervention at teaching social skills to children with DD (Garrison-Harrell et al., 1997; Kamps et al., 1997; Kamps et al., 2014; Mason et al., 2014; McFadden et al., 2014). Four components of the PN intervention that studies have in common are that peers are directly involved with delivering the intervention, the treatment itself is a conglomeration of different forms of instruction, use of PN is individualized to the target student, and the level of adult involvement varies from setting to setting. The first component is that peers are directly involved in all facets of the intervention across all settings in which the intervention is delivered (Garrison-Harrell et al., 1997; Kamps et al., 1997; Kamps et al., 2014; Mason et al., 2014; McFadden et al., 2014). Naturally this level of involvement requires that peers are thoroughly trained by the interventionists/supervising adult. Another component is that the PN intervention is a conglomeration of PMII techniques and various forms of systematic instruction (see Garrison-Harrell et al., 1997; Kamps et al., 1997; Kamps et al., 2014; McFadden et al., 2014),

which has led to it being described as a “packaged intervention” (McFadden et al., 2014, p. 1700). The collection of instructional techniques used includes, but are not limited to, modeling, prompting, reinforcement, and visual cues (Garrison-Harrell et al., 1997; Kamps et al., 1997; Kamps et al., 2014; Mason et al., 2014). The third component is that PN is individualized to the target student (Garrison-Harrell et al., 1997; Kamps et al., 1997; Kamps et al., 2014). In fact, the PN intervention has been customized to the point that researchers have suggested that it can actually serve as a limitation against reported findings (Garrison-Harrell et al., 1997). Finally, the fourth component is that adult involvement during delivery of the PN intervention varies across settings. Adults sometimes serve as the individual who is directly working with the target students and peers (Garrison-Harrell et al., 1997; Kamps et al., 1997; Kamps et al., 2014; Mason et al., 2014; McFadden et al., 2014). Usually this involves providing feedback on student performance (see Garrison-Harrell et al., 1997; Kamps et al., 1997; Kamps et al., 2014; Mason et al., 2014; McFadden et al., 2014). At other times, adults supervise peers as they work with target students and interject only to provide assistance to the peers and to ensure that students remain on task (Garrison-Harrell et al., 1997; Kamps et al., 1997; Kamps et al., 2014; Mason et al., 2014; McFadden et al., 2014).

### **Review and Analysis of Studies Related to Peer Video Modeling**

**Effectiveness studies.** In Nikopoulos and Keenan (2003) the researchers conducted a study the purpose of which was to investigate the effects of VM on social initiations in seven children with developmental delays using both an A-B design and a multiple-treatment design. The seven participants (six males and one female) were between the ages of nine and sixteen, attended a residential school for individuals with disabilities, and their abilities to imitate were described as “restricted” and “nonverbal” (Nikopoulos & Keenan, 2003, pp. 88-89). The first



participant was a nine year old male who had been diagnosed with autism and profound ID, demonstrated delayed echolalia, had limited receptive language (a few words and instructions), did not reciprocate emotions, did not interact with his peers, engaged in repetitive and stereotypical motor behaviors, and engaged in challenging behaviors. This individual was also reported to not play with toys appropriately unless he was under direct supervision and was prompted continuously. The second participant was a fifteen-year-old male diagnosed with autism and profound ID. This individual was reported to have no speech, almost never responded to other individuals (though he did respond to a few instructions), often times behaved passively, and was interested in puzzles. The third participant was a ten-year-old male diagnosed with autism, profound ID, and polymorphic epilepsy. This individual had limited receptive language and engaged in self-injurious and stereotypical behaviors. He did not make eye contact and did not interact with other individuals. When he did interact with other individuals, this interaction was usually aggressively in nature. The fourth participant was a ten-year-old male diagnosed with autism, ID, and epilepsy. This individual had limited receptive language (a few words and instructions), exhibited challenging and stereotypical behaviors, and usually did not respond to other individuals. The fifth participant was an eleven-year-old male diagnosed with autism. This individual demonstrated some speech, was able to respond to visual prompts (usually one word), and was able to request. This individual did not interact with peers and did not make eye contact. The sixth participant was a thirteen-year-old male diagnosed with autism. This individual demonstrated some speech, however most of it was echolalia. He had limited receptive language (a few words and instructions), did not interact with peers, and preferred to engage in activities on his own. The seventh participant was a nine-year-old female who was diagnosed with Asperger's syndrome and attention deficit hyperactivity disorder. This individual did not interact

with her peers but was able to engage in conversation (which sometimes was not directed at anyone) and was able to seek the attention of an adult. Upon becoming anxious however, this participant would begin to use inappropriate speech. Finally this participant engaged in challenging behaviors, engaged in repetitive and stereotypical behaviors, could concentrate only for a limited time, and was reported to need constant supervision. Other than the seven participants, four individuals participated in this study. One individual, a peer with a learning disability, participated only in the generalization phase. The other three participated as actors in the VM videos. The first individual was a child without a disability. The researchers did not state how old this child was or if the participants knew him or her. The second individual was an adult who the participants were not familiar with. The third individual was an adult who the participants were familiar with.

This study took place in three different rooms on residential school campus grounds. The first room measured 4.2 meters by 1.7 meters, contained a 14-inch television and a chair, and was where participants would view the PVM videos. The second room measured 5 meters by 3.7 meters, contained a Sony video camera that was used to record video, and was where data was collected during the baseline and intervention phases. The third room measured 4 meters by 4.7 meters and was where the generalization phase occurred.

The researchers identified two DVs. The first was social initiation latency and was defined as a participant approaching the interventionist and then performing a verbal or gestural behavior that resulted in obtaining a toy. The second DV was the duration of time a participant spent playing appropriately with a toy. The IV was VM, of which there were three variants: (a) a PVM video; (b) a VM video with an unfamiliar adult; and (c) a VM video with a familiar adult. The video itself was 35 seconds long and involved the actor and the interventionist entering the

same room that was used to during the intervention phase (the second room). While the interventionist sat on a chair, the actor walked around the room. After a few seconds the actor approached the interventionist, asked the interventionist to play, and then took the interventionist to a specific toy. The researchers referred to this toy as the “pertinent toy”, it was the toy closest to the interventionist, and differed across conditions (Nikopoulos & Keenan, 2003, p. 90). Once at the toy, the model and the interventionist would play with the toy for 15 seconds. The actors were instructed to model the target behaviors as they normally would perform them (instead of a slow or exaggerated manner). The third, fourth, and seventh participants were shown only the PVM video. The second and fifth participants were shown only the VM video with the unfamiliar adult. The first and sixth participants were shown only the VM video with the familiar adult. Finally, IOA data was collected on 31% of the sessions the mean of which was reported to be 98% overall, 100% for the social initiation latency, and 97% for the duration of time participants spent playing appropriately with toys.

Throughout the entire study five conditions were identified. Conditions in which all toys were presented to the participant and where the pertinent toy was a Whack Attack will be labeled as P1. Conditions in which all toys were presented to the participant and where the pertinent toy was a trampoline will be labeled as P2. Conditions in which all toys were presented to the participant and where the pertinent toy was a ball will be labeled as P3. Conditions in which only the pertinent toy was presented to the participant and where the pertinent toy was a Whack Attack will be labeled as P'1. Conditions in which only the pertinent toy was presented to the participant and where the pertinent toy was a trampoline will be labeled as P'2. Conditions in which only the pertinent toy was presented to the participant and where the pertinent toy was a ball will be labeled as P'3. Prior to the beginning of the baseline phase the researchers observed

the participants to see if they were able to attend to the television screen for a minimum of one minute. Individuals who were not able to attend for a minute were provided additional instruction. The researchers provided participants with positive reinforcement (food and verbal praise) during this prephase. Baseline sessions lasted no more than five minutes in length and began with each participant entering the second room with the interventionist. Depending on the condition either one toy (the pertinent toy), or more than one toy (which included the pertinent toy), was available in the room. The pertinent toy was always placed closest to the chair that the interventionist would sit on. Sessions ended when either a participant performed a social initiation and began using a toy to play with the interventionist or five minutes had elapsed. Baseline sessions were separated by at least eight minutes. Intervention sessions involved use of the VM videos and began in the first room where participants would view their assigned videos. The 35-second videos were viewed only once each session. If during a viewing of a VM video it was noticed that a participant was not attending, the interventionist would deliver a prompt. Six of the seven participants attended to the video at least 50% of the time. Once the video ended participants were taken to the second room. The second room was constructed in a similar manner to the VM video that was shown to the participant with the pertinent toy closest to the chair that the interventionist would sit on. Intervention sessions were five minutes in length. Positive reinforcement (food or verbal praise) was provided if participant engaged in play with the interventionist. Criterion was met if a participant initiated a social initiation within 25 seconds of entering the second room, with all toys present in the room, and did so across three consecutive sessions. During the intervention phase it was discovered that VM videos had no effect on the second participant therefore the researchers decided to use SVM with this individual. Use of SVM involved the researchers providing this participant with additional

instruction and positive reinforcement such that he would be able to perform the target behaviors while being recorded. After being recorded, the second participant was once again exposed to baseline conditions to measure if participating in the recording of the video affected his ability to perform the target behaviors. Also during the intervention phase it was discovered that the seventh participant would play appropriately for only about one minute each time. This resulted in the researchers eliminating the five minute time limit and allowing the interventionist to play with this participant once she performed any type of social initiation. Generalization sessions were conducted in three different ways. The first variation was similar to the conditions during baseline except for the removal of the pertinent toy and will be labeled as GT. The second variation was also similar to conditions during baseline but occurred in the third room instead of the first room and will be labeled as GS. The third variation used conditions similar to baseline with the exception that the interventionist was replaced by a peer who had a learning disability and will be labeled as GP. Only the fifth and sixth participants were exposed to the third variation. Follow-up sessions occurred one and two months after intervention/generalization sessions had ended and were conducted under conditions similar to baseline.

The researchers presented data collected in 14 graphs that span 6 figures. Seven of the graphs show social initiation latency and the other seven show the duration of time each participant spent playing appropriately with a toy. During baseline sessions all participants except for the fourth were exposed to the P1, P2, and P3 conditions. The first and second participants also received the P'1 and P'2 conditions after the P1, P2, and P3 conditions occurred. The fourth participant was the only individual whom the researchers used an A-B design with and thus received the P'1, P'2, and P'3 conditions for baseline. Only one participant, the seventh participant, initiated. This initiation occurred on the very first session of the baseline phase.

Following baseline the third, fifth, sixth, and seventh participants were given the VM treatment followed by the P1 condition while the first, second, and fourth participants were provided the VM treatment followed by the P'1 condition. The first participant also received the VM treatment followed by the P1 condition for one session. Introduction of VM with the P1 condition had little effect on the seventh participant (initiation performed only on the fourteenth overall session), and had no effect for the third, fifth and sixth participants. Introduction of VM with the P'1 condition increased social initiations performed by the first participant (decrease in latency as depicted on the graph) and had no effect for the second and fourth participants. This concluded participation in the study for the fourth participant. At this point treatment was withdrawn for all remaining participants except for the first. The third, fifth, sixth, and seventh participants received the P'1 baseline condition. The third, fifth, and sixth participants did not initiate. The seventh participant continued her trend of initiating at least once (and only once) during each phase. The second participant received the P'2 baseline condition, which resulted in the target behavior not being performed. The first participant received the P2 condition under the GT (generalization) condition, which resulted in behavior returning to baseline levels (no initiation). The researchers then reintroduced the VM interventions. The second participant received SVM accompanied with the P'2 condition. This had no effect on the second participant. This also concluded participation in the study for the second participant. The third participant received VM accompanied with the P'1 condition, which had no effect on the target behavior. This concluded participation in the study for the third participant. The fifth, sixth, and seventh participants received VM accompanied by an alternation of the P1 and P'1 conditions. This resulted in variable performance for all three participants. However, all three participants ended the intervention phase meeting criterion. The first participant received VM accompanied by an

alternation of the P2 and P'2 conditions and also met criterion. The researchers then withdrew the intervention and exposed all four remaining participants to the generalization phase. The sixth and seventh participants were exposed to the GT with P2 conditions. The first and fifth participants were exposed to the GT with P3 conditions. Behavior for all four participants returned to baseline levels (target behaviors were not performed). The researchers then reintroduced the VM interventions with the seventh participant receiving the treatment accompanied by P2 conditions, the fifth and sixth participants receiving the treatment accompanied by an alternation of P2 and P'2 conditions, and the first participant receiving the treatment accompanied by an alternation of P3 and P'3 conditions. The first, sixth, and seventh participants would once again meet criterion however the fifth participant did not. This was the final time the intervention would be used with the first participant. Once again the researchers withdrew treatment-exposing participants to generalization conditions. The first participant was exposed to the GS condition once each with P1, P2, and P3. This participant continually performed initiations doing so under 30 seconds. The fifth, sixth, and seventh participants were exposed to P3 conditions under the GT generalization phase. Behaviors for all three participants returned to baseline levels. The researchers then reintroduced the VM treatment to the fifth, sixth, and seventh participants. The fifth participant received VM treatment accompanied by an alternation of the P3 and P'3 conditions. The sixth and seventh participants received VM treatment accompanied by the P3 conditions. All three participants continued to initiate under 30 seconds during majority of sessions. Of note was that the fifth participant returned to baseline levels for three consecutive sessions during the VM with P3 condition however began performing initiations once the VM with P'3 condition was reintroduced. The researchers then reintroduced the generalization phase for the final time in this study for the fifth, sixth, and

seventh participants. All three participants met criterion during this phase. The seventh participant was also exposed to one extended play session which resulted in the target behavior being performed under 25 seconds. Of note was that even though the fifth and sixth participants were exposed to GP conditions, both individuals continued to perform the target behaviors under 30 seconds (suggesting generalization of behavior across individuals). Follow-up for the first participant was conducted during three separate time spans (three sessions per time span). The first occasion resulted in behavior returning to baseline levels. The second and third time spans resulted in variable results with this individual performing at both low and high levels (initiations performed under a minute or not performed at all). Follow-up for the fifth, sixth, and seventh participants were conducted during two separate time spans. Follow-up for the fifth participant demonstrates that the target behaviors were maintained at a low-level during the first time span (initiations performed under a minute), but was highly variable during the second time span (under a minute to not performed at all). Follow-up for the sixth and seventh participants demonstrate that the target behaviors were maintained at low-levels (initiations performed under a minute) during both the first and second time spans. Follow-up data was not collected for the second, third, and fourth participants.

Data presented in the graphs that depict the duration of time that participants participated in appropriate play show that even though individuals may not have been initiating over the course of the study (especially at the beginning), majority of participants would still play with the available toys (the exceptions were the second, third, and fourth participants who did not engage in appropriate play at anytime during the study). Of note was that during the final three sessions of the first phase that the VM treatment was introduced, the average duration of play for the first, fifth, and sixth participants increased to 215 seconds, 90 seconds, and 53.5 seconds



respectively. The duration of time spent participating in appropriate play was variable for these three participants throughout the entire study (highly variable and zero trend for the first participant and relatively low-level for the fifth and sixth participants). For the seventh participant, the duration spent participating in appropriate play generally increased throughout the entire study.

Overall results presented by Nikopoulos and Keenan (2003) suggest that: (a) PVM was effective at teaching initiations and increasing the duration of appropriate play for one out of three participants; (b) VM with a familiar adult as an actor was effective at teaching initiations and increasing the duration of appropriate play for two out of two participants; and (c) VM with an unfamiliar adult as an actor was effective at teaching initiations and increasing the duration of appropriate play for one out of two participants. When discussing why the PVM intervention had no effect on two of the participants it was used with Nikopoulos and Keenan (2003) offered that these two individuals did not attend to the video as long as the others because they engaged in inappropriate behaviors. As a result of these behaviors the third participant spent a mean of 51% of time attending to the video and the fourth participant spent a mean of 41% of time attending to the video. In contrast the seventh participant (the one participant whom the PVM video had an effect on) was reported to have been attending to the video 92% of the time. The researchers also cited a lack of time available when working with these participants.

Simpson et al. (2004) conducted a study with the purpose of evaluating the effects of a computer-based intervention that included VM videos on teaching three social behaviors (sharing, complying, and greeting) in four children with autism using a multiple probe design. The first participant was a five-year-old male who was diagnosed with autism and had speech delay that was described as severe (limited spoken language other than echolalia). He received

services in a self-contained classroom though he would periodically join his peers in the kindergarten classroom. This participant did not share or greet other individuals but was able to follow verbal instructions and complete tasks when provided adult assistance. This participant was able use a computer but required adult supervision while doing so. The second participant was a five-year-old female who was diagnosed with autism and had a speech delay. This participant received services in a self-contained classroom, however she also received instruction in a general education setting (kindergarten classroom). She was able to follow directions and with prompting, participate in school activities (though only at her own pace). This individual was able to perform some of the target behaviors in this study and was more focused in one-to-one and small group settings, but experienced difficulty with performing those behaviors (instead engaging in off-task/disruptive behaviors) in large group settings. This participant was able use a computer independently. The third participant was a six-year-old male who was diagnosed with autism and had a speech delay that was described as mild. This participant received services in a self-contained classroom though he did join his peers without disabilities for activities related to music, P.E., art, and computers. He was able to perform the three social behaviors at low-levels, learn new content, would follow teacher directions for routine activities (however would refuse to do so for activities that were not apart of this routine and at times needed physical assistance to complete activities). This participant was able use a computer. The fourth participant was a six-year-old female who was diagnosed with autism and was reported to have a severe delay in speech and language. This participant received services in a self-contained classroom. She would engage in tantrumming if she was asked to participate in an activity she was not used to participating in or if there was a disruption in her routine. Though this individual was able to share and follow directions, she did not do so independently (prompting was required). This

participant was able use a computer. Two typically developing peers of similar age, one first grade student and one second grade student, also participated in this study serving as the actors in the VM videos. Though these individuals attended the same school as the four participants, the researchers did not specifically state whether or not the participants were familiar with these individuals. The setting for this study was a special education classroom.

The researchers identified three social skills related DVs: sharing, complying, and greeting. Sharing was defined as a student allowing another individual to use an object/item. Complying was defined as a student following teacher directions within 15 seconds of those instructions being given. A greeting was defined as a social interaction that was initiated by a student to another individual (not group) and should occur when first coming into contact with another individual (e.g., at the beginning of a session). The researchers derived these definitions by first recording video of students in class and then by having teachers highlight examples of those behaviors in the recorded video. The IV was an electronic presentation created using Hyperstudio 3.2 that contained embedded within it video clips of peers modeling the target behaviors. To create these clips, video were recorded on VHS tapes in the special education classroom that the study took place in. Using the recorded video a total of 18 video clips between four to six seconds long were created (6 videos per target behavior). One session occurred each day. Each session was comprised of 36 trials (12 in the morning, 12 after lunch, 12 at the end the day) and occurred during math, reading, and arts and crafts. Data collection involved teachers reviewing recorded video of these sessions then scoring instances of those behaviors using data sheets. Point-by-point interobserver reliability data was collected across 30% of the baseline sessions and 40% of the intervention sessions and was reported to be 97.2%. Procedural reliability was reported to be 100%.

There were two phases in this experiment: the baseline and intervention phases. The baseline phase involved the collection of probe data over a minimum of three sessions during regularly scheduled class activities (math, reading, and arts and crafts). The intervention phase involved the researchers first providing participants with access to the Hyperstudio presentation with the embedded VM videos and then recording the behaviors of participants during regularly scheduled activities. While viewing the presentation participants would sit in a cubicle. The teacher provided assistance if needed. During regularly scheduled activities each participant was provided with four structured opportunities to perform the target behaviors. Teachers supervised the process to ensure that all participants had the opportunities to elicit the three target behaviors.

Data collected were presented in two graphs. The first graph depicts the total amount of unprompted target behaviors (sharing, complying, and greeting) that each participant performed across the entire study. Baseline data collected across the four participants confirm that each participant was able to perform the target behaviors and that they do so in a relatively stable manner. The first participant performed these behaviors between six to twelve times each session (stable and low-level). The third and fourth participants did so at a rate of 12 to 21 per session (stable and low to mid level). The second participant however performed the target behaviors between 12 to 21 times each session during the first set of probe data collected and 18 to 24 times each session during the second set of probe data collected suggesting an accelerating trend ( $M = 18.8$ ). Upon introduction of the intervention phase all participants experienced an accelerating trend that peaked on the last or second to last session. The best example of behavior change was the first participant who performed the target behaviors an average of 8.6 times during the baseline phase. On the last session of the intervention phase this individual was recorded to have performed the target behaviors a total of 35 times (the upper limit was 36).

Similar to the first graph, the second graph depicts the amount of unprompted target behaviors. However, results in the second graph represent the totals for each behavior separately (sharing, complying, and greeting). During the baseline phase the target behavior performed least often by the first participant was greeting, for the second and third participants it was complying (following directions), for the fourth participant it was sharing. Introduction of the intervention increased the frequency of these minimally performed behaviors such that they were being performed more often by all four participants. In the case of the second participant, they were being performed at the same rate as the other target behaviors. Furthermore, performance on each of the target behaviors during the intervention phase did not markedly decrease from performance levels during the baseline phase. Overall performance for the first participant was variable though an accelerating trend was present showing increases in all three behaviors with two of the behaviors (sharing and complying) being consistently performed at the upper limit of the graph (12 per session). The second participant experienced an increase throughout the study (accelerating trend) with all three-target behaviors peaking at the upper limit on the second to last session. Data on the third participant suggests an accelerating trend with all three-target behaviors being performed at or near the upper limit on the last session. Overall performance for the fourth participant suggests an accelerating trend with an increase in two of the target behaviors (sharing and complying) and slight increase in the third behavior (greeting). All three-target behaviors were being performed at a high level (near the upper limit) by the last session.

Findings from Simpson et al. (2004) suggest that a computer based intervention that included videos of peers modeling the target behaviors was effective at increasing the number of target behaviors performed by four children with autism. Overall performance on target behaviors for all participants was at higher levels after introduction of the intervention than they

were during baseline. A limitation with this study was that all four participants had already demonstrated that they were able to perform the target behaviors prior to the study (though their performance more often than not was described to be at low-levels). Therefore, the researchers suggest that the gains that were witnessed were not as impactful as they could have been if participants did not initially perform these behaviors.

Nikopoulos and Keenan (2004) conducted a study with the purpose of investigating the effects of PVM on social initiations and reciprocal play behaviors in three children diagnosed with autism using a multiple-baseline across participants design. The three participants were all males, were between the ages of seven through nine, and were between the ranges of mild to moderate autistic range as assessed by the Childhood Autism Rating Scale. A peer without disabilities and one of the researchers participated in the PVM video as actors. The researchers did not provide the age of the peer model, the gender of the peer model, nor did they state whether the participants were familiar with the peer model. The study took place in two different rooms, one of which was used to show the video, and the second was used to measure the effects of the IV on the DVs.

The researchers identified two DVs. The first was social initiations and was defined as a verbal or gestural behavior while physically approaching the interventionist leading to a toy. The second was reciprocal play and was defined as a participant playing with one of the interventionist in an appropriate manner using a toy. The IV was a PVM video that was 35 seconds in length. In the video the peer model approached the interventionist, verbally asked the interventionist to play, and then engaged in play for 15 seconds with the toy (a trampoline) that was closest to the chair the interventionist was sitting on. Data collection involved recording the

amount of time (latency) that it took for a social initiation to occur and the time spent playing (duration). IOA data was collected over 55% of the sessions and was reported to be 98%.

Baseline sessions, referenced by the researchers as Condition A, occurred in one of the rooms in which the researchers had placed four toys on the floor (trampoline, ball, tambourine, and a board game). The researchers rotated the toy that was closest to the chair the interventionist was sitting on such that each toy was placed in that location at least once. Sessions ended when a participant was done playing or after five minutes elapsed. Intervention sessions occurred in a similar manner as baseline sessions with two exceptions. First, participants watched the PVM video in a separate room. Following the video, participants were then led to the room with the toys on the floor. Second, the conditions that participants were exposed to varied between participants. In total there were three different conditions during the intervention phase. The first condition, labeled by the researchers as Condition B1, was similar to baseline except for participants watching the entire 35-second video prior to entering the room with the toys. The second condition, Condition B2, was similar to Condition B1 with the exception that the video participants watched did not include the portion that depicted the peer and interventionist playing with the toy. The third condition, Condition C, was similar to Condition B1 with the exception that at the end of the session, three toys were removed from the room. Only the ball was left. Participants were then given another five minutes to initiate and play with the ball. Follow-up data was collected one and three months after the final intervention session occurred for each participant. Measurement of procedural fidelity was not reported.

Data related to the social initiation latency and time engaged in reciprocal play was presented in one graph. During baseline all three participants did not initiate during the five-minute time span nor did they engage in reciprocal play. Implementation of Condition B1

resulted in the first participant initiating in less than 30 seconds (low latency) and briefly engaging in reciprocal play with only the trampoline (between 30 to 60 seconds) throughout the condition. No changes in behaviors were recorded for the second and third participants during Condition B1. During Condition B2 initiations occurred within 30 seconds (low latency) across four out of five sessions for the second participant and three out of seven sessions for the third participant for only the trampoline. The first participant was not exposed to Condition B2. During Condition C initiation latency continued to remain stable (occurred within 30 seconds; low latency) for the first participant for the trampoline. The duration of reciprocal play remained relatively stable at the same level as during Condition B1 (duration lasted between 30 to 60 seconds). Of difference during Condition C from prior conditions for the first participant was that he began initiating with other toys at a low-level of latency (between zero to 40 seconds). Exposure to Condition C for both the second and third participants resulted in continuing low-level stability in initiation latency (less than 30 seconds) for the trampoline. Duration of reciprocal play increased but was variable for both the second (between 30 and 200 seconds) and third participants (between 90 and 240 seconds). Furthermore, and similar to the first participant, both the second and third participants began to engage in initiating with other toys at a stable low-level of latency (between zero and 30 seconds). One month follow-up data for the first participant is relatively similar to Condition C data however three-month follow-up data varied with reciprocal play increasing to durations between 150 seconds and 300 seconds. Both one month and three-month follow-up data for the second and third participants were relatively similar to data collected during Condition C.

Overall results suggest that use of PVM (at different variations) was effective at decreasing the latency to initiation (and thus increasing social initiations) and increasing the



duration of reciprocal play behaviors for all three participants. The researchers listed one limitation to their current study by suggesting that the increase in initiations (and thus decrease in latency) with a toy other than the trampoline during Condition C may have been caused by removing all but the toy ball.

In Apple et al. (2005) the researchers reported the findings from two experiments. The purpose of the first experiment was to investigate the effects of PVM on increasing compliment giving initiations and compliment giving responses in two young children with autism using a multiple baseline across participants design. Both participants were males, were five years old, were diagnosed with high-functioning autism, and, with the exception of social skill impairments, demonstrated at near grade level performance in language, intellectual functioning, and academic related tasks. In addition to the participants, their classroom peers (selected using teacher input) also participated in the experiment serving as actors in the PVM videos. The researchers did not provide additional demographic descriptions of the peers who participated. Adults also participated as actors in the video creation process. Their roles were to provide explicit instruction during the video.

The setting was a half-day integrated preschool that had a full-day option for children with disabilities. Each classroom at the preschool contained approximately sixteen children, at least six of which were described as typically developing. There were also four adults assigned per classroom.

The DV in the first experiment was compliment giving behaviors (initiations and responses) of which Apple et al. (2005) defined three different types: (a) sentences that contained a descriptive positive word (e.g., “Cool”); (b) sentences that used the words “I like” (e.g., “I like your jacket”); and (c) sentences that contained a descriptive positive word and used the words

“You have/made” (e.g., “You made a cool drawing”). The IV was a collection of eight PVM videos (four videos per participant) each about 60 seconds in length. Six of the videos depicted peers modeling compliment giving responses, two videos for each of the three sentence structure types described previously. The final two videos were of peers modeling compliment-giving initiations using all three-sentence structure types. Data was collected in three ways. First the frequency of responses and initiations over a 15 minute time span were recorded. Secondly, the researchers conducted pre and post study questionnaires with parents and teachers. Finally, the researchers conducted pre and post interviews with the participants. IOA data was collected over 33% of the sessions and was reported to be 100%. Procedural reliability was reported to range from 84% to 97% and was 90%.

Each participant was exposed to a total of five phases throughout the first experiment. The first phase was the baseline phase. During baseline sessions participants were observed engaging in free play in their respective classrooms for 15 minutes. Other than naturally occurring instances, teachers were instructed to periodically have peers prompt participants in order to create opportunities to perform compliment-giving responses. These instances were only allowed to occur two times a session. The second phase was the PVM intervention phase. During this phase, each participant was shown one of the four PVM videos assigned to him in a separate room during free play. After the video ended the participant was brought back to the classroom for the rest of the free play period and were exposed to conditions similar to those during baseline sessions while the researchers collected data for 15 minutes. The third phase was the PVM with reinforcement intervention phase. This phase was similar to the PVM alone phase with the exception that at the conclusion of the video, the teacher told the participant that he would be rewarded with a prize after making four compliments. The fourth phase was the

reinforcement only intervention phase. This phase was similar to the third phase minus the PVM video. The fifth and final phase was similar to the baseline phase.

Data for the first experiment was graphed and visually analyzed by the researchers. The graph itself depicts the number of compliment giving initiations and responses for each participant for each 15-minute session. Baseline data for the two participants demonstrate zero compliment giving initiations exhibited by both participants and zero compliment giving responses for the second participant. The first participant performed two compliment-giving responses during baseline, one during the fifth session, and another during the sixth session. Introduction of the PVM videos lead to an increase in compliment giving responses (both participants performed an average of two responses during each session of this phase) but had no effect on compliment giving initiations for both participants. The researchers then added reinforcement to the PVM treatment. This resulted in an increase in compliment giving initiations for both participants, a small increase in compliment giving responses for the first participant, and relatively no change in the compliment giving responses for the second participant. The researchers then withdrew the PVM treatment but continued to provide reinforcement. This resulted in relatively no change for the first participant and an increase in compliment giving initiations and a decrease in compliment giving responses for the second participant. Finally the researchers withdrew reinforcement. This resulted in compliment giving initiations returning to zero for both participants while compliment giving responses were continuing to be performed at relatively the same level as during intervention sessions.

Overall results suggest that PVM alone was effective at increasing the number of compliment giving responses performed by both participants however had no effect at increasing the number of compliment giving initiations. Addition of the reinforcement component to the

PVM treatment resulted in an increase in the number of compliment giving initiations by both participants. Furthermore, participants were able to maintain compliment-giving responses upon withdrawal of both the PVM and reinforcement components.

For the second experiment conducted by Apple et al. (2005), the researchers once again chose to investigate the effects of PVM on increasing compliment giving initiations and compliment giving responses in three young children with autism using a multiple baseline across participants design. This experiment was conducted about half a year after the first experiment ended. Along with the first participant from the first experiment (who was listed at five years and nine months of age at the beginning of this experiment), two additional young children with autism participated. The second participant from the first experiment did not participate because of conflicting schedules. The second participant in this experiment was a four year one month old female with autism who was also a student in the same preschool classroom as the first participant. The third participant was a five year nine month old male diagnosed with Asperger syndrome who was a student at the same school the other two participants but was in a different classroom (kindergarten). The setting was the same school that the first experiment took place in with the exception that this experiment occurred in the kindergarten classroom for the third participant.

The DVs and data collection procedures were reportedly the same as in the first experiment. The IV was the same with the exception that participants were also given self-management devices during certain portions of the intervention phase. The first and third participants used self-management wrist devices that would require them to press a button after a compliment occurred. The second participant was not able to press the button on the wrist device without assistance so she was instead provided with a checklist and a pen, which she could use to

record compliments. IOA data was collected over 50%, 50%, and 54% of the sessions and was reported to be 100%. Procedural reliability was reported to range from 89% to 100%.

There were five phases in this experiment. The first phase was baseline and was described as being similar to the baseline phase in the first experiment. The PVM intervention was introduced in the second phase. This phase was also described as being similar to the PVM intervention in the first experiment. The third phase was the self-management teaching phase and targeted only compliment giving initiations. There were two variations of this phase. The first variant involved each participant first watching the PVM video in a separate room. After the video ended the supervising adult (usually the teacher) would show each participant a self-management device and (if applicable) place the device on the participant's wrist (the second participant was shown the checklist). The supervising adult then verbally mentioned that the participant would receive a reward once two compliments were made, modeled two compliment giving initiations, modeled pressing the button on the wrist device (or checking boxes on the checklist), and then modeled retrieving an reward. The adult would then show the participant the prize that he/she would receive if criteria were met, prompted the participant to perform two compliments, prompted the participant to record the compliments (i.e., wrist device or checklist) and then told the participant to take the prize. Once the participant was able to perform the two compliments, he/she was returned to the classroom. For the second variant the adult provided instruction and delivered prompts in the regular classroom (instead of the separate room that the videos were shown in). These sessions involved the adult verbally prompting the participant that he or she needed to perform two compliments in order to earn a reward. If two initiated compliments were provided before the end of the session, the participant was told to see the teacher to obtain his/her reward. If an initiated compliment was not provided within two minutes,

the adult delivered a verbal reminder and then waited ten seconds for a compliment. If the participant failed to make a compliment then the adult would model giving a compliment. If the participant did not perform the second compliment after the fourth minute, the adult would once again start with a verbal prompt, then (if necessary) follow that by modeling giving a compliment. The fourth phase was the self-management phase. Once again only compliment giving initiations were targeted. This phase was essentially the same as the second variant of the self-management teaching phase with the exception that adults did not model compliment giving and that verbal prompts at that two and four minute marks were faded thereafter if they were not needed. The fifth phase was the generalization phase. This phase was reported to have occurred at the same time that the self-management phase occurred. During this phase data was collected during times other than when free-play was scheduled. Prompts at the two and four minute level marks were used, along with verbal praise when participants used compliments. The PVM video was not shown during this phase.

Data collected during the experiment was presented across two different graphs. The first graph depicts the frequency of compliments for each session across the three participants. Because the first participant had already participated in the first experiment, the researchers did not collect baseline data for him. Baseline data for the second and third participants demonstrated that both did not perform initiations and responses throughout this entire phase. After four sessions had passed for the second participant, and six sessions had passed for the third participant, the PVM intervention was introduced. Similar to the first experiment, introduction of PVM resulted in an increase in compliment giving responses for both the second and third participants (both increased and stabilized at two responses per session), but had no effect on increasing compliment-giving initiations. The PVM intervention was not introduced to

the first participant because he had already experienced that during the first experiment. Following the PVM phase the researchers then introduced the self-management teaching phase to all three participants (note that this was the first recorded intervention that the first participant received in the second experiment and also the first time data was collected for this participant). This resulted in compliment giving initiations for all three participants increasing and stabilizing at two per session across the entire phase. Introduction of the self-management phase resulted in initiations continuing to be performed at a stable two per session across the entire phase for the second and third participants. However for the first participant, introduction of this phase resulted in initiations varying between zero and two per session. The second graph depicts the compliment giving responses performed during the generalization phase for both the second and third participants. Data collected across four sessions for each participant suggest a relatively stable performance in responses with the second participant performing an average of 1.75 per session and the third participant performing an average of 1.5 per session. Generalization data was not collected for the first participant.

Overall results suggest that PVM alone was effective at increasing the number of compliment giving responses for two participants however had no effect at increasing the number of compliment giving initiations. Introduction of the self-management teaching strategy served to increase the number of compliment giving initiations performed by all three participants. These behaviors maintained relatively stable throughout the rest of the study. A limitation described by the researchers was the amount of time spent creating the PVM video. The researchers suggest that it would be more efficient to use adults as actors and have them model the appropriate behaviors.

Gena et al. (2005) conducted a comparison study with two purposes using a multiple baseline design across participants that included a return to baseline. The first purpose was to investigate the effects of PVM as an intervention delivered in the home setting to teach affective behaviors to three preschool-aged children with DD. The second purpose was to compare the effects of PVM to in-vivo modeling in teaching affective behaviors in three preschool-aged children with DD. All three participants were diagnosed with autism, had received services for at least two years before participating in this study, were able to communicate using complete sentences, were able to imitate, were able to identify both verbal and nonverbal responses (e.g., joy, anger, sadness), attended half-day preschool, and had not been exposed to VM as an intervention. When the participants were asked to respond to situations in which certain types of affective responses would be appropriate (e.g., sympathy, disapproval, appreciation) their responses were limited (Yes or No) or they provided no response. The first participant was a five year and seven month old female who lived in Athens, Greece. She was reported to have been diagnosed with a mild ID. The second participant was a four year and four month old male from New York who was reported to have an IQ score of 50 as measured by the revised *Stanford-Binet*. The third participant was a three years and eleven months old male from New York who was reported to have an IQ score of 100 as measured by the revised *Stanford-Binet*. At least two peers participated in the video as actors. They were described as being of the same gender and same age of the participant who would watch those videos. No further descriptions about the peers were provided by the researchers.

This study's occurred in the participant's homes. The physical location for the first and second participants remained the same throughout. The physical location for the third participant changed throughout the study because the family moved more than once.



Gena et al. (2005) defined the DV, affective behavior, as a collection of responses. They then defined three categories of responses: (a) sympathy (e.g., “I’m sorry”); (b) appreciation (e.g., “Thank you”); and (c) disapproval (e.g., “No, I don’t like that”). Affective behaviors were recorded as having been performed when participants responded appropriately and specifically (sympathy, appreciation, or disapproval), responses occurred within five seconds, and eye contact was made while responding. There were two different IVs for this study. The first IV was in-vivo modeling and was described as an individual modeling the appropriate affective behaviors live and in person for the participants, and then having the participants imitate those behaviors. Prompts (verbal and gestural) and reinforcement were provided when appropriate. The second IV was PVM and was described as videos of a same age and same gender peer modeling appropriate affective behaviors. The videos themselves were recorded on videotape and played on a TV using a VCR. One videotape for each type of response was created (sympathy, disapproval, and appreciation). Sessions were conducted by three psychologists (one for each child). Each psychologist was already familiar with the child he/she was assigned to having worked with the individual prior to this study. The psychologists, along with research assistants, were responsible for collecting data during the sessions. Two to four sessions were conducted per week each of which lasted 15-20 minutes and were comprised of 14 trials. Ten of the trials were considered as training trials and the other four were probes. A point-by-point comparison method was used to calculate IOA and was reported to be between 90%-100%.

There were five phases in this experiment: (a) baseline phase; (b) in-vivo modeling intervention phase; (c) PVM intervention phase; (d) generalization phase; and (e) follow-up phase. During the baseline phase reinforcement was not provided if a participant performed the target behavior (however verbal praise was provided if the child performed other appropriate

behaviors). The baseline phase was introduced on two separate occasions for each participant. During the in-vivo modeling intervention phase the interventionist modeled the appropriate target behaviors and then used prompts and reinforcement to teach participants to imitate those behaviors. During the PVM intervention phase procedures similar to the in-vivo condition was used with the exception that the interventionist would show the video instead of modeling the target behaviors. After the video ended the interventionist would then ask the participant to perform the behaviors that were performed by the peer. Generalization was similar to the baseline phase with the exception that different individuals were introduced for the participant to respond to (participant's mother and a different interventionist). For the follow-up phase, participants were exposed to the same conditions as in baseline, however these sessions occurred one and three months after the second intervention phase had ended.

Data collected were presented and analyzed in graph format. The graph depicts the percent of affective behaviors that participants performed across sessions. Both training and probe data appear on the graph. During the first baseline phase affective responses were not performed (first participant) or were performed at low-levels (second and third participants). Introduction of the first intervention phase, which for the first and third participants were in-vivo modeling, and for the second participant was PVM, resulted in an increase in affective responses performed by all participants. For the first participant, affective behaviors performed resulted in an accelerating trend with the percentage of responses reaching 90% on two consecutive sessions during training trials and peaking at 100% during probe trials on four separate occasions. Introduction of PVM for the second participant resulted in affective behaviors continuing to be performed at baseline levels for a few sessions. Performance of affective behaviors then reflected an accelerating trend with the percentage of responses performed during probe trials increasing

from 0% in one session to 100% during the next session. Performance towards the end of the intervention phase, while variable for the second participant, remained at the mid to high level for responses performed during training trials and at a high level for responses performed during probe trials. Introduction of the in-vivo modeling intervention to the third participant also resulted in a continuation of baseline performance at the beginning of the phase. After the first two sessions however, performance, though variable, increased (accelerating trend) with the percentage of affective responses peaking at 100% on 5 separate occasions during probe trials and reaching 90% on two consecutive sessions during training trials. Reintroduction of the baseline phase resulted in the performance of the target behavior returning to baseline levels for the second participant (zero trend during training trials and decelerating trend during probe trials). Reintroduction of baseline conditions for the first and third participants resulted in variable but decelerating trends in behavior to near low-levels. The researchers then introduced the second intervention phase. The intervention that participants received during this phase was the treatment that they did not receive during the first intervention phase. Introduction of the PVM treatment to the first and third participants resulted in an overall increase in the percentage of affective responses performed. Performance was variable for the first participant but reflected an accelerating trend and remained in the mid to high level range peaking at 100% during both training and probe trials in four separate occasions. Performance was also variable for the third participant but reflected an accelerating trend and (with one exception) remained in the mid to high level range peaking at 100% during two separate probe trials and 90% during the final training trial. Introduction of the in-vivo modeling treatment for the second participant resulted in an accelerating trend with performance peaking at 100% during the final session for both training and probe trials. Generalization and follow-up data continue to be at the mid to high

level suggesting that all three participants were able to generalize affective responses to other individuals and other scenarios, and that those behaviors were maintained.

Findings from Gena et al. (2005) suggest that both in-vivo modeling and PVM increased the number of affective behaviors performed by three preschool-aged children with DD. Overall performance on target behaviors for all participants increased from low-levels to high levels once treatments were introduced, decreased back to low-levels once treatments were withdrawn, and increased back to high levels when different treatments were introduced. Furthermore, target behaviors generalized to other individuals and other scenarios, and were maintained. The researchers were unable to conclude which treatment was most effective however anecdotal evidence suggests that VM may be more efficient in teaching “acquisition of appropriate tone of voice and facial expressions” (Gena et al., 2005, p. 554). One limitation was that the researchers were not able to assess participant performance in different settings outside of the home (e.g., playground or school grounds).

In Rudy et al. (2014) the researchers investigated the effects of PVM on the independent initiations of actions related to joint attention in three young children with DD using a multiple-baseline across participants design. All three children were five, were diagnosed with autism or other forms of DD, and did not initiate a complete independent action for joint attention. The first participant was a five-year-old male with autism. He was identified to be in the severely autistic range after being assessed by the Childhood Autism Rating Scale. This participant was able to communicate with two to three word sentences, imitate verbal and motor actions of both peers and adults, physically approach other individuals, make eye contact, track, and when given a list of five instructions, progress through them independently. The second participant was a five-year-old male with autism. He was identified to be in the moderately autistic range

according to the Childhood Autism Rating Scale. He was able to communicate with four to five word sentences, interact with peers verbally when provided prompts, imitate others, make eye contact, and track. The third participant was a five-year-old female with autism. She was identified to be in the mild to moderately autistic range according to the Childhood Autism Rating Scale. She was able to interact with peers verbally when provided prompts, use four to five word sentences, imitate others, request using a minimum of ten words, make eye contact, and track. In addition to the three participants, two other individuals participated by serving as actors in the VM video. The first actor was a five-year-old female. The researchers did not state whether or not the three participants were familiar with the peer actor. The second actor was an adult.

The study took place in a university setting in which services were provided to individuals with autism. Both the university's hallways and classrooms were used throughout the study. The researchers attempted to minimize distractions by closing hallway doors and limiting access to the setting to only those participating directly in the intervention and to the individual collecting data.

Rudy et al. (2014) defined the DV, joint attention, as the shifting of attention from between individuals, to an object, and vice versa. Joint attention behaviors included performing all of the following: (a) pointing at an object (pointing); (b) looking directly at an object (orienting); (c) making a verbal statement about an item (vocal); and (d) transitioning from looking at an object to looking at another individual without having been prompted (shifting eye gaze). The IV was a PVM video that was 68 seconds in length. In the video the peer modeled the appropriate joint attention behaviors with five unique objects (e.g., pompoms). The adult's role was to verbally respond to the peer's behavior. A trial-by-trial method of data collection was

used by the researchers. A participant had the opportunity to elicit a bid for joint attention if he or she physically moved towards one of the ten preset stimuli presented by the researchers. Each opportunity served as one trial. The data collector would mark a plus (+) if the participant performed the joint attention behaviors and a minus (-) if the participant did not. Other than the primary data collector, a second individual also collected data for the purpose of IOA. Using trial-by-trial IOA, the mean IOA was reported to be 100% for the first participant, 98.9% for the second participant, and 98.7% for the third participant.

Baseline sessions were comprised of 10 trials. Each trial was estimated to be about five minutes in length (though the length was reported to vary depending on the participant). Anywhere from one to three sessions occurred each day and were at least 30 minutes apart. During baseline the interventionist would deliver a verbal prompt that instructed the participant to take a walk in the hallway. In the hallway itself the researchers placed 10 unique objects (e.g., pompoms). A participant had the opportunity to elicit a bid for joint attention if he or she physically moved towards one of the ten preset stimuli. This opportunity would serve as one trial. A trial would end if a participant performed the target behaviors or if he or she walked more than one meter past one of the unique objects. Partial or successful performance of the target behaviors resulted in the interventionist delivering reinforcement verbally. If participants walked more than one meter past a specific item, and then attempted to return to that item, then the interventionist would not allow them to do so. If participants engaged in problem behavior, the interventionist would ignore it and redirect the participants to continue walking down the hallway. Intervention sessions were described as similar to baseline sessions with four exceptions. First, the participants were shown the VM video on an iPad in an adjacent classroom prior to the interventionist instructing the participants to walk down the hallway. Secondly, if

while the video is playing participants are not watching the video for longer than three seconds, the interventionist would verbally redirect the participants back to the video. Thirdly, if it was apparent to the interventionist that the participants did not watch at least 20 seconds of the video, then the session would end for that day. Finally, while the VM video depicts the actors interacting with the same five unique objects placed in the hallway, the other five unique objects do not appear in the video. These five served to measure if the participants were able to generalize target behaviors to objects not shown in the video. For the female participant it was determined about half way through the study's intervention phase that the VM intervention alone did not result in a significant change in the ability to perform the eye gaze portion of the joint attention behaviors. Therefore, the researchers had the interventionist introduce a physical prompt if the participant had already performed all of the other target behaviors (orient, point, and vocal) during a given trial. Procedural fidelity was collected on 42%, 43%, and 47% of the sessions and was reported to be 100% across all participants.

Data were presented in graph format and analyzed visually by the researchers. Two graphs were presented. The first graph depicts the percentage of trials that resulted in all target behaviors (bids for joint attention) performed independently. Objects that appeared in the video and objects that did not were graphed separately. Baseline data collected across all three participants suggest no occurrence of the target behaviors for the first and third participants, and low-level performance for the second participant. Upon introduction of the intervention for the first participant, occurrence percentages increased to 20% and eventually stabilized at 100% starting from the fifteenth session for objects that were included in the video ( $M = 73\%$ ). A one-week follow-up found that all target behaviors were continually being performed ( $M = 100\%$ ). However, those target behaviors did not generalize as the first participant did not perform

independent bids for joint attention for objects not shown in the video ( $M = 0\%$ ) across the entire intervention phase including the follow-up. Data presented for the second participant suggests that VM increased the occurrence of the target behaviors with an increase to 80% for the first session of the intervention phase for objects that were included in the video. Occurrence of the target behaviors peaked at 100% after the third session in the intervention phase and remained there for the duration of the study. The mean percentage was reported to be  $M = 96\%$  and the one-week follow-up was 100%. Similar to the first participant, the second participant did not perform independent bids for joint attention for objects not shown in the video across the entire intervention phase ( $M = 0\%$ ). Introduction of the intervention for the third participant resulted in a 20% increase in performance of the target behaviors after the third session for objects that were included in the video. However, those behaviors peaked at 20% ( $M = 6\%$ ) resulting in the researchers adding a physical prompt component to the VM treatment. Occurrence of the target behaviors after adding the prompt were variable peaking at 80% twice during the intervention phase and raising the mean to  $M = 46\%$ . Follow-up data was not collected for the third participant and she did not perform the target behaviors for objects not shown in the video ( $M = 0\%$ ) across the entire intervention phase.

The second graph depicts the percentage that each of the individual target behaviors (point/orient, vocal, eye gaze) was performed independently across the baseline and intervention phases for objects in the video. During the baseline phase, the first participant pointed and oriented for  $M = 46\%$  of sessions but did not perform the vocal and eye gaze behaviors. During the intervention phase, the first participant performed pointing/orienting 100% of the time starting from the second session, performed at 100% for the vocal portion starting from the fourth session, and performed the eye gaze at 100% starting from the fifteenth session with



overall means of  $M = 98\%$  for pointing/orienting,  $M = 96\%$  for vocal, and  $M = 73\%$  for eye gaze. The second participant's performance of the individual target behaviors were variable during the baseline phase: (a)  $M = 55\%$  for pointing/orienting; (b)  $M = 60\%$  for vocal; and (c)  $M = 4\%$  for eye gaze. After implementation of VM, all behaviors increased to 100% starting from the third session with means of  $M = 100\%$  for pointing/orienting,  $M = 96\%$  for vocal, and  $M = 96\%$  for eye gaze. The third participant's performance of the individual target behaviors demonstrated an accelerating trend for pointing/orienting ( $M = 25\%$ ), and stability for vocal and eye gaze ( $M = 0\%$  for both) during the baseline phase. After implementation of VM, performance increased to 100% for both pointing/orienting (starting from third session) and vocalizations (starting from fifth session) and remained there throughout the duration of the entire intervention phase. Eye gaze for participant three peaked at 20% occurrence with VM only. After the addition of the physical prompting component, it increased to 80% after the fourth session and varied between 60% and 80% until the end of the study.

Overall results suggest that PVM was effective at increasing the number of independent bids for joint attention performed by two of the three participants. A combination of VM plus physical prompting was effective at increasing the number of independent bids for joint attention performed for the third participant. The researchers listed three limitations to their current study in that they did not: (a) collect generalization data in different settings (the entire study took place in the same setting); (b) incorporate steps that may have improved generalization across different objects; and (c) plan for the possibility that participants may have lost interest and thus ignored the 10 novel objects in the hallway.

The purpose of the study conducted by Kourassanis et al. (2015) was to examine the effects of PVM on teaching to two young children with autism how to play social games. To do

so the researchers utilized a multiple baseline design across two social games (Kourassanis et al., 2015). The first participant was a five-year-old female who was diagnosed with PDD-NOS and exhibited delayed echolalia. She was described as having a large vocabulary, liked to read, and enjoyed working on puzzles. This individual was able to play appropriately with toys however she would often play by herself, did not enjoy sharing and playing with her peers, and would engage in tantrumming if another individual played with an object that she wanted to play with. The second participant was a six-year-old male who was diagnosed with autism. This individual was described as being more interested in playing video games than interacting with other individuals (both peers and adults). He was reported to not initiate social interactions. Both individuals were selected as participants because they were able to use sentences, had a large vocabulary, were able to imitate and follow directions, and did not actively participate in-group activities on their own.

The setting this study took place in was a center that provided training and support to children with disabilities and their parents. Both participants were members of a group that would meet weekly to work on social skills. The group itself was comprised of children with autism and was run by one of the researchers.

The DV was the percentage of social game steps performed correctly and independently. The steps were from two task analyses, one for Duck Duck Goose (six steps total) and one for Hokey Pokey (nineteen steps total), that were created by one of the researchers. The IV was two PVM videos. One video was a *“Let’s Play” Watch Me Learn* video clip and the second was a *YouTube* video clip. The videos themselves depicted children without disabilities, from both genders and of similar age to the participants, playing games. The first video showed five children playing Duck Duck Goose. The second video showed six children playing Hokey

Pokey. These videos were about 40 seconds in duration. The participants were not acquainted with the children in the videos. Data collection involved researchers reviewing video of participants. A participant was marked as performing a step correctly when conditions were appropriate for the step to be performed, the participant performed the step within five seconds, and the order of the step was correct. Steps that were performed in response to interventionist prompts were recorded but not marked as correct. IOA data was collected on 31% of the sessions and was reported to be 98%. Treatment integrity was reported to be 100%.

There were two phases in this study: the baseline phase and the intervention phase. During the baseline phase participants were first allowed to participate in regularly scheduled social skills group activities. At a prescheduled time the interventionist led a participant to a separate room. In this room the interventionist would introduce Duck Duck Goose, take a three-minute break, and then introduce Hokey Pokey. At the conclusion of Hokey Pokey the interventionist would lead the participant back to the room where the social skills group activities took place. Feedback and reinforcement was not provided during baseline. The researchers referred to these as “no-video probe” sessions (Kourassanis et al., 2015, p. 29). Sessions during the intervention phase would occur in a similar manner to no-video probe sessions up until after Hokey Pokey ended. After Hokey Pokey ended the interventionist would show the participant the first PVM video on a television. As soon as the video ended the participant was given the opportunity to play Duck Duck Goose again. This was followed by a three-minute break, viewing of the second PVM video on the same television, and then the opportunity to play Hokey Pokey. The interventionist provided praise when steps were performed correctly. If a participant did not perform a given step for two consecutive sessions, the interventionist would implement a least to most intrusive prompt hierarchy. Praise was delivered upon performance of

prompted behavior. The researchers referred to the procedures that included showing of the PVM video as “post-video probe” sessions (Kourassanis et al., 2015, p. 32). In order to meet criterion a participant must have performed at a minimum of 90% for two consecutive sessions. If this occurred, the intervention phase would end. Though not a specific phase, generalization data was periodically collected and involved the researchers collecting data on participant performance for a third game (Ring Around the Rosey), using a third task analysis (created by one of the researchers), and using the same procedures during no-video probe sessions. Generalization data was collected once during baseline and twice during intervention for each participant.

Data collected were presented in two graphs. Each graph depicts the percentage of social game steps performed correctly and independently across sessions for each participant. Baseline data collected for the first participant depict stable, almost zero trend, low-level performance of social game steps for both games (both below 15% performance). Generalization probe data collected during baseline suggest the same with performance at 20%. Baseline data collected for the second participant also depict stable, zero trend (Hokey Pokey) or almost no trend (Duck Duck Goose), low-level performance of social game steps for both games (between 17% and 25% for both games). However, generalization probe data collected during baseline was at 50%. Introduction of the intervention for both participants resulted in variable but accelerating trends for both games across both no-video probes and post-video probes. The first participant reached criterion for both games for post-video probes but did not meet criterion for no-video probe sessions (83% for Duck Duck Goose and 89% for Hokey Pokey). The second participant reached criterion for both games for post-video probes and met criterion during no-video probe sessions for Duck Duck Goose but not for Hokey Pokey (89%). Generalization probe data collected during the intervention phase resulted in mid-level performance for both participants (50% for

the first participant and 60% for the second participant). Results from the social validity questionnaires suggest that parents supported intervention procedures and the teaching of social skills to their children.

Findings from Kourassanis et al. (2015) suggest that use of PVM was effective at teaching to two young children with autism how to play social games. Overall performance on target behaviors increased from low-levels during baseline to levels at or near criterion following introduction of the intervention. A limitation with this study was that actors in the videos were children that the participants were not familiar with. The researchers suggest that had the peer actors been familiar or preferred individuals, that the participants may have paid more attention to the PVM videos.

**Comparison studies.** In Cihak et al. (2012) the researchers utilized an alternating treatments design to compare the effects of Picture Exchange Communication System (PECS) only against the use of PVM plus PECS to teach independent social initiations to four preschool children with autism and developmental delays. All four children received special education and related services in a separate classroom setting that had assigned to it eight children, one special education teacher, one paraprofessional, one intern, and one nurse. The four participants also received instruction in an inclusive environment for four hours a week. Each inclusive classroom had assigned to it 15 to 18 students, one teacher, and one paraprofessional. The first participant was a three-year-old female diagnosed with autism. This participant's scores on the personal, social communication, and cognitive subtests on the *Battelle Developmental Inventory - Second Edition* were exceptional and scores on subtests on communication, socialization, and motor skills on the *Vineland Adaptive Behavior Scale - Second Edition* were also reported to be exceptional. The first participant did not use words at school, though was reported to utter words

at home. The second participant was a three-year-old male with developmental delays. This participant's scores on the adaptive, motor, personal-social, communication, and cognition subtests on the *Battelle Developmental Inventory - Second Edition* were in the exceptional range (first to fourth percentile) and scores on subtests on communication, daily living skills, socialization, and motor skills on the *Vineland Adaptive Behavior Scale - Second Edition* were reported to be in the first percentile. The second participant did not use words however was reported to babble syllables. Both the first and second participants were assigned to the same inclusive classroom. The third participant was a three-year-old male diagnosed with autism. On the *Bayley Scales of Infant and Toddler Development* this participant's score was reported to be 80 (equivalent age of 24 months). This participant's scores on the *Gilliam Autism Rating Scale - Second Edition* suggested that he was "in the 'very likely' category of autism" (Cihak et al., 2012, p. 5). On the *Vineland Adaptive Behavior Scale - Second Edition* this participant's score was 64. This individual did not use words however was able to make requests through various motor movements (pointing or leading another person to an object). He was also assigned to a different inclusive classroom from the first two participants. The fourth participant was a three-year-old male with developmental delays. This participant's scored a 50 on the *Preschool Language Scale - Fourth Edition* and on the *Early Learning Accomplishment Profile* he scored a 4. This individual did not verbally communicate however he was able to point to desired objects. This individual was also assigned to a different inclusive classroom from the other three participants. All four participants had not used PECS or VM until this study occurred. A typically developing four-year-old female, who also attended the same school as the participants, participated as the actor in three PVM videos (videos differed based on the setting in which the exchange took place). The videos themselves ranged from 20 to 30 seconds in length. The setting

for this study was an elementary public school located in the southeastern U.S. that was attended by more than 650 students and staffed by 50 faculty and staff.

Cihak et al. (2012) defined the DV as initiations that were made independently (e.g., participant independently picked up picture symbol and gave it to a teacher). The IV was either PECS only or VM with PECS. The PECS only treatment involved a participant requesting a preferred item by picking up a picture symbol and giving that symbol to the teacher intern. The teacher intern, in exchange for the picture symbol, would give the participant the preferred item. Assistance during the exchange (if needed) was provided by either the special education teacher or the paraprofessional. The VM plus PECS treatment was similar to the PECS only treatment with one exception: each participant was first shown one of the three videos on a laptop before the opportunity to exchange occurred. The settings in which the participants were in dictated which of the three videos they were shown. Data collection occurred in the inclusive classroom settings and involved recording the number of initiations that were made independently. Data was collected by the special education teacher and the paraprofessional. The teacher collected data across all sessions. The paraprofessional collected data across at least 50% of the sessions. Each session consisted of 10 trials. Percentages were calculated by dividing the number of initiations that were performed independently by 10. The mean IOA was reported to be 96% for the first participant, 92% for the second participant, 89% for the third participant, and 95% for the fourth participant. The mean treatment integrity was reported to be 96% for the first participant, 97% for the second participant, 94% for the third participant, and 95% for the fourth participant.

Baseline sessions lasted for a total of three sessions per participant. Each trial began with the participant and the teacher intern sitting and facing each other. In between them was a picture

symbol. The intern also placed a preferred item (e.g., food or toy) approximately three feet from the participant. Once a trial began each participant had 30 seconds to exchange the picture symbol for the preferred item. No prompts (verbal or physical) were used. Intervention sessions during the comparison phase (second phase) occurred in a similar manner to baseline sessions except additional instruction and assistance was provided. As explained previously (and in contrast to the baseline phase), for the PECS only treatment, assistance during the exchange was provided when necessary. Furthermore, if a participant failed to exchange the picture symbol for the preferred item within the 30 seconds time limit, either the special education teacher or paraprofessional would provide physical assistance such that the child was able to complete the exchange. The preferred item for the PECS only treatment for the first and second participants was a consumable item (i.e., snack item or drink) while the preferred item for the PECS only treatment for the third and fourth participants was a toy. For the VM plus PECS treatment, participants were first shown the appropriate PVM video before the opportunity to make the exchange occurred. At the conclusion of the video, intervention procedures were exactly the same as during the PECS sessions. The preferred item for the VM plus PECS treatment for the first and second participants was a toy while the preferred item for the VM plus PECS treatment for the third and fourth participants was a consumable item. The first intervention in which each participant was able to independently initiate at 100% for three consecutive sessions (which was also the criterion) was deemed as the most efficient treatment. Once each participant met criterion, participants entered what the researchers referred to as the “replication phase” (Cihak et al., 2012, p. 6). This phase involved the intern implementing only the treatment that was found to be most effective and using the preferred item that was used for the treatment that was least effective.



Data collected were graphed and visually analyzed by the researchers. Results were presented across four graphs, which displayed the percentage of exchanges (initiations) that were performed independently. Baseline data for all four participants was at 0% (flat and stable), meaning that no independent exchanges were performed. This resulted in all four participants entering the comparison phase starting from the fourth session. The first intervention delivered to the first and third participants was the PECS only treatment. The first intervention delivered to the second and fourth participants was the VM plus PECS treatment. Upon entering the comparison phase, the first participant's performance started at the low to mid level (20% for PECS only and 30% for VM plus PECS) but steadily increased for both treatments ending with a mean of 58.3% for PECS only and 75% for VM plus PECS. The first participant reached 100% (all exchanges were performed independently) for only the VM plus PECS treatment on the eleventh overall session. The first participant did not reach 100% under the PECS only treatment (highest performance was 80%). The second participant's performance started at around the mid level (30% for PECS only and 50% for VM plus PECS) and steadily increased for both treatments. This participant reached 100% on the 10th overall session for VM plus PECS, and the 17th overall session for PECS only. The mean percentage for this participant was 75.7% for PECS only and 82.5% for VM plus PECS. Of note for the second participant was that once this individual reached 100% with the VM plus PECS treatment, his performance never dipped below 90% for both treatments. The third participant's performance started at 0% for PECS only and 60% for VM plus PECS. From there this participant's performance was variable but generally increased. The third participant reached 100% on only the VM plus PECS treatment starting from the 16th session. Performance on the PECS only treatment reached 70% on the 18th session and leveled off from there until the end of the comparison phase. The mean

percentage for this participant was 32% for PECS only and 78.8% for VM plus PECS. Similar to the first participant, the fourth participant began the comparison phase performing at the low to mid level (20% for PECS only and 30% for VM plus PECS). This individual's performance then gradually increased reaching 100% at the 14th session for the VM plus PECS treatment and 15th session for the PECS only treatment. However, while the fourth participant maintained 100% performance with the VM plus PECS treatment until the end of the comparison phase, his mean performance with the PECS only treatment was 85% after the 15th session. Overall the mean percentage of exchanges for this participant was 58.8% for PECS only and 71.3% for VM plus PECS. Implementation of the replication phase for all four participants involved the use of the VM plus PECS intervention. While performance varied between 70% and 100% for the first participant, 90% and 100% for the second and third participants, and 80% and 100% for the fourth participant, all individuals ended the study at 100%. Social validity data collected suggest that classroom staff felt that the VM plus PECS intervention benefitted participants and that they planned to expand the use of VM to teach other skills.

Results presented by Cihak et al. (2012) suggest that all participants were taught to use PECS to initiate independently. When comparing the two interventions, the VM plus PECS treatment was found to be more efficient with the average amount of sessions taken to reach criterion at 7.25 and with all participants meeting criterion. In contrast no participants met criterion with the PECS only intervention. Limitations were lack of generalizability (i.e., low number of participants), lack of time, only one peer model was used (i.e., participants may have performed the target behaviors faster if the model was more similar to them), and that participants may simply have been highly motivated to obtain the food/toy item.

A study conducted by Sani-Bozkurt and Ozen (2015) utilized an adapted alternating treatments design to compare the effects of PVM and VM using adults in teaching cooking and first aid pretend play skills to three young children with autism. All three children experienced impairments in social skills and play skills, experienced difficulty with interacting with peers, and were unable to maintain a conversation. However they were able to attend to a computer for a minimum of two minutes, attend to an activity for a minimum of two to three minutes, follow simple directions, and imitate other individuals. The first participant was a six-year-old male with autism. The second participant was a five-year-old male with autism. The third participant was a six-year-old female with autism. Two individuals participated as actors in the VM videos. The first was a typically developing female peer who was described as being of similar age to the participants. The second individual, an adult, was the peer's mother. The participants were not familiar with both individuals.

This study took place in three different areas on a university campus. Majority of the study was conducted in a room three by four meters. The generalization sessions of the study took place in a kitchen area and a physiotherapy room.

The researchers identified the DV as pretend play skills. Two sets of pretend play skills were listed: cooking soup and first aid. Each set was comprised of a 15-step task analysis. There were two IVs in this study: PVM videos and VM videos with an adult as an actor (one video each of both actors modeling cooking soup, and one video each of both actors modeling first aid). The researchers then created another VM video that they used, along with in-vivo modeling, to train the actors the target behaviors that needed to be portrayed. Data were collected on the amount of correct responses in each task analysis that were performed in each session.

Inter-observer reliability and treatment reliability data collected throughout all phases of the study were reported to be 100%.

Baseline sessions were comprised of one trial per session. To begin a session the interventionist working with each participant would first get the child's attention. Once the child responded, the interventionist would then reinforce that response and then verbally instruct the participant to attend to the pretend play task at hand (either pretend play making soup or pretend play first aid) and then wait five seconds for a response. If the participant performed the appropriate step in the task analysis, then the interventionist delivered positive reinforcement in the form of verbal praise. If the participant did not perform the appropriate step in the task analysis, then the interventionist ignored the response and ended the session. In addition to the baseline sessions, daily probe sessions were conducted. These sessions occurred before training for that day. The conditions that participants were exposed to during the daily probe sessions were the same as during baseline. After three consecutive days of stable performance during baseline, the comparison phase began which resulted in the researchers introducing the VM treatments in an alternating manner. VM treatment sessions involved a participant and the interventionist sitting at a computer. The interventionist would first get the participant's attention. Once the participant responded, the interventionist would then reinforce that response and then the appropriate VM video would be shown to that individual. After the video ended the interventionist would provide reinforcement and then take the participant to the appropriate play area (kitchen or physiotherapy room). As during baseline, the interventionist would get the participant's attention, praise the child once he or she responded, verbally ask the individual to perform the appropriate pretend play task, and then waited five seconds for a response. A correct performance of the step resulted in verbal praise while an incorrect performance was ignored.

The researchers conducted maintenance and generalization sessions for all participants. The conditions participants were exposed to for both maintenance and generalization were the same as during baseline with the exception that generalization sessions occurred in environments that were different (kitchen area and a physiotherapy room), used different toys, and incorporated different people.

Data collected were graphed and visually analyzed by the researchers. Results were presented across three graphs and one data table. All three graphs display the percentage of responses that participants got correct. Baseline data for all three participants demonstrate a stable, flat performance (0% correct responses for all participants). Since baseline data were stable, the researchers introduced the VM interventions beginning with the fourth session for each participant. The first participant's performance then steadily increased and reached 100% correct (all steps in the task analysis performed) for both sets of behaviors on the seventh session of the comparison phase (tenth session overall counting baseline). The first participant then performed at 100% for two more sessions, thus signaling the end of the comparison phase for this individual. At the beginning of the comparison phase the second participant's performance continued to be the same as during baseline (0%) for four straight sessions for both sets of behaviors. Starting from the fifth session on the first aid tasks, and the sixth session for the cooking soup tasks, the second participant began performing steps correctly. The second participant then increased and reached 100% performance on the 11th session (14 session overall counting baseline) for first aid and the 12th session (15th overall) for cooking soup. Performance continued at 100% correct for two more sessions each, thus ending the comparison phase for the second participant. The researchers hypothesized that the reason why the second participant took longer to reach criterion than the first participant was due to the second participant having to take

time off due to health related reasons. Similar to the first participant's performance, the third participant increased and reached 100% correct (all steps in the task analysis performed) for both sets of behaviors on the seventh session of the comparison phase (tenth session overall counting baseline), and continued to perform at 100% for two sessions thereafter with delivery of the interventions ending after the ninth session (twelfth overall). The researchers conducted three maintenance sessions per participant. These sessions were reported to have occurred on the seventh, fourteenth, and twenty-eighth day after the child had met criterion. All three participants performed at 100% correct for both sets of target behaviors across all three sessions each. Participants also performed at 100% correct for generalization sessions. The data table presented by the researchers describes the efficiency of each participant's responses. It does so by listing the amount of sessions that each participant took to meet criterion, the amount of incorrect responses performed by each participant, and the amount of time that was spent teaching each participant. Results from the table suggest no significant differences between the two types of VM however the researchers found that it took less time (i.e., minutes and seconds of training) for two of the three participants to reach criterion with the PVM intervention. Social validity data revealed that parents felt positive about both interventions however they preferred PVM to VM using adults as actors.

Results presented by Sani-Bozkurt and Ozen (2015) suggest that both VM treatments were effective at teaching participants pretend play skills, participants were able to generalize to different settings and different people, and no significant differences were found between treatments. Parents were reportedly satisfied with both treatments though they favored PVM. Finally, the researchers reported two limitations: probe sessions were time consuming and that

since one participant took time off due to health reasons, training that child took much longer than the other two participants.

### **Summary of Research Related to PVM**

Results from quantitative experimental studies conducted in the field have demonstrated that PVM is effective at teaching social skills to young children with DD (Apple et al., 2005; Cihak et al., 2012; Gena et al., 2005; Nikopoulos & Keenan, 2003; Nikopoulos & Keenan, 2004; Rudy et al., 2014; Sani-Bozkurt & Ozen, 2015; Simpson et al., 2004). A few of the qualities of PVM intervention that studies have in common are that video content is individualized to the target student, PVM is not the sole instructional strategy that is used, the videos themselves are relatively short, children who serve as actors in PVM videos are similar to the participants, and the effectiveness of PVM has been compared directly with other social skills interventions. The first component is that video content are usually individualized to the target student (Apple et al., 2005; Nikopoulos & Keenan, 2003) or the specific situation/setting (Cihak et al., 2012; Gena et al., 2005; Kourassanis et al., 2015; Simpson et al., 2004). This usually involves creating more than one video. A second component is that PVM is usually used as part of an instructional package that includes other forms of instruction such as reinforcement (Gena et al., 2005; Nikopoulos & Keenan, 2003), prompting hierarchies (Kourassanis et al., 2015), task analyses (Rudy et al., 2014; Sani-Bozkurt & Ozen, 2015), PECS (Cihak et al., 2012), and self-management techniques (Apple et al., 2005). A third component is that PVM videos are relatively short (Apple et al., 2005; Cihak et al., 2012; Kourassanis et al., 2015; Nikopoulos & Keenan, 2003; Nikopoulos & Keenan, 2004; Rudy et al., 2014; Simpson et al., 2004). PVM videos in the literature were reported to range from four seconds (see Simpson et al., 2004) to 68 seconds in length (Rudy et al., 2014). A fourth component is that studies incorporated the use of

PVM was that the peer actors and the participants who viewed the videos may not have been familiar with each other (Kourassanis et al., 2015; Sani-Bozkurt & Ozen, 2015). What instead happened was that the researchers used peer actors who were typically developing, were able to perform the target behaviors, and were the same or of similar age to the participants (Cihak et al., 2012; Rudy et al., 2014; Sani-Bozkurt & Ozen, 2015; Simpson et al., 2004). Finally, researchers in the field have compared the use of PVM to other social skills interventions such as PECS (Cihak et al., 2012), in-vivo modeling provided by adults (Gena et al., 2005), and other forms of VM (Sani-Bozkurt & Ozen, 2015). Their results suggest significant differences between PVM and PECS only (favoring PVM) and no significant differences between PVM and in-vivo modeling and PVM and AVM treatments.

### **Review of Literature Summary**

The types of social relationships that individuals with disabilities have with their peers significantly impact their lives (Spooner et al., 2011; Westling & Fox, 2009). The need to teach children with DD social skills is evident in the literature as demonstrated by the vast array of studies that have continued to focus on addressing this issue (see Bellini & Akullian, 2007; Gillis & Butler, 2007; Odom & Strain, 1984; Rogers, 2000; Utley et al., 1997). A review of the literature reveals that both PN (see Garrison-Harrell et al., 1997; Kamps et al., 1997; Kamps et al., 2014; Mason et al., 2014; McFadden et al., 2014) and VM in the form of PVM (see Apple et al., 2005; Cihak et al., 2012; Gena et al., 2005; Nikopoulos & Keenan, 2003; Nikopoulos & Keenan, 2004; Rudy et al., 2014; Sani-Bozkurt & Ozen, 2015; Simpson et al., 2004) have been demonstrated to be effective intervention strategies that can be used to teach social skills to children with DD. Thus far however, researchers have not focused on comparing the effects of



PVM with live (in-vivo) peers modeling the appropriate target behaviors. This study will seek to address this gap in the literature.

## **CHAPTER 3**

### **Methodology**

It has been suggested that individuals with DD need to be in environments that provide opportunities to practice positively interacting with their peers without disabilities (Spooner et al., 2011; Westling & Fox, 2009). Meaningfully positive interactions will likely only occur when individuals with disabilities are taught the necessary skills to interact with their peers in ways that are deemed to be socially appropriate (Spooner et al., 2011). Two categories of interventions that have been used to teach social skills to children with DD are PMII (Garrison-Harrell et al., 1997; Haring & Breen, 1992; Kamps et al., 2014; McFadden et al., 2014; Utley et al., 1997) and video-based instruction (Bellini, Akullian, et al., 2007; Bellini, Peters, et al., 2007; Buggey, 2012; Buggey et al., 2011; Cihak et al., 2012; D'Ateno et al., 2003; Maione & Mirenda, 2006; van der Meer et al., 2013; Wert & Neisworth, 2003; Wilson, 2013). However which intervention is more effective at teaching social skills to children with DD? To address this question this study involved the application of an ATD to compare the effects of PN, a type of PMII, and PVM, a type of video-based instruction, at increasing the number of positive social interactions in young children with DD in an inclusive classroom setting. Furthermore this study involves an attempt to determine whether or not the effects of the best treatment (either PN or PVM) generalized to a playground setting.

This chapter will begin by restating this study's research questions. Following the presentation of the research questions a description of the participants, settings, instrumentation, materials, experimental design, and procedures will be presented. It will conclude with a description of the procedures that were used to collect data and how those data were analyzed.

## **Research Questions**

The following research questions were addressed:

1. Is PN more effective than PVM at increasing the number of positive social interactions in young children with DD in an inclusive classroom setting? In Chapter One it was predicted that there would be a significant difference between the effects of PN and PVM on the number of positive social interactions performed by preschool aged children with DD in an inclusive classroom setting favoring the PVM intervention.

2. Will the positive effects of the best treatment generalize to the playground setting? In Chapter One it was predicted that PVM will be the most effective treatment and that the effects of that intervention would generalize to the playground setting.

## **Participants**

### **Students With Disabilities**

Five preschool aged children with disabilities participated in this study all of which attended a fully inclusive preschool located in the Southwestern United States who were between 38 months to 72 months of age. Individuals were selected for participation were described as having a disability either through a clinical or educational assessment (Kamps et al., 2014) of which occurred independent of the researcher and comparison raters in this study (McFadden et al., 2014), and because of the description were receiving services under Part B of the Individual with Disabilities Education Act (IDEA). Finally, and based on input provided by the educators working with the child, each research participant must not have had any identified vision or hearing deficits (with or without aid) and must have demonstrated the ability to watch a five minute video on a tablet device (see Shipley-Benamou et al., 2002), imitate a minimum of ten motor movements (see Sani-Bozkurt & Ozen, 2015), be able to communicate with a minimum of

three to four phrases (see Tetreault & Lerman, 2010), and follow simple directions (see Kamps et al., 2014; Kamps et al., 2015). In addition, and in inline with the university’s Institutional Review Board (IRB) recommendation, each research participant’s parent was required to sign an informed consent form and the individual himself was required to sign a youth assent form in order to participate in the study (see Appendix A for the Research Participant Parent Consent Form and Appendix B for Research Participant Youth Assent Form). Once parent consent and youth assessment forms were collected individuals were randomly assigned numerical designations and referred to as such for the remainder of the study. Research participants were also randomly assigned a numerical order for when they would begin the study. Research participant demographic information is presented in Table 1.

Table 1. Research Participant Demographics.

Participant	Age	Gender	Disability
One	4yr 5m	Male	Developmental Delay
Two	3yr 5m	Male	Speech Impairment
Three	5yr 2m	Male	Autism
Four	3yr 2m	Male	Autism
Five	4yr 7m	Male	Developmental Delay

### Typical Peers

A total of 12 peers without disabilities were recruited to serve as possible peer intervention candidates. In order to qualify as a peer each individual must have: (a) been between 36 months to 72 months of age; (b) been in the same classroom as the participant (i.e., share the same teacher as a participant); (c) demonstrated age appropriate use of social and language (expressive and receptive) skills; (d) frequently complied with teacher requests; and (e) consistently attended school. Recruiting of peers was conducted based on input provided by educators who work at the preschool (Garrison-Harrell et al., 1997; Kamps et al., 2014; Kamps et al., 2015; McFadden et al., 2014). In order to be selected for participation, and in inline with

the university's IRB recommendation, each peer's parents were asked to provide informed consent (see Appendix C), and each peer was asked to provide youth assent (see Appendix D). All parents of the 12 typically developing peers consented to have their children participate in the study however one peer chose to not provide youth assent. This brought the final number participating peers to 11 (5 males and 6 females). Three peers were educated in the same classroom as Research Participants One and Five, three peers were educated in the same classroom as Research Participant Two, two peers were educated in the same classroom as Research Participant Three, and three peers were educated in the same classroom as Research Participant Four.

### **Teacher**

Teachers who participated in this study must have had a valid State of Nevada Teaching License and must have been endorsed to teach early childhood, autism, and early childhood developmentally delayed based on the requirements presented by the State of Nevada Department of Education (2012). In total four teachers were selected. All four teachers were required to complete an informed consent form before being allowed to participate (see Appendix E).

Teacher Participant One was female, had taught for 15 years, and had earned a bachelor's degree in elementary education. This individual taught in a four to five year old classroom and was the teacher of record for Research Participants One and Five. Teacher Participant Two was female, had taught for seven months, and had earned a bachelor's degree in psychology and a master's degree in special education with an emphasis in early childhood special education. This individual taught in a three to five year old classroom and was the teacher of record for Research Participant Two. Teacher Participant Three was female, had taught for 16 years, and had earned

a bachelor's degree in elementary education and a master's degree in special education with an emphasis in early childhood special education. This individual taught in a four to five year old classroom and was the teacher of record for Research Participant Three. Teacher Participant Four was female, had taught for 6 years, and had earned a bachelor's degree in early childhood education. This individual taught in a three to four year old classroom and was the teacher of record for Research Participant Four.

In addition to the four teachers, a fifth educator was invited to participate. This individual was a specialized program teaching assistant who, at the beginning of the study, had worked with young children with disabilities for ten and a half years. This individual was asked to participate in the event that one of the four teacher participants did not report to work on a given day.

### **Comparison Raters**

Three individuals, two special education doctoral students and one graduate of the special education doctoral program, independently reviewed the recorded video. All three individuals each have over five years of experience teaching in early childhood settings. Two had served as comparison raters in previous SCRD studies.

### **Setting**

#### **School**

The study was conducted at a National Association for the Education of Young Children accredited preschool on a university campus. The school is located in an urban environment in a city in the Southwestern United States and serves students from six months to five years of age both with and without disabilities. Individuals who attend the preschool are primarily the children of the university's faculty, staff, or students. However, children from the surrounding community are also invited to attend.

## **Classrooms**

This study took place in four different inclusive preschool classrooms. Students between four to five and a half years old were educated in two of the four classrooms. The third classroom was a multiage classroom that included students ranging in age from three to five years old. The fourth classroom included students who were between three to four years of age. The maximum number of students (both with and without disabilities) that were assigned to a class was 22, however each class typically had less than 15 students. There were no self-contained classrooms.

Classrooms were staffed with one teacher of record and multiple assistants. Typically there would be at least one assistant in the classroom at all times. The assistants were preschool staff who did not have assigned classrooms, practicum students, or student teachers.

## **Playground**

Playground has been described as a setting that offers children the opportunity to play and interact in an environment that is different from the typical classroom (Pica, 2011). Furthermore, the playground has traditionally been an environment in which interactions with adults have been kept to a minimum (Pica, 2011). These qualities make the playground an ideal setting for children with disabilities to practice interacting with their peers. It is for these reasons that the playground has been chosen as a primary setting for conducting research with children with disabilities (see McFadden et al., 2014). It is the reason why the playground at the preschool attended by the participants was chosen as the second setting for generalization purposes..

The preschool's playground was a fenced area that included access to an outdoor play set with one ramp and three slides, three swings, a sandbox, and numerous other portable equipment such as tables, chairs, bowling pins, balls, baskets, hula hoops, a pretend kitchen set, a pretend

house, tricycles, and wagons. There were three separate blue canopies. One canopy was over the outdoor play set, the second was over the sandbox, and the third was over the area of the playground that contained the majority of the portable equipment.

### **Instrumentation**

#### **Baseline, Intervention, and Maintenance**

Fifteen minutes of video was recorded for each research participant for each session across the three phases of this study (Phase One - Baseline, Phase Two - Comparison, Phase Three - Best by Comparison) in both the classroom and playground settings. Using the recorded video, and the data sheet in Appendix F, the frequency of positive social interactions was scored by the researcher and two comparison raters using a partial-interval recording procedure (Cooper et al., 2007; Westling & Fox, 2009). The partial-interval recording procedure requires that a target behavior be marked as having occurred if it was performed at least once during the preset interval (Cooper et al., 2007; Westling & Fox, 2009). The partial-interval recording procedure was selected because it is an appropriate method for measuring discrete behaviors (i.e., behaviors that are not ongoing; Westling & Fox, 2009) and can be used to calculate inter-observer agreement (IOA) in order to demonstrate that behaviors were being recorded properly (Cooper et al., 2007).

The researcher viewed all of the recorded video clips. Independent of the researcher, and independent of each other, the two comparison raters each viewed a randomly drawn 25% sample of the videos for each research participant. The `randbetween()` function in Microsoft Excel was used to assist in randomly selecting the videos for the comparison raters. The procedure itself involved each reviewer watching 30 seconds of video (e.g., starting at the zero



seconds mark and then watching to the 30 second mark) and making note if the participant was involved participating in a positive social interaction using the following criteria:

- If a participant performed a positive social initiation and at least one peer responded, then the “SI” and “PR” in the “Roles” column under that time interval were circled.
- If a peer performed a social initiation and the participant responded with a positive social response, then “PI” and “SR” in the “Roles” column under that time interval were circled.
- Positive social initiations that did not result in a peer response were not recorded.
- Social initiations performed by a peer that did not yield a response from a research participant were not recorded.
- Initiations and responses between research participants and adults were not recorded.

Reviewers collected data on 15 minutes of video for each session. A 15-minute sample was selected because of the recommendation that when calculating percentages, such as those that result from using partial-interval recording, the value of the divisor should be no less than 30 (Cooper et al., 2007). In the event that the video sample is longer than 15 minutes, reviewers collected data on the first 15 minutes (i.e., 0:00 seconds to 15:00 minutes) of that clip as marked by the timer. Video beyond the first 15 minutes as marked by the timer (i.e., beyond 15:00 minutes) were reviewed by the researcher, but was not included in the data collection and data analysis portions of this study.

## **Behaviors**

**Social interactions.** Social interactions have been defined as behaviors, verbal or nonverbal, that are directed towards another individual, and in turn are reciprocated (Green et al., 2013; O’Connor, 1969). These interactions are essentially, “behavior that included at least one initiation followed by a response” (Haring & Breen, 1992, p. 325). This class of behaviors

includes positive social interactions, which are defined as a positive social initiation followed by a positive social response.

**Social initiations.** Social initiations were defined as, “attempts to engage a peer in a mutual activity, including any motor or vocal behavior clearly directed to a peer that attempted to elicit a social response” (Garrison-Harrell et al., 1997, p. 243). Motor related initiations were defined as movement to towards of one meter in length (about 3 feet) of another individual (Gaylord-Ross et al., 1984; Haring & Breen, 1992). Verbal initiations include greetings (“Hi”, “good morning”), referring to another individual by name (“Hey Maggie”), commenting on a topic (either directly or not directly) related to a current activity (“Turtles are green”; Garrison-Harrell et al., 1997), and requesting (“Can I have juice?”; Kamps et al., 2015; Wert & Neisworth, 2003; Wilson, 2013). Initiations may be directed toward a single individual or an entire group (Kamp et al., 2014; Kamps et al., 2015).

For the purposes of this study positive social initiations were defined as verbal initiations that were contextually appropriate to the current situation and originated from either a research participant, or was directed towards a research participant from a peer. Examples include delivering an appropriate greeting to a peer (“How you doing”), referring to a peer by name (“Hey Jake”), commenting on a topic that was directly related to the current activity (“I like that color”), and requesting an item from a peer (“Can you give me train track?”). This is relatively consistent with initiations that have been described as socially appropriate in the literature (see Garrison-Harrell et al., 1997; Kamps et al., 2014; Kamps et al., 2015; Wert & Neisworth, 2003; Wilson, 2013).

**Social responses.** Social responses were defined as, “as any verbal or motor behavior directed back to an initiating peer within 5 seconds of the initiation” (Garrison-Harrell et al.,

1997, p. 243). Responses are essentially reciprocations of initiations (Garrison-Harrell et al., 1997; Kamps et al., 2015). Examples include an individual accepting an item that is being given to him or her (“Thank you”), responding to a question (“OK”), and providing a comment on a given topic or activity (“I like dinosaurs”; Garrison-Harrell et al., 1997).

For the purposes of this study positive social responses only included verbal responses and were defined as those that were contextually appropriate to that current situation, were performed within five seconds of an initiation occurring, and occurred between two or more individuals (i.e., the initiator and at least one responder). Furthermore, either the research participant must have been the initiator and a peer the responder, or the peer was the initiator and the research participant the responder. Examples include accepting an item from a peer (“Thank you Mary”), responding to a peer’s question (“OK let’s play”), and commenting on a contextually relevant topic or activity (“Thank you for sharing the iPad”). This is consistent with how appropriate social responses have been described in the literature (see Garrison-Harrell et al., 1997; Gaylord-Ross et al., 1984; Haring & Breen, 1992).

### **Fidelity of Treatment Measures**

Two checklists were used to assess fidelity of procedural implementation. The first checklist, the PN Peer Fidelity Measure, is presented in Appendix G. This measure, adapted from a procedural checklist used by Van Norman (2005), was completed by the teacher of record who supervised the delivery of the PN intervention, by the researcher, and by one of the comparison raters. Using the fidelity measure all PN intervention sessions (100%) were reviewed by the researcher and the teacher who supervised the intervention. The comparison rater reviewed a randomly selected 20% of the PN intervention sessions for each research participant. Videos were randomly selected using the `randbetween()` function in Microsoft Excel.

The second checklist, the PVM Teacher Fidelity Measure, is contained in Appendix H. It is also adapted from Van Norman (2005). This measure was completed by the researcher who reviewed all PVM sessions and by a comparison rater who reviewed a randomly selected 20% of the PVM intervention sessions for each research participant. Once again videos were randomly selected for the comparison rater using the randbetween() function in Microsoft Excel.

### **Social Validity Measure**

Social validity, the appropriateness of the goals, procedures, and effects of this study (Hurley, 2012; Wolf, 1978), were measured using a survey comprised of 18 questions (see Appendix I). Seventeen of the questions were likert-type scale items (1 = Strongly Disagree to 5 = Strongly Agree and N/A = Not Applicable). The eighteenth question was an open-ended response question that asked individuals to comment on the study. The items themselves were adapted from social validity questionnaires used in experimental SCRD studies conducted by Jung, Sainato, and Davis (2008), Garfinkle and Schwartz (2002), and Storey et al. (1994). All three studies utilized social skills interventions and were conducted in preschool or kindergarten settings. The Social Validity Measure was distributed to all teacher participants and all parents (both parents of children with disabilities and parents of peers) by one of the comparison raters. The comparison rater did not reveal to the researcher who the respondents were but did indicate which of the measures returned were from teachers, which were from parents of the research participants, and which were from the parents of the peers.

## **Materials**

### **iPad**

Two iPads were used in this study. The first iPad was a 16GB Apple iPad 2 (Model Number: MC769LL/A) with a black iPad 2 Otterbox Defender case (Model Number: 77-18640).

The peers used this iPad during sessions when they are working with the research participants. The second iPad was a first generation 16GB Apple iPad (Model Number: MB292LL). It was used by the teacher to show the PVM videos to the research participants.

### **Portable Speaker**

In conjunction with the 16GB Apple iPad (Model Number: MB292LL) an iHome Portable Bluetooth Speaker (Model Number: iBT55) was used. The purpose of the portable speaker was to allow the PVM's audio to be audible by research participants without having to hold the iPad's speakers in close proximity to their ears.

### **Video Equipment**

Five video cameras, one tripod, and one wireless microphone were used to record video across all three phases of this study (Phase One - Baseline, Phase Two - Comparison, Phase Three - Best by Comparison). Four of the video cameras, Sanyo VCC-9500P High-Speed-Dome Cameras, are stationary cameras mounted to the ceiling of one of the classrooms of where the treatments will be delivered. These cameras interfaced with two MGW 400 Optibase devices that are used to save the video. Due to limited drive space on the Optibase device, video recorded using the four stationary cameras were transferred to a Western Digital My Passport Ultra one Terabyte USB 3.0 external hard drive (Model Number: WDBGPU0010BBK-NESN). Video of these cameras capture was viewable on four Insignia LCD TV monitors (Model Number: NS-LCD 15-09). The cameras themselves were controlled using a Sanyo System Controller (Model Number: VSP-8500). An Apple MacPro computer with 3.2 GHz Quad-Core Intel Xeon processor (Serial Number: G88112H3XYL) with Parallels, a Windows XP operating system, an Apple Mouse, and Apple Keyboard were used to start and stop the recording of video.

In instances where it would not be possible to use the four stationary video cameras (e.g., playground setting), the fifth camera, a portable Sony High Definition Handycam camcorder (Model Number: HDR-PJ260V), was used. When appropriate, the portal video camera was used in conjunction with a Sony Remote Control Tripod (Model Number: VCT-60AV) and a Sony Wireless Microphone (Model Number: ECM-AW3) to enhance the quality of the audio that was recorded. Video recorded using the portal video camera was stored on a SanDisk 32GB Secure Digital High Capacity Class 4 Flash Memory Card (Model Number: SDSDB-032G-AFFP).

### **Digital Storage**

Two types of digital storage devices were used to aid in storing and transferring recorded video. The first was a Western Digital My Passport Ultra one Terabyte USB 3.0 external hard drive (Model Number: WDBGPU0010BBK-NESN). The second was four SanDisk Ultra CZ48 32GB USB 3.0 flash drives (Model Number: SDCZ48-032G-UAM46).

### **Water Table**

A blue Lakeshore economy water table (Item #LA309) measuring 20 in. in width, 27.25 in. in length, 18 in. in height, and 6.5 in. deep was used. The water table was used as a preferred activity for Research Participant Four in place of watching a video on the iPad. The water table was typically filled with a depth of about two to three inches of water and contained measuring cups, plastic spoons, toy boats, and plastic eggshells for children to interact with.

### **Neptune Sand Table**

When the Lakeshore economy water table was not available a blue The Children's Factory Neptune Table (Item #CHF-1138-18) measuring 24 in. in width, 36 in. in length, and 18 in. in height was used. Similar to the water table, the sand table was used as a preferred activity only for Research Participant Four in place of watching a video on the iPad. The sand table was

typically filled with about a depth of an inch of sand and contained measuring cups, plastic spoons, toy cars, and toy construction vehicles for children to interact with.

## **Training**

### **Researcher**

**Video creation.** The researcher trained the teachers of record how to record video using the iPad and the camcorder. Emphasis was placed on training the educators to optimize the video (avoiding covering up of the camera, minimize shaking, and setting an appropriate zoom distance) and audio (optimizing recorded audio) quality during recording.

The PVM videos were recorded from a point-of-view perspective. In other words, the events that were depicted in the videos appeared to occur in the same manner as if the participant himself was watching the interaction occur from his point-of-view. This also means that when a specific action took place in the video, it appeared from the appropriate height of the individual for whom the video was intended.

The teachers of record were responsible for providing instruction and any necessary prompting to the peer actors regarding the behaviors that they were expected to perform. In order to optimize the contents of the videos the researcher used iMovie to edit out interactions (i.e., prompts) that the teacher had with the peers during the recording of the video, as well as any actor behaviors that may not have been appropriate or associated with the target behaviors (Apple et al., 2005; Buggey, 2005; Buggey, 2012; Buggey et al., 2011; Buggey et al., 1999).

During training it was discovered that the teachers had difficulty with conceptualizing the eight steps in the social interaction as well as the procedures for the PN Intervention. To aid teachers, the researcher, with the assistance of Teacher Participant Two and another consented preschool staff member, created two VM videos. In the first VM video the researcher and the

two preschool staff members role-played the delivery of the PN intervention with no prompts. In the second VM video the researcher and the two preschool staff members role-played the delivery of the PN intervention with prompts (e.g., Teacher Participant Two provided verbal prompts after the researcher did not perform the behavior in the social interaction task list). The video was recorded using the camcorder, edited using iMovie, and placed on an iPad for teachers to use as a reference. These two videos were not made available for the research participants to watch.

**Data collection procedures.** Before baseline data were collected the researcher met with each of the teachers to discuss where the optimal locations would be for setting up the portal video camera and tripod. Following these discussions, test video was recorded by the researcher. The test video was then reviewed by the researcher, the appropriate teacher, and one of the comparison raters.

### **Teacher of Record**

**PN treatment.** The researcher trained the teacher how to set up and implement the PN intervention. This involved training the teacher on the LTM prompting hierarchy and the steps in the social interaction task list. The two VM videos of the researcher and two preschool staff members role-playing the delivery of the PN intervention were used as guides. The teacher was then responsible for training the peers who delivered the PN intervention and for setting up the classroom prior to the beginning of intervention. Each peer needed to achieve at least 80% proficiency on the PN Peer Fidelity Measure (Appendix G) as evaluated by the teacher and the researcher before that peer was allowed to participate in delivery of the PN intervention to the research participants. If peers did not deliver the intervention with at least 80% proficiency, then the teacher provided additional training.



**PVM treatment.** The PVM video was recorded during PN training with at least two peers serving as the actors. Both peers were tasked with physically and verbally modeling the appropriate behaviors that constitute the positive social interaction in the eight-step task list. One peer was designated as the individual who initiated the positive social interaction. This individual was referred to as the peer initiator (PI). This peer is the individual whom the research participants were be asked to imitate in the video. The other peer served as the individual who verbally responded to the initiation provided by the PI. This individual was referred to as the peer responder (PR). The task analysis of behaviors that the PI and PR were responsible for performing is provided in the Procedures section of this chapter. The behaviors themselves were appropriate to the situation (Apple et al., 2005), such as appropriately greeting an individual, waiting for an individual to respond, and requesting an item instead of taking it.

Since the teacher participants were responsible for setup and delivery of the PVM intervention, the researcher trained them how to set up the classroom prior to delivery of the PVM treatment. This involved ensuring that the teachers understood the instructional strategies that were used (CTD with LTM prompting hierarchy as described under Procedures) and what to say and do during delivery of the intervention. The teacher needed to achieve at least 80% proficiency on the PVM Teacher Fidelity Measure (Appendix H) as evaluated by the researcher before the PVM intervention was delivered. If at anytime the teacher did not implement the intervention at a minimum of 80% proficiency, or if a research participant was absent from school for five straight school days, the researcher retrained the teacher to ensure that the teacher was able to perform the necessary steps at an 80% proficiency level before the start of the next PVM session.

Due to similarities between the behaviors performed by peers in the PN and PVM treatments, peers who participated in the PVM intervention were not asked to undergo additional training provided that they had already achieved at least 80% proficiency on the PN Peer Fidelity Measure (Appendix G).

### **Comparison Raters**

Based on the suggestions of Horner et al. (2005), IOA was calculated for the dependent variable for both the classroom and playground settings across all three phases for all participants in this study. The researcher trained all three reviewers prior to providing them with the videos that were randomly assigned to them using the randbetween() function in Microsoft Excel. One comparison rater was responsible for reviewing 20% of the recorded video for the procedural fidelity measures (see Appendix G and Appendix H). The other two comparison raters were responsible for recording the frequency of positive social interactions (see Appendix F) performed by research participants. These two comparison raters reviewed 25% of the videos recorded for each of the research participants.

### **Design and Procedures**

This study utilized an alternating treatments design (ATD). The purpose of the ATD design is to compare the effects of two or more different treatments on a dependent variable (Barlow, Nock, & Hersen, 2009; Cooper et al., 2007; Horner et al., 2007). In order to perform this comparison, the delivery of different treatments (i.e., the different independent variables) was rapidly alternated across sessions (Wolery, Gast, & Ledford, 2014). The effects that those treatments had on the dependent variable were then compared against each other to identify the best treatment (Wolery et al., 2014). As a result, the ATD has been referred to as a design that answers the question, “Which one works better” (Shabani & Lam, 2013, p. 175). This is different

from other SCRDs (i.e., withdrawal and multiple baseline) that are used to determine, “whether an IV [independent variable] is effective for changing the DV [dependent variable] of interest” (Gast, 2014, p. 88).

There are three advantages to using an ATD. These advantages are that the ATD: (1) can be implemented in a relatively short amount of time meaning that less (participant, teacher, and researcher) time and resources are used to conduct the study; (2) it can be used to determine the best treatment out of an array of two or more interventions; and (3) due to the flexibility of the design itself, it is useable in different iterations with different types of interventions (Wolery et al., 2014). Indeed the flexibility of this design allowed this study to incorporate an iteration of the ATD comprised of three phases the Phase One - Baseline, Phase Two - Comparison, Phase Three - Best by Comparison.

In general, the ATD design should only be used with a behavior that is reversible (Holcombe, Wolery, & Gast, 1994; Wolery et al., 2014). This is in contrast to a behavior that is relatively non-reversible, which has been described as, “does not revert to baseline levels” (Wolery et al., 2014, p. 303). This makes the ATD an ideal choice for measuring the effects of treatments on improving social interactions since once learned they are not easily reversed (Wolery et al., 2014).

### **Pre-Phase**

In order to identify research participants and peer participants for this study the researcher followed protocol recommended by the university’s IRB and sent an email (see Appendix J) to the Director of the preschool. The email contained an invitation to teachers to participate in the study. The Director was asked to distribute the email to teachers of record who met the study’s perquisites for participation. Interested teachers were asked to reply to the email.

At the same time a recruitment flyer (see Appendix K) was posted in a visible location near the parent check-in area at the preschool notifying parents of this study.

Teachers who responded to the researcher were asked to meet in person to discuss the study and to review the informed teacher consent (see Appendix E). If teachers provided consent, the researcher sent recruitment emails to them and asked that they send those emails to parents of possible candidates. The email that parents of children with disabilities received is provided in Appendix L and the email that parents of typically developing peers received is provided in Appendix M.

If parents expressed interest, printed versions of the informed consent forms for parents of participants with disabilities (see Appendix A) and informed consent forms for parents of peer participants (see Appendix C) were distributed under supervision of their associated teachers of record. If parents provided consent, then their children were asked to provide youth assent. Both children with disabilities (see Appendix B) and typically developing peers (see Appendix D) were asked to provide youth assent as recommended by the university's IRB. Youth assent was obtained under the supervision of each student's teacher of record. If parents did not provide informed consent, or the children did not provide youth assent, then they were not allowed to participate in this study. There were no changes in the quality or frequency of services provided to individuals who did not agree to participate in this study.

**PVM video creation.** The PVM video reflected an eight-step task analysis of how to initiate a positive social interaction adapted from the social interaction task analysis for individuals with autism used in Gaylord-Ross et al. (1984) and a VM video used in Green et al. (2013). These steps were: (1) participant walks over to peer; (2) participant gets no closer than one meter (about three feet) (distance suggested by Gaylord-Ross et al., 1984; Haring & Breen,

1992) but no farther than 10 feet; (3) participant faces the peer; (4) participant says greeting to peer (hi, good morning, or similar greeting); (5) participant waits for peer to respond; (6) participant asks peer, “Can I use the iPad?”; (7) participant waits for peer to respond; (8) participant chooses a video clip to watch on the iPad after peer responds with “Yes”. Videos were recorded during PN intervention training sessions in which peer participants served as actors in the role-playing the appropriate behaviors as the PI and PR.

Once recorded the videos were edited into eight separate sections (one section per step in the task analysis) using iMovie. Voice-overs, provided by one of the comparison raters, that described each step (e.g., “In this step [Name] asks if she can use the iPad”; Green et al., 2013) were added to the videos along with text that provides a brief summary (e.g., Step #6: Can I use the iPad?; Buggey, 2005; Buggey, 2012; Buggey & Ogle, 2012; Buggey et al., 2011; Buggey et al., 1999).

Initially a total of four videos were created: (a) one video for Research Participants One and Five (they were in the same classroom with the same peers thus the same PVM video was used for both); (b) one video for Research Participant Two; (c) one video for Research Participant Three; and (d) one video for Research Participant Four. Videos ranged in length from 59 through 62 seconds. This is consistent with the use of VM in prior research with young children with disabilities where entire videos were typically between one and four minutes in length (Buggey, 2012; Buggey & Ogle, 2012; Buggey et al., 2011; Green et al., 2013; Kleeberger & Mirenda, 2010).

Once the videos were completed the researcher used iMovie to export eight different versions of each. The first video depicted all eight steps of the task list in order, the second Steps 2-8, the third Steps 3-8, the fourth Steps 4-8, the fifth Steps 5-8, the sixth Steps 6-8, the seventh

Steps 7-8, and the final video depicted only Step 8. The purpose of creating eight different versions of the same video was so that teachers could select the appropriate PVM video that needed to be played without having to manually adjust the play head when navigating through the different steps.

During the study it became apparent that Research Participant Four was no longer interested in accessing the iPad therefore a fifth PVM video was created using the classroom water table. This video was created using the same procedures as the other four videos, was 57 seconds in length, and used the same two peer participants who role-played the eight-step task list in the original video. The sole exception for the fifth video was that “water table” was used in place of “iPad”.

### **Phase One - Baseline**

Though not a required component of an ATD, this study included a baseline only phase. The purpose of the baseline only phase was to provide data that could be used for comparison with research participant performance in Phase Two - Comparison. In other words, to assist in identifying multi-treatment interference (Wolery et al., 2014). Phase One - Baseline occurred in two settings: the classroom during free play and on the playground.

The first setting was an inclusive preschool classroom where the research participants received their regularly scheduled classroom instruction minus the components of PN and PVM associated with this study. Any instruction or services that research participants received (e.g., speech or occupational therapy) occurred according to normal and usual school requirements. Fifteen minutes of video in the classroom were recorded using the portable camcorder and when appropriate, the four stationary classroom cameras. Recording occurred during free play (Green et al., 2013). The primary researcher and the two comparison raters reviewed video from the

classroom setting and recorded the frequency of positive social interactions performed by the research participants. Phase One lasted three sessions for each research participant. If more than one research participant was in the same classroom (Research Participants One and Five), then only one participant was in Phase One at any one given time.

The second setting was the school playground. Sessions took place on the same day that baseline video was recorded in the classroom. Once again, any instruction or services that research participants were scheduled to receive occurred according to school requirements. Fifteen minutes of video was recorded using the portable camcorder. Both the primary researcher and the two comparison raters reviewed video from the playground and scored the frequency of positive social interactions performed by the participants. Similar to the classroom setting, Phase One on the playground lasted for three sessions for each research participant.

### **Peer Training**

For each research participant peer training occurred after Phase One baseline data were collected but before any Phase Two data were collected. During this time peer training occurred. Initially four trainings were held for the peers who were the classmates of Research Participants One and Five, seven trainings were held for peers who were the classmates of Research Participant Two, three trainings were held for peers who were the classmates of Research Participant Three, and four trainings were held for peers who were the classmates of Research Participant Four. More training was provided for the peers who worked with Research Participant Two because at the beginning of peer training, one of the peers was absent for five straight school days. When this peer returned, another peer missed school for three straight school days. Training sessions were conducted by the teachers of record with assistance from the researcher, lasted no longer than ten minutes per, were not held more than once per day, involved

the teachers and peers roleplaying the eight step task list, and occurred in a separate room or a section of the classroom that was made inaccessible to research participants and students not involved in the study. Pierce and Schreibman (2007) and two VM videos created by the researcher modeling delivery of the PN intervention were used to assist with the training. Additional trainings were provided periodically for peers when the research participants in their classrooms were absent for more than five straight school days or if their performance in the delivery of the intervention fell below 80%.

During the peer training the researcher video recorded the peers role-play the eight-step social interaction task list. The researcher used iMovie to edit these videos in order to create the videos that would be used for the PVM intervention.

A total of 11 participating peers received training (five males and six females). Three peers were in the same classroom as Participants One and Five, three were in the same classroom as Participant Two, two were in the same classroom as Participant Three, and three were in the same classroom as Participant Four.

The following school days elapsed between Phases One and Two for participants: (a) six school days for Research Participant One; (b) eight school days for Research Participant Two; (c) three school days for Research Participant Three; (d) four school days for Research Participant Four; and (e) zero school days for Research Participant Five. A greater number of school days elapsed for Research Participants One and Two because of absences. Zero school days elapsed for Research Participant Five because the peers that worked with this individual had already received training.

## **Phase Two - Comparison**



At the conclusion of Phase One - Baseline, Phase Two (Comparison Phase) began. During this phase research participants received the two different treatments in a rapidly alternating manner in order to provide a comparison of the effects of those interventions (Barlow et al., 2009; Wolery et al., 2014). In this case, participants received both the PN and PVM interventions in only the classroom setting. Phase Two consisted of ten sessions, one per day, for each research participant. This translated into five sessions of PN and five sessions of PVM. The order and time of day that the PN and PVM sessions occurred were randomly determined and counterbalanced (Wolery et al., 2014). Baseline sessions occurred on each day of Phase Two for a total of ten sessions per participant.

Video was recorded for 15 minutes using the portable camcorder and (when appropriate) the four stationary cameras, immediately following the delivery of the intervention (either PN or PVM). During this time teachers and other instructional aides were asked to refrain from prompting or rewarding interactions between the participants and their classmates unless they deemed it to be absolutely necessary to do so (Bellini, Akullian, et al., 2007). The primary researcher and the two comparison raters reviewed the video and recorded the frequency of positive social interactions performed by the research participants.

Originally it was planned that there would be at least one hour of time separating one session from another (Wilson, 2013). One example of the order of treatment delivery during the comparison phase is presented in Appendix N. However in practice, that was not possible due to a variety of factors: (a) participant arrival times; (b) enrollment schedules of the research participants (e.g., Research Participants Two and Three received afternoon services offsite); (c) the current school schedule; (d) special events; and (e) recording was scheduled around other special education and related services that research participants were already receiving on site

(e.g., speech or occupational therapy). As a result a thirty-minute wait time between recording sessions was instituted.

**PN.** Before the start of a session the teacher would bring two of the trained PN peers to an adjacent room. For Research Participants One, Three, and Five it was not practical to use an adjacent room therefore a separate section of the classroom was used. Students not participating in the intervention were instructed by the teacher not to enter. Any students who were in this separate section of the classroom before the start of the intervention were asked by the teacher to leave. Research Participant Four had an adverse reaction to entering the adjacent room before the fifth session of Phase Two. As a result, the intervention was delivered in a separate section of the classroom.

One peer was given an iPad to use. This individual was referred to as the Peer Responder (PR). In order to optimize video recording conditions, the PR was positioned in one corner of the room. The second trained PN peer was instructed to stand near the entrance to the room. This second peer was referred to as the Peer Facilitator (PF). For Research Participants One, Three, Four, and Five, the peer stood at the entrance to the designated intervention area. The teacher then returned to the classroom and alerted the participant by telling him, “Come with me [Name] we are going to talk to our friends”. The teacher then led the research participant to the entrance of the adjacent room/area where the PF was waiting to interact with the participant. The teacher then remained at the starting point for the duration of the intervention unless peers required prompting.

At this point the PF began with delivery of the PN intervention using the adapted version of the eight step task analysis of how to initiate a positive social interaction provided in Gaylord-Ross et al. (1984) and a two step LTM prompting hierarchy adapted from Johnston, Nelson,

Evans, and Palazolo (2003). Research participants in prior PN research were given between three seconds (e.g., Kamps et al., 2014) to ten seconds (e.g., McFadden et al., 2014) to perform a given step. As a result, peers in this study were instructed to give research participants no less than five seconds to begin performing the target behavior for that step (e.g., Garrison-Harrell et al., 1997; Kamps et al., 1997).

Originally if the research participant performed the correct target behavior, the PF delivered verbal praise (such as, “Good job [Name]”), then the research participant was expected to perform the next step in the social interaction task analysis. After conversations with teachers, this was changed such that verbal praise was delivered only after the research participant completed the last step in the task list.

If the participant did not perform the correct target behavior, then the PF would introduce the least intrusive prompt in the LTM hierarchy. The least intrusive prompt involved the PF verbally stating the step such as, “[Name] let’s walk to [Name of PR]”. If after delivery of the least intrusive prompt the research participant did not perform the target behavior, then the PF provided assistance (e.g., held the research participant’s hand and walked him over to the PR) or performed the step for the participant (e.g., “[Name of research participant] says hi”). Peers were instructed to ignore behaviors that were inappropriate or off topic (e.g., the research participant said “It’s raining outside”; Haring & Breen, 1992). If an inappropriate behavior was severe (e.g., the research participant hit a peer with the iPad) then the teacher was asked to intervene using the normal and usual procedures of the school. In addition, if at any point the research participant appeared to be agitated, or outright refused to participate in the intervention, the session would end for that day. This occurred once for Research Participant Four in which he had an adverse reaction to entering an adjacent room.

A task analysis depicting the entire PN process for a participant who successfully imitates the target behavior is provided in Appendix O. A task analysis depicting the entire PN process for a participant who does not imitate the target behavior is provided in Appendix P.

In order for dialogue delivered by the PN peers to appear as natural as possible no scripts were used. Instead, PN peers were allowed to, “use their own language” (Kamps et al., 2014, p. 236), when communicating with research participants. If PN peers spoke or performed actions that were not related to the social interaction task analysis, or the peers forgot to perform a step (e.g., provide positive reinforcement) the teacher would verbally remind the peers of what to say or do. Otherwise, the teacher remained silent.

After working through all eight steps of the social interaction task analysis, the research participant was allowed to watch a video clip on the iPad with the peers. Initially three videos were available for Research Participant One. These videos ranged in length from 21 seconds to 38 seconds, were selected by the researcher based on teacher recommendation, and depicted cartoon versions of various superheroes (e.g., Batman, Superman, Flash) interacting with each other (e.g., Superman and the Flash racing around the world for charity). Two more superhero videos were added prior to Research Participant Two entering the Comparison Phase. These two videos were 22 seconds and 42 seconds in length respectively, were selected by the researcher based on teacher recommendation, and depicted cartoon versions of superheroes (e.g., Green Lantern). An additional five videos were added when Research Participant Four entered the Comparison Phase. These five videos ranged in length from 25 seconds to 43 seconds and were selected by the researcher based on teacher recommendation. Three of the videos were of cartoon versions of airplanes (from Disney’s Planes) verbally interacting with each other appropriately while the other two videos were of actual airplanes at the airport. In preparation for Research

Participants Three and Five an additional airplane video (recorded by the researcher) and two dinosaur videos (from Pixar's *The Good Dinosaur*) were added while one airplane video (due to low interest by all participants) was removed. These videos ranged in length from 24 seconds to 46 seconds and were once again selected by the researcher based on teacher recommendation. Overall a total of 13 videos were available for participants to view after progressing through the task list. All but one of the videos that were used originated from YouTube. The researcher recorded the one video that was not from YouTube.

After each video clip was done playing the teacher collected the iPad and then instructed the research participant and peers to commence with free play. At this point data collection began with 15 minutes of video recorded using the camcorder, and when appropriate, the four stationary classroom cameras. Recorded video was reviewed by the primary researcher and two comparison raters to score the frequency of positive social interactions performed by the research participants in the classroom setting.

Overall each PN session lasted no longer than ten minutes. If a given research participant's peers were absent from school, trained peers from another classroom were asked to participate in that session's intervention. These substitutions occurred as follows: (a) Research Participant One's peers were used to deliver the third PN intervention session (sixth Phase Two session overall) for Research Participant Two; (b) Research Participant One's peers were used to deliver the fourth and fifth PN intervention sessions (seventh and ninth Phase Two sessions overall) for Research Participant Three; and (c) Research Participant One's peers were used to deliver the first best treatment PN session (session fourteen overall) for Research Participant Three.

Following the fourth session of intervention for Research Participant Four, obtaining the iPad was no longer of interest to this individual. As a result the water table was substituted beginning on the third PN intervention session of Phase Two (fifth session overall of Phase Two). Selection of the water table was based on feedback provided by one of the comparison raters because it was observed to be of high interest to this research participant and it was still an activity in which multiple peers could participate. The water table was used with Research Participant Four for the third and fourth Phase Two PN intervention sessions (sessions eight and ten respectively) and the final two Phase Three PN intervention sessions for this study (sessions fifteen and sixteen). The sand table was used during the fifth Phase Two PN intervention session (session 12) and the first Phase Three PN intervention session (session 13) because the water table was not available.

**PVM.** Delivery of the PVM intervention involved a conglomeration of CTD procedures adapted from Zisimopoulos et al. (2011), the LTM prompting hierarchy adapted from Johnston et al. (2003), and PVM procedures adapted from Gena et al. (2005). The rationale behind the use of time delay involves introducing a format in which initially both a stimulus and a prompt are presented at the same time creating trials in which, "...the student responds correctly without error" (Spooner et al., 2011, p. 105). For the PVM intervention, the stimulus was the presence of the peer with the iPad. The prompt delivered was the PVM video.

Prior to each PVM session a peer was brought to an adjacent room and given an iPad to use. In order to optimize video recording conditions, the peer was positioned in one corner of the room. The teacher then returned to the classroom and told the research participant to, "Come with me [Name] we are going to watch a video", and then had the research participant follow him or her into the adjacent room. While in the room, both the teacher and the research

participant would stop at the entrance to the room. The intervention began with the teacher showing the entire PVM video to the research participant. In the event that an individual was not watching the video the teacher would redirect the research participant back to the video using a verbal prompt such as, “[Name] watch the video” (Bellini, Akullian, et al., 2007). If at the end of the video it was apparent that the research participant did not watch at least one-third of it (e.g., if the video was 60 seconds and the research participant watched less than 20 seconds of it) then the session would end for that day (Rudy et al., 2014). Furthermore if the research participant appeared to be agitated, felt uncomfortable, or refused to participate in the intervention, the session would end for that day (Wert & Neisworth, 2003). This occurred once for Research Participant Five when his teacher discovered that he had fever and subsequently sent him home..

For Research Participants One, Three, and Five it was not practical to use an adjacent room. Instead, a separate section of the classroom was designated as the area in which the intervention was delivered. Students not participating in the intervention were not allowed to enter. Research Participant Four had an adverse reaction to entering the adjacent room before delivery of the PN intervention during the fifth session of Phase Two prompting all proceeding sessions to be cancelled for that school day. As a result, this research participant’s reaction, all subsequent interventions for this individual were delivered in a separate section of the classroom.

After the entire PVM video was played the teacher would announce to the participant, “[Name] now it’s your turn”. When the social interaction task analysis was first taught, a CTD of zero seconds was used. If a research participant successfully imitated a specific step’s target behavior, then the participant would move to the next step in the eight-step social interaction task analysis. If a research participant did not imitate the target behavior, then a three level LTM error correction procedure was implemented for that step. The first level prompt involved the teacher

replaying the portion of the video starting from that specific step in the eight-step task analysis and then progressing to the end of the final step. The second level prompt involved the teacher playing the video and then providing a verbal and/or gestural prompt after the video ended (e.g., “[Name] say hi to your friend”). The third level prompt involved the teacher playing the video and then performing the behavior for the child. Depending on the target behavior, this meant gently providing physical assistance, or by verbally stating what the participant was supposed to say (e.g., “[Name of research participant] says hi”). A task analysis depicting the PVM process at CTD of zero seconds for a participant who successfully imitated the target behavior at a given step is provided in Appendix Q. A task analysis depicting the PVM process at CTD of zero seconds for a participant who does not imitate the target behavior at a given step is provided in Appendix R.

After two consecutive trials, a five second delay was instituted (Cannella-Malone et al., 2013). The purpose of increasing the delay was to fade the delivery of the prompts (i.e., the PVM video and those provided in the subsequent LTM hierarchy) provided to the research participants (Neitzel & Wolery, 2009). During the five second delay the initial cue was the presence of the peer. Similar to the CTD of zero seconds condition, if a research participant successfully imitated the target behavior, then the research participant would move to the next step in the eight-step social interaction task analysis. If a participant did not imitate the target behavior, then the three level LTM error correction procedures were implemented for that step. A task analysis depicting the PVM process at CTD of five seconds for a research participant who successfully imitated the target behavior for a given step is provided in Appendix S. A task analysis depicting the PVM process at CTD of five seconds for a research participant who does not imitate the target behavior at a given step is provided in Appendix T.



Overall PVM sessions lasted no longer than ten minutes. This is relatively consistent with the length of VM sessions that has been used with preschool aged children with disabilities (Hine & Wolery, 2006; Maione & Mirenda, 2006). After viewing the PVM video and progressing through the entire eight-step social interaction task sequence, the research participant was given the opportunity to watch a preferred video clip on the iPad with the peer. The video clips used were the same video clips that were made available during the PN intervention sessions. The video clips were age appropriate, were of interest to the participant as suggested by the research participant's teacher, and ranged from 21 seconds to 46 seconds. At the conclusion of the video the teacher would collect the iPad and then verbally tell the research participant and the peer to resume free play.

After the video clip was finished playing the teacher collected the iPad and then instructed the research participant and peers to begin free play. At this time 15 minutes of video were recorded using the portable camcorder, and when appropriate, the four stationary classroom cameras. The primary researcher and two comparison raters reviewed the recorded video. These individuals recorded the frequency of positive social interactions performed by the research participants in the classroom setting.

During the third PN intervention session for Research Participant Four obtaining the iPad was no longer of interest. Thus the water table was substituted for the third and fourth PVM intervention sessions of Phase Two (sixth and eighth sessions overall of Phase Two). The sand table was used during the fifth PVM intervention session (tenth Phase Two session overall) because the water table was not available on that day.

**Baseline.** In addition to collecting data on the PN and PVM treatments, baseline data were also collected during Phase Two in both the classroom setting during free play and in the

playground setting for ten sessions for each research participant. The purpose of collecting baseline data during Phase Two was to provide the researcher with a means of determining if multi-treatment interference was occurring by comparing these data to those collected during Phase One - Baseline (Wolery et al., 2014). Differences in the level, trend, and/or variability between phases would suggest the presence of multi-treatment interference (Wolery et al., 2014). Baseline sessions were recorded on the same school day that an intervention was delivered and occurred no less than thirty minutes before or after implementation of the intervention. Furthermore, baseline sessions were counterbalanced such that the time period that the sessions were collected occurred either before or after delivery of the intervention for that day. For example, if PN was implemented on the first and third days and PVM was implemented on the second and fourth days, then baseline sessions were recorded at least thirty minutes after delivery of the treatment on the first and fourth days and at least thirty minutes prior to delivery of the treatment on the second and third days. A hypothetical example schedule depicting one possible order of treatments and when baseline data could be collected is provided in Appendix N.

Similar to Phase One - Baseline, baseline video recorded during Phase Two was recorded using both the portable camcorder, and when appropriate, the four stationary classroom cameras. The primary researcher and two comparison raters used the video to record the frequency of positive social interactions performed by the research participants in both the classroom and playground settings.

### **Phase Three - Best By Comparison**

After Phase Two had ended, research participants entered Phase Three. The purpose of Phase Three, or the Best By Comparison Phase, was to control for a type of multi-treatment interference known as alternation effects (Wolery et al., 2014). Alternation effects occur when

the rapid alternating of treatments (such as in an ATD design) impact the behavior measured (Barlow et al., 2009; Wolery et al., 2014). Therefore exposure to only one treatment (either PN or PVM) serves to provide evidence that may suggest the presence or absence of multi-treatment interference (Barlow et al., 2009; Wolery et al., 2014).

Phase Three occurred both in the classroom and on the playground during which research participants received the intervention that benefitted them the most. The best treatment was identified through the use of visual inspection of graphed data and statistical analysis of data collected (mean, median, and PND). Teacher input of each research participant's performance, while solicited, was not used to determine the best treatment. A total of 15 minutes of video were recorded in both the classroom and playground settings per session during Phase Three. The camcorder and (when appropriate) four stationary cameras were used in the classroom and only the camcorder was used on the playground. Similar to Phases One and Two, the researcher and the two comparison raters reviewed the recorded videos to identify the frequency of positive social interactions performed by the research participants. Phase Three lasted for three sessions for Research Participants One, Two, Three, and Four. Phase Three data was not collected for Research Participant Five due to the study ending.

Similar to the latter half of Phase Two, either the water or the sand table was substituted in place of the iPad as the preferred activity for Research Participant Four. Due to the unavailability of the water table, the sand table was used during delivery of the PN intervention on session 14. The water table was used during delivery of the PN intervention on sessions 15 and 16.

### **Data Collection**

#### **Baseline, Comparison, and Best of Treatments**

Data were collected on the frequency of positive social interactions from videos recorded across all three phases in both the classroom and playground settings. Graphs of research participant performances are provided in the Results section of Chapter Four. An analysis of the data collected (level, trend, and variability) in order to determine which intervention was more effective at increasing the number of positive social interactions in the classroom setting, are also provided in the Results section of Chapter Four. Furthermore, data collected on the playground were graphed with the level, trend, and variability visually inspected in order to determine if the effects generalized to that setting.

Even though both interventions required research participants to approach and verbally interact with peers while standing at an appropriate distance and by facing them, the positive social interactions that occurred in the video were counted even if those interactions occurred while participants were not in close proximity or facing their peers. The reason for this was because in certain circumstances it was appropriate for the research participant to verbally interact with peers without being in close proximity (e.g., a research participant verbally asking a peer who was using the swing if he could be next to use it).

### **PN Peer Fidelity Measure**

The Peer Fidelity Measure for the PN treatment is presented in Appendix G. This measure was completed by the teacher of record who supervised the delivery of the PN intervention, the researcher, and one of the comparison raters. The teacher completed the PN Peer Fidelity Measure during each session that the PN treatment was implemented. If a peer was not performing at least 80% accuracy, then the teacher provided additional training.

The researcher and one comparison rater used the PN Peer Fidelity Measure to independently review the video of the delivery of the intervention. The researcher reviewed all

videos. The comparison rater reviewed 20% of the videos for each research participant that were randomly selected using the randbetween() random number generator function in Microsoft Excel. Total count IOA was calculated using the formula provided by Cooper et al. (2007):  $(\text{smaller count}/\text{larger count})100 = \text{total count IOA}$ .

### **PVM Teacher Fidelity Measure**

The Teacher Fidelity Measure for the PVM treatment is presented in Appendix H. Both the researcher and one comparison rater used the form to review the video recorded during delivery of the intervention. The researcher reviewed all video using the measure. If it was discovered that the teacher was not implementing the PVM treatment at 80% accuracy then the researcher worked with the teacher to improve implementation fidelity. The comparison rater reviewed at least 20% of the videos for each research participant. The videos that were reviewed by the comparison rater were selected randomly using the randbetween() random number generator function in Microsoft Excel. Using both the ratings of the researcher and the comparison rater, total count IOA was calculated. The formula that was used to calculate IOA was suggested by Cooper et al. (2007) and is as follows:  $(\text{smaller count}/\text{larger count})100 = \text{total count IOA}$ .

### **Inter-observer Agreement**

Using the recorded video, and the Partial-Interval Recording Positive Social Interactions Data Collection Sheet (see Appendix F), the researcher reviewed all of the videos. Each comparison rater, independent of both the researcher and each other, reviewed 25% of the recorded videos that were randomly selected using the randbetween() random number generator function in Microsoft Excel.

The Partial-Interval Recording Positive Social Interactions Data Collection Sheet itself is adapted from a partial-interval data collection form presented in Cooper et al. (2007). To use the form the researchers and the comparison raters viewed an interval of the recorded video (e.g., from the one minute to one and a half minute mark). They then circled the appropriate role that was performed by the research participant and same-aged peer (e.g., SI or PR).

Once all of the video was reviewed, the researcher collected all data sheets and used what was recorded to calculate interval-by-interval IOA for the dependent variable in this study. The formula that was used to calculate interval-by-interval IOA is, as suggested by Cooper et al. (2007), the:  $\text{number of intervals agreed} / (\text{number of intervals agreed} + \text{number of interval disagreed}) \times 100 = \text{interval-by-interval IOA}$ . IOA results are presented in Chapter Four.

### **Social Validity Measure**

The participating teachers of record, parents of the children with disabilities targeted for intervention, and parents of the peers were each asked to complete one Social Validity Measure. The measure itself was based on questions used in research studies conducted by Jung et al. (2008), Garfinkle and Schwartz (2002), and Storey et al. (1994). The Social Validity Measure is presented in Appendix I.

Social validity results are presented in Chapter Four. The teachers only completed the Social Validity Measure for the research participants for whom they were the teacher of record. The parents of the peers were asked to complete only one Social Validity Measure regardless if their children participated in the intervention process for more than one research participant. The Social Validity Measure was distributed in paper format by one of the comparison raters to the associated parties only after that particular research participant had completed all sessions for all three phases of this study. The comparison rater did not reveal to the researcher who the

respondents were other than to identify which measures were returned by teachers, which were returned by parents of the research participants, and which were returned by the parents of the peers.

### **Treatment of the Data**

Data collected across all research participants and settings were graphed using Microsoft Excel with the data analyzed using two methods. The first method was to use visual inspection of the level, trend, and variability. The “80%-25%” rule as suggested by Gast and Spriggs (2014) was used to evaluate stability with respect to level and with respect to trend. The median of the baseline data collected during Phase Two was used to assist in determining the stability envelope for data collected in the classroom. Because baseline data were not collected on the playground during Phase Two, the median of the baseline data collected during Phase One was used to assist in determining the stability envelope for playground data. The second method was to calculate the mean, median, range, and percentage of non-overlapping data (PND). PND serves as the quantitative means of interpreting data collected through an ATD and was calculated by comparing the number of data points for one condition (e.g., PN treatment) in the comparison phase to another condition (e.g., PVM treatment) in the same comparison phase (Wolery et al., 2014). Results of both visual and statistical analyses are presented in Chapter Four.

Experimental control was demonstrated in two ways. The first, and consistent with the ATD, demonstration of experimental control occurred through the rapid alternation of treatments (Horner et al., 2005). This would occur during the Phase Two - Comparison Phase where treatments were implemented in a manner that was both randomly scheduled and counterbalanced. The second manner in which experimental control was demonstrated was

through inter-subject replication where comparison of the two treatments (PN and PVM) was delivered to five research participants (Horner et al., 2005).

A functional relation has been described as a change in a dependent variable that consistently occurs as a result of exposure to an independent variable and not an extraneous variable (i.e., confounding variable; Cooper et al., 2007). A functional relation between the dependent variable and the independent variables was indicated by examination of the level and trend of data collected both within the conditions for each participant (intra-subject replication) and across participants (inter-subject replication; Gast & Spriggs, 2014).



## **CHAPTER 4**

### **Results**

#### **Introduction**

The purpose of this study was to compare the relative effect of two interventions, PN and PVM, on the positive social interactions performed by young children with DD in an inclusive classroom setting and to determine if the effect of the best treatment (either PN or PVM) generalized to the playground setting. Data were collected and analyzed in order to address this study's two research questions. This chapter presents these results beginning with the restating of each research question. After the research questions are restated, results pertaining to each research question will be presented.

#### **Summary of Findings**

Data related to the number of positive social interactions performed by the research participants were collected using a 30-second partial-interval recording procedure (Cooper et al., 2007; Westling & Fox, 2009). These data were then graphed on a line graph using Microsoft Excel. Visual inspection with respect to level, trend, and variability, and statistical analyses (mean, median, and PND) were used to interpret the data that were collected. These methods of analyses are commonly accepted means for analyzing data collected through SCRDs (Cooper et al., 2007; Gast & Spriggs, 2014). The "80%-25%" rule presented in Gast and Spriggs (2014) was used to determine level and trend stability (p. 179). Trend lines were drawn using the task analysis presented in Deochand, Costello, and Fuqua (2015) on how to add trend lines in Microsoft Excel.

#### **Phase One - Baseline**

Though it was not a required component of an ATD, an initial baseline only phase (Phase One) was implemented in which data were collected in absence of the components that were specific to the two interventions delivered in this study (PN and PVM). The purpose of Phase One was to collect data that, when combined with post intervention data, could be used to compare participant performance both before and after treatments. Phase One occurred in the classroom during free play for a total of three sessions for each research participant (a total 15 sessions overall across all participants) and on the playground for a total of three sessions for each participant (a total 15 sessions overall across all participants). Each classroom and playground session during Phase One occurred on the same school day (e.g., session one playground data were collected in the morning and session one classroom data were collected in the afternoon).

With the exception of Research Participant Four, all of the participants performed at least one positive social interaction in both the classroom and playground settings during Phase One. Research Participant Four was observed verbally interacting with adult staff and with classroom toys (e.g., stuffed animal), but he did not verbally initiate or respond to peers. Instead, he was observed physically interacting with peers (e.g., attempting to grab a toy from a peer).

Though his performance was variable, Research Participant Five performed more positive social interactions in the classroom during Phase One than the other four participants combined. This individual also performed more positive social interactions on the playground throughout Phase One than the other four participants.

### **Phase Two - Comparison**

Phase Two for each participant began after the end of Phase One, after the research participant's teacher and peers were trained to deliver both the PN and PVM interventions, and

after the participant's PVM video was created. The purpose of Phase Two was to provide a comparison of the effects of the different interventions as those treatments were delivered in a rapidly alternating manner (Barlow et al., 2009; Wolery et al., 2014). All five-research participants received the PN and PVM interventions in an alternating format in the classroom setting only during free play for a total of ten alternating sessions (five PN session and five PVM sessions). Research Participants One, Three, and Four began Phase Two with the PN intervention delivered first and Research Participants Two and Four began Phase Two with the PVM delivered first. Post intervention data on the relative effects of those treatments were collected immediately following their delivery for each research participant (a total 50 sessions overall across all participants). In addition to the post intervention data, baseline data were also collected in the classroom during free play, ten sessions for each research participant (a total 50 sessions overall across all participants).

During Phase Two ten sessions of data were collected on the playground for each research participant to determine if the relative effects of those treatments generalized to a different setting (a total of 50 sessions overall across all participants). These data were collected on the same school day that the interventions were delivered for all participants except for Research Participant Three. Because this individual received services off site during the afternoon, he was on only for the morning playground session each school day. Therefore for this participant only, the playground data that were collected on one school day were used to measure the effects of the intervention from the prior school day (e.g., if this participant received the PN intervention on Monday, the applicable playground data would be collected on Tuesday morning before delivery of the PVM intervention). Baseline data were not collected on the

playground during Phase Two due to restrictions related to scheduling and participant attendance.

All research participants performed positive social interactions in both the classroom settings across all three conditions (baseline, PN post intervention, and PVM post intervention) and in the playground settings. Research Participant Four performed the least amount of positive social interactions with delivery of both interventions not having a significant effect on his behavior. Research Participant Five performed the most positive social interactions out of the five participants during classroom baseline and during playground sessions. Research Participant One performed the most positive social interactions for data collected following delivery of the interventions in the classroom setting.

Overall data reflected an increase in post intervention performance for all research participants during Phase Two when compared to baseline performance during Phase One for both classroom and playground settings. The increase was small for Research Participant Four. The differences (with respect to level) were significant for Research Participants One and Five in the classroom setting. However, there were also changes in Phase Two baseline performance (in comparison to Phase One performance) for four of the five research participants suggesting multi-treatment interference. Moreover, performance for Research Participant Five was variable with post intervention performance for both interventions deteriorating towards the end of the second phase. Clear differences between the two interventions were noticeable for Research Participants Two and Three in both the classroom and playground settings.

A combination of visual inspection and statistical analyses were used to identify the best treatment for Phase Three. PN was identified as the best treatment for Research Participants One, Two, Three, and Four.

### **Phase Three - Best by Comparison**

Phase Two ended for each research participant after ten sessions and Phase Three began immediately thereafter. The purpose of Phase Three was to control for a type of multi-treatment interference referred to as alternation effects (Wolery et al., 2014). This is accomplished by identifying the best intervention and then delivering only that treatment (Barlow et al., 2009; Wolery et al., 2014). Phase Three data were collected only for Research Participants One, Two, Three, and Four in both the post intervention classroom settings and playground settings for three sessions each. This translates into a total of 12 sessions in the classroom and 12 sessions on the playground for the four participants. Data were not collected for Research Participant Five due to the study ending before Phase Three could begin for that individual.

All four research participants who experienced Phase Three performed positive social interactions in the classroom setting. Research Participant Four did not perform any positive social interactions on the playground. Research Participant One performed the most positive social interactions out of the four Phase Three participants during both post intervention classroom and playground sessions.

Post intervention performance in the classroom during Phase Three for Research Participant One decreased from his performance in Phase Two suggesting that multi-treatment interference was present during Phase Two (Barlow et al., 2009; Wolery et al., 2014). In contrast, Research Participant One's performance on the playground was similar to Phase Two, and when combined with Phase One and Phase Three data, depicts an overall accelerating trend. Post intervention performance in the classroom and on the playground for Research Participants Two and Three were similar to post intervention performance during Phase Two with slight decreases possibly suggesting the presence of multi-treatment interference (Barlow et al., 2009;

Wolery et al., 2014). Graphically performance for Research Participant Four in the classroom was also similar to his performance during Phase Two, however, this individual went from zero to one positive social interactions, which was not a significant increase.

### **Research Questions and Related Findings**

The following research questions were addressed in this study:

#### **Research Question 1**

Is PN more effective than PVM at increasing the number of positive social interactions in young children with DD in an inclusive classroom setting? In Chapter One it was predicted that there would be a significant difference between the effects of PN and PVM on the number of positive social interactions performed by preschool aged children with DD in an inclusive classroom setting favoring the PVM intervention.

**Research Participant One.** Visual analysis of Phase One data in Figure 1 for Research Participant One suggests a variable, low-level performance with an accelerating trend. Performance peaked on session two in which this participant participated in seven positive social interactions (11.67%). Table 2 and Table 3 lists the mean percentage during Phase One as 7.78%, the median as 10%, and the range as 1.67%-11.67%. When analyzing level, it was observed that two of the three baseline data points were inside of the 25% stability envelope suggesting variability. The same was true when analyzing trend where an accelerating trend line was drawn in Microsoft Excel with two of the three data points inside of the 25% stability envelope suggesting variability with respect to trend.

With the beginning of Phase Two a visual inspection of graphed baseline data presented in Figure 1 suggests a continuing variable, low-level of performance that deteriorates, then improves, and then gradually deteriorates until session 12 where performance increases to the

low to mid level range. Performance of the dependent variable peaked on the final session of Phase Two (session 13) with this individual participating in 23 positive social interactions (38.33%) during that particular classroom session. Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage during Phase Two baseline as 18.17%, the median as 20%, and the range as 3.33%-38.33%. This would be this participant's highest baseline session performance throughout the entire study. Six of the ten baseline data points were inside of the 25% stability envelope suggesting variability with respect to level. Using Microsoft Excel an accelerating trend line was drawn with three of the ten data points falling inside of the 25% stability envelope suggesting variability with respect to trend.

Visual inspection of Phase Two PVM post intervention data presented in Figure 1 for this participant suggests a variable, low to mid level performance with an accelerating and then decelerating trend. Statistical analysis results presented in Table 2 and Table 3 reveals that the mean percentage for Phase Two PVM post intervention sessions was 29.33%, the median was 26.67%, and the range was 15%-40%. Two of the five Phase Two PVM post intervention data points were on the edge or inside of the 25% stability envelope suggesting variability with respect to level. When analyzing trend, an accelerating trend line was drawn in Microsoft Excel with only one of the five data points found to be inside of the 25% stability envelope suggesting variability with respect to trend. PND data presented in Table 4 lists the comparison of PVM-PN during Phase Two as 40%. This translates into performance during two of the five PVM post intervention sessions exceeding performance during adjacent PN post intervention sessions.

Visual analysis of Phase Two PN post intervention data presented in Figure 1 for this participant suggests a variable, low to mid level performance with an overall accelerating trend. Performance of the dependent variable peaked on the final PN post intervention session (session

12) with this individual participating in 31 positive social interactions (51.67%) on that day. This performance during session 12 would also be this individual's best performance throughout the study in both classroom and playground settings. Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage for Phase Two PN post intervention sessions as 29.33% (similar to PVM results), the median as 25%, and the range as 10%-51.67%. Two of the five Phase Two PN post intervention data points were on or inside of the 25% stability envelope suggesting variability with respect to level. When analyzing trend, an accelerating trend line was drawn in Microsoft Excel with three of the five data points inside of the 25% stability envelope suggesting variability with respect to trend. PND data presented in Table 4 lists the comparison of PN-PVM during Phase Two at 40%, which is similar to the PND comparison of PVM-PN.

Due to similarities between two calculated results (PND and the mean), visual analysis alone was used to identify the best treatment for this participant. Since visual analysis reflected an overall accelerating trend throughout the delivery of the PN intervention throughout Phase Two, PN was selected as the best treatment.

With the PN intervention identified as the best treatment, Phase Three began. Visual inspection of Figure 1 suggests a variable, low to mid level of performance that appears to be decelerating. Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage for Phase Three PN post intervention sessions as 25.56%, the median as 28.33%, and the range as 15%-33.33%. Only one of the three Phase Three data points was found to be on or inside of the 25% stability envelope suggesting variability with respect to level. Using Microsoft Excel a decelerating trend line was drawn in which two of the three data points were inside of the 25% stability envelope suggesting trend variability.



**Research Participant Two.** Visual inspection of Phase One data in Figure 1 for Research Participant Two suggests a relatively stable, low-level performance with a small increase on the final baseline session peaking at participation in one positive social interaction (1.67%). Statistical analysis presented in Table 2 and Table 3 lists the mean percentage during Phase One as 0.56%, the median as 0%, and the range as 0%-1.67%. With the median set at zero percent, this means the stability envelope was also set at zero percent (25% of zero percent is zero). Analysis suggests variability with respect to level and variability with respect to trend because only two of the three Phase One baseline data points (66.67%) was found to be on or inside of the 25% stability envelope. The trend line drawn in Microsoft Excel was accelerating.

Visual inspection of graphed Phase Two baseline data presented in Figure 1 suggests a variable, low-level of performance until after session 11 where performance rapidly increases. Performance of the dependent variable peaked on the final session (session 13) when this individual participated in 13 positive social interactions (21.67%). This performance would also be his best performance throughout Phase Two in the classroom setting (also matching his best performance following delivery of the best treatment in Phase Three). Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage during Phase Two baseline as 6.67%, the median as 3.33%, and the range as 0%-21.67%. Two of the ten baseline data points were inside of the 25% stability envelope suggesting variability with respect to level. When analyzing trend, an accelerating trend line was drawn in Microsoft Excel with two of the ten data points falling inside of the 25% stability envelope suggesting variability with respect to trend.

Visual inspection of Phase Two PVM post intervention data presented in Figure 1 suggests a variable, low-level performance that rapidly accelerates and then decelerates. Performance of the dependent variable peaked on session ten with this individual participating in

nine positive social interactions (15%) during that post intervention session. Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage for Phase Two PVM post intervention sessions as 6.33%, the median as 1.67%, and the range as 1.67%-15%. Zero of the five Phase Two PVM post intervention data points were found to be on or inside of the 25% stability envelope suggesting variability with respect to level. Using Microsoft Excel, an accelerating trend line was drawn in which none of the five data points were inside of the 25% stability envelope suggesting variability with respect to trend. PND data presented in Table 4 lists the comparison of PVM-PN during Phase Two at 20%.

A visual inspection of Phase Two PN post intervention data presented in Figure 1 suggests a variable, low-level performance with no trend. This participant's performance of the dependent variable reached its highest point on session nine where he participated in nine positive social interactions (15%) during that day's 15-minute post intervention session. This would match his highest performance of the dependent variable for the PVM intervention but still be below his highest performance in all of Phase Two. Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage for Phase Two PN post intervention sessions as 8%, the median as 8.33%, and the range as 3.33%-15%. One of the five Phase Two PN post intervention data points were found to be on or inside of the 25% stability envelope suggesting variability with respect to level. Microsoft Excel drew an accelerating trend line in which two of the five data points were on or inside of the 25% stability envelope suggesting variability with respect to trend. PND data presented in Table 4 lists the comparison of PN-PVM during Phase Two at 80% favoring the PN intervention.

Clear separation between treatments for this participant was difficult to detect visually (overall performance was low-level and variable for both interventions) so the researcher relied

on statistical calculations to identify the best treatment. PND calculations suggest that overall, this individual performed better following delivery of the PN intervention. As a result, the PN intervention was identified as the best treatment.

Visual inspection of Figure 1 suggests a variable, low-level of performance that deteriorates then improves. Performance of the dependent variable reached its highest point on the first post intervention session (session 14) of Phase Three with this individual participating in 13 positive social interactions (21.67%). This performance matched his best performance in Phase Two in the classroom setting. Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage for Phase Three PN intervention sessions as 12.78%, the median as 13.33%, and the range as 3.33%-21.67%. One of the three Phase Three data points was found to be on or inside of the 25% stability envelope suggesting variability with respect to level. With respect to trend, a decelerating trend line was drawn in Microsoft Excel with none of the data points inside of the 25% stability envelope suggesting variability.

**Research Participant Three.** Visual analysis of Phase One data in Figure 1 for Research Participant Three suggests a stable, low-level of performance with an accelerating trend. This individual's best performance during this phase was on the final session of baseline where he participated in seven positive social interactions (11.67%). Performance of the dependent variable peaked on session seven with this individual participating in fifteen positive social interactions (25%) during that session. Calculations presented in Table 2 and Table 3 indicate that the mean percentage during Phase One was 7.78%, the median was 6.67%, and the range was 5%-11.67%. Only two of the three Phase One baseline data points were inside of the 25% stability envelope suggesting variability with respect to level. The trend line drawn in Microsoft

Excel was accelerating with all three of the Phase One baseline data points inside of the 25% stability envelope suggesting stability with respect to trend.

A visual inspection of Phase Two baseline data presented in Figure 1 suggests a variable, low-level of performance across this phase with no apparent trend. Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage during Phase Two baseline as 13.33%, the median as 10.83%, and the range as 3.33%-25%. Three of the ten Phase Two baseline data points were inside of the 25% stability envelope suggesting variability with respect to level. When analyzing trend, an accelerating trend line was drawn in Microsoft Excel with only one of the ten data points inside of the 25% stability envelope. This suggests variability with respect to trend.

Visual inspection of Phase Two PVM post intervention data presented in Figure 1 suggests a relatively stable, but low-level performance with an overall decelerating trend. This participant's best performance was on session five (also the first day of the delivery of the PVM intervention) where he participated in six positive social interactions (15%) during that day's post intervention session. Statistical analysis results presented in Table 2 and Table 3 gives the mean percentage for Phase Two PVM post intervention sessions as 4.67%, the median as 3.33%, and the range as 1.67%-10%. None of the Phase Two PVM post intervention data points were inside of the 25% stability envelope suggesting variability with respect to level. A decelerating trend line was drawn in Microsoft Excel with all five of the post intervention data points inside of the 25% stability envelope suggesting stability with respect to trend. PND data presented in Table 4 lists the comparison of PVM-PN during Phase Two at 0%.

Visual inspection of Phase Two PN post intervention data presented in Figure 1 suggests low-level performance with an overall decelerating trend. However, and in contrast to the PVM

data collected during Phase Two, performance was variable for PN post intervention data. This participant's performance on the dependent variable reached its highest point on session ten with sixteen positive social interactions (26.67%) during that day's 15-minute post intervention session. This would also mark this individual's best performance throughout all of Phase Two, as well as throughout the entire study. Table 2 and Table 3 reveal that the mean percentage for Phase Two PN post intervention sessions was 15%, the median was 13.33%, and the range was 8.33%-26.67%. Three of the five Phase Two PN post intervention data points were found to be inside of the 25% stability envelope suggesting variability with respect to level. Using Microsoft Excel an accelerating trend line was drawn with two of the five data points inside of the 25% stability envelope suggesting trend variability. PND data presented in Table 4 lists the comparison of PN-PVM during Phase Two at 100% favoring the PN intervention. As a result of the PND calculation, and because visually overall performance was higher throughout Phase Two after having received the PN intervention, PN was selected as the best treatment for this participant.

Similar to Research Participant Two, visual inspection of Phase Three PN post intervention data presented in Figure 1 suggests a variable, low-level of performance that deteriorates and then improves. Performance peaked on the final session of the study (session 16) in which this participant participated in nine positive social interactions (15%). Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage for Phase Three PN post intervention sessions as 11.67%, the median as 13.33%, and the range as 6.67%-15%. Only one of the three Phase Three data points was found to be inside of the 25% stability envelope suggesting variability with respect to level. With respect to trend, an accelerating trend line was

drawn in Microsoft Excel with two of the three data points inside of the 25% stability envelope suggesting variability.

**Research Participant Four.** Visual inspection of Phase One data in Figure 1 for Research Participant Four suggests a flat, stable level of performance with a zero-celerating trend. Table 2 and Table 3 list the mean percentage during Phase One as 0% and the median as 0%. Because this participant did not perform any positive social interactions during baseline, all three Phase One baseline data points fell within the 25% stability envelope suggesting stability with respect to both level and trend. A zero-celerating trend line was drawn in Microsoft Excel.

Visual inspection of Phase Two baseline data presented in Figure 1 suggests a stable (almost flat), low-level of performance across this phase with an almost zero-celerating trend. Statistical analysis results presented in Table 2 and Table 3 lists the mean, median, and range percentages during Phase Two baseline as 0.17%, the median as 0%, and the range as 0%-1.67%. Nine of the ten data points were on the 25% stability envelope suggesting stability with respect to level. With regards to trend, an accelerating trend line was drawn in Microsoft Excel. Due to the slight increase on session 11, zero data points fell within the 25% stability envelope therefore suggesting variability with respect to trend.

Visual inspection of Phase Two PVM post intervention data presented in Figure 1 suggests a relatively stable, but low-level performance with an overall decelerating trend. The results of statistical analysis presented in Table 2 and Table 3 give the mean percentage for Phase Two PVM post intervention sessions as 0.33%, the median as 0%, and the range as 0%-1.67%. Four of the five Phase Two PVM post intervention data points were inside of the 25% stability envelope suggesting stability with respect to level. Using Microsoft Excel a decelerating trend line was drawn with none of the post intervention data points on or inside of the 25% stability

envelope. This suggests variability with respect to trend. PND data presented in Table 4 gives the comparison of PVM-PN during Phase Two at 20%.

Visual inspection of Phase Two PN post intervention data presented in Figure 1 suggests a relatively stable, low-level performance with a near zero-celerating trend. Performance peaked on the final session of Phase Two (session 12) in which this participant participated in four positive social interactions (6.67%). This performance would also mark this individual's best performance throughout the entire study in both classroom and playground settings. Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage for Phase Two PN post intervention sessions as 1.33%, the median as 0%, and the range as 0%-6.67%. Four of the five Phase Two PN post intervention data points were found to be within the 25% stability envelope suggesting stability with respect to level. Due in part to the performance increase on session 12, analysis of trend in Microsoft Excel resulted in an accelerating trend line in which none of the PN post intervention data points were inside of the 25% stability envelope. This suggests trend variability. PND data presented in Table 4 lists the comparison of PN-PVM during Phase Two at 20%.

Because of the increase in the number of positive social interactions at the end of Phase Two, which were more than all of the positive social interactions that were recorded in all of the prior sessions throughout this study thus far for this participant, Phase Three began with the PN intervention identified as the best treatment. Post intervention data presented in Figure 1 suggests a low-level of performance with an increasing trend during which two interactions occurred, one on session 15 and one on session 16. Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage for Phase Three PN post intervention sessions as 1.11%, the median as 1.67%, and the range as 0%-1.67%. One of the three points was found to be inside of the 25%

stability envelope suggesting level variability. With respect to trend, an accelerating trend line was drawn in Microsoft Excel with all three data points falling outside of the 25% stability envelope suggesting variability.

**Research Participant Five.** Visual analysis of Phase One data in Figure 1 for Research Participant Five suggests a low, variable level of performance with a deteriorating then improving trend. Performance reached its highest point on the third baseline session of Phase One with 12 positive social interactions (20%). Statistical analysis presented in Table 2 and Table 3 lists the mean percentage during Phase One as 12.78%, the median as 15%, and the range as 3.33%-20%. One of the three baseline data points were inside of the 25% stability envelope suggesting variability with respect to level. Using Microsoft Excel an accelerating trend line was drawn with all three Phase One baseline data points falling outside of the 25% stability envelope suggesting variability with respect to trend.

An inspection of graphed Phase Two baseline data presented in Figure 1 suggests continuing variability with performance constantly improving then deteriorating from the low to mid levels throughout the entire phase. Performance of the dependent variable peaked on session 11 with this individual participating in 32 positive social interactions (53.33%) during that particular session. This would be this individual's highest performance of the dependent variable throughout the entire study in both classroom and playground settings. Statistical analysis results presented in Table 2 and Table 3 gives the mean percentage during Phase Two baseline as 25%, the median as 20%, and the range as 3.33%-53.33%. None of the Phase Two baseline data points were inside of the 25% stability envelope suggesting variability with respect to level. With respect to trend, an accelerating trend line was drawn in Microsoft Excel with only one of the ten data points falling inside of the 25% stability envelope also suggesting variability.

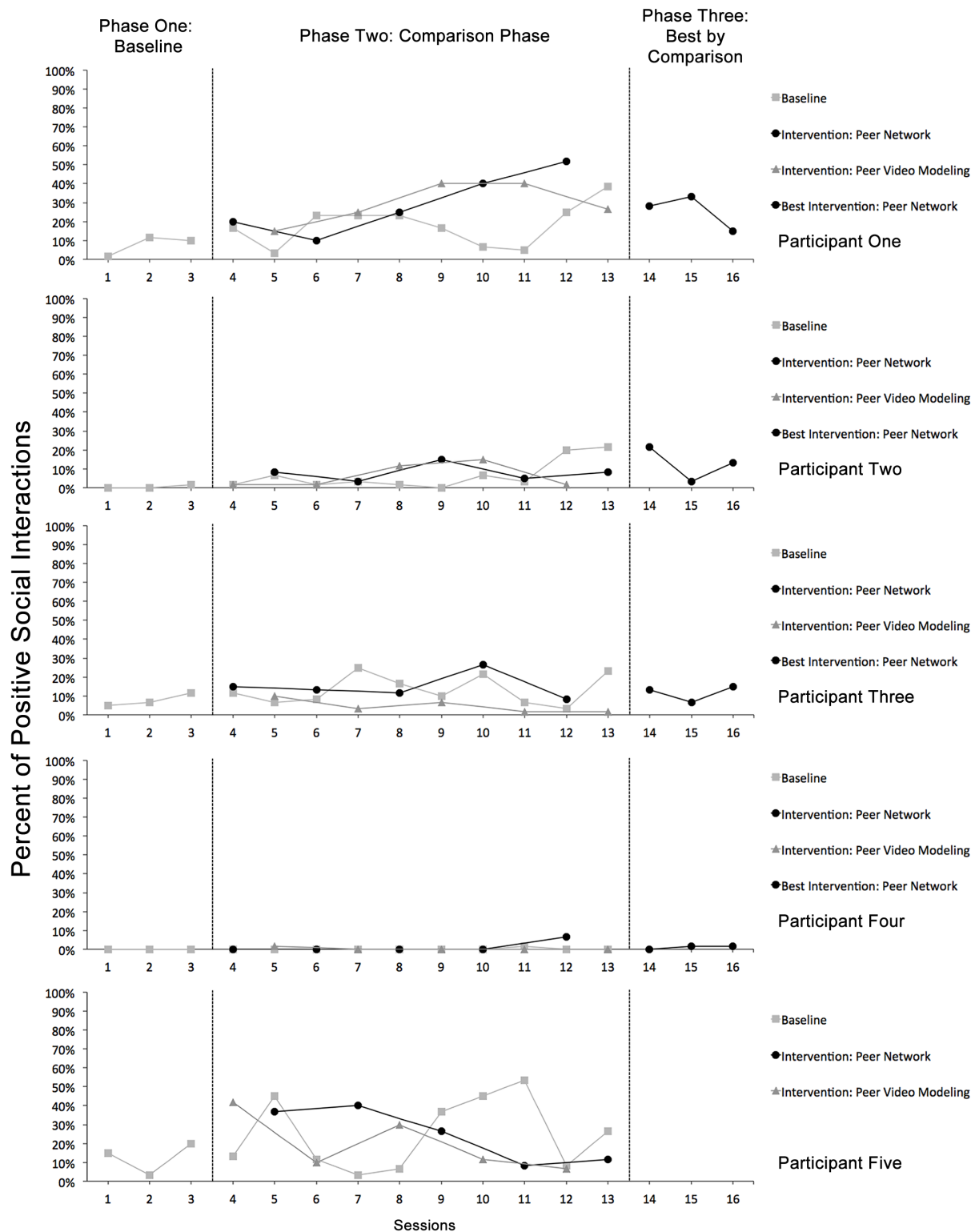


Visual inspection of Phase Two PVM post intervention data presented in Figure 1 for this participant suggests a variable, mid to low-level performance with an overall decelerating trend. Performance of the dependent variable reached its highest point during the first post intervention session (session four overall) where this individual participated in 25 positive social interactions (41.67%) during that particular session. Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage for Phase Two PVM post intervention sessions as 20%, the median as 11.67%, and the range as 6.67%-41.67%. Zero of the five Phase Two PVM post intervention data points were on or inside of the 25% stability envelope suggesting variability with respect to level. When analyzing trend, a decelerating trend line was drawn in Microsoft Excel with two of the five data points found to be inside of the 25% stability envelope suggesting variability with respect to trend. PND data presented in Table 4 lists the comparison of PVM-PN during Phase Two at 60%.

Similar to PVM post intervention data, visual inspection of Phase Two PN post intervention data presented in Figure 1 for this participant suggests a variable, mid to low-level performance with an overall decelerating trend. Performance peaked on session seven in which this participant participated in twenty-four positive social interactions (40%). Statistical analysis results presented in Table 2 and Table 3 lists the mean percentage for Phase Two PN post intervention sessions as 24.67%, the median as 26.67%, and the range as 8.33%-40%. None of the five Phase Two PN post intervention data points were inside of the 25% stability envelope suggesting variability with respect to level. Also similar to PVM post intervention results, a decelerating trend line was drawn in Microsoft Excel with two of the five data points inside of the 25% stability envelope suggesting variability with respect to trend. PND data presented in Table 4 lists the comparison of PN-PVM during Phase Two at 40%.

Session 13, also the end of Phase Two, represented the last day that data were collected for this individual. Phase Three data were not collected due to the study ending. Due to variability in this individual's performance throughout majority of the 13 sessions across conditions, statistical calculations do not provide conclusive evidence as to which intervention (PVM or PN) was the most effective treatment. As a result an adapted version of this participant's graph was constructed (see Figure 2). Visual inspection of Figure 2 suggests that overall, the PN intervention was more effective. However when compared to the baseline data collected during both Phase One and Phase Two (see Figure 1), that point is moot because this individual's performance was measured to be higher during baseline sessions suggesting that neither intervention was effective for this individual and that performance of the dependent variable was not under experimental control (Gast & Tawney, 2014).

Figure 1. Comparison of Percentage of Positive Social Interactions in the Classroom.



Note. Research participants are listed in order that they completed the study.

Table 2. Mean and Range Percentages for Positive Social Interactions in the Classroom.

Participant	Phase One Baseline <i>M</i> (Range)	Phase Two Baseline <i>M</i> (Range)	Phase Two PVM <i>M</i> (Range)	Phase Two PN <i>M</i> (Range)	Phase Three Best Treatment <sup>a</sup> <i>M</i> (Range)
One	7.78 (1.67- 11.67)	18.17 (3.33- 38.33)	29.33 (15-40)	29.33 (10- 51.67)	25.56 (15- 33.33)
Two	0.56 (0-1.67)	6.67 (0-21.67)	6.33 (1.67-15)	8 (3.33-15)	12.78 (3.33- 21.67)
Three	7.78 (5-11.67)	13.33 (3.33- 25)	4.67 (1.67-10)	15 (8.33- 26.67)	11.67 (6.67- 15)
Four	0 (0)	0.17 (0-1.67)	0.33 (0-1.67)	1.33 (0-6.67)	1.11 (0-1.67)
Five	12.78 (3.33- 20)	25 (3.33- 53.33)	20 (6.67- 41.67)	24.67 (8.33- 40)	-

*Note.* Phase 3 data was not collected for Participant Five due to the study ending.

<sup>a</sup>The best treatment identified for Research Participants One through Four was PN.

Table 3. Median Percentages for Positive Social Interactions in the Classroom.

Participant	Phase One Baseline <i>Mdn</i>	Phase Two Baseline <i>Mdn</i>	Phase Two PVM <i>Mdn</i>	Phase Two PN <i>Mdn</i>	Phase Three Best Treatment <sup>a</sup> <i>Mdn</i>
One	10	20	26.67	25	28.33
Two	0	3.33	1.67	8.33	13.33
Three	6.67	10.83	3.33	13.33	13.33
Four	0	0	0	0	1.67
Five	15	20	11.67	26.67	-

*Note.* Phase 3 data was not collected for Participant Five due to the study ending.

<sup>a</sup>The best treatment identified for Research Participants One through Four was PN.

Table 4. PND for Positive Social Interactions in the Classroom.

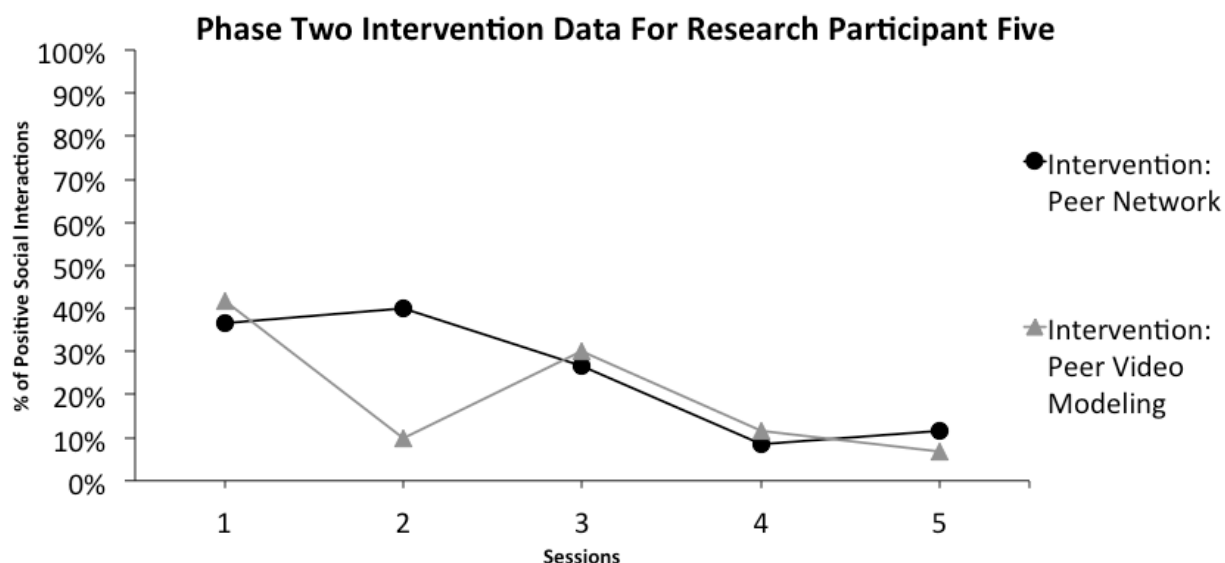
Participant	PVM-Baseline	PN-Baseline	PVM-PN <sup>a</sup>	PN-PVM <sup>b</sup>
One	80	80	40	40
Two	40	60	20	80
Three	20	80	0	100
Four	20	20	20	20
Five	40	20	60	40

*Note.* PND calculations were performed using Phase Two data only as suggested by Wolery et al. (2014).

<sup>a</sup>Represents a comparison of data collected during Phase Two only.

<sup>b</sup>Represents a comparison of data collected during Phase Two only

Figure 2. Modified Version of a Graph of Research Participant Five's Performance in the Classroom Setting During Phase Two Without Baseline Data.



## Research Question 2

Will the positive effects of the best treatment generalize to the playground setting? It was predicted that PVM would be the most effective treatment and that the effects of that intervention would generalize to the playground setting.

**Research Participant One.** Visual analysis of Phase One data in Figure 3 for Research Participant One suggests a relatively stable, low-level performance with an accelerating trend. Performance of the dependent variable during baseline peaked on session three with this individual participating in eight positive social interactions (13.33%) during that particular session. Calculations presented in Table 5 and Table 6 indicate that the mean percentage during Phase One was 8.89%, the median was 8.33%, and the range was 5%-13.33%. An analysis of level using a 25% stability envelope resulted in one of the three data points falling inside of the envelope suggesting variability. However with respect to trend, the data were stable with all

three of the data points falling inside of the 25% stability envelope. An accelerating trend line was drawn in Microsoft Excel.

Visual inspection of Phase Two PVM post intervention data presented in Figure 3 for this participant suggests a variable, low to lower-mid level performance with an overall accelerating trend. Performance of the dependent variable reached its highest point for the playground setting on session 13 where this individual participated in 20 positive social interactions (33.33%). Statistical analysis results presented in Table 5 and Table 6 give the mean percentage for Phase Two PVM post intervention sessions at 22.92%, the median at 21.67%, and the range at 15%-33.33%. None of the five Phase Two PVM post intervention data points were on or inside of the 25% stability envelope suggesting variability with respect to level. An analyst of trend resulted in an accelerating trend line drawn in Microsoft Excel with two of the five data points found to be inside of the 25% stability envelope suggesting variability with respect to trend. PND data presented in Table 7 lists the comparison of PVM-PN during Phase Two at 50%.

Visual analysis of Phase Two PN post intervention data presented in Figure 3 for this participant suggests a variable, low-level performance with an overall accelerating trend. Performance of the dependent variable during Phase Two PN post intervention peaked on session 12 with 13 positive social interactions (21.67%) during that particular session. Statistical analysis results presented in Table 5 and Table 6 lists the mean percentage for Phase Two PN post intervention sessions as 16%, the median as 16.67%, and the range as 8.33%-21.67%. One of the five Phase Two PN post intervention data points were inside of the 25% stability envelope suggesting variability with respect to level. An analysis of trend resulted in an accelerating trend line drawn in Microsoft Excel with none of the five data points falling inside of the 25% stability envelope. This suggests variability with respect to trend. PND data presented in Table 7 lists the

comparison of PN-PVM during Phase Two at 50%, which is similar to the PND comparison of PVM-PN. PND notwithstanding, this individual's performance of the dependent variable following PVM sessions was higher than his performance on the playground following PN sessions. As mentioned previously though, when factoring in selection of the best treatment, the researcher chose to rely on both visual inspection and statistical analysis of classroom data.

Visual inspection of Phase Three PN post intervention data in Figure 3 suggests a low to lower-mid level of performance that appears to be accelerating and is relatively stable. Performance of the dependent variable during the best by comparison phase peaked on session 16 with Participant One participating in 17 positive social interactions (28.33%) during that particular session. Statistical analysis results presented in Table 5 and Table 6 gives the mean percentage for Phase Three PN post intervention sessions as 21.11%, the median as 20%, and the range as 15%-28.33%. One of the three Phase Three data points was found to be on or inside of the 25% stability envelope suggesting variability with respect to level. Using Microsoft Excel an accelerating trend line was drawn in which all three of the data points were inside of the 25% stability envelope suggesting trend stability.

**Research Participant Two.** Visual inspection of Phase One data in Figure 3 for Research Participant Two suggests variable, low-level performance with a small increase on the final baseline session. Statistical analysis presented in Table 5 and Table 6 lists the mean percentage during Phase One as 1.67%, the median as 0%, and the range as 0%-5%. Two of the three data points were found to be on or inside of the 25% stability envelope suggesting variability with respect to level. None of the three data points fell inside of the 25% stability envelope suggesting that there was variability with respect to trend. The trend line drawn in Microsoft Excel was accelerating. Because the Phase One baseline median was zero percent, the

stability envelope would also be set at zero (25% of zero is zero). This, along with the fact that playground “baseline” data were not collected during Phase Two resulted in the “80%-25%” rule suggested by Gast and Spriggs (2014) not being used to analyze Phase Two and Phase Three post intervention data for Research Participant Two.

Visual inspection of Phase Two PVM post intervention data presented in Figure 3 suggests a variable, low-level performance that gradually decelerates. Performance of the dependent variable peaked on session six with this individual participating in ten positive social interactions (16.67%) during that particular session. Statistical results presented in Table 5 and Table 6 give the mean percentage for Phase Two PVM post intervention sessions as 11.67%, the median as 10%, and the range as 8.33%-16.67%. Using Microsoft Excel a decelerating trend line was drawn. PND data presented in Table 7 lists the comparison of PVM-PN during Phase Two at 20%.

A visual inspection of Phase Two PN post intervention data presented in Figure 3 suggests a relatively stable, low-level of performance with a gradually decelerating trend. Performance of the dependent variable peaked after introduction of the PN intervention on session four with this individual performing fifteen positive social interactions (25%) during that session. With the exception of session 16 on the playground, this was the highest number of positive social interactions performed by this individual in one session throughout the entire study across all conditions and settings. Statistical analysis results presented in Table 5 and Table 6 lists the mean percentage for Phase Two PN post intervention sessions as 17%, the median as 15%, and the range as 13.33%-25%. Microsoft Excel was used to draw a decelerating trend line. Similar to the classroom setting for this participant, PND results presented in Table 7 reveals that the comparison of PN-PVM during Phase Two was 80% PND favoring the PN intervention. This



individual's performance graphed in Figure 3 demonstrates clear separation between treatments favoring the PN intervention.

Visual inspection of graphed Phase Three PN post intervention data presented in Figure 3 suggests a low, variable level of performance with an overall accelerating trend. Performance during this phase peaked on session 16 in which this participant participated in 10 positive social interactions (16.67%). Statistical analysis results presented in Table 5 and Table 6 lists the mean percentage during Phase Three PN post intervention as 12.22%, the median as 13.33%, and the range as 6.67%-16.67%. An accelerating trend line was drawn using Microsoft Excel.

**Research Participant Three.** Visual inspection of Phase One data in Figure 3 for Research Participant Three reveals a low, variable level performance with a lack of trend. Performance was at its highest on sessions one and three with this individual participating in three positive social interactions (5%) during those sessions. Calculations presented in Table 5 and Table 6 lists the mean percentage during Phase One as 3.89%, the median as 5%, and the range as 1.67%-5%. Two of the three Phase One baseline data points were inside of the 25% stability envelope suggesting variability with respect to level. The trend line drawn in Microsoft Excel was near zero-celerating. Two of the three Phase One baseline data points were inside of the 25% stability envelope suggesting variability with respect to trend.

A visual inspection of Phase Two PVM post intervention data presented in Figure 3 suggests a variable, low-level of performance across this phase with an overall decelerating trend. This individual's highest performance of the dependent variable throughout the PVM post intervention playground setting in Phase Two was on the fifth session in which he participated in seven positive social interactions (11.67%). Statistical analysis results presented in Table 5 and Table 6 give the mean percentage during Phase Two PVM post intervention as 7.08%, the

median as 8.33%, and the range as 0%-11.67%. Two of the five Phase Two PVM post intervention data points were inside of the 25% stability envelope suggesting variability with respect to level. An analysis of trend resulted in a decelerating trend line drawn in Microsoft Excel in which none of the five data points were inside of the 25% stability envelope. This suggests variability with respect to trend. PND data presented in Table 7 reveals that the PND for the PVM-PN comparison during Phase Two was 0%.

Visual inspection of Phase Two PN post intervention data presented in Figure 3 suggests a variable, low-level performance with an overall decelerating trend. Performance peaked on sessions six and eight with this individual performing sixteen (26.67%) and fifteen (25%) positive social interactions respectively during those two fifteen-minute time spans. Statistical analysis results presented in Table 5 and Table 6 indicates that the mean percentage for Phase Two PN post intervention sessions was 17.33%, the median was 15%, and the range was 8.33%-26.67%. One of the five data points were inside of the 25% stability envelope suggesting variability with respect to level. A decelerating trend line was drawn in Microsoft Excel with none of the post intervention data points falling inside of the 25% stability envelope suggesting variability with respect to trend. PND data presented in Table 7 lists the comparison of PN-PVM during Phase Two at 80%. Similar to the classroom setting for this individual, Figure 3 clearly shows separation between treatments favoring the PN intervention.

Visual inspection of Phase Three PN post intervention data presented in Figure 3 suggests variable, low-level performance with an overall accelerating trend. This individual's highest performance of the dependent variable during this phase was on session 15 in which he participated in 14 positive social interactions (23.33%). Statistical analysis results presented in Table 5 and Table 6 lists the mean percentage for Phase Three PN post intervention sessions as

14.44%, the median as 13.33%, and the range as 6.67%-23.33%. One of the three PN post intervention data points were found to be inside of the 25% stability envelope suggesting variability with respect to level. Using Microsoft Excel an accelerating trend line was drawn with none of the three data points inside of the 25% stability envelope suggesting trend variability.

**Research Participant Four.** Similar to the classroom setting for Research Participant Four, visual inspection of Phase One data in Figure 3 suggests a flat, stable level of performance with a zero-celerating trend. Statistical analysis presented in Table 5 and Table 6 indicates that the mean percentage during Phase One was 0% and the median was 0%. All three baseline data points fell within the 25% stability envelope suggesting stability with respect to both level and trend. Microsoft Excel was used to draw a trend line that was zero-celerating.

Visual inspection of Phase Two PVM post intervention data presented in Figure 3 suggests a stable (almost flat), low-level of performance across this phase with a near zero-celerating trend. Results of the statistical analyses presented in Table 5 and Table 6 give the mean, median, and range percentages during Phase Two PVM post intervention as 0.33%, the median as 0%, and the range as 0%-1.67%. Four of the five Phase Two PVM post intervention data points were on the 25% stability envelope suggesting stability with respect to level. Using Microsoft Excel an accelerating trend line was drawn due to the one positive social interaction this individual performed during session 13. Because of this slight increase zero data points fell within the 25% stability envelope suggesting variability with respect to trend. PND data presented in Table 7 lists the comparison of PVM-PN during Phase Two at 20%.

Visual inspection of Phase Two PN post intervention data presented in Figure 3 also suggests a stable, low-level performance with a near zero-celerating trend. Statistical analysis results presented in Table 5 and Table 6 lists the mean percentage for Phase Two PN post

intervention sessions as 0.33%, the median as 0%, and the range as 0%-1.67%. Four of the five Phase Two PN post intervention data points were within the 25% stability envelope suggesting stability with respect to level. An accelerating trend line was drawn in Microsoft Excel in which none of the PN post intervention data points were inside of the 25% stability envelope suggesting trend variability. PND data provided in Table 7 lists the comparison of PN-PVM during Phase Two at 20%.

This individual's performance during Phase 3 was exactly the same as his performance during Phase One baseline: a stable, low-level of performance with a zero-celerating trend. The mean and median, presented in Table 5 and Table 6, were both 0%. All three data points were the same therefore they all fell within the 25% stability envelope suggesting stability with respect to both level and trend.

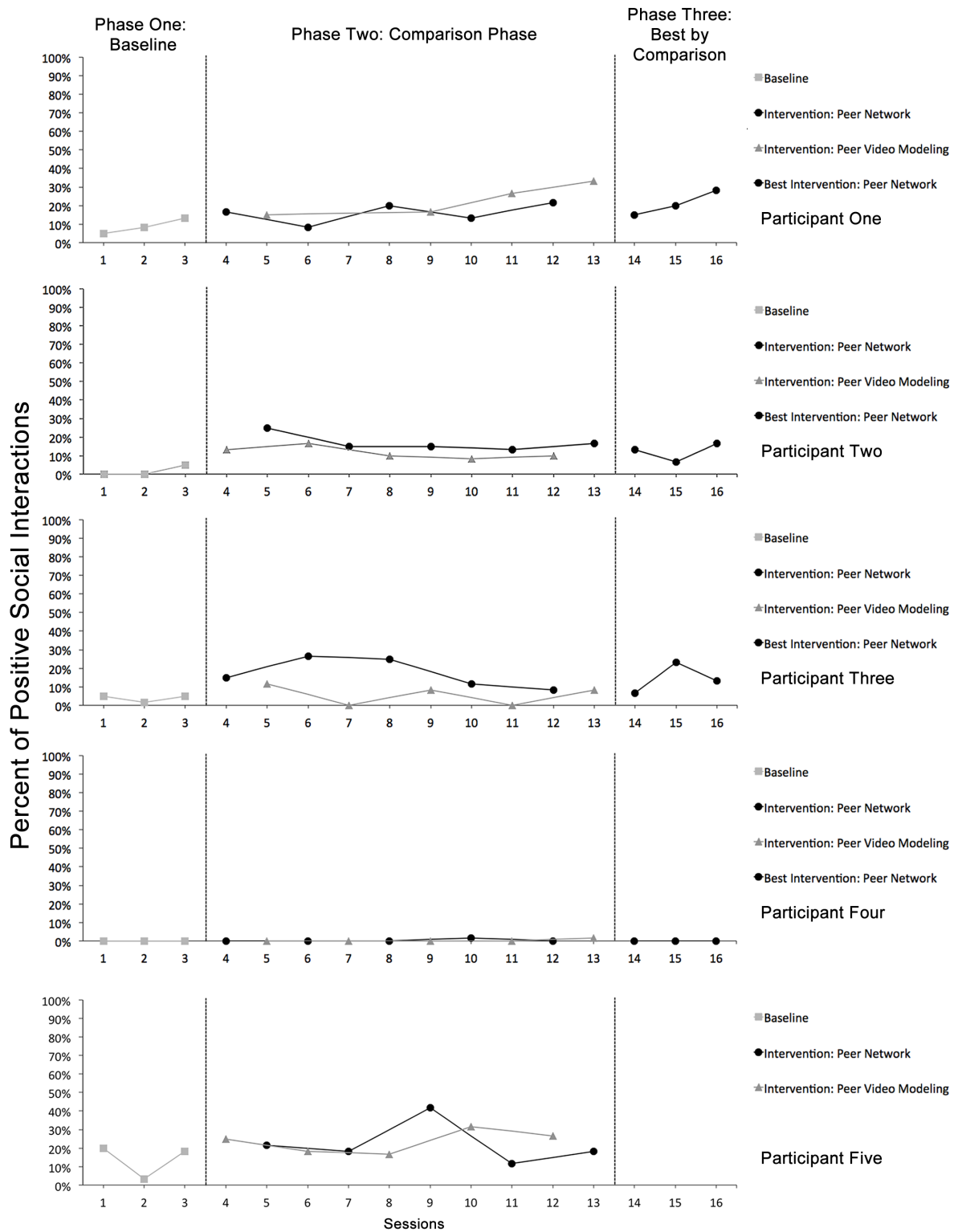
**Research Participant Five.** Visual inspection of Phase One data in Figure 3 for Research Participant Five suggests a variable, low-level performance with an overall deteriorating trend. Performance of the dependent variable was at its highest on the first session of baseline when this individual engaged in 12 positive social interactions (20%). Statistical analysis presented in Table 5 and Table 6 give the mean percentage as 13.89%, the median as 18.33%, and the range as 3.33%-20%. Two of the three Phase One baseline data points were inside of the 25% stability envelope suggesting variability with respect to level. Using Microsoft Excel a decelerating trend line was drawn in which all three baseline data points were outside of the 25% stability envelope suggesting variability with respect to trend.

Visual inspection of Phase Two PVM post intervention data presented in Figure 3 suggests a variable, low-level performance with an overall gradually accelerating trend. PVM post intervention performance peaked on session ten in which this individual participated in

nineteen positive social interactions (31.67%). Statistical results presented in Table 5 and Table 6 lists the mean percentage for Phase Two PVM post intervention sessions as 23.67%, the median as 25%, and the range as 16.67%-31.67%. Two of the five Phase Two PVM post intervention data points were inside of the 25% stability envelope suggesting variability with respect to level. Using Microsoft Excel an accelerating trend line was drawn with two of the five post intervention data points were on or inside of the 25% stability envelope. This suggests variability with respect to trend. PND of the comparison of PVM-PN during Phase Two is 60%.

Visual inspection of Phase Two PN post intervention data presented in Figure 3 for this participant suggests a variable, low to mid level performance with an overall decelerating trend. Performance of the dependent variable peaked on session nine with this individual performing twenty-five positive social interactions (41.67%) during that time span. Statistical analysis results presented in Table 5 and Table 6 reveal that the mean percentage for Phase Two PN post intervention sessions was 22.33%, the median was 18.33%, and the range was 11.67%-41.67%. Three of the five Phase Two PN post intervention data points were inside of the 25% stability envelope suggesting variability with respect to level. When analyzing trend, a decelerating trend line was drawn in Microsoft Excel with two of the five post intervention data points inside of the 25% stability envelope suggesting variability with respect to trend. PND data presented in Table 7 lists the comparison of PN-PVM during Phase Two at 20%. Phase Three data were not collected for this individual to the study ending.

Figure 3. Comparison of Percentage of Positive Social Interactions on the Playground.



*Note.* Research participants are listed in order that they completed the study.

Table 5. Mean and Range Percentages for Positive Social Interactions on the Playground.

Participant	Phase One <i>M</i> (Range)	PVM <i>M</i> (Range)	PN <i>M</i> (Range)	Best Treatment <i>M</i> (Range)
One	8.89 (5-13.33)	22.92 (15-33.33) <sup>a</sup>	16 (8.33-21.67)	21.11 (15-28.33)
Two	1.67 (0-5)	11.67 (8.33-16.67)	17 (13.33-25)	12.22 (6.67-16.67)
Three	3.89 (1.67-5)	7.08 (0-11.67)	17.33 (8.33-26.67)	14.44 (6.67-23.33)
Four	0 (0)	0.33 (0-1.67)	0.33 (0-1.67)	0 (0)
Five	13.89 (3.33-20)	23.67 (16.67-31.67)	22.33 (11.67-41.67)	-

*Note.* Phase 3 data was not collected for Participant Five due to the study ending.

<sup>a</sup>Playground was cancelled during the seventh session of Phase 2 for Research Participant One due to poor weather conditions therefore the PVM data for this individual represents data collected during only four playground sessions.

Table 6. Median Percentages for Positive Social Interactions on the Playground.

Participant	Phase One <i>Mdn</i>	PVM <i>Mdn</i>	PN <i>Mdn</i>	Best Treatment <i>Mdn</i>
One	8.33	21.67	16.67	20
Two	0	10	15	13.33
Three	5	8.33	15	13.33
Four	0	0	0	0
Five	18.33	25	18.33	-

*Note.* Phase 3 data was not collected for Participant Five due to the study ending.

<sup>a</sup>Playground was cancelled during the seventh session of Phase 2 for Research Participant One due to poor weather conditions therefore the PVM data this individual represents data from four playground sessions.

Table 7. PND for Positive Social Interactions on the Playground.

Participant	PVM-PN <sup>a</sup>	PN-PVM <sup>b</sup>
One	50 <sup>c</sup>	50 <sup>d</sup>
Two	20	80
Three	0	80
Four	20	20
Five	60	20

*Note.* Comparison of the effects of the two interventions in the playground setting.

<sup>a</sup>Represents a comparison of data collected during Phase Two only.

<sup>b</sup>Represents a comparison of data collected during Phase Two only.

<sup>c</sup>Playground was cancelled during the seventh session of Phase Two for Research Participant One due to poor weather conditions therefore the PND calculation for this individual incorporated data from four PVM and four PN playground sessions.

<sup>d</sup>Playground was cancelled during the seventh session of Phase Two for Research Participant One due to poor weather conditions therefore the PND calculation for this individual incorporated data from four PVM and four PN playground sessions.

### **Fidelity of Treatment**

Data on treatment fidelity were collected on all intervention sessions that were delivered to research participants throughout the study as recommended by Wolery et al. (2014).

#### **PN Intervention Fidelity**

Delivery of the PN intervention sessions were reviewed by the teacher participants, the researcher, and one comparison rater using the Peer Fidelity Measure for the PN treatment (Appendix G). Teacher participants used the fidelity form to review live, only those PN intervention sessions that they themselves supervised. Independent of the teacher participants, and independent of each other, the researcher and one of the comparison raters, reviewed video recorded of the PN intervention sessions being delivered. The researcher and at least one teacher reviewed each of the PN intervention sessions. The comparison rater reviewed at least 20% of all PN intervention sessions for each research participant. Table 8 presents the mean percentage rating of those reviews for each research participant.

Table 8. Mean Percentage of Fidelity of Implementation for Peer Network Intervention Sessions.

Research Participant	Teachers of Record	Researcher	Comparison Rater
One	93.91%	96.07%	97.44%
Two	97.12%	90.3%	100%
Three	94.23%	88.46%	84.62%
Four	92.40%	84.62%	84.61%
Five	93.96%	96.92%	100%

*Note.* A total of eight PN intervention sessions were delivered for Research Participants One through Four (five during Phase Two and three during Phase Three). Only five PN intervention



sessions were delivered for Research Participant Five (five during Phase Two).

In addition the total count IOA for PN intervention sessions were calculated. The total count IOA for PN intervention sessions 100% for Research Participant One, 100% for Research Participant Two, 96.15% for Research Participant Three, 92.31% for Research Participant Four, and 100% for Research Participant Five.

### **PVM Intervention Fidelity**

Videos of the delivery of the PVM intervention sessions were reviewed independently by the researcher and one comparison rater using the Teacher Fidelity Measure for the PVM treatment (Appendix H). The comparison rater reviewed at least 20% of all PVM intervention sessions for each research participant. Table 9 presents the mean percentage rating of those reviews for each research participant.

Table 9. Mean Percentage of Fidelity of Implementation of Peer Video Modeling Intervention Sessions.

Research Participant	Researcher	Comparison Rater
One	95.33%	83.33%
Two	86.67%	83.33%
Three	89.33%	86.67%
Four	82.67%	93.33%
Five	97.33%	93.33%

The total count IOA for PVM the intervention sessions were also calculated. The total count IOA for PVM intervention sessions was 100% for Research Participant One, 100% for Research Participant Two, 100% for Research Participant Three, 100% for Research Participant Four, and 100% for Research Participant Five.

### **Inter-observer Agreement**

Using the Partial-Interval Recording Positive Social Interactions Data Collection Sheet (see Appendix F), the researcher reviewed all recorded videos across all conditions (baseline and

post intervention) and settings (classroom and playground). Independent of both the researcher and each other, two comparison raters each reviewed 25% of the recorded video. Interval-by-interval IOA for the dependent variable was calculated using a formula as suggested by Cooper et al. (2007) where:  $\frac{\text{the number of intervals agreed}}{(\text{number of intervals agreed} + \text{number of interval disagreed})} \times 100 = \text{interval-by-interval IOA}$ . Between the researcher and the first comparison rater the interval-by-interval IOA was 86.94% for Research Participant One, 93.57% for Research Participant Two, 92.92% for Research Participant Three, 100% for Research Participant Four, and 86.81% for Research Participant Five. Between the researcher and the second comparison rater the interval-by-interval IOA was 86.25% for Research Participant One, 92.44% for Research Participant Two, 91.39% for Research Participant Three, 99.86% for Research Participant Four, and 85.83% for Research Participant Five.

### **Social Validity Measure**

Social validity was measured through the use of an 18-item survey distributed on paper by one of the comparison raters to 5 teacher participants and 16 parent participants (5 parents of the research participants and 11 parents of the peer participants). Seventeen of the questions were likert-scale items. The eighteenth item was an open-ended question that prompted respondents to provide feedback on any aspect of this study. The Social Validity measure was adapted from questions used in Jung et al., (2008), Garfinkle and Schwartz (2002), and Storey et al. (1994). A total of four teacher participants and two parent participants responded to the measure. The two measures returned by parents were blank. The teacher responses are presented in Table 10.

Table 10. Social Validity - Means and Ranges of Teacher Responses.

	<i>M</i>	<b>Range</b>
1. The goal of increasing the number social interactions exhibited by the target student is a valid and appropriate goal.	4.75	4-5
2. PVM was effective at increasing the number of social interactions of the target student?	3.25	2-5
3. PN was effective at increasing the number of social interactions of the target student?	4.5	4-5
4. The other children involved in the intervention benefitted from the use of PVM.	3.75	2-5
5. The other children involved in the intervention benefitted from the use of PN.	4.25	3-5
6. Other children not involved in the intervention benefitted from the use of PVM.	3	2-5
7. Other children not involved in the intervention benefitted from the use of PN.	2.67	2-3
8. PVM is something I could do in my classroom.	3.75	2-5
9. PN is something I could do in my classroom.	5	5
10. PVM is something I could do on the playground.	4.5	3-5
11. PN is something I could do on the playground.	5	5
12. Reasonable effort was expended implementing the PVM procedures?	4.5	4-5
13. Reasonable effort was expended implementing the PN procedures?	4.5	4-5
14. I would use PVM again with a new group of students.	4	3-5
15. I would use PN again with a new group of students.	5	5
16. Overall, the use of PVM was appropriate for a preschool setting.	4	3-5
17. Overall, the use of PN was appropriate for a preschool setting.	5	5

*Note.* The measure was comprised of 17 Likert-scale questions. 5 = Strongly Agree; 4 = Agree; 3 = Neither Agree nor Disagree; 2 = Disagree; 1 = Strongly Disagree; N/A = Not Applicable.

Two teachers responded to the eighteenth question item. The first response was, “This could be used with specific children. I would use both”. The second response was, “Though peer model seemed harder to train, we saw an improvement in peer interactions”.

Teacher respondents agreed that the goal of increasing the number social interactions performed by the research participant was a valid and appropriate goal ( $M = 4.75$ ). More teacher respondents agreed that PN ( $M = 4.5$ ) was more effective at increasing the number of social interactions performed by the research participants than PVM ( $M = 3.25$ ). Majority agreed that the peers who participated in the PN intervention benefitted ( $M = 4.25$ ) more than from participating in the PVM intervention ( $M = 3.75$ ). However, the teachers were unsure, or did not agree, that other students who were not involved in either intervention benefitted.

All teachers agreed that reasonable effort was expended to deliver both interventions ( $M = 4.5$  for both PN and PVM) with all respondents strongly agreeing that PN was something they could use both in the classroom and on the playground ( $M = 5$ ). Finally, the respondents reported that that would use both PN ( $M = 5$ ) and PVM ( $M = 4$ ) interventions with a new group of students and all teachers strongly agreed that PN was appropriate ( $M = 5$ ) for a preschool setting while majority of the teachers agreed that PVM was appropriate ( $M = 4$ ) for a preschool setting.

## **CHAPTER 5**

### **Discussion**

#### **Introduction**

There were two purposes to this study. The first was to compare the relative effect of two interventions, PN and PVM, on positive social interactions performed by young children with DD in an inclusive classroom setting. The second purpose was to determine if the effect of the best treatment generalized to the playground setting. In Chapter One it was predicted that there would be a significant positive impact of both interventions on the social interactions of preschool aged children with DD with PVM identified as the more effective treatment of the two and that the relative effect of that best treatment would generalize to the playground setting. A quantitative experimental single case ATD was used to compare the effects of both interventions in the classroom and in a playground setting. Data were collected and analyzed in both settings to address these two research questions. This chapter will present a discussion of the findings from this study beginning with the restating of each research question. Implications on how these findings impact the literature, limitations, and suggestions for future research will also be discussed.

#### **Research Question Discussion**

##### **Research Question 1**

Is PN more effective than PVM at increasing the number of positive social interactions in young children with DD in an inclusive classroom setting?

Analysis of the data collected in the classroom setting suggests that the PN intervention, not the PVM intervention, was more effective at increasing the number of positive social interactions performed by one young child with DD (Research Participant Three) in an inclusive

classroom setting. Furthermore, analysis of the data suggest that the PN intervention was more effective than the PVM intervention at increasing the number of positive social interactions participated in for one young child with a speech and language impairment. Graphed data reveal a difference in the relative effect for both treatments for data collected immediately following delivery of the PN intervention for Research Participant Two for four of the five comparison sessions (PND = 80%) and for Research Participant Three for all five comparison sessions (PND = 100%).

For Research Participant One, the effects of both interventions were similar suggesting no difference between treatments. Statistical analyses of data collected did not yield much insight as to which treatment was more effective with both means and PND values being the same ( $M = 29.33\%$ ; PND = 40%) or very similar ( $Mdn_{PVM} = 26.67\%$ ;  $Mdn_{PN} = 25\%$ ) for both interventions. Moreover, this participant participated in the same number of positive social interactions (88) for both interventions across the entirety of Phase Two. Visually the relative effects of both interventions during Phase Two were similar with graphed data suggesting an overall accelerating trend for both treatments that did not differentiate until the final two comparison sessions (sessions 12 and 13). During these final two sessions, post intervention performance for the PVM intervention decreased and post intervention performance for PN increased resulting in the latter being selected as the best treatment. One possible cause for the similarity could be related to the procedures used to deliver the PVM intervention. The procedures for delivering the PVM intervention in this study involved the use of VM combined with LTM prompting and CTD. The purpose of time delay was to fade the use of prompting by gradually increasing the amount of time for research participants to perform the steps in the social interaction task list before the prescribed prompt was delivered (i.e., video and appropriate LTM prompt). This is

consistent with the use of time delay as described in the literature (Cannella-Malone et al., 2013; Neitzel & Wolery, 2013; Spooner et al., 2011). Because a CTD of five seconds was introduced beginning on the third PVM session for each participant, it could be possible for an individual to experience the PVM intervention session as described in Chapter Three of this study without actually watching the PVM video. This is exactly what happened with Research Participant One where the PVM video was not shown to this individual beginning with the third PVM session (session nine). Overall however, Research Participant One's participation in performance relative to the dependent variable increased throughout the study over that of the Phase One Baseline levels in the classroom setting suggesting that both interventions were effective for this individual. Though variable, his Phase Two baseline performance also increased suggesting the presence of multi-treatment interference (Barlow et al., 2009; Wolery et al., 2014). Phase Three data, while decelerating and not on the same level as Phase Two, further suggests the presence of multi-treatment interference (Barlow et al., 2009; Wolery et al., 2014). Regardless, this individual's overall performance during Phase Three ( $M = 25.6\%$ ) was still at a higher level than was his performance during the Phase One baseline ( $M = 7.78\%$ ).

Over the course of 20 sessions (5 hours of record video) throughout Phase Two, Research Participant Four participated in a total of six positive social interactions. This suggests that there was no significant difference between the relative effects of either intervention and that neither intervention was truly effective for this individual.

Due to variability, graphed results of both treatments overlapping three times, an overall decelerating trend, and PND results conflicting with visual inspection, identifying which intervention was more effective for Research Participant Five was a difficult task. Visual inspection suggests that PN was the more effective intervention (see Figure 2).

Mean, median, and the total number of positive social interactions that this individual participated in ( $M_{PVM} = 20\%$ ;  $M_{PN} = 24.67\%$ ;  $Mdn_{PVM} = 11.67\%$ ;  $Mdn_{PN} = 26.67\%$ ;  $PVM = 60$ ;  $PN = 74$ ) suggest that PN was the more effective intervention. Yet, PND calculations revealed that PVM was more effective ( $PND_{PVM} = 60\%$ ;  $PND_{PN} = 40\%$ ). The reality was that while PN may have been more effective than PVM for this participant, neither intervention was truly effective. For example, Phase Two baseline data (though variable) often times was superior ( $M = 25\%$ ;  $Mdn = 20\%$ ) to data collected immediately following this individual receiving either of the interventions during Phase Two. This suggests that the performance of the dependent variable, at least for this participant, was not under experimental control (Gast & Tawney, 2014).

## **Research Question 2**

Will the positive effects of the best treatment generalize to the playground setting?

Analysis of the data collected on the playground suggests that the relative effect of the PN intervention generalized to the playground setting for one young child with autism (Research Participant Three;  $PND = 80\%$  favoring PN) and one young child with a speech and language impairment (Research Participant Two;  $PND = 80\%$  favoring PN). Comparison of Phase Two playground data with data collected during Phase One also demonstrated an increase ( $PND = 100\%$ ) for both participants. Performance, though dropping slightly, was maintained after delivery of the PVM intervention was removed during Phase Three, suggesting the possibility of multi-treatment interference (Barlow et al., 2009; Wolery et al., 2014).

In contrast to the data collected in the classroom, it was not possible to discern if the effects of either intervention generalized to the playground setting for Research Participant One. Complicating matters was the fact that playground data were not collected during session seven due to poor weather conditions. A comparison of the four remaining PVM data points against



four of the adjacent PN data points favor the PVM intervention. However, and as previously mentioned in Chapter Four, an overall accelerating trend throughout all three phases on the playground may suggest that improvements in this individual's performance may not have been the result of the effects of either intervention generalizing to the playground setting.

During Phase Two on the playground Research Participant Four participated in a total of two positive social interactions, one after receiving the PN intervention and one after receiving the PVM intervention. Due to the low-level performance in behavior on the playground, and when coupled with this individual's performance in the classroom setting, the findings for this participant suggest that it did not matter which intervention this individual received because the relative effect did not generalize to the playground (because neither intervention had a significant effect on his behavior to begin with).

Similar to the classroom setting, Research Participant Five's performance of the dependent variable was variable on the playground with two overlaps occurring during Phase Two. Even though PND favored the PVM intervention in this setting ( $PND_{PVM} = 60\%$ ;  $PND_{PN} = 20\%$ ), overall there was not much difference. Due to variation within the Phase One condition on the playground, and the fact that playground baseline data were not collected during Phase Three, it was not possible to determine if the relative effect of either intervention generalized to the playground.

### **Relation to the Literature**

All of the components of PN as described in the literature were not incorporated into the delivery of the PN intervention in this study. Pivotal response training as described in Mason et al. (2014), the delivery of the intervention across multiple settings as described in Kamps et al. (1997), the incorporation of an alternative augmentative communication system as described in

Garrison-Harrell et al. (1997), and the use of cue card combined with both direct instruction and scripted practice as described in Kamps et al. (2014) were not present. Nevertheless the foundation of the intervention itself was provided which is essentially, as stated in McFadden et al. (2014), "...a small group of teacher-nominated typically developing peers in which adult instruction is combined with peer mediation and is provided in integrated settings" (p. 1700). Furthermore, unlike prior implementation of PN where the reward for participation was something more tangible offered to the entire class (reward for participation in the form of a party for the entire class as in McFadden et al., 2014), the reward for participation in this study mainly benefited the child with the disability in the form of access to a preferred activity. Though this may have contributed to the PN intervention not being effective for Research Participants Four and Five, and may have also impacted results for Research Participants Two and Three, findings suggest that the PN intervention was effective for two participants (Research Participants Two and Three), and when combined with the effects of PVM, may have been effective for a third participant (Research Participant One) in the classroom setting.

Interestingly enough the use of PVM in this study was found to not be as effective as the use of PVM in prior studies involving young children with autism (e.g., Apple et al., 2005; Gena et al., 2005; Rudy et al., 2014; Sani-Bozkurt & Ozen, 2015; Simpson, 2014) and young children diagnosed with developmental delays (e.g., Cihak et al., 2012; Kourassanis et al., 2015). Furthermore, they contrast with the findings presented in Gena et al. (2005) in which both PVM and in vivo modeling were compared and both were found to be effective. One possible reason for this could be related to the variations in how the use of PVM, and VM in general, have been described in the literature. As described in Chapter Two, use of PVM involved more than removing a participant from the classroom setting, showing the video, and then returning that

individual to the classroom. Prior SCRD studies that have incorporated the use of PVM have also included other components of specialized instruction such as reinforcement (Gena et al., 2005; Nikopoulos & Keenan, 2003), prompting hierarchies (Kourassanis et al., 2015), task analyses (Rudy et al., 2014; Sani-Bozkurt & Ozen, 2015), use of PECS (Cihak et al., 2012), and self-management techniques (Apple et al., 2005). Until use of PVM, and VM in general, are better defined, the effects of these interventions may vary across studies (Bellini & Akullian, 2007).

### **Limitations**

#### **Participant Selection**

Before this study was conducted it was the researcher's intention to target only young children with DD for participation. With limitations related to the number of research participants with DD available, the researcher included one participant with a speech and language impairment (Research Participant Two). Although he was not diagnosed with a DD, he did meet the other prerequisites for participation and was recommended by his teacher due to not socially interacting with his peers.

#### **Participant Attendance**

Every child who participated was absent from school at least once making it impossible to progress through the entire study in sixteen consecutive school days: (a) Research Participant One was absent for one school day following the recording of session fifteen; (b) Research Participant Two arrived late on the school day following session four making it impossible to deliver the intervention for that day and was absent for one school day following the recording of session fifteen; (c) Research Participant Three was absent for one school day following the recording of session four and his assigned peer participants were absent from school during sessions ten, twelve, and fourteen prompting the intervention to be delivered by the peer

participants who worked with Research Participants One and Five; (d) Research Participant Four was absent for ten school days following the recording of session four; and (e) Research Participant Five was absent for six school days following the recording of session seven. Due in part to these absences, only four of the five research participants selected for participation progressed through all three phases.

In addition to the above, there was variability between the times that research participants were available on site. At the beginning of the study it was suggested to the researcher that four of the five research participants attended school full time. However during the course of the study, it was discovered that full time enrollment did not necessarily translate into the children being onsite throughout the entire school day. For example, two of the participants were onsite consistently only during the mid-morning free play period (as opposed to the early morning and afternoon free play periods) and one participant was onsite consistently for only the morning playground period (as opposed to the noon and afternoon playground times). Further complicating matters was that the arrival times for research participants also varied with children arriving as early as before 8 a.m. till as late as 11:30 a.m.

### **Procedural Factors**

It was stated in Chapter Three that the delivery of both interventions would occur in a separate room from the main classroom. The purpose of this decision was to minimize any interference that may have occurred (e.g., non-participants interacting with the participants) during the delivery of the interventions. Due to restrictions on the amount of space available for use, it was not possible to deliver the interventions in a separate classroom space for Research Participants One, Three, and Five. This may have affected the level of quality of the interventions that participants were exposed to. The interventions for Research Participant Four

were originally delivered in a separate room, however after having an adverse reaction to those conditions, they were delivered in the classroom beginning with session eight.

### **Multi-treatment Interference**

In Chapter Three it was originally stated that data would not be collected more than one hour after an intervention was delivered in order to minimize the effects of multi-treatment interference. This was based on a suggestion by Wolery et al. (2014) who recommended allowing at least one hour between different sessions if they occur on the same day. Due to school schedules, IEP related services that were delivered to the participants, and the inconsistent arrival and departure times of both participants and peers, allowing one hour between the delivery of an intervention and an accompanying same day session (baseline or playground) proved to be a difficult task for Research Participants One, Four, and Five, and was not possible for Research Participants Two and Three. As a result, the researcher made the decision to wait for at least 30 minutes between same day sessions for all participants. This decision may have increased the possibility that multi-treatment interference occurred for all participants. This also may have contributed to the inability to clearly discern which intervention was most effective for Research Participants One and Five.

### **Diffusion of Treatment**

There was a possibility that diffusion of treatment may have occurred with Research Participant Five. Both Research Participant One and Research Participant Five were from the same classroom. Though he was usually oblivious to what was going on while the interventions were being delivered to Research Participant One, and Phase One data were not collected on Research Participant Five until the first participant had completed Phase Three, the fifth

participant was present for majority of days in which Research Participant One received his set of interventions.

### **Peer Participant Variability**

All of the preschool staff who participated in this study were professional educators, four of whom have worked in schools for over five years. It is to be expected that when these teachers participate in delivering both interventions, they did do so with high fidelity. However, and in addition to the teachers, the other integral component to both of the interventions in this study were the typically developing peer participants. These peers were trained, and in general their performances were stellar, but they were not trained professional educators. Thus, it would be natural to expect variability with their performances. Examples include leaving the intervention area to use the restroom after the teacher had prepped the environment, not giving the research participants five seconds to begin performing the social interaction task list, not responding to the participant after the initiation was delivered (e.g., “Hi [name of research participant]”), or forgetting to provide positive reinforcement at the end of the interaction (e.g., “Goob job”!).

### **Data Collection**

The setting where this study occurred was located in an urbanized environment in close proximity to an international airport. As a result, the ambient noise level, while tolerable to school staff and students, made it difficult to collect data both in the classroom and on the playground. For sessions that occurred in the classroom, when airplanes flew over it was typical for classrooms to physically vibrate. For sessions that occurred on the playground, when airplanes flew over it was difficult, sometimes impossible, to understand what children were saying.

## **Practical Implications**

Though not the primary focus of this study, the teacher participants, the researcher, and the comparison raters were able to train eleven typically developing peers across four classrooms to participate in the delivery of two different peer interventions: PVM and PN. The PVM intervention required typically developing peers to role-play an appropriate social interaction in order to obtain enough video to create a VM video, and to verbally interact with the research participants during delivery of the PVM intervention. The PN intervention utilized a two level LTM prompting hierarchy and was delivered by peers who were familiar to the research participants with the teacher preparing the environment for the intervention, supervising delivery of the intervention, and intervening only when necessary to prompt peers. Therefore, this study adds to the body of literature that suggests that it is possible to train typically developing preschool aged children to assist in delivering effective in vivo PMII for young children with disabilities with high fidelity (albeit with adult supervision and periodic retraining as necessary).

Before this study was conducted it was the researcher's intention to target only young children with DD for participation. With limitations related to the amount of research participants with DD available, the researcher included one participant with a speech and language impairment because while he was not diagnosed with a DD, did meet the other prerequisites for participation and was recommended by his teacher due to limited social interaction with peers. After exposure to both interventions, findings suggest that while this participant's performance was still at a low-level, it had increased above initial Phase One baseline levels both in the classroom and on the playground suggesting that both interventions were effective at increasing the number of his positive social interactions with the PN intervention being more effective than the PVM intervention. Furthermore, this individual

continued to verbally interact with his peers even after delivery of the PVM intervention was discontinued.

Finally, while this study does not provide conclusive evidence favoring inclusion, findings do suggest that for three young children with disabilities, participation in a social skills intervention delivered by typically developing children who were also familiar to them increased the number of social interactions they performed. It would be difficult for educators who teach in self-contained schools, much less self-contained classrooms, to implement PMII such as PN as it has been described in the literature (see McFadden et al., 2014).

### **Suggestions for Future Research**

During Phase Two, Research Participant Two was observed to position himself in close proximity to peers and periodically attempt to verbally initiate and respond to peers. This was not the case during baseline Phase One and may be a result of intervention in Phase Two. However due in part to his diagnosed disability (speech and language impairment), and perhaps his prior history with his peers, verbal initiations that originated from this individual would often times be ignored by his peers. In order for the researcher and comparison raters to identify that a positive social interaction occurred, there would have had to have been a verbal initiation followed by a verbal response. Because Research Participant Two verbally initiated, but there was no peer response, those initiations were not reflected in the data. This was also observed to occur with Research Participants Three and Five to a lesser extent in which their peers would ignore their attempts at initiating conversation. Therefore future studies that examine the effectiveness of social interaction interventions on young children with disabilities may also want to measure whether or not the treatment that's delivered results in an increase in appropriate initiations with typically developing peers regardless if those initiations were replied to.



This study did not focus on counting appropriate social responses to inappropriate initiations (e.g., peer walks up to participant and says, “Mine!”, and then takes the participant’s toy; participant responds by saying “No”). While the participant’s response may have been contextually appropriate, this response would not have been counted in this study because the initial peer initiation was not appropriate. Future studies may look beyond positive social initiations followed by positive social responses, and instead, focus on identifying the appropriateness of a participant’s response based on the context of the situation.

A third possible area of research would be to also focus on training all of the typically developing students in the classroom to interact with the research participants. As previously mentioned it was observed on multiple occasions during baseline and post intervention data collection that Research Participant Two, and to a lesser extent Research Participants Three and Five, would verbally initiate, but their classmates would not respond. Therefore perhaps a future study could include either a brief training session with only the typically developing children before delivery of the intervention, or perhaps the intervention itself would be a specialized form of instruction delivered to both children with disabilities and typically developing children at the same time.

### **Summary**

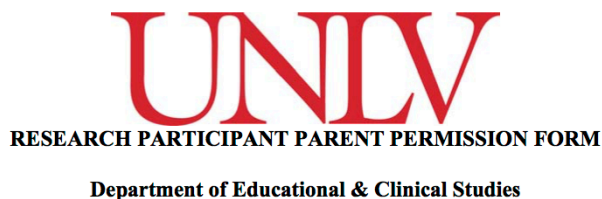
The purposes of this study were to compare the relative effect of the PN intervention and the PVM interventions on the positive social interactions performed by young children with DD in an inclusive classroom setting and to determine if the effect of the best treatment generalized to the playground setting. In order to address this a single case ATD was utilized with five young children with disabilities between thirty-eight and fifty-two months. Five educators and eleven typically developing peers across four classrooms also participated. Results suggest that PN was

more effective than PVM on increasing the number of positive social interactions participated in for one young child with autism (Research Participant Three) and one young child with a speech and language impairment (Research Participant Two) in the classroom setting and that the relative effect of the PN treatment generalized to the playground setting. The PN intervention was found to be more effective than PVM in the classroom setting for a third young child with a developmental delay (Research Participant Five), however neither intervention significantly increased performance over baseline conditions for this individual. Both interventions were equally effective in the classroom setting for a fourth young child with a developmental delay (Research Participant One) and neither were effective for a fifth child with autism (Research Participant Four).

## APPENDICES

### Appendix A

#### Parent of Research Participant Informed Consent Form



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**TITLE OF STUDY: A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities**

**INVESTIGATOR(S): Dr. John Filler and Conrad Oh-Young**

**CONTACT PHONE NUMBER: 702-895-3328**

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#### **Purpose of the Study**

Your child is invited to participate in a research study. The purpose of this study is to compare the relative effects of two types of social skill interventions: peer networks (PN) and peer video modeling (PVM), in order to determine which is better at increasing the number of positive social interactions performed by young children with developmental disabilities. PN is an intervention that involves peers interacting with a child targeted for intervention. When working with the target individual, the peers will prompt, model, encourage, and reinforce socially appropriate behaviors for that child. PVM is an intervention that uses video to teach children how to perform target behaviors. It involves having a child targeted for intervention watch a video of actors performing target behaviors. At the completion of the video, the child is then provided the opportunity to imitate those behaviors performed in the video. Both interventions have been demonstrated to be effective in numerous prior research studies. This study will attempt to identify which one is better.

#### **Participants**

Your child is being asked to participate in the study because he or she is enrolled in the UNLV/CSUN Preschool and was identified as having a developmental disability.

#### **Procedures**

If you allow your child to volunteer to participate in this study, your child will be assigned to interact with his/her teacher and other children whom they are familiar with (e.g., other students in your child's classroom). Furthermore, your child will be asked to do the following during regularly scheduled school hours and while under the supervision of school staff:

- (a) participate in the intervention (PN or PVM) for up to 30 minutes a school day for up to 5 weeks;
- (b) be video recorded while the intervention is being implemented (approximately 30 minutes); and
- (c) be video recorded for up to 45 minutes during regular class time (approximately 15 minutes after delivery of the intervention, 15 minutes in the classroom during a time other than immediately after delivery of the intervention, and 15 minutes on the playground) for up to 5 weeks.

The purpose of video recording the sessions are to ensure that the individuals delivering the intervention (e.g., staff members and peers) are implementing the instructional strategies in a highly structured fashion and to record your child's behavioral responses during regularly scheduled class time. Both the student investigator and the preschool staff will manage the video recording process.

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**TITLE OF STUDY: A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities**

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The student investigator, two doctoral students, and one graduate of the doctoral program, will review the recorded video in order to measure the social interaction behaviors performed by your child. With the exception of the time spent receiving the PN or PVM specialized instruction (estimated to be 30 minutes per school day for up to 5 weeks), your child will continue to participate in regularly scheduled school activities.

In addition to your child participating in the study you will be asked to complete an 18-item questionnaire. The purpose of the questionnaire is to measure the appropriateness of the purpose of this study, the appropriateness of the procedures used in this study, and the level of satisfaction with the results of this study. You will be asked to complete the questionnaire at the conclusion of this study.

### **Benefits of Participation**

There *may not* be direct benefits to your child as a participant in this study. However, we hope to learn which intervention (PN or PVM) is better at increasing the number of positive social interactions performed by preschool aged children with disabilities. Through participation your child may experience an increase in frequency and time spent interacting with similar aged peers.

### **Risks of Participation**

There are risks involved in all research studies. One such risk is related to the low number of individuals who are participating in this study. Since the maximum number of participants will be 18 (3 teachers, 5 students with disabilities, and 10 student peers), there is a possibility that individuals may be able to link your child's reported performance to participation in this study. In order to minimize this risk, when results are presented, they will be presented in aggregate and/or with the use of the appropriate de-identifiers as listed below:

- a. Research participants will be referred to as Participant One, Participant Two, Participant Three, etc.
- b. Peer participants will be referred to as Peer Participant One, Peer Participant Two, Peer Participant Three, etc.
- c. Teacher participants will be referred to as Teacher Participant One, Teacher Participant Two, Teacher Participant Three, etc.
- d. Parent participants will be referred to as Parent Participant One, Parent Participant Two, Parent Participant Three, etc.
- e. Non-participating students will be referred to as a child, student, or peer.

Another possible risk is related to video recording. Video will be recorded of your child during each session the purposes of which are to ensure that the instructional strategies are implemented in a highly structured fashion and to record student behavioral responses. As a result, your child may feel uncomfortable during the recording of video.

### **Cost /Compensation**

There *will not* be financial cost to you to participate in this study. Individuals will be expected to: (a) participate in the intervention (PN or PVM) up to 30 minutes a school day for up to 5 weeks; and (b) be video recorded for up to 30 minutes while the intervention is delivered; and (c) be video recorded for up to 45 minutes of regular class time. Your child *will not* be compensated for their time.

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TITLE OF STUDY: A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities

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**Contact Information**

If you or your child have any questions or concerns about the study, you may contact Dr. John Filler at **702-895-1105**. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-895-2794, or via email at IRB@unlv.edu.**

**Voluntary Participation**

Your child's participation in this study is voluntary. Your child may refuse to participate in this study or in any part of this study. Your child may withdraw at any time without prejudice to your relations with the university. Withdrawal from this study means that your child will no longer actively participate in either of the intervention sessions (PN or VP). Furthermore, any data that would have been collected related to your child's performance in this study would be destroyed. You or your child are encouraged to ask questions about this study at the beginning or any time during the research study. Children who are not participating in the study will continue to receive regularly scheduled instruction delivered by the preschool staff. Furthermore, lack of participation will not impact the quality of instruction, assessment, or evaluations that your child is scheduled to receive.

**Confidentiality**

All information gathered in this study will be kept as confidential as possible. When results are presented, they will be presented in aggregate and/or with the use of the appropriate de-identifiers as described previously. All data/records will be stored in a locked facility at UNLV for five years after completion of the study. After the storage time the information gathered will be destroyed. Recorded video, and other materials related to data collected that have not been de-identified, will not be uploaded or shared online.

**Participant Consent:**

I have read the above information and agree to participate in this study. I am at least 18 years of age. A copy of this form has been given to me.

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Signature of Parent

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Child's Name (Please print)

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Parent Name (Please Print)

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Date

Audio/Video Taping:

I agree for my child to be audio or video taped for the purpose of this research study.

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**TITLE OF STUDY: A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities**

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Signature of Parent

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Date

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Parent Name (Please Print)

## Appendix B

### Research Participant Youth Assent Form



#### RESEARCH PARTICIPANT ASSENT TO PARTICIPATE IN RESEARCH

#### **A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities**

1. My name is Conrad Oh-Young
2. We are asking you to take part in a research study because we are trying to learn more about how to teach you to say hi and share an iPad with your friends.
3. If you agree to be in this study your teacher and classmates will teach you how to say hi and ask a friend to share an iPad.
4. You will be video taped while you are interacting with your friends. The videotaping will last for up to 45 minutes each day for up to 5 weeks. That is about 50 school days.
5. There may not be any direct benefits to joining our study but we are asking you to help because we want to learn more about how to teach our friends to say hi and share.
6. Please talk this over with your parents before you decide whether or not to participate. We will also ask your parents if it is OK for you to help us. But even if your parents say "yes" you can still decide not to do this.
7. If you don't want to be in this study, you don't have to help us. Remember, being in this study is up to you and no one will be upset if you don't want to help us or even if you change your mind later and want to stop.
8. You can ask any questions that you have about the study. If you have a question later that you didn't think of now, you can ask your mom or dad to call me at 702-895-1105 or ask me next time. If I have not answered your questions or you do not feel OK with me talking to me about your question, you can have your mom or dad call the UNLV Office of Research Integrity – Human Subjects at 702-895-2794 or toll free at 877-895-2794.
9. Circling the smiley face at the bottom left means that you agree to be in this study. Circling the sad face at the bottom right means that you do not want to be in this study. You and your parents will be given a copy of this form after you have signed it.

Circle the smiley face if you agree to help us with this study:



Smiley Face

Circle the sad face if you do not want to help us with this study:



Sad Face

\_\_\_\_\_  
Child's name

\_\_\_\_\_  
Date

#813509-3, Expiration: 11-14-2016



## Appendix C

### Parent of Peer Participant Informed Consent Form



#### PEER PARTICIPANT PARENT PERMISSION FORM

Department of Educational & Clinical Studies

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**TITLE OF STUDY: A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities**

**INVESTIGATOR(S): Dr. John Filler and Conrad Oh-Young**

**CONTACT PHONE NUMBER: 702-895-3328**

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#### **Purpose of the Study**

Your child is invited to participate in a research study. The purpose of this study is to compare the relative effects of two types of social skill interventions: peer networking (PN) and peer video modeling (PVM), in order to determine which is better at increasing the number of positive social interactions performed by young children with developmental disabilities. PN is an intervention that involves peers interacting with a child targeted for intervention. When working with the target individual, the peers will prompt, model, encourage, and reinforce socially appropriate behaviors for that child. PVM is an intervention that uses video to teach children how to perform target behaviors. It involves having a child targeted for intervention watch a video of actors performing target behaviors. At the completion of the video, the child is then provided the opportunity to imitate those behaviors performed in the video. Both interventions have been demonstrated to be effective in numerous prior research studies. This study will attempt to identify which one is better.

#### **Participants**

Your child is being asked to participate in the study as a peer because he or she is typically developing and is enrolled at the UNLV/CSUN Preschool.

#### **Procedures**

If you allow your child to volunteer to participate in this study, your child will be assigned to interact with children with disabilities (research participants whom are the targets of the PN and PVM interventions) whom they are familiar with (e.g., your child and a research participant may be students in the same classroom). Furthermore, your child will be asked to do the following during regularly scheduled school hours and while under the supervision of school staff:

(a) participate in a maximum of five training sessions that will be delivered by your child's teacher. The purpose of these training sessions are to teach your child to implement the components of the PN and PVM interventions. Implementing the interventions involves your child modeling and role-playing appropriate social interaction behaviors (e.g., greeting another individual, asking a question to another individual, waiting an appropriate amount of time for a response) for the research participant (the child targeted for intervention). These training sessions will last no longer than one hour a day for up to five days and will occur during normal school hours;



(b) because it is important for the interventions to be implemented in a structured fashion, your child may be asked to participate in additional training sessions. These additional sessions will serve as a quick review of how to implement each intervention. Your child's teacher will conduct these sessions, they will last no longer than ten minutes per, and they will occur during school hours;

(c) participate in the delivery of the intervention (PN or PVM) and be video recorded while doing so (approximately up to 30 minutes a school day for up to 10 weeks). For the PN intervention, your child will be asked to work with another typically developing peer to deliver the intervention to the child with the disability. For the PVM intervention, your child will work in conjunction with his or her teacher to deliver the intervention to the child with the disability. Both interventions involve your child interacting, modeling, and role-playing appropriate social interaction behaviors for the research participant (the child with the disability); and

(d) be video recorded for up to 45 minutes a day (approximately 15 minutes immediately following the delivery of the intervention, 15 minutes in the classroom during a time other than immediately after delivery of the intervention, and 15 minutes on the playground) for up to 10 weeks.

The purpose of video recording the sessions are to ensure that the interventionists are implementing the instructional strategy in a highly structured fashion and to record behavioral responses during class time. Both the student investigator and the preschool staff will manage the video recording process. The student investigator, two doctoral students, and one graduate of the doctoral program, will review the recorded video in order to measure the social interaction behaviors performed by the research participant receiving the intervention. With the exception of the time spent participating in the delivery of the PN or PVM specialized instruction (estimated to be 30 minutes per school day for up to 10 weeks), your child will continue to participate in regularly scheduled school activities.

In addition to your child participating in the study you will be asked to complete an 18-item questionnaire. The purpose of the questionnaire is to measure the appropriateness of the purpose of this study, the appropriateness of the procedures used in this study, and the level of satisfaction with the results of this study. You will be asked to complete the questionnaire at the conclusion of this study.

### **Benefits of Participation**

There *may not* be direct benefits to your child as a participant in this study. However, we hope to learn which intervention (PN or PVM) is better at increasing the number of positive social interactions performed by preschool aged children with disabilities. Through participation your child may experience an increase in frequency and time spent interacting with similar aged peers.

### **Risks of Participation**

There are risks involved in all research studies. One such risk is related to the low number of individuals who are participating in this study. Since the maximum number of participants will be 18 (3 teachers, 5 students with disabilities, and 10 student peers), there is a possibility that individuals may be able to link your child to his or her reported performance in this study. In order to minimize this risk, when results are presented, they will be presented in aggregate and/or with the use of the appropriate de-identifiers as listed below:

a. Research participants will be referred to as Participant One, Participant Two, Participant Three, etc.

- b. Peer participants will be referred to as Peer Participant One, Peer Participant Two, Peer Participant Three, etc.
- c. Teacher participants will be referred to as Teacher Participant One, Teacher Participant Two, Teacher Participant Three, etc.
- d. Parent participants will be referred to as Parent Participant One, Parent Participant Two, Parent Participant Three, etc.
- e. Non-participating students will be referred to as a child, student, or peer.

Another possible risk is related to video recording. Video will be recorded of your child during each session the purposes of which are to ensure that the instructional strategies are implemented in a highly structured fashion and to record student behavioral responses. As a result, your child may feel uncomfortable during the recording of video.

#### **Cost /Compensation**

There *will not* be financial cost to you to participate in this study. Individuals will be expected to: (a) participate in five training sessions which will last no longer than one hour a day for five days; (b) participate in additional refresher training sessions (as needed); (c) participate in the delivery of the intervention (PN or PVM) up to 30 minutes a school day for up to 10 weeks; and (d) be video recorded for up to 45 minutes during regular class time following delivery of the instructional strategy. Your child *will not* be compensated for his or her time.

#### **Contact Information**

If you or your child have any questions or concerns about the study, you may contact Dr. John Filler at **702-895-1105**. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-895-2794, or via email at IRB@unlv.edu.**

#### **Voluntary Participation**

Your child's participation in this study is voluntary. Your child may refuse to participate in this study or in any part of this study. Your child may withdraw at any time without prejudice to your relations with the university. Withdrawal from this study means that your child will no longer actively participate in either of the intervention sessions (PN or VP). Furthermore, any data that would have been collected related to your child's performance in this study would be destroyed. You or your child are encouraged to ask questions about this study at the beginning or any time during the research study. Children who are not participating in the study will continue to receive regularly scheduled instruction delivered by the preschool staff. Furthermore, lack of participation will not impact the quality of instruction, assessment, or evaluations that your child is scheduled to receive.

#### **Confidentiality**

All information gathered in this study will be kept as confidential as possible. When results are presented, they will be presented in aggregate and/or with the use of the appropriate de-identifiers as described previously. All data/records will be stored in a locked facility at UNLV for five years after completion of the study. After the storage time the information gathered will be destroyed. Recorded

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**TITLE OF STUDY: A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities**

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video, and other materials related to data collected that have not been de-identified, will not be uploaded or shared online.

**Participant Consent:**

I have read the above information and agree to participate in this study. I am at least 18 years of age. A copy of this form has been given to me.

---

Signature of Parent

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Child's Name (Please print)

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Parent Name (Please Print)

---

Date

Audio/Video Taping:

I agree for my child to be audio or video taped for the purpose of this research study.

---

Signature of Parent

---

Date

---

Parent Name (Please Print)

## Appendix D

### Peer Participant Youth Assent Form



PEER PARTICIPANT  
ASSENT TO  
PARTICIPATE IN

#### **A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities**

1. My name is Conrad Oh-Young
2. We are asking you to take part in a research study because we are trying to learn more about how to teach our friends to say hi and share an iPad with each other.
3. If you agree to be in this study your teacher will train you to help us teach our friends. After the training you will be asked to teach your friends how to say hi and how to ask to use the iPad to watch a video.
4. You will be video taped while you are interacting with your friends. The videotaping will last for up to 45 minutes each day for up to 10 weeks. That is about 50 school days.
5. There may not be any direct benefits to joining our study but we are asking you to help because we want to learn more about how to teach our friends to say hi and share and we think that you would make a great peer model for our friends.
6. Please talk this over with your parents before you decide whether or not to help us. We will also ask your parents if it is OK for you to help us. But even if your parents say "yes" you can still decide not to do this.
7. If you don't want to be in this study, you don't have to help us. Remember, being in this study is up to you and no one will be upset if you don't want to help us or even if you change your mind later and want to stop.
8. You can ask any questions that you have about the study. If you have a question later that you didn't think of now, you can ask your mom or dad to call me at 702-895-1105 or ask me next time. If I have not answered your questions or you do not feel OK with me talking to me about your question, you can have your mom or dad call the UNLV Office of Research Integrity – Human Subjects at 702-895-2794 or toll free at 877-895-2794.
9. Circling the smiley face at the bottom left means that you agree to be in this study. Circling the sad face at the bottom right means that you do not want to be in this study. You and your parents will be given a copy of this form after you have signed it.

Circle the smiley face if you  
agree to help us with this study:



Smiley Face

Circle the sad face if you do not want  
to help us with this study:



Sad Face

\_\_\_\_\_  
Child's name

\_\_\_\_\_  
Date

#813509-3, Expiration: 11-14-2016

## Appendix E

### Teacher Participant Informed Consent Form



#### TEACHER INFORMED CONSENT

Department of Educational & Clinical Studies

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**TITLE OF STUDY: A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities**

**INVESTIGATOR(S): Dr. John Filler and Conrad Oh-Young**

For questions or concerns about the study, you may contact Dr. John Filler at 702-895-1105.

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, contact the **UNLV Office of Research Integrity – Human Subjects** at 702-895-2794, toll free at 877-895-2794 or via email at [IRB@unlv.edu](mailto:IRB@unlv.edu).

---

#### **Purpose of the Study**

You are invited to participate in a research study. The purpose of this study is to compare the relative effects of two types of social skill interventions: peer networks (PN) and peer video modeling (PVM), in order to determine which is better at increasing the number of positive social interactions performed by young children with developmental disabilities. PN is an intervention that involves peers interacting with a child targeted for intervention. When working with the target individual, the peers will prompt, model, encourage, and reinforce socially appropriate behaviors for that child. PVM is an intervention that uses video to teach children how to perform target behaviors. It involves having a child targeted for intervention watch a video of actors performing target behaviors. At the completion of the video, the child is then provided the opportunity to imitate those behaviors performed in the video. Both interventions have been demonstrated to be effective in numerous prior research studies. This study will attempt to identify which one is better.

#### **Participants**

You are being asked to participate in the study because you have met the qualifications to serve as a staff member of the UNLV/CSUN Preschool and you teach in a classroom with students between the ages of 36 months through 72 months.

#### **Procedures**

If you volunteer to participate in this study, you will be asked to do the following:

- (a) assist the student investigator with obtaining parent consent and youth assent. This will involve assisting the student investigator with the scheduling of meetings to obtain parent consent/youth assent and being present while those meetings occur. You will only be requested to schedule/attend meetings with parents and students whom you are currently working with;
- (b) participate in twelve training sessions which will last no longer than one hour a day and will be conducted at times convenient to, and approved by, both you and the Director of the UNLV/CSUN Preschool. Two of the sessions will be conducted by the student investigator and the other ten will be conducted by you;
- (c) because it is important for the interventions to be implemented in a structured fashion, you may be asked to participate in additional training sessions. These additional sessions will serve as a quick



review of how to implement each intervention. These sessions will last no longer than ten minutes per and occur during school hours;

(d) participate in the intervention (PN or PVM) for up to 30 minutes a school day for up to 30 weeks;

(e) be video recorded while the intervention is being implemented (approximately 30 minutes per session);

(f) be video recorded for up to 45 minutes (per student; approximately 15 minutes after delivery of the intervention, 15 minutes in the classroom during a time other than immediately after delivery of the intervention, and 15 minutes on the playground); and

(g) assist the student investigator with the recording of video.

The purpose of video recording the sessions are to ensure that the interventions are being implemented in a highly structured fashion and to record student behavioral responses during regularly scheduled class time. Both yourself and the student investigator will manage the video recording process. The student investigator, two current doctoral students, and one graduate of the doctoral program, will review the recorded video in order to measure the social interaction behaviors performed by the student. With the exception of the time spent receiving the PN or PVM specialized instruction (estimated to be 30 minutes per school day for up to 30 weeks), the student will continue to participate in regularly scheduled school activities.

In addition to participating in the study you will be asked to complete an 18-item questionnaire. The purpose of the questionnaire is to measure the appropriateness of the purpose of this study, the appropriateness of the procedures used in this study, and the level of satisfaction with the results of this study. You will be asked to complete the questionnaire at the conclusion of this study.

#### **Benefits of Participation**

There *may not* be direct benefits participating in this study. However, we hope to learn which intervention (PN or PVM) is better at increasing the number of positive social interactions performed by preschool aged children with disabilities. Through participation, students may experience an increase in frequency and time spent interacting with similar aged peers.

#### **Risks of Participation**

There are risks involved in all research studies. One such risk is related to the low number of individuals who are participating in this study. Since the maximum number of participants will be 18 (3 teachers, 5 students with disabilities, and 10 student peers), there is a possibility that individuals may be able to link you to participation in this study. In order to minimize this risk, when results are presented, they will be presented in aggregate and/or with the use of the appropriate de-identifiers as listed below:

- a. Research participants will be referred to as Participant One, Participant Two, Participant Three, etc.
- b. Peer participants will be referred to as Peer Participant One, Peer Participant Two, Peer Participant Three, etc.
- c. Teacher participants will be referred to as Teacher Participant One, Teacher Participant Two, Teacher Participant Three, etc.
- d. Parent participants will be referred to as Parent Participant One, Parent Participant Two, Parent Participant Three, etc.
- e. Non-participating students will be referred to as a child, student, or peer.

Another possible risk is related to video recording. Video will be recorded during each session the purposes of which are to ensure that the instructional strategies are implemented in a highly structured fashion and to record student behavioral responses. As a result, the children targeted for intervention may feel uncomfortable during the recording of video.

**Cost /Compensation**

There *will not* be financial cost to you to participate in this study. Individuals will be expected to: (a) participate in twelve training sessions which will last no longer than one hour a day; (b) participate in additional refresher training sessions (as needed); (c) participate in delivery of the intervention (PN or PVM) up to 30 minutes a school day for up to 30 weeks; and (d) be video recorded for up to 30 minutes (per student) while the intervention is delivered; and (e) be video recorded for up to 45 minutes (per student) of regular classroom time. You *will not* be compensated for your time.

**Confidentiality**

All information gathered in this study will be kept as confidential as possible. When results are presented, they will be presented in aggregate and/or with the use of the appropriate de-identifiers as described previously. All data/records will be stored in a locked facility at UNLV for five years after completion of the study. After the storage time the information gathered will be destroyed. Recorded video, and other materials related to data collected that have not been de-identified, will not be uploaded or shared online.

**Voluntary Participation**

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with UNLV. Withdrawal from this study means that you will no longer actively participate in the delivery of the intervention sessions (PN or VP). Furthermore, any data collected related to your active participation in this study would be destroyed. You are encouraged to ask questions about this study at the beginning or any time during the research study.

**Participant Consent:**

I have read the above information and agree to participate in this study. I have been able to ask questions about the research study. I am at least 18 years of age. A copy of this form has been given to me.

---

Signature of Participant

---

Date

---

Participant Name (Please Print)

Audio/Video Taping:

---

**TITLE OF STUDY: A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities**

---

I agree to be audio or video taped for the purpose of this research study.

---

Signature of Participant

---

Date

---

Participant Name (Please Print)



## Appendix F

### Partial-Interval Recording Positive Social Interactions Data Collection Sheet

Use the definitions and the directions below to record the frequency of positive social interactions exhibited by the participant in the recorded video.

#### Definitions:

- Positive social interaction: Social interactions have been described as essentially, “behavior that included at least one initiation followed by a response” (Haring & Breen, 1992, p. 325). For the purposes of this study, in order for a social interaction to be considered as a *positive social interaction*, there has to be a positive social initiation followed by a positive social response.
- Positive social initiation: A social initiation is a behavior whose function is to engage another individual in an activity and to exhibit a social response (Garrison-Harrell et al., 1997). In order for the behavior to be classified as a *positive social initiation* it has to be contextually appropriate to that current situation and has to either originate from the participant, or be directed to the participant from a same-aged peer (either with or without disabilities). Examples include greetings (“Good morning”), referring to a peer by name (“Hey Mary”), commenting on an item that is related to a current activity (“I like this song”), and requesting (“Can I play with the iPad?”).
- Positive social response: Verbal behavior that is directed towards an initiator within five seconds after the initiation (Garrison-Harrell et al., 1997). In order for the behavior to be classified as a *positive social response* it has to be contextually appropriate to that current situation, is performed within five seconds of the initiation, and occurs between two or more individuals (one of which is the initiator). Examples include “Thank you for sharing the iPad”, “OK let’s play”, “Yes”, and “I am fine”.

#### Directions:

- Circle “SI” under the appropriate time interval if the participant performed a positive social initiation towards a same-aged peer.
- Circle “PI” under the appropriate time interval if a same-aged peer performed a positive social initiation towards the participant.
- Circle “SR” under the appropriate time interval if the participant responded to a positive social initiation from a same-aged peer.
- Circle “PR” under the appropriate time interval if a same-aged peer responded to a positive social initiation from the participant.

Do not circle a role if:

- A participant initiates to an adult.
- A participant responds to an adult.
- A participant initiates and a same-aged peer does not respond.
- A same-aged peer initiates and the participant does not respond.

So in other words, you will either circle zero, two, or four roles under each time interval.

Participant: \_\_\_\_\_ Setting: \_\_\_\_\_ Session: \_\_\_\_\_

**Directions:** Circle the appropriate role if the participant was involved in a positive social interaction within that allotted time interval. Refer to the key at the bottom of the table for the meaning of the abbreviations.

Interval	Role				Interval	Role			
0s - 30s	SI	PI	SR	PR	8min - 8min 30s	SI	PI	SR	PR
30s - 1min	SI	PI	SR	PR	8min 30s - 9mins	SI	PI	SR	PR
1min - 1min 30s	SI	PI	SR	PR	9min - 9min 30s	SI	PI	SR	PR
1min 30s - 2mins	SI	PI	SR	PR	9min 30s - 10mins	SI	PI	SR	PR
2min - 2min 30s	SI	PI	SR	PR	10min - 10min 30s	SI	PI	SR	PR
2min 30s - 3mins	SI	PI	SR	PR	10min 30s - 11mins	SI	PI	SR	PR
3min - 3min 30s	SI	PI	SR	PR	11min - 11min 30s	SI	PI	SR	PR
3min 30s - 4mins	SI	PI	SR	PR	11min 30s - 12mins	SI	PI	SR	PR
4min - 4min 30s	SI	PI	SR	PR	12min - 12min 30s	SI	PI	SR	PR
4min 30s - 5mins	SI	PI	SR	PR	12min 30s - 13mins	SI	PI	SR	PR
5min - 5min 30s	SI	PI	SR	PR	13min - 13min 30s	SI	PI	SR	PR
5min 30s - 6mins	SI	PI	SR	PR	13min 30s - 14mins	SI	PI	SR	PR
6min - 6min 30s	SI	PI	SR	PR	14min - 14min 30s	SI	PI	SR	PR
6min 30s - 7mins	SI	PI	SR	PR	14min 30s - 15mins	SI	PI	SR	PR
7min - 7min 30s	SI	PI	SR	PR					
7min 30s - 8mins	SI	PI	SR	PR					

**Key**

SI = Subject initiated interaction  
PI = Peer initiated interaction

SR = Subject responded to initiation  
PR = Peer responded to initiation

Adapted from: Cooper, Heron, and Heward (2007).

## Appendix G

### Peer Network Peer Fidelity Measure

**Directions:** Follow the steps outlined below.

- Circle “Y” if the step was performed.
- Circle “N” if the opportunity to perform that step occurred but the step itself was not performed.
- Circle “N/A” if the opportunity to perform that step did not occur.

Procedural Question	Performed?		
	Y	N	N/A
1. Did the teacher bring the peer responder (PR) and the peer facilitator (PF) to an adjacent room prior to the delivery of the intervention?	Y	N	N/A
2. Did the teacher position the PR and PF in the correct locations? a. PR is in a corner of the room away from the entrance that the participant will enter from. b. PF is near the entrance that the participant will enter from.	Y	N	N/A
3. Did the teacher bring the participant into the room after the two peers were positioned?	Y	N	N/A
4. Did the PF give the participant at least five seconds to begin performing each step of the target behavior?	Y	N	N/A
5. Did the PF deliver verbal praise if the participant performed the target behavior, “Good job [Name of participant]” (or something similar)?	Y	N	N/A
6. If the participant did not perform the target behavior did the PF implement the prescribed least-to-most intrusive prompt hierarchy in appropriate order? a. Verbally state the step (least intrusive) b. Provides full physical assistance or performs the behavior for the participant (whichever is most appropriate). (most intrusive)	Y	N	N/A
7. Did the PR perform his/her step in appropriate fashion? a. Step #5: PR responds to participant initiation.	Y	N	N/A
8. Was the participant given the opportunity to proceed through the entire eight-step task analysis?	Y	N	N/A

9. Did the peers let the participant watch the iPad video after completing the task analysis?	Y	N	N/A
10. Did the entire session last less than 20 minutes?	Y	N	N/A
11. Did the teacher supervise the intervention?	Y	N	N/A
12. Did the teacher provide assistance when necessary?	Y	N	N/A
13. Did the teacher bring the participant and the peers back to the regular classroom after the intervention was over?	Y	N	N/A

*Note.* Procedural fidelity checklist adapted from Van Norman (2005).

## Appendix H

### Peer Video Modeling Teacher Fidelity Measure

**Directions:** Follow the steps outlined below.

- Circle “Y” if the teacher performed the listed step.
- Circle “N” if the opportunity to perform that step occurred but the teacher did not perform the listed step.
- Circle “N/A” if the opportunity to perform that step did not occur.

Procedural Question	Performed?		
	Y	N	N/A
1. Was a peer brought to an adjacent room prior to the delivery of the intervention?	Y	N	N/A
2. Was the participant brought to an adjacent room at the start of the intervention?	Y	N	N/A
3. Did the teacher use the iPad to play the videos?	Y	N	N/A
4. Before playing the video did the teacher point to the iPad screen and tell the participant to, “[Name of participant] watch this” (or something similar to that)?	Y	N	N/A
5. Did the teacher redirect the participant back to the video clip if the participant was not paying attention?	Y	N	N/A
6. Did the participant watch the video for a total of one-third the duration of the entire video (e.g., at least 40 seconds for a video that is 120 seconds in duration).	Y	N	N/A
7. After the video ended did the teacher use constant time delay (i.e., either zero seconds or five seconds).	Y	N	N/A
8. Did the teacher deliver verbal praise if the participant imitated the behavior, “Good job [Name of participant]” (or something similar)?	Y	N	N/A
9. If the participant did not imitate the behavior did the teacher interrupt the incorrect behavior by saying, “Sorry [Name of participant] that is not right” (or something similar to that)?	Y	N	N/A
10. If the participant did not imitate the behavior did the teacher implement the prescribed least-to-most intrusive prompt hierarchy	Y	N	N/A

in appropriate order? a. Teacher plays video again. (least intrusive) b. Teacher plays video again and provides verbal/gestural prompt. c. Teacher plays video again and either provides full physical assistance or performs the behavior for the participant (whichever is most appropriate). (most intrusive)			
11. Did the peer perform his/her step in appropriate fashion? a. Step #5: Peer responds to participant initiation.	Y	N	N/A
12. Was the participant given the opportunity to proceed through the entire eight-step task analysis?	Y	N	N/A
13. Did the teacher let the participant watch his/her video of choice on the iPad after completing the task analysis?	Y	N	N/A
14. Did the entire session last less than 15 minutes?	Y	N	N/A
15. Did the teacher bring the participant and the peer back to the regular classroom after the intervention was over?	Y	N	N/A

*Note.* Procedural fidelity checklist adapted from Van Norman (2005).

## Appendix I

### Social Validity Measure

The items in this questionnaire are a conglomeration and adaptation of the procedures and measures reported in Jung, Sainato, and Davis (2008), Garfinkle and Schwartz (2002), and Storey et al. (1994):

5 = Strongly Agree

4 = Agree

3 = Neither Agree nor Disagree

2 = Disagree

1 = Strongly Disagree

N/A = Not Applicable

	5	4	3	2	1	N/A
1. The goal of increasing the number social interactions exhibited by the target student is a valid and appropriate goal.						
2. Peer video modeling was effective at increasing the number of social interactions of the target student?						
3. Peer networking was effective at increasing the number of social interactions of the target student?						
4. The other children <b>involved</b> in the intervention benefitted from the use of peer video modeling.						
5. The other children <b>involved</b> in the intervention benefitted from the use of peer networking.						
6. Other children <b>not involved</b> in the intervention benefitted from the use of peer video modeling.						
7. Other children <b>not involved</b> in the intervention benefitted from the use of peer networking.						
8. Peer video modeling is something I could do in my classroom.						
9. Peer networking is something I could do in my classroom.						
10. Peer video modeling is something I could do on the playground.						
11. Peer networking is something I could do on the playground.						
12. Reasonable effort was expended implementing the peer video modeling procedures?						

13. Reasonable effort was expended implementing the peer networking procedures?						
14. I would use peer video modeling again with a new group of students.						
15. I would use peer networking again with a new group of students.						
16. Overall, the use of peer video modeling was appropriate for a preschool setting.						
17. Overall, the use of peer networking was appropriate for a preschool setting.						
18. Do you have any comments you would like to add related to any portion of this intervention or the overall effects of this intervention?						



## **Appendix J**

### **Teacher Recruitment Email**

**Subject:** Research Participation Invitation: A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities

**Dear UNLV/CSUN Preschool Teachers:**

My name is Conrad Oh-Young. I am a doctoral student in the Department of Educational & Clinical Studies at the UNLV College of Education. You are receiving this email because you have met the qualifications to serve as a staff member of the UNLV/CSUN Preschool and you teach in a classroom with students between the ages of 36 months through 72 months.

For my dissertation I am attempting to compare the relative effects of two types of social skill interventions: peer networks (PN) and peer video modeling (PVM), in order to determine which is better at increasing the number of positive social interactions performed by young children with developmental disabilities. Both interventions have been demonstrated to be effective in numerous prior research studies.

If you choose to participate in this study, you will be asked to:

- assist the student investigator with obtaining parent consent and youth assent;
- participate in twelve training sessions (two conducted by the student investigator and ten conducted by you) lasting for no longer than one hour per;
- participate in additional training sessions (as needed for review purposes);
- participate in the delivery of the both interventions, PN and PVM;
- be video recorded while the interventions are being delivered (up to 30 minutes per session for up to 30 weeks);
- be video recorded for up to 45 minutes a day for up to 30 weeks (30 minutes in your classroom and 15 minutes on the playground); and
- complete an 18-item questionnaire at the conclusion of this study.

All sessions will be held in your classroom or on the playground during regularly scheduled school hours.

If you would be interested in volunteering to participate in this study please email me at [ohyoung@unlv.nevada.edu](mailto:ohyoung@unlv.nevada.edu)

Thank you for your time.


**Sincerely,**  
Conrad Oh-Young

Student Investigator  
University of Nevada, Las Vegas  
Department of Educational & Clinical Studies

John Filler, Ph.D.  
Full Professor and Principal Investigator  
University of Nevada, Las Vegas  
Department of Educational & Clinical Studies

## Appendix K

### Recruitment Flyer



# Preschool Social Interaction Research Study

## Research Participants Needed

My name is Conrad Oh-Young. I am a doctoral student in the Department of Educational & Clinical Studies at the UNLV College of Education. For my dissertation I am attempting to compare the relative effects of two types of social skill interventions: peer networks and peer video modeling, in order to determine which is better at increasing the number of positive social interactions performed by young children with developmental disabilities.

Who is eligible to participate:

- Children ages 3 to 5 years of age who have been diagnosed with a developmental disability (e.g., autism);
- Children ages 3 to 5 years of age who are typically developing (have not been diagnosed with a disability);

There is no cost to participate in this study. This study will occur during regular school hours and will be conducted under the supervision of the UNLV/CSUN Preschool Staff.

If you are interested in allowing your child to volunteer to participate in this study please let me know by contacting me at: [ohyoung@unlv.nevada.edu](mailto:ohyoung@unlv.nevada.edu)

**UNLV** | College of  
EDUCATION

Conrad Oh-Young ([ohyoung@unlv.nevada.edu](mailto:ohyoung@unlv.nevada.edu))  
Doctoral Student  
Department of Educational & Clinical Studies

## **Appendix L**

### **Parent of Research Participant Recruitment Email**

**Subject:** Research Participation Invitation: A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities

**Dear UNLV/CSUN Preschool Parent:**

My name is Conrad Oh-Young. I am a doctoral student in the Department of Educational & Clinical Studies at the UNLV College of Education. You are receiving this email because you are the parent of a child who has been identified as having a developmental disability and who is enrolled at the UNLV/CSUN Preschool.

For my dissertation I am attempting to compare the relative effects of two types of social skill interventions: peer networks (PN) and peer video modeling (PVM), in order to determine which is better at increasing the number of positive social interactions performed by young children with developmental disabilities. Both interventions have been demonstrated to be effective in numerous prior research studies.

If you choose to let your child participate in this study, your child will be asked to:

- participate in the intervention (PN or PVM) for up to 30 minutes per session for up to 5 weeks;
- be video recorded while the interventions are being delivered (up to 30 minutes per session; and
- be video recorded for up to 45 minutes a day for up to 5 weeks (30 minutes in your child's classroom and 15 minutes on the playground).

All sessions will be held in your child's classroom or on the playground during regularly scheduled school hours and be supervised by preschool staff.

In addition, you will be asked to complete an 18-item questionnaire at the conclusion of this study.

If you think that you may be willing to allow your child to volunteer to participate as a research participant in this study please let me know by sending me an email to me at [ohyoung@unlv.nevada.edu](mailto:ohyoung@unlv.nevada.edu)

Thank you for your time.

**Sincerely,**

Conrad Oh-Young  
Student Investigator  
University of Nevada, Las Vegas  
Department of Educational & Clinical Studies

John Filler, Ph.D.  
Full Professor and Principal Investigator  
University of Nevada, Las Vegas  
Department of Educational & Clinical Studies

## **Appendix M**

### **Parent of Peer Participant Recruitment Email**

**Subject:** Research Participation Invitation: A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities

**Dear UNLV/CSUN Preschool Parent:**

My name is Conrad Oh-Young. I am a doctoral student in the Department of Educational & Clinical Studies at the UNLV College of Education. You are receiving this email because you are the parent of a typically developing child (child without a disability) who is enrolled at the UNLV/CSUN Preschool.

For my dissertation I am attempting to compare the relative effects of two types of social skill interventions: peer networks (PN) and peer video modeling (PVM), in order to determine which is better at increasing the number of positive social interactions performed by young children with developmental disabilities. Both interventions have been demonstrated to be effective in numerous prior research studies.

If you choose to let your child participate, your child will be asked to:

- participate in five training sessions to be conducted by your child's teacher (each of which will last for no longer than one hour per);
- participate in additional training sessions (as needed for review purposes);
- participate in the delivery of the both interventions, PN and PVM;
- be video recorded while the interventions are being delivered (up to 30 minutes per session for up to 10 weeks); and
- be video recorded for up to 45 minutes a day for up to 10 weeks (30 minutes in your child's classroom and 15 minutes on the playground).

All sessions will be held in your child's classroom or on the playground during regularly scheduled school hours and be supervised by preschool staff.

In addition, you will be asked to complete an 18-item questionnaire at the conclusion of this study.

If you think that you may be willing to allow your child to volunteer to participate as a peer model in this study please let me know by sending me an email to me at

[ohyoung@unlv.nevada.edu](mailto:ohyoung@unlv.nevada.edu)

Thank you for your time.

**Sincerely,**

Conrad Oh-Young

Student Investigator

University of Nevada, Las Vegas

Department of Educational & Clinical Studies

John Filler, Ph.D.

Full Professor and Principal Investigator

University of Nevada, Las Vegas

Department of Educational & Clinical Studies

## Appendix N

### Example Schedule

Day	Time of Day Peer Networking Treatment Implemented	Time of Day Peer Video Modeling Treatment Implemented	Time of Day Baseline Condition Data Collected
Day 1	Morning		Afternoon
Day 2		Afternoon	Morning
Day 3	Afternoon		Morning
Day 4		Morning	Afternoon
Day 5	Morning		Afternoon
Day 6		Afternoon	Morning
Day 7	Afternoon		Morning
Day 8		Morning	Afternoon
Day 9	Morning		Afternoon
Day 10		Afternoon	Morning

*Note.* The schedule provides an example of when a given treatment condition could be implemented and when data could be collected throughout one possible comparison phase.



## Appendix O

### Task Analysis of Peer Network Process with Correct Performance of Behavior

**Directions:** Assumes teacher, peer responder (PR), and peer facilitator (PF) are already in a room adjacent to the classroom. The PF and participant are standing at the entrance to the room. The PR is sitting and playing far enough away such that the participant will need to traverse a short distance before conversing with him/her in an appropriate manner. The shaded cells denote the actions that occur first in each step of the task analysis.

Step #	What PF Does	What Participant Does
Participant given 5 seconds to begin performing the target behavior. Participant given 10 seconds to finish performing the behavior if he/she has begun to perform it.		
1	Peer delivers verbal praise and then starts at Step #1 with the next step in the task list.	Participant performs target behavior.

*Note.* This task analysis assumes that the participant successfully imitated the target behavior on the first attempt.

## Appendix P

### Task Analysis of Peer Network Process with Incorrect Performance of Behavior

**Directions:** Assumes teacher, peer responder (PR), and peer facilitator (PF) are already in a room adjacent to the classroom. The PF and participant are standing at the entrance to the room. The PR is sitting and playing far enough away such that the participant will need to traverse a short distance before conversing with him/her in an appropriate manner. The shaded cells denote the actions that occur first in each step of the task analysis.

Step #	What PF Does	What Participant Does
Participant given 5 seconds to begin performing the target behavior. Participant given 10 seconds to finish performing the behavior if he/she has begun to perform it.		
1	PF delivers verbal prompt. Example: “[Name of participant] let’s walk to [Name of PR]”.	Participant does not perform the target behavior.
Participant given 5 seconds to begin performing the target behavior. Participant given 10 seconds to finish performing the behavior if he/she has begun to perform it.		
2	PF delivers physical assistance or performs the target behavior for the participant. Example: The peer physically assists the participant in walking towards the PR by placing her hands on the participant’s shoulders.	Participant does not perform the target behavior.
3	Peer delivers verbal praise and then starts at Step #1 on the next step in the task list.	

*Note.* This task analysis assumes that the participant does not successfully imitate the target behavior throughout all attempts until the most intrusive prompt is provided.

## Appendix Q

### Task Analysis of Peer Video Modeling Process with Constant Time Delay of Zero Seconds and Correct Imitation of Behavior

**Directions:** Assumes teacher, participant, and peer are already in a room adjacent to the classroom. The teacher and participant are standing. The teacher has the iPad. The peer is sitting and playing far enough away such that the participant will need to traverse a short distance before conversing with him/her in an appropriate manner. The shaded cells denote the actions that occur first in each step of the task analysis.

Peer Video Modeling Process (CTD 0 seconds)		
Step #	What Teacher Does	What Participant Does
1	Teacher starts video on iPad. Note: This is the CTD of 0 seconds.	Participant watches teacher
2	Teacher points to iPad screen and says, “[Name] watch this”.	Participant watches video
Video plays		
3	Immediately after video ends teacher says to participant, “[Name] now it’s your turn”.	Participant watches video
Participant given 5 seconds to begin imitating the target behaviors shown in the video. Participant given 10 seconds to finish imitating each target behavior if he/she has begun to imitate.		
4	Teacher delivers verbal praise, “Good job [Name]”, and then allows the participant to enjoy the iPad with the peer.	Participant imitates target behaviors depicted in video.

*Note.* This task analysis assumes that the participant successfully imitated all of the target behaviors on the first attempt.

## Appendix R

### Task Analysis of Peer Video Modeling Process with Constant Time Delay of Zero Seconds and Incorrect Imitation of Behavior

**Directions:** Assumes teacher, participant, and peer are already in a room adjacent to the classroom. The teacher and participant are standing. The teacher has the iPad. The peer is sitting and playing far enough away such that the participant will need to traverse a short distance before conversing with him/her in an appropriate manner. The shaded cells denote the actions that occur first in each step of the task analysis.

<b>Peer Video Modeling Process (CTD 0 seconds) with Incorrect Imitation of Behavior</b>		
<b>Step #</b>	<b>What Teacher Does</b>	<b>What Participant Does</b>
1	Teacher starts video on iPad. Note: This is the CTD of 0 seconds.	Participant watches teacher
2	Teacher points to iPad screen and says, “[Name] watch this”.	Participant watches video
Video plays		
3	Immediately after video ends teacher says to participant, “[Name] now it’s your turn”.	Participant watches video
Participant given 5 seconds to begin imitating the target behaviors shown in the video. Participant given 10 seconds to finish imitating each target behavior if he/she has begun to imitate.		
4	a. If the participant begins to imitate the wrong behavior the teacher should immediately interrupt the participant then say, “Sorry [Name] that is not right”.  b. If the participant does not imitate at all the teacher says, “Sorry [Name] that is not right”.	Participant does not imitate a specific target behavior depicted in video.
5	Teacher cues the video to the current target behavior in the eight-step task analysis that the participant did not perform and then plays the video from that step to the end of the video.	Participant watches teacher
6	Teacher points to iPad screen and says, “[Name] watch this”.	Participant watches video

Video plays		
7	Immediately after video ends teacher says to participant, “[Name] now it’s your turn”. The teacher also delivers the appropriate verbal and/or gestural prompt depending on the behavior that needs to be imitated. Example: Teacher says, “[Name] go to [Name of Peer]”, while pointing directly at the peer.	Participant watches video
Participant given 5 seconds to begin imitating the target behaviors shown in the video. Participant given 10 seconds to finish imitating each target behavior if he/she has begun to imitate.		
8	a. If the participant begins to imitate the wrong behavior the teacher should immediately interrupt the participant then say, “Sorry [Name] that is not right”.  b. If the participant does not imitate at all the teacher says, “Sorry [Name] that is not right”.	Participant does not imitate the behavior depicted in video.
9	Teacher cues the video to the current target behavior in the eight-step task analysis that the participant did not perform and then plays the video from that step to the end of the video.	Participant watches teacher
10	Teacher points to iPad screen and says, “[Name] watch this”.	Participant watches video
Video plays		
11	Immediately after video ends teacher says to participant, “[Name] now it’s your turn”. The teacher also delivers the appropriate most intrusive prompt depending on the target behavior. Example: The teacher physically assists the participant in walking towards the peer by placing her hands on the participant’s shoulders.	Participant watches video
12	a. Teacher delivers verbal praise and then moves to the next target behavior in the eight-step task analysis.  b. If this is the final step in the eight-step task	

	analysis, then the teacher delivers verbal praise, “Good job [Name]”, and then allows the participant to enjoy the iPad with the peer.	
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*Note.* This task analysis assumes that the participant does not successfully imitate the target behaviors throughout all attempts until the most intrusive prompt is provided. For target behaviors where it may not be appropriate for the teacher to deliver a physical prompt (e.g., verbal communication) the most intrusive prompt will involve the teacher performing the target behavior for the participant (e.g., The teacher may say, “[Name of peer] can [Name of participant] use the iPad with you”?).

## Appendix S

### Task Analysis of Peer Video Modeling Process with Constant Time Delay of Five Seconds and Correct Imitation of Behavior

**Directions:** Assumes teacher, participant, and peer are already in a room adjacent to the classroom. The teacher and participant are standing. The teacher has the iPad. The peer is sitting and playing far enough away such that the participant will need to traverse a short distance before conversing with him/her in an appropriate manner. The shaded cells denote the actions that occur first in each step of the task analysis.

Peer Video Modeling Process (CTD 5 seconds)		
Step #	What Teacher Does	What Participant Does
Participant given 5 seconds to begin imitating the target behaviors. Note: This is the CTD of 5 seconds. Participant given 10 seconds to finish imitating if he/she has begun to imitate a target behavior.		
1	Teacher delivers verbal praise and then moves to the next target behavior.	Participant imitates behavior depicted in video.

*Note.* This task analysis assumes that the participant successfully imitated the target behavior on the first attempt.

## Appendix T

### Task Analysis of Peer Video Modeling Process with Constant Time Delay of Five Seconds and Incorrect Imitation of Behavior

**Directions:** Assumes teacher, participant, and peer are already in a room adjacent to the classroom. The teacher and participant are standing. The teacher has the iPad. The peer is sitting and playing far enough away such that the participant will need to traverse a short distance before conversing with him/her in an appropriate manner. The shaded cells denote the actions that occur first in each step of the task analysis.

Peer Video Modeling Process (CTD 5 seconds) with Incorrect Imitation of Behavior		
Step #	What Teacher Does	What Participant Does
Participant given 5 seconds to begin imitating the target behaviors. Note: This is the CTD of 5 seconds. Participant given 10 seconds to finish imitating if he/she has begun to imitate a target behavior.		
1	a. If the participant begins to imitate the wrong behavior the teacher should immediately interrupt the participant then say, "Sorry [Name] that is not right".  b. If the participant does not imitate at all the teacher says, "Sorry [Name] that is not right".	Participant does not imitate the target behavior.
2	Teacher cues the video to the current target behavior in the eight-step task analysis that the participant did not perform and then plays the video from that step to the end of the video.	Participant watches teacher
3	Teacher points to iPad screen and says, "[Name] watch this".	Participant watches video
Video plays		
Participant given 5 seconds to begin imitating the target behaviors. Note: This is the CTD of 5 seconds. Participant given 10 seconds to finish imitating if he/she has begun to imitate a target behavior.		
4	a. If the participant begins to imitate the wrong behavior the teacher should immediately interrupt the participant then	Participant does not imitate the behavior depicted in video.



	<p>say, “Sorry [Name] that is not right”.</p> <p>b. If the participant does not imitate at all the teacher says, “Sorry [Name] that is not right”.</p>	
5	Teacher cues the video to the current target behavior in the eight-step task analysis that the participant did not perform and then plays the video from that step to the end of the video.	Participant watches teacher
6	Teacher points to iPad screen and says, “[Name] watch this”.	Participant watches video
Video plays		
<p>Participant given 5 seconds to begin imitating the target behaviors. Note: This is the CTD of 5 seconds.</p> <p>Participant given 10 seconds to finish imitating if he/she has begun to imitate a target behavior.</p>		
7	<p>a. If the participant begins to imitate the wrong behavior the teacher should immediately interrupt the participant then say, “Sorry [Name] that is not right”, then delivers appropriate verbal and gestural prompt depending on the behavior that needs to be imitated. Example: Teacher says “[Name] go to [Name of Peer]”.</p> <p>b. If the participant does not imitate at all the teacher says, “[Name] now it’s your turn”, then delivers appropriate verbal and gestural prompt depending on the behavior that needs to be imitated. Example: Teacher says, “[Name] go to [Name of Peer]”, while pointing directly at the peer.</p>	Participant does not imitate the behavior depicted in video.
<p>Participant given 5 seconds to begin imitating the target behaviors. Note: This is the CTD of 5 seconds.</p> <p>Participant given 10 seconds to finish imitating if he/she has begun to imitate a target behavior.</p>		
8	a. If the participant begins to imitate the wrong behavior the teacher should immediately interrupt the participant then	Participant does not imitate the behavior depicted in video.

	<p>say “Sorry [Name] that is not right”.</p> <p>b. If the participant does not imitate at all the teacher says, “Sorry [Name] that is not right”.</p>	
9	Teacher cues the video to the current target behavior in the eight-step task analysis that the participant did not perform and then plays the video from that step to the end of the video.	Participant watches teacher
10	Teacher points to iPad screen and says, “[Name] watch this”.	Participant watches video
Video plays		
<p>Participant given 5 seconds to begin imitating the target behavior. Note: This is the CTD of 5 seconds.</p> <p>Participant given 10 seconds to finish imitating if he/she has begun to imitate the target behavior.</p>		
11	<p>a. If the participant begins to imitate the wrong behavior the teacher should immediately interrupt the participant then say, “Sorry [Name] that is not right”, then deliver the appropriate most intrusive prompt depending on the target behavior. Example: The teacher physically assists the participant in walking towards the peer by placing her hands on the participant’s shoulders.</p> <p>b. If the participant does not imitate at all the teacher says, “[Name] now it’s your turn”, and then delivers the appropriate most intrusive prompt depending on the target behavior. Example: The teacher physically assists the participant in walking towards the peer by placing her hands on the participant’s shoulders.</p>	Participant does not imitate the behavior depicted in video.
12	a. Teacher delivers verbal praise and then moves to the next target behavior in the eight-step task analysis.	

	b. If this is the final step in the eight-step task analysis, then the teacher delivers verbal praise, “Good job [Name]”, and then allows the participant to enjoy the iPad with the peer.	
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*Note.* This task analysis assumes that the participant does not successfully imitate the target behavior throughout all attempts until the most intrusive prompt is provided. For target behaviors where it may not be appropriate for the teacher to deliver a physical prompt (e.g., verbal communication) the most intrusive prompt will involve the teacher performing the target behavior for the participant (e.g., The teacher may say, “[Name of peer], can [Name of participant] use the iPad with you?”).

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### Dissertation Title:

A Comparison of the Effects of Peer Networks and Peer Video Modeling on Positive Social Interactions Performed By Young Children With Developmental Disabilities

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