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A Comparison of the Effects of Video Modeling Other and Peer-Implemented Pivotal Response Training to Video Modeling Other on Positive Social Interactions of Young Children with Developmental Disabilities

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A COMPARISON OF THE EFFECTS OF VIDEO MODELING OTHER AND PEER-IMPLEMENTED PIVOTAL RESPONSE TRAINING TO VIDEO MODELING OTHER ON POSITIVE SOCIAL INTERACTIONS OF YOUNG CHILDREN WITH DEVELOPMENTAL DISABILITIES

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ABSTRACT

A Comparison of the Effects of Video Modeling Other and Peer-Implemented Pivotal Response Training to Video Modeling Other on Positive Social Interactions of Young Children with Developmental Disabilities

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Young children with developmental disabilities (DD) frequently have delays in social play skills. Students with DD may require social skills instruction in order to be successful in playing cooperatively with others. These opportunities to practice social play skills learned from specialized interventions must be available throughout the school day. Providing opportunities for positive social interactions, engagement, and play within a classroom setting allows children to make friendships, engage in higher levels of play, participate with peers in multiple social contexts, and lead to overall school success.

The purpose of this study was to answer two research questions. The first question examined the relative effects of Video Modeling Other and Peer-Implemented Pivotal Response Training (VMO-PIPRT) when compared to Video Modeling Other alone (VMO) at increasing the number of social play actions in young children with DD in an inclusive setting. Secondly, the study investigated whether the positive effects of the best treatment generalized to the playground for each participant. An alternating treatments design was used to examine the

relative effects of the comparison between the two interventions, VMO-PIPRT versus VMO alone. The VMO and VMO-PIPRT treatments were implemented in an inclusive classroom during child-directed learning centers. Data were collected daily during child-directed learning centers and on the playground.

Five young children with DD were selected as research participants in the study and ten peer participants were trained on the PIPRT strategies implemented in the VMO-PIPRT treatment. Results of the study were variable between the two treatments and the participants. Visual analysis of the data suggests VMO-PIPRT was more effective for one participant with DD and the relative effect of VMO-PIPRT generalized to the playground. VMO-PIPRT was found to be minimally effective for a second participant with Autism. VMO alone was more effective for a third participant with DD and minimally effective for a fourth participant with Autism. There was no significant effect on the fifth participant with Autism. Generalization of the relative effects to the playground did not occur for the remaining four participants; however, there were increased levels of social play actions, or positive social interactions, when phases of treatment were compared. Further analysis of initiations suggests the research participants engaged in higher levels of initiations in the classroom and on the playground compared to reciprocal social play actions.

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CHAPTER 1

INTRODUCTION

Students with disabilities may require social skills instruction in order to be successful in school (Brigman, Lane, Switzer, Lane, & Lawrence, 1999; Bruder, 2010). This includes playing cooperatively with others, making friends, and maintaining relationships with peers (Wang, Haertel, & Walberg, 1994). Although strategies to teach social skills have been identified, children with disabilities often lack the social skills needed to be successful in social interactions and school (American Psychiatric Association, 2000; Brigman et al., 1999; Rogers, 2000; Travis, Sigman, & Ruskin, 2001). Under the Individuals with Disabilities Education Act (IDEA, 2004) children with significant delays, at-risk for a delay, or diagnosed with a disability qualify for early intervention, and at an older age, children also qualify for special education and related services. With an increased prevalence of children diagnosed with autism and developmental disabilities (DD), there is a need for continuous research to not only identify effective interventions, but to also implement evidenced-based practices (Graff, Berkeley, Evmenova, & Park, 2014). Many children diagnosed with autism and DD may have social deficits. Due to these deficits in social skills, teachers need a systematic way to determine not only what to teach, but also how to teach (Bruder, 1997).

Providing opportunities for positive social interactions, engagement, and play within a classroom setting allows children to make friendships, engage in higher levels of play and participate with peers in multiple social contexts (Barton, 2015; Freeman & Kasari, 2002; Guarlnick, Neville, Hammond, & Connor, 2007; Lifter, Mason, & Barton, 2011). While most young children are able to benefit from early childhood learning environments, young students with autism and DD struggle because those environments may not accommodate instruction

geared to their specific needs (Warash, Curtis, Hursh, & Tucci, 2008) and prosocial behaviors often times do not naturally occur in early childhood classrooms (Eisenberg & Fabes, 1998). Individuals with disabilities that lack social skills require intensive and individualized instruction to target those deficits (Hemmeter, Ostrosky, & Fox, 2006). The skills involved in knowing how to interact with peers in play-type settings are important as they may generalize to other settings outside the classroom (Wolery & Bailey, 1989).

Positive and appropriate social-emotional skills are important in forming relationships and developing healthy friendships (Kasari, Rotheram-Fuller, Locke, & Gulsrud, 2012; Klein, 2002). Having one or more friends leads to healthier development, overall well-being, academic success, and improvement in skills needed to be socially appropriate with peers (Buysse, Goldman, West, & Hollingsworth, 2008; Costin & Jones, 1992). For children with disabilities, a majority of teachers and parents believe that ongoing friendship relationships are important because of the emotional and cognitive development of skills that lead to developing additional relationships (Hollingsworth & Buysse, 2009).

Educators and families continue to search for additional effective interventions that minimize the behavioral and communicative deficits that prevent children with autism from being successful members of society, interacting with others in a meaningful way, and living independently as adults (Autism and Developmental Disabilities Monitoring Network, 2010). The IDEA (2004), along with Every Student Succeeds Act (ESSA; 2015), and other professional organizations (e.g., Division for Early Childhood, Council for Exceptional Children), require the use of evidence-based interventions for students with disabilities. Children with autism require specialized and effective interventions that positively increase social skills and functioning (Rogers, 2000; Simpson, McKee, Teeter, & Beytien, 2007). Although there is a need for early

intervention and special education services (Autism and Developmental Disabilities Monitoring Network, 2010; Rogers et al., 2012), there is still a gap between research and practice in services (Bruder, 2010). Odom, Collect-Klinenberg, Rogers, and Hatton (2010) reported 24 evidence-based practices currently recommended for use with students with autism when teaching social skills. Among those recommended were pivotal response training (PRT), peer-mediated instruction/intervention (PMII), social narratives (e.g., Social Stories), and video modeling (VM) (Odom et al., 2010).

Autism

Autism is defined as a person with a DD who has delays in social communication, social interaction, nonverbal communication, developing and maintaining relationships across multiple and diverse environments, and often with restricted and repetitive behaviors (American Psychiatric Association, 2013; IDEA, 2004). Although the definition of autism has evolved over time (i.e., Kanner, 1943), one thing has remained the same – social deficits in individuals with autism are evident and there is a need for improved social functioning and skills (Reichow & Volkmar, 2007; Rogers, 2000). The social impairments include the lack of desire to interact with others and lack of motivation to please others (Ali & Frederickson, 2006).

Social deficits appear at an early age for young children with autism (Boyd, Conroy, Asmus, & McKenney, 2011; Carter, Cushing, Clark, & Kennedy, 2005). Children with autism play with less diversity and complexity, have limited and fewer social interactions, and are engaged less in social behaviors than their typical peers (Chamberlain, Kasari, & Rotheram-Fuller, 2007; Jarrold, Boucher, & Smith, 1996). Children with autism often have communication breakdowns where they have difficulty following social norms for initial interactions that can interfere with play for young children (Keen, 2005). These social skills deficits prevent them

from creating and maintaining friendships (Hallahan, Kauffman, & Pullen, 2012).

Since 1979, the number of intervention studies for individuals with autism has increased (Matson, Matson, & Rivet, 2007). The interventions have been in large part focused on social skills (Volkmar, Lord, Bailey, Schultz, & Klin, 2004). In a 12-year period, 44% of published intervention articles focused on social-emotional and behavior skills for individuals with autism (Graff et al., 2014). However, Graff et al. noted the number of studies focused on early childhood and autism were limited.

Developmental Delay

The term "Developmental Delay" is used to describe qualifying individuals who are receiving special education and related services. In order to qualify under Developmental Delay, he or she must be between 3 and 9 years of age and be demonstrating developmental delays. The developmental delays are defined by each state and are measured by appropriate diagnostic instruments, personnel, and procedures. An individual must qualify in one or more of the following areas of development: cognitive, communication, social or emotional, physical or adaptive development. Due to an individual's delays, they require special education and related services. The eligibility is determined by a multidisciplinary team consisting of a special education teacher working in early childhood education, a licensed school psychologist, a parent, a person able to interpret health, family, and social/emotional information, and other professionals knowledgeable about the child (IDEA, 2004).

Developmental Disabilities

Students diagnosed with DD display atypical patterns of development. These delays and atypical patterns of development may severely limit and/or impede participation in common routines and daily activities (Batshaw et al., 2013). For the purpose of this study, the term DD is

referring to young children with autism, mild to severe intellectual disabilities, and multiple disabilities (Batshaw et al., 2013).

Inclusion

As stated in IDEA (2004), children with disabilities 3 to 22 must be educated in the least restrictive environment (LRE). Research suggests young children with disabilities in inclusive settings have a higher frequency of interactions and higher levels of play (Odom et al., 2004). Although research supports the inclusion of children with DD in community preschools and with their general education peers (Strain, McGee & Kohler, 2001), children diagnosed with DD continue to be placed in segregated settings. In 2012, only 39.5% of students with autism spent a majority (i.e., 80%) of their school day in the general education classroom, compared to 61.2% of students with other disabilities (U.S. Department of Education, 2016). Boyd et al. (2011) reported that their participants, children ages 3-5 diagnosed with autism, who were placed in inclusive educational settings had the highest percentage of social interaction time with typical peers compared to students in segregated settings. When children are provided intensive early intervention, the likelihood of inclusion is greater (Harris & Handleman, 2000). In addition, children who are integrated at an earlier age have more opportunities to be exposed and learn from peer models that demonstrate age appropriate social interactions and exchanges.

One of the aims of early childhood inclusion is the formation of friendships (DEC/NAEYC, 2009). There are many components that are needed to support the formation of friendships within inclusive settings, such as facilitation of dyadic interaction, play, or placing peers in the same activities or in locations close to peers with and without disabilities (Hollingsworth & Buysse, 2009). Without inclusion and the presence of typical peers in the classroom, it is difficult to discern how children with DD will learn appropriate social

interactions and exchanges and how will they make and keep friends. This is the reason why research has moved in the direction of examining social interactions for children with DD in their natural settings with their typical peers rather than in segregated settings (Rogers, 2000).

Since the reauthorization of IDEA (2004), inclusive school practices have continued to gain popularity in educational policy and school reform (Byrnes, 2013). However, there is controversy regarding what constitutes "full inclusion" (Byrnes, 2013; Cole, Waldron, & Majd, 2004; Odom, 2000). Per IDEA (2004), students must be provided a free and appropriate public education (FAPE) in the least restrictive environment (LRE). Oh-Young and Filler (2015) found that students in more inclusive settings outperformed peers in less inclusive settings on both social and academic outcome measures. In September 2015, the Departments of Education and Health and Human Services presented a joint publication titled "*Policy Statement on Inclusion of Children with Disabilities in Early Childhood Programs*." This policy statement emphasizes, "all young children with disabilities should have access to inclusive high-quality early childhood programs, where they are provided with individualized and appropriate support in meeting high expectations" (p. 1).

Just by placing a student in the general education environment does not mean he or she will thrive cognitively, socially, or behaviorally. Adjustments and modifications should be made to the instructional strategies, environmental arrangement, materials, interactions, and classroom community (Deris & Di Carlo, 2013; Yu, Ostrosky, & Fowler, 2015). Pairing a child with DD with a peer to see how the child interacts, adjusts, or flourishes in the general education classroom is not sufficient either (Pierce & Shreibman, 1997). Typical peers can be trained within the classroom setting to promote positive social interactions with students with disabilities (Pierce & Shreibman, 1997). Trained peers help teach children with DD social skills and cues so

the child with DD can successfully initiate conversations and play with peers, respond on topic, and be willing to join play groups with peers (Craig-Unkefer & Kaiser, 2002).

Play

For the purpose of this research study, *play* will be defined as an individual or group of individuals who dynamically and functionally engaging with objects and/or people for the purpose of enjoyment (Barton & Wolery, 2010; Carrero, Lewis, Zolkoski, & Lusk, 2014). Play is important as it furthers the development of cognitive, social emotional, and self-regulation skills (Lifter & Bloom, 1989; Parten, 1933) and is one of the primary ways in which social skills and language are advanced (Vygotsky, 1978). Play takes on many forms, including solitary, onlooker, parallel, associative, and cooperative play (Parten, 1932). Children may also display negative behavior (Pierce-Jordan & Lifter, 2005). Play continues to become more complex as children get older and relate to their social-emotional development (Barton & Wolery, 2008; Smilansky, 1968). Appropriate play behaviors provide opportunities for social interactions (Pierucci, Barber, Gilpin, Crisler, & Klinger, 2015). Through play, children can learn assorted social skills that are fundamental to interacting with others and developing relationships (Frost, Wortham, & Reifel, 2012). Not only are there different levels of play, but there are also numerous skills involved in play, including but not limited to positive interactions, responding to social cues, initiating, engaging in meaningful ways, problem solving, communicating, and responding to peers (Barton & Pavilanis, 2012; Craig-Unkefer & Kaiser, 2002). However, children with DD may have difficulty engaging in and displaying appropriate play behaviors (Hobson, Lee, & Hobson, 2009). Stahmer, Shreibman, and Powell (1995) found that typically developing children demonstrated more enhanced and higher quality play skills than young children with autism before and after interventions.

Children with DD can be taught social skills through interventions in the context of play, naturally occurring events, and embedding learning opportunities in the classroom (Barton, Bishop, & Snyder, 2014; Pretti-Frontzcak & Bricker, 2004). Play is an age appropriate activity used in early childhood education (ECE) and early childhood special education (ECSE) classrooms throughout the school day. Teaching social skills in the context of play can lead to larger long-term growth (Pretti-Frontzcak & Bricker, 2004). It is important to provide additional daily opportunities for play to see if skills generalize to other settings and times in the daily schedule. Young children with DD in inclusive programs may lose out on developing positive friendships because they do not have appropriate social interaction skills to build on those relationships, are not positively viewed by their peers, and may become withdrawn (Bellini et al., 2007; Yu et al., 2015).

Social Skills

For the purpose of this study, *social skills* will be defined as behaviors that an individual learns in order to function in a social environment, as well as the ability to find solutions to social challenges and problems (Scattone, 2007). Children with DD must be provided with specialized interventions and opportunities to practice social skills throughout the school day (Spooner et al., 2011). The environment, antecedents, and rewards for behavior must be evaluated to determine if the child has the skill, or establish if there are limitations in the environment that impede the student from exhibiting targeted social behaviors and skills (Matson et al., 2007). Given the importance of social skills for young children with disabilities there is a clear need to enhance social skills interventions (Brown & Conroy, 2011).

Social Skills Interventions

There is an abundance of research related to interventions for students with DD (e.g., Bellini & Akullian, 2007; Boudreau & D'Entremont, 2010; Cadogan & McCrimmon, 2013; Reynhout & Carter, 2006; Test, Richter, Knight & Spooner, 2011). Paul (2003) describes social skills interventions as being compartmentalized into one of the following three categories: peer mediated, adult mediated, or a combination of the two.

Peer-mediated instruction/intervention (PMII). Peer-mediated instruction/interventions (PMII) can be described as instructional strategies taught to peer models to help increase the initiation and maintenance of interactions with individuals with DD (Odom et al., 2010). The peer model(s) are typically the same age as the research participants receiving the intervention (Odom & Strain, 1984). Peer-mediated instruction/intervention is an evidence-based practice for behavior, communication, social [skills], and transition (Odom et al., 2010). Odom and Strain (1984) identified peer mediated interventions as fitting in to one of three categories: (a) proximity, (b) prompt/reinforce, and (c) peer initiated interventions.

Matson et al. (2007) noted that social skills interventions incorporating peer trainers illustrate the need for generalization across people, settings, and skills. There are four characteristics of PMII as an intervention: (a) they are comprehensive in nature when tackling the skills and activities in the intervention, (b) effective for producing desired outcomes, (c) socially valid to practitioners and teachers who will continue to use the method(s) (e.g., practical, acceptable), and (d) intensive in the amount and type of time spent in the intervention (Kohler & Strain, 1999). PMII is an adaptable intervention that has been found to be effective for children with DD at different levels (Ganz & Flores, 2008; Jung, Sainato, and Davis, 2008; Katz & Girolametto, 2013; Mason et al., 2013; Odom et al., 2003; Watson et al., 2015).

Peer implemented pivotal response training (PIPRT). Peer Implemented Pivotal Response Training (PIPRT) uses typical peers to implement Pivotal Response Training (PRT) (Banda, Hart, & Liu-Gitz, 2009). Pivotal response training (PRT) takes a more naturalistic approach in that it teaches a specific or pivotal skill by teaching "the learner to seek out and respond to naturally occurring learning opportunities" (Odom et al., 2010, p. 278; Westling & Fox, 2009; Koegel & Koegel, 2006). In PIPRT, modeling, enhancing motivation, and reinforcement is used to elicit an appropriate response (Jung & Sainato, 2013; Lydon, Healy, & Leader 2010). Strategies in PIPRT also incorporate operant teaching or the Applied Behavioral Analysis (ABA; Pierce & Shreibman, 1995).

PIPRT is designed to increase motivation and support generalization while orienting the participant's attention to significant aspects in the environment (Pierce & Shreibman, 1995). Pivotal Response Training targets four pivotal areas: (a) responsivity to multiple cues, (b) initiation, (c) motivation, and (d) self-management (Boutot & Myles, 2011). Pivotal Response Training (PRT) is an evidence-based practice for behavior, communication, play, and social [skills] (Odom et al., 2010). Peers are pre-trained before the intervention by the researchers or practitioners through role-play, didactic instruction, modeling, and providing specific and constructive feedback (Pierce & Shreibman, 1995). Stahmer (1995) used PRT to increase the symbolic play skills of children with autism to similar levels of children without disabilities.

Koegel, Vernon, and Koegel (2009) used PRT with embedded social interactions within the individualized rewards to increase the participants' social engagement and dyadic orienting compared to non-embedded reinforcement (i.e., young children with autism). Thorp, Stahmer, and Schreibman (1995) used PRT with socio-dramatic play training for children with autism. The participants positively responded and increased their skill repertoire in play, language, and

social skills, as well as generalized skills across toys and settings. Pivotal Response Training is also utilized for elementary-aged children with autism (Kuhn, Bodkin, Devlin, & Doggett, 2008) and used in parent training (Baker-Ericzen, Stahmer, & Burns; 2007). PIPRT has been used to increase a variety of social skills in children with autism (DiSalvo & Oswald, 2002; Koegel et al., 2012; Koegel et al., 2009; Kuhn et al., 2008; Pierce & Shreibman, 2007; Stahmer, 1995; Stahmer, Shreibman, & Powell, 2006); Thorp et al., 1995).

Video modeling (VM). Video Modeling involves the creation of a video that demonstrates desired behaviors for the participant viewer to emulate (Carrero, Lewis, Zolkoski, & Lusk & 2014; Odom et al., 2010). The video is meant to be a means of pre-rehearsing and providing exposure to the target behavior (Carrero, Lewis, Zolkoski, & Lusk, 2014). The participants are asked to imitate the target behaviors displayed in the video (Bandura, 1977; Sigafoos et al., 2005). VM is a more recent intervention technique because of its utilization of technology and "visual cues through media" (Lydon, Healy, & Leader, 2011). VM has been described as being an evidence-based practice for behavior, communication, play, and social [skills] (Odom et al., 2010).

In VM target behaviors are selected based on the assumption that the participants are able to understand a perspective other than their own and imitate some or all of the targeted behaviors in the video(s) (Piaget, 1926; Sancho, Sidener, Reeve, & Sidener, 2010). VM typically includes the following: (a) edited video footage of the model acting displaying the target behavior; (b) multiple or repeated video clip examples of the target behavior; (c) time set aside for the participant to practice the new skills; (d) assessment of generalization across people, settings, and/or materials; and (e) review of the tapes over a given period of time (Hine & Wolery, 2006).

There are noted advantages of VM over other interventions, including the limited amount of time to show the video (i.e., implement), low cost, and the ability to provide access to only positive examples (Boutot & Myles, 2011; Charlop-Christy, Le, & Freeman, 2000). One of the limitations of VM is that the child interacts with technology and not a peer. Some researchers have begun to compare commercially created videos versus instructor-created videos (Palechka & MacDonald, 2010). There are three types of video modeling included in this search: (1) self-video modeling (VSM), (2) point-of-view video modeling (POV VM), and (3) adult or peer video modeling (i.e., other, VMO).

Video modeling has been used as an effective intervention for children with DD (Apple et al., 2005; Boyd et al., 2011; Buggey, 2007; Charlop-Christy, et al., 2000; MacDonald, Sacramone, Mansfield, Wiltz, & Ahearn, 2009; Maione & Mirenda, 2006; Palechka & MacDonald, 2010; Paterson & Arco, 2007; Plavnick et al., 2015; Wilson, 2013). Bellini and Akullian (2007) completed a meta-analysis with 23 studies for the years 1980 to 2005 and found that VM and VSM meet the criteria to be considered an evidence-based practice. Wilson (2013) found three out of four young children with ASD positively responded to the VM; however, there was no consistency among participants regarding the intervention method they favored (i.e., video modeling, in-vivo modeling).

Self-video modeling. Self-video modeling involves the recording and observation of the participant displaying the appropriate target behaviors in a video and seeing himself or herself as competent (Bellini & Akullian, 2007; Davis, Ayres, Davis, & Mason, 2016; Ogilvie, 2011; Wert & Neisworth, 2003). Self-video modeling has been used for students of all ages. Self-video modeling has been found to be an effective delivery model for teaching social skills to young children with autism and DD (Buggey et al., 2011; Mason et al., 2016; Wert & Neisworth, 2003).

Point-of-view video modeling. Point-of-view VM is when the video is recorded from the participant or performer's viewpoint by placing the recording device near or on their shoulder (Bellini & Akullian, 2007; Ganz, et al., 2011; Sigafoos et al., 2007). The videos typically show only what the child would see when engaging in the same activity, i.e., two hands, materials, and toys (Hine & Wolery, 2006). Point-of-view video modeling has been found to be an effective intervention for social skills when working with young children with autism and DD (Buggey, 2012; Buggey et al., 2011; Cihak et al., 2012; Hine & Wolery, 2006; Maione & Mirenda, 2006; Wilson, 2013; Shrestha, Anderson, & Moore, 2012).

Adult or peer video modeling. Models in a video may include adults (e.g., Charlop-Christy et al., 2000; MacDonald et al., 2009; Maione & Mirenda, 2006; Paterson & Arco, 2007), peers (e.g., Marcus & Wilder, 2009; Sherer et al., 2001) or a combination of video modeling techniques (Cihak, Fahrenkrog, Ayres, & Smith, 2010; Grosberg & Charlop, 2014). Some researchers suggest that the use of peers is more effective than using adults for modeling social skills because it is organic and a more natural occurrence within the learning environment (Apple, Billingsley, & Schwartz, 2005; Charlop, Schreibman, & Tryon, 1983). When adults model social skills, unnatural interactions, tone, reinforcers, and situations can be difficult for students with disabilities (Simpson, Myles, Sasso, & Kamps, 1997). The actors in the video may be peers from class, or unknown to the participants (Cihak, Smith, Cornett, & Coleman, 2012). VM has been used to teach social skills to young children with DD (Apple et al., 2005; Cihak et al., 2012; Kourassanis et al., 2015). For this dissertation, adult or peer VM will be referred as VMO.

Statement of the Problem

Children integrated more in inclusive settings compared to those in segregated settings have more positive school outcomes (Odom, 2000; Oh-Young & Filler, 2015). However, merely placing students in inclusive settings without support does not guarantee quantifiable or quality social skills benefits (Utley, Mortweet, & Greenwood, 1997). Positive peer relationships suggest that positive, ongoing interactions and friendships support child development and school performance (Buysse, Goldman, & Skinner, 2003; Guralnick, Neville, Hammond, & Connor, 2007). Deficits in social development may lead students with DD to be socially rejected by their peers (Apple et al., 2005; Odom et al., 2006). When children lack appropriate and positive social skills at an early age, their academic and social development are at risk (Buysse et al., 2003; Rubin, Bukowski, & Parker, 1998; Welsh, Parke, Widaman, & O'Neil, 2001).

Purpose of the Study

Students diagnosed with DD require specialized effective treatments in order to maximize outcomes (Simpson, McKee, Teeter, & Beytien, 2007). The benefits of social skill instruction for children with DD is that it can be adjusted to fit the unique needs of the participant(s), can have a positive effect on targeted skills, is typically enjoyed by students, and can be differentiated to meet individual needs (Kohler, Strain, Hoyson, & Jamieson, 1997). Young students diagnosed with DD require explicit and systematic instruction in target areas (DEC, 2014) to facilitate socialization with peers (Rogers, 2000). Additionally, there has been a research-driven shift to teach social skills to students in natural settings (Kohler et al., 1997; Rogers, 2000). Yet, there have been few studies examining the relative effectiveness of different methods for teaching social skills, particularly when methods are combined as opposed to offered alone. Consequently, the purposes of this research study were to:

- examine the relative effects of Video Modeling Other and Peer-Implemented Pivotal Response Training (VMO-PIPRT) to Video Model Other alone (VMO) on positive social interactions in young children with DD in an inclusive classroom setting.
- determine whether or not the effect of the best treatment (VMO-PIPRT or VMO alone) will generalize to a playground setting.

Research Questions

1. Is VMO-PIPRT more effective than VMO at increasing the number of positive social interactions in young children with DD in an inclusive setting? I predicted there was going to be a significant difference between VMO alone and VMO-PIPRT favoring VMO-PIPRT.
2. Will the positive effects of the best treatment generalize to the playground setting? I predicted the effects of VMO-PIPRT would generalize to the playground setting.

Significance of the Study

The focused research questions of this study were to examine the relative effects of two evidence-based practices when combined versus one evidence-based practice alone, Video Modeling Other (VMO) and Peer-Implemented Pivotal Response Treatment (PIPRT) versus Video Modeling Other (VMO) alone on young children with DD (Odom et al., 2010). Up to the present time no studies have emerged in the literature that combined PIPRT and VMO together as an intervention package for children with DD. In the literature, both interventions, taken alone have been found to be effective for young children with DD (see Bellini & Akullian, 2007; Cadogan & McCrimmon, 2015; Odom et al., 2010). Although there have been other comparative studies for children with autism using one of the selected interventions and other target skills (e.g., Charlop-Christy, Le, & Freeman, 2000 for developmental skills; Decker &

Buggey using VMO and VSM for oral fluency), there is no current research on the relative effects when two interventions are combined versus either one alone. Both intervention strategies, VMO and PIPRT, include peer models but one is an electronic version and the other is presented in order for the individuals to interact face-to-face. Since both have independently been found to be effective for teaching young children with DD social skills, this study will seek to find whether the combined effects of VMO-PIPRT is significantly greater or comparable to when VMO is implemented alone.

Using an alternating treatments design (ATD), measurements of frequency of reciprocal interactions, initiation and responses, were taken in the general education classroom. In order to determine if the effects of the intervention generalized to other settings, measures of the dependent variable took place during free play after treatment sessions in the classroom and also on the playground. The playground was selected due to the setting's ritualistic nature of being part of early childhood programs' routine. The playground provides opportunities for unstructured play. It was predicted the most effective strategy for frequency of initiation and social participation variables in both settings would be VMO-PIPRT.

Limitations

This single case research design (SCRD) study utilized an ATD. An ATD was selected because of the comparison of the two interventions, and the target behaviors were ones that are reversible when the two different treatments were delivered (Gast & Ledford, 2014). Internal validity of the study may have been compromised due to multi-treatment interference (Gast, 2014). Multiple-treatment interference is when two or more interventions are utilized with the same participants and they impede impact the dependent variable being measured (Gast, 2014). The types of interference that can occur in an ATD are carryover effects, sequential confounding,

and alternation effects (Barlow, Nock, & Hersen, 2009). In order to address carryover effects, the treatments were counterbalanced and treatments occurred on different days; that is, the two treatments were not given to the participants on the same day. Carryover was a concern because it can be then difficult to decipher which intervention was more effective, and whether or not there was an interaction (Barlow et al., 2009).

Another limitation to the study was related to external validity. There were different ways to minimize threats to external validity (Gast, 2014). These include inter-subject replication, intra-subject replication, and systematic replication. This study utilized inter-subject replication by replicating the effects of the two treatments across five participants and different toy play sets (Gast, 2014). The selection of participants were based on convenience sampling and those willing to participate through consent and assent.

The participants were selected from the Lynn Bennett Early Childhood Development Center on the campus of the University of Nevada, Las Vegas. Since the study was completed using a SCRD, the results may not generalize to a broader range of children with DD at different functioning levels. The selected participants had different characteristics and skills, possibly contributing to differential outcomes for participants. The willingness of the participants' teachers to continue implementation once the intervention was complete relied on the final results and feasibility of implementation (i.e., time, procedures, and adult supervision) within a classroom setting. The researcher offered support to the teachers if they wanted to continue implementing the intervention (i.e., through follow-up meetings, communication).

Additionally, internal validity was established through having a stable baseline for the participants (Barlow et al., 2009). Experimental control was established through comparison of the baseline and first phase's step-up at the phase change line (Baer, Wolf, & Risley, 1968). The

baseline also served as an objective means of measuring the target behavior (Cooper, Heron, & Heward, 2007). The baseline lent information to the researcher by acting as a predictor of the level of the target behavior attained in the future (Risley & Wolf, 1972). Experimental control was reviewed by a visual analysis of the trend, level, and variability. As recommended, inter-observer agreement (IOA) was used for 25% of the sessions (i.e., recommended 15%) with an agreement threshold of 80% or higher (Gast, 2010).

Definition of terms.

Consistent with prior discussion key terms are defined as follows:

Autism Spectrum Disorder. The term "autism spectrum disorder" is for a person with a developmental disability who significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, adversely affecting a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences" (IDEA, 2004). One possible eligibility for research participants to partake in this study is having been identified with autism according per IDEA (2004) guidelines and have an Individualized Education Plan (IEP).

Developmental Delay. The term "Developmental Delay" is used to describe qualifying individuals who are receiving special education and related services. In order to qualify under Developmental Delay, he or she must be between 3 and 9 years of age and be demonstrating developmental delays. The developmental delays are defined by each state and are measured by appropriate diagnostic instruments and procedures. As described earlier, an individual must qualify in one or more of the following areas: physical, cognitive, communication, social or emotional, or adaptive development. Due to an individual's delays, they would require special

education and related services.

Eligibility is determined by a multidisciplinary team consisting of a special education teacher working in early childhood education, a licensed school psychologist, a parent, a person able to interpret health, family, and social/emotional information, and other professionals knowledgeable about the child (IDEA, 2004). Some participants in this study will have been identified as having a developmental delay per IDEA (2004) and have an Individualized Education Plan (IEP).

Developmental Disabilities. The term "DD" is used to describe individuals who display atypical patterns of development. These delays and atypical patterns of development may severely limit and/or impede participation in common routines and daily activities (Batshaw et al., 2013). DD is referring to individuals with autism, mild to severe intellectual disabilities, and multiple disabilities (Batshaw et al., 2013). Some participants in this study may have been identified as having a DD (e.g., autism, intellectual disability) per IDEA (2004) and have an Individualized Education Plan (IEP).

Evidence-based practice. The term "evidence-based practice" is defined as a practice that utilizes an experimental design to determine the strength of relationships between a defined and measurable manipulated independent variable(s) due to a change in a dependent variable(s). Experimental control is demonstrated through different types of analysis. This may include using one participant, or a small group of participants (Horner et al., 2005; Odom, Collet-Klingenberg, Rogers, & Hatton, 2010).

Early childhood inclusive program. The term "early childhood inclusive program" refers to those that provide early care and education to children birth through age five, where the majority (i.e., 50% or more) of children in the program are typically developing and the other

percentage of children receives early intervention or special education services. These include, but are not limited to, private or publicly funded center or family-based child care, home visiting, Early Head Start, Head Start, private preschool, and public school and community-based pre-kindergarten programs, including those in charter schools (U.S. Department of Health and Human Services & U.S. Department of Education, 2015).

Peer-implemented pivotal response training (PIPRT). The term "peer-implemented pivotal response training" involves typical peers trained to provide a targeted intervention for a child with DD. The typical peers are pre-trained before the intervention by the researchers or practitioners through role-play, didactic instruction, modeling, and providing specific and constructive feedback (Pierce & Shreibman, 1995). The PIRPT approach teaches the learner, in this case an individual with DD, to seek out and return a response to learning opportunities with peer trainers and generalize to other settings (Odom et al., 2010).

Peer training sessions. The term "peer training session" is defined as a developmentally appropriate training session where typically developing children (e.g., peers without known disabilities) learn a set of pre-taught strategies that aide them in engaging children with DD through play and other social opportunities available throughout the school day (Pierce & Shreibman, 1995).

Social communication. The term "social communication" is defined as the verbal language used in social interactions, including back-and-forth exchanges (i.e., initiation, responses) in conversation, in a variety of settings and people, most often used with similar-aged peers (DSM-V, 2012).

Social initiation. A "social initiation" is defined as an attempt to involve a peer (i.e., with or without a disability) in a reciprocal activity. The social initiation includes a vocalization

noticeably pointed to a peer that attempted to extract a social response (Garrison-Harrell, Kamps, & Kravits, 1997). More specifically, a *positive social initiation* must fit and be appropriate to the ongoing scenario. Examples include greetings ("Good afternoon"), referring to a peer by name ("Hi, Jake!"), commenting on ongoing activity ("I like your drawing"), requesting items or a turn ("Can I play with the train?"), and offering a toy to a friend to play (holding up a toy within proximity of another student). The social initiation begins with either the research or peer participant.

Social interactions. A "social interaction" is defined as an act that includes a single or group of initiations followed by responses (Haring & Breen, 1992). For this dissertation, the social interaction must be a *positive social interaction*, due to the fact that initiations can also be negative (e.g., "Stop it!"). The interaction must be based on the child's individual communication. The positive social interaction includes an exchange of a positive initiation followed by a positive response (i.e., verbal or non-verbal response).

Social play skills. "Social play skills" involve social interactions with one or more individuals over a given period of time, such as initiating, maintaining, and engaging in one of the phases of play (Yang, Wolfberg, Wu, & Hwu, 2003). This includes but is not limited to pretend play (Lillard, Lerner, Hopkins, Dore, Smith, & Palmquist, 2012), playing with varieties of toys (Hine & Wolery, 2006; Kleeberger & Mirenda, 2010), communicating with others and getting ones views across (Wilson, 2013), social play, cooperative play (Charlop-Christy & Freeman, 2000), and spontaneous play (Van Berckelaer-Onnes, 2003). In order to engage in high levels of play, children need specific prerequisite skills, such as imitating (Kleeberger & Mirenda, 2010), affect behavior (e.g., sympathy, compassion) (Couloura & Kymissis, 2005), and reciprocating and/or understanding of others' feelings and point of view (MacDonald et al.,

2009; Schreibman, 2007).

Social response. A "social response" is defined as "any verbal or motor behavior directed back to an initiating peer within 5 seconds of the initiation. Responses serve to acknowledge initiations" (Garrison-Harrell et al., 1997, p. 243). A behavior is categorized as a *positive social response* when it fits and is appropriate to the ongoing scenario, and is performed within 5 seconds of the initiation by the peer or research participant. The social response can occurs between two or more individuals with or without a disability. Examples include "Thanks for giving me the doll", "Let's ride bikes instead", "Not today", "Yes", and accepting an offered toy.

Social skills. The term "social skills" is defined as those skills that allow one to function in a social environment and find solutions to social challenges and problems, such as appropriately interacting with peers, playing with peers and toys, initiating interaction, following social norms, and engaging in different levels of social play (e.g., cooperative play, imaginary play) (Scattone, 2007).

Special education teacher. The term "special education teacher" is a licensed educator who works with students who have a wide range of learning, intellectual, emotional, and physical disabilities. They adapt general education lessons and teach various subjects, such as reading, writing, and math, to students with mild and moderate disabilities (U.S. Department of Labor, 2015). An early childhood professional is an individual who provides early care and education services to children birth through age five, including public or private preschool teachers, home and center-based child care providers, Head Start and Early Head Start teachers, home visitors, early interventionists, early childhood special educators, and related services personnel (U.S. Department of Health and Human Services & U.S. Department of Education,

2012). An early childhood professional may work with students with disabilities in their classroom or program.

Typical peers. The term "typical peer" is defined as a child without a known disability. These are individuals found in developmentally appropriate settings and have not been diagnosed with a disability per IDEA. (Allen & Cowdery, 2009). They also present no apparent signs of disability per observation, or parent or teacher report. For this dissertation, a typical peer will be between three and six years old.

Video modeling. The term "video modeling" is defined as an intervention that includes watching a type of visual video that displays or imitates a target behavior based on self, peers, or adult models (Dowrick, 1999). There are many different forms of video modeling, including self-video modeling (VSM), video modeling of others (VMO), and point-of-view video modeling (POV) (Bellini & Akullian, 2007). It allows for pre-rehearsal of the target behavior or skill via observation (Odom et al., 2010). This dissertation will focus on VMO.

Summary

Young children with disabilities often lack the social skills needed to positively interact with peers (Rogers, 2000; Travis, Sigman, & Ruskin, 2001). These social skill deficits prevent them from creating and maintaining friendships (Hallahan et al., 2012). Since social skills are critical for learning, growth, and development, explicit social skills instruction and intervention must be a part of the daily routine for those who require support (DEC, 2014). Delivering specific interventions during the early childhood years can be beneficial and can lead to long-term success academically and socially (Hemmeter et al., 2006). A variety of social play skills interventions have been utilized for young children with DD and autism (Odom et al., 2010; Rogers, 2000).

Research suggests that VMO and PIPRT have been effective when implemented with young children with disabilities. The purpose of this study was to examine the overall effectiveness of combining VMO-PIPRT when compared with VMO for increasing the number of positive social interactions in young children with DD in an inclusive early childood setting. Since the two interventions were simultaneously alternated, the results demonstrate which intervention was more effective for each participant, and if that intervention generalized to the playground setting. The results of the study have practical applications not only to those involved in the study, but can also be shared with other classroom teachers, parents, researchers, and professionals.

CHAPTER 2

REVIEW OF RELATED LITERATURE

This chapter serves three purposes. The first purpose of this chapter is to summarize social play interventions for young children with DD. The second purpose is to summarize and analyze current research and literature related to VMO. Finally, the last purpose is to summarize and analyze current research and literature related to PIPRT. Understanding intervention strengths, limitations, past successes, recommendations, and consequences are vital to knowing how to implement these strategies with young children with DD. Thus, this chapter begins by summarizing experimental studies related to social play skills, VMO, and PIPRT for children diagnosed with DD. The chapter concludes with a summary of the research on VMO and PIPRT as used to teach social play skills.

Literature Review Procedures

A search of several databases was conducted: Academic Search Premiere, ERIC, Education: A Sage Collection, Child Development and Adolescent Studies, Education Full Text, and PscyhINFO). The following descriptors were used: social skills, play skills, social play skills, autism, autism spectrum disorders, developmental disabilities, developmental delay, typical peers, preschool, early childhood, autism and preschool, developmental disabilities and preschool, developmental delay and preschool, video modeling, video modeling and autism, video modeling and developmental disabilities, video modeling and preschool, video modeling of others, VMO, pivotal response training, peer mediated interventions, peer implemented strategies, and pivotal response training. In addition, a manual hand-search of journals from 2011-2015 was completed in the following journals: *Journal of Early Intervention*, *Journal of Positive Behavior Interventions, Journal of Autism and Developmental Disorders*, *Journal of*

Positive Behavior Interventions, *Journal of Applied Behavior Analysis* (2009), and *Exceptionality* (2011). Meta-analyses or literature reviews were examined and the lists of relevant studies were included (e.g., Bellini & Akullian, 2007). Finally, the reference lists of the articles used in this dissertation were reviewed.

Selection Criteria

Studies were included in the review if they met the following inclusion criteria: (a) published between 1985 and 2016; (b) the participant subjects between the ages of 2-9 with at least one participant diagnosed with DD (i.e., preschool or elementary students); (c) the purpose of the study was to examine the positive social interactions or social play skills of children diagnosed with autism or DD; and (d) studies published in peer-reviewed journals. Additionally, the purpose of the study must have either focused on the effects of VMO participation or PIPRT participation of children diagnosed with DD. Studies were eliminated from the review if: (a) the procedures for the intervention were unclear, (b) the data presented was incomplete or unclear (e.g., lack of data, graphs), (c) if they qualitative articles, or (d) if they were quantitative non-experimental articles.

Review and Analysis of Social Play Skills Research

Ingersoll and Schreibman (2006) investigated the effects of reciprocal imitation training (RIT) on teaching object imitation in five children with autism by utilizing a single-case, multiple-baseline across participants design. The authors also explored whether RIT, a naturalistic behavioral intervention, positively impacted the participants' language skills, pretend play, and joint attention. Five young children with autism participated in the study (three boys and two girls) ranging in age between 2 years and 5 months to 3 years and 9 months. Their results from the *Autism Diagnostic Observation Schedule-Generic* (*ADOS-G*) stated all

participants had difficulty with joint attention, language, and play skills. Per the *Bayley Scales of Infant Development, 2nd Edition* their mental age ranged from 15 to 29 months. On the *Childhood Autism Rating Scale-2nd Edition* (*CARS-2*) their autism severity scales ranged from mild-moderate to severe (31.5 to 42 points). The intervention took place on the carpeted floor of a treatment room and generalization occurred in a sitting room at a local preschool. Five sets of identically developmentally appropriate toys were used each session per participant, with up to 50 preferred toys used randomly throughout the study.

The therapists trained on intervention procedures until they met the 90% mastery criterion. A new baseline was introduced at two-week intervals with a total of five phases (total of 10 weeks). The sessions were video taped for later scoring. Although the treatment occurred eight times per week in 20-minute sessions, only the first 10 minutes of each session was scored. Baseline procedures included free time with the therapist, verbal prompts, and object imitation approximately every minute. Each action was modeled up to three times in a session but the verbal prompt was not repeated (e.g., "bounce bounce" when bouncing a ball versus "up it goes"). Each RIT phase built upon the previous phase (i.e., four types of actions modeled total) beginning with: (a) no modeled actions, (b) familiar actions with the same toy, (c) familiar and novel actions with the same toy, (d) familiar and novel actions with the same toy and familiar actions modeled with a different toy, and (e) familiar and novel actions were modeled with the same and different toys. If a participant correctly modeled the action, the child earned access to the toys. After three incorrect trials, the therapist used hand-over-hand to correctly model the action and then provided verbal praise. There were three to five additional post-treatment sessions and a 1-month follow-up session. In these sessions contingencies were removed and generalization to novel situations, play materials, and therapists were assessed. Each participant

worked with four to six different therapists throughout the study.

The dependent variables (DVs) were imitation (percentage), language (occurrence/non-occurrence in 30 second intervals), pretend play behaviors (frequency), and coordinated joint attention (occurrence/non-occurrence in 30 second intervals). Treatment fidelity was scored in five areas for 10% of treatment sessions (M = 95.88% implemented correctly, Kappa coefficient M = .96). Data were analyzed through visual analysis and a resampling procedure. Inter-rater observer reliability was collected for 25% of sessions with a Kappa coefficient average of .96. The data suggest all participants made significant gains in the ability to spontaneously imitate others. Four participants maintained skills at post-treatment. Through a one-way ANOVA, there was a significant difference in ratings for all behavioral categories (e.g., imitates adult $F(1) = 55.07$, $p < .001$). Social validity measures were collected from 32 college students via a 7-point Likert-type rating scale.

Limitations of the study include the variability in results between participants, along with the lack of evidence to conclude that the imitation changes for the participants is what caused positive effects in in social-communicative behaviors. Findings suggest that all participants made significant gains related to spontaneous object imitation, while also positively influencing social-communicative behaviors, language skills, pretend play, and joint attention (Ingersoll & Schreibman, 2006).

Liber, Frea, and Symon (2007) conducted a study using graduated time delay procedures to teach multiple-step social play sequences with three students with autism. The authors employed a multiple baseline across subjects design. The play sequences included initiating and asking peers for help. The participants were three boys diagnosed with autism according to the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*). The

participants had verbal abilities and visual discrimination capabilities but were delayed in language skills. The first participant was 9 years old. He engaged in delayed echolalia, had difficulty making eye contact, desired routine activities/objects, and had difficulty playing with unfamiliar toys. The second participant was 7 years old. The second participant used incorrect grammar when speaking, had difficulty interacting with peers without being aggressive, craved routine, played with toys concretely, yet had a desire to engage with peers. The third participant was 6 years old. He also engaged in delayed echolalia, was typically seen playing far away from his peers, and imitated others. The intervention took place in the participants' classroom during playtime sessions (i.e., non-public school). The peer partners had one or more disabilities, were a similar age, and were individually selected by the participant. The peer partners had some training focusing on waiting for the participant to initiate and responding in a welcoming, friendly manner.

Two high-preference activities were used, the "Circus Train" and the "Zoo Keeper." Each play activity was task analyzed (e.g., 11 steps) into visual prompts and written directions that were read aloud to the participant. The materials were presented to the students before treatment began. The task analysis required participant interactions to: (a) use the peer partner's name; (b) turn in the direction and/or face the peer; (c) make a statement, request, or ask the peer partner a question; and (d) sequence steps in the task analysis. If the participant was unresponsive, they were given one prompt, and if he was still unresponsive, a "no response" was recorded.

There were two DVs. The first DV was social interactions between the subjects and peer partners. The second DV was correct responses for steps completed in the visual analysis. Baseline probes were 5 minutes long and included an attention-getting statement and directions

to play with the peer and materials. Verbal praise and points towards the classroom's reward points system was provided for correctly completing the sequence of steps. In treatment and generalization phases, graduated time delay (2 seconds), prompts, gestures, and visual cues were implemented. Graduated delay intervals were increased until the participant was able to complete 90% or more steps without prompting.

Two trained teachers collected reliability data for 25% of the sessions (agreement across phases and participants $M = 92\%$ and agreement across unprompted responses $M = 94\%$). Results of the study indicated the implementation of the graduated time delay (e.g., delayed prompting) and task analysis sequencing increased the participants' play and requesting skills from baseline (range 0% to 40%) to intervention (range 70% to 100%). The generalization probes occurred 2 weeks post-intervention and indicated two participants generalized skills to a larger group and additional activities. A limitation to this study includes selecting only one play activity per individual, as well as only having peers with a disability versus a variety of peers with different skill levels. The study supports interventions that target social skills in self-contained or other restrictive settings. Overall, the graduated delayed and task analysis interventions increased interactions and social play sequence skills for children with autism.

Boyd et al. (2011) investigated the initiations, responses, and outcomes on pro-social behaviors of eight young children with autism in naturally occurring classroom activities. The eight children (six boys and two girls) with autism between ages 3 years and 5 years and 10 months participated in the study. Participant selection criteria included: (a) the individual receives special education and/or related therapy services under the eligibility of autism; (b) have access to same-aged peers in their educational setting; and (c) have social skills deficits. The *CARS-2* was administered to all students (range = 25.5 to 45). The study took place in the

classroom setting during naturally occurring activities (e.g., snack, art/sensory, cognitive/books). The DVs were the overall rate of social initiations, responses, interactions, and percentage of time engaged in social interactions for each participant. Target behaviors were measured by event (i.e., social initiations, responses, social outcomes) and duration measures (i.e., social interactions).

There were 3.5 to 6.0 hours of videotapes recorded for each individual over 12 weeks (i.e., each session was 20 to 30 minutes long). Social initiations were defined as a verbalization or gesture directed towards a peer that indicated helping the peer, being friendly, requesting their attention with or without materials, or organizing play activities. Social responses were defined as verbalizations or gestures in response and to a peer. Social interactions were defined as a sequence of three or more exchanges related to initiations and responses. All observers were trained on the coding procedures until they met mastery criterion (80% success for three consecutive days).

Results demonstrated the participant initiations, responses, and percentage of time engaged in social interactions with peers varied and was individualized. All participants had minimal interactions with their peers during observations; however, participants who were in inclusive classrooms had the highest percentage of interactions (12.71% and 16.39%). The participant with the lowest percentage of time (0.36%) engaged with peers was enrolled in a self-contained classroom. The outcomes that maintained interactions for participants in inclusive classrooms were gaining peer attention or tangible items, whereas the participants from self contained classrooms most frequently obtained adult attention. Interobserver agreement (IOA) was collected for an average of 30% of sessions (social initiations M = 89.8% and social responses M = 95%). A limitation of the study was not reporting percentage rates of initiations,

responses, or outcomes for the specific classroom activities. This information could have offered information about child preferences and future studies. Overall, the study suggests the participants generally exhibited low and varied rates of prosocial behaviors (i.e., initiations and responses) when interacting with their peers in different school settings.

Summary of Research Related to Social Play Skills

Young children with autism spend limited amounts of time socially engaged with their peers (Boyd et al., 2011; Chamberlain et al., 2007). Without a repertoire of some social skills, children with DD and autism will not be successful in school (Brigman, Lane, Switzer, Lane, & Lawrence, 2001). Social skills help children with DD and autism adapt to their environment with verbal and nonverbal communication (Matson et al., 2007). Naturalistic interventions such as reciprocal imitation training (RIT) provide a well-rounded approach in increasing object imitation and potentially other play skills (Ingersoll & Schreibman, 2006). Other naturalistic interventions effortlessly fit into the daily schedule for young children with DD in different classroom settings. Liber et al. (2007) found that students with autism could learn multiple-step social play sequences through the use of graduated time delay and when taught a task analysis.

The literature supports using targeted interventions to improve social play skills for children with DD. One area of the literature that has been previously explored as an effective intervention for children with DD is VMO.

Review and Analysis of Studies Related to VMO

Charlop-Christy, Le, and Freeman (2000) compared the effectiveness of VMO to in-vivo modeling for teaching developmental skills to elementary-aged children with autism. The researchers used three different designs: (a) multiple baseline across children, (b) a multiple baseline within child and across two modeling conditions, and (c) across two tasks designs

within each modeling condition. Generalization across stimuli, children, and settings were assessed. They also evaluated the time and cost efficiency of both treatments.

Five participants between ages 7 and 11 years old diagnosed with autism with the *DSM-IV* participated in the study. The participants were selected because of their diversity in skills, ability to imitate nonverbally, and they could watch television for a set period of time. Each participant had additional mental assessment scores (e.g., *Leiter International Performance Scale*). All participants attended a biweekly after-school behavior therapy program for children with autism. The first participant was an 8 years and 1 month old girl (mental age was 4 years and 7 months). She receptively labeled objects, had difficulty with pronunciation, avoided interactions with others, and demonstrated self-injurious behaviors. The second participant was 7 years and 10 months old boy (mental age 4 years and 11 months). He recognized some sight words but he was unable to categorize items. He was seen frequently gazing, tapping, and drawing pictures in perseverative ways. The third participant was 10 years and 9 months old with a mental age of 5 years and 4 months. The third participant was a boy, had expressive language difficulties, often engaged in echolalia, and he was unable to answer "WH" questions. He shared inappropriate verbalizations of harm towards others and perseverated on specific topics (e.g., fires). The fourth participant was an 11 years and 3 months old boy (mental age 4 years and 4 months). He answered questions in three-to-four word-phrases, read at a first grade level and performed math at a second grade level. He mainly played with computers or video games by himself, demonstrated stereotypy behaviors (e.g., licking fingers), and would become extremely aggressive towards others. The fifth participant was a 7 years and 2 months old boy (i.e., communication age was 5 years and 4 months; socialization age was 4 years and 4 months). He was able to answer questions in four-to-five word sentences, engaged in solitary play, thrived

off of rituals, and lacked self-help skills. There were two settings for the study. Baseline and training sessions occurred in the therapy room, and generalization probes took place in the free-play room located in the participants' after-school program.

The DVs were measurements of individualized tasks. Tasks were reviewed and randomly assigned based on their individual curriculum assessments. The researchers ensured that tasks were similar in difficulty levels and the same procedures were used throughout both conditions. The in-vivo model was a familiar adult from the after-school program and different adults were used for the video models. The video models demonstrated the skills at a slow pace. Two of five participants had one target behavior (i.e., split into two for each condition), and the other three participants had two target behaviors. Example target behaviors included expressively labeling emotions and daily living skills. Prompting was used in all conditions (e.g., pay attention). In baseline, reinforcement was used only for correct responses. In each condition, the video and in-vivo models were shown/demonstrated twice to the participants. Generalization probes and post-criterion probes (three to five days across different stimuli, people, and settings) were administered. IOA was collected for 50% of tasks across all conditions and yielded 90% to 100% agreement.

Data were analyzed using visual analysis, percentage of intervals, percent correct, and number of correct responses. Results suggest that VMO was more effective than in-vivo modeling because the participants acquired the skills more quickly and the skills generalized. After in-vivo modeling, the target behaviors did not generalize. Three of the participants required twice as many in-vivo sessions as they did VM sessions to reach criterion, and one of the participants took two VMO sessions compared to 11 in-vivo modeling sessions to reach criterion. One participant had an equal number of sessions for both treatments.

The total length of time for each intervention was 170 minutes for the VMO treatment and 635 minutes for the in-vivo modeling treatment. The total cost of the VMO treatment was $58 compared to a total cost of $127 for the in-vivo modeling treatment. The generalization of skills were assessed across multiple dimensions (i.e., persons, settings, stimuli), which is an important consideration when working with children with autism. Overall, VMO was found effective for increasing individualized developmental skills in participants with diverse functioning levels, was time effective, and was cost effective.

Plavnick, McFarland, & Ferrari (2015) investigated the effects of a VMO package for teaching initiations for "joining" play compared to "sharing" toys for three young children with autism using single case reversal design (i.e., A-B-C-B-C). The VMO package included VMO, interventionist instruction, naturalistic reinforcement, and error correction. Participant selection criteria included having the diagnosis of autism and minimal social interactions with peers. Participant inclusion criteria included: (a) showing interest in the study and (b) teacher and parent report regarding participant difficulty with social interactions. Three participants were selected for the study. The first participant was a 5 years old boy who had an expressive vocabulary of approximately 30 words. He had a score of 46.5 on the *CARS-2* (severely autistic category). The second participant was a 6 years old boy who was diagnosed with autism from the *DSM-IV*. He used some two- to three-word requests when prompted by an adult. The third participant was a 5 years old boy. Although he was nonverbal until the age of 3, he expressed approximately 25 words and could speak in four- to five-word requests. His score on the *Gilliam Autism Rating Scale* (*Gilliam*) was 106 (average probability of having autism). All three participants initiated interactions with adults but not with typical peers.

The setting of the intervention was a classroom in an early childhood center. Treatment sessions were simultaneously run for all participants during a social skills group for preschool-aged children with autism that the participants regularly attended. When a participant was absent, another student with social skills deficits was invited to join the intervention for the day. Materials used in all phases of the study included age appropriate children's games, books, blocks, and preferred activities (e.g., iPad, children's computer).

Six videos (three for each condition) were shown to the participants on an iPad 2. The videos were 20 to 30 seconds long. The models in the videos were girls ages 3 to 5 years old. An initiation was defined as: (a) placing oneself within proximity of a peer; (b) saying the peer's name or an attention-gaining response (e.g., "hi"); and (c) depending on the condition, either asking the peer to play (i.e., "joining" play) or "sharing" the toy with a peer. The baseline phase consisted of six trials for each target behavior (i.e., three for each condition) and included verbal prompts. The intervention phases included showing the video two times and continuing with the prompts. These prompts were either, "ask a peer to play" or "see if you can play with your friends" (Plavnick et al., 2015, p. 108). Since all three participants were simultaneously in the intervention, two participants had to wait for data to be collected. Participant order was counterbalanced throughout each session in order to ensure all participants received the same amount of sessions with immediate and delayed data collection.

Procedures were consistent in both treatments. At the beginning of the "sharing" video condition, the peer video model held a preferred item. This was done in order to reflect the procedures the participants would have to follow in order to earn access to materials in the "sharing" condition. Participants earned access to preferred objects when they performed the target verbal and location requirements. When there was an incorrect response, the preferred

object was removed and the therapist gave vocal feedback. IOA were randomly collected for 31% of treatments (M = 100% during baseline, M = 95% for both treatments).

The authors used visual analysis and percentages to analyze the data. The results suggest the "joining" initiation treatment was more effective than the "sharing" treatment. The first participant did not initiate joining play in progress in baseline or the first sharing treatment phase. However, he increased to an average of 70% with the "sharing" VMO, decreased to 11% in "joining" play in progress VMO, and then increased to 44% in the final "sharing" VMO treatment. The second participant had a similar reaction to the first participant, with a mean of 0% in baseline and the first "sharing" phase. In the first "joining" play in progress treatment phase, his score increased to 78%, followed by 0% in the "sharing" phase, and 33% for "joining" play in the final phase of the intervention. The third participant scored 0% during baseline and the first sharing phase. In the next "joining" play VMO, there was an upward trend. He scored 0% in the two phases of "joining" play VMO and then increased to 67% in the last "sharing" treatment phase. Since the videos were played twice for the participants, data on percent of correct responses were collected for both (62% to 73%, 0% to 45%, 57% to 87%).

The data suggest the participants performed better and were more motivated in the "joining" ongoing play VMO condition compared to the "sharing" VMO condition. This may be due to "the hypothesis that video modeling may be differentially efficacious based on the observed and direct consequences" (Plavnick et al., 2015, p. 113). Although research suggests video model actors should be as similar to the participants as possible (Bellini & Akullian, 2007), the same models of the opposite sex were consistently used in all videos and didn't appear to impact the results. A limitation of the study included the introduction of the conditions in the same order for each participant, along with lack of procedural fidelity for the treatments.

In 2013, Wilson examined the effects of VMO compared to in-vivo modeling on targeted social-communication skills, visual attention, and the attitudes of the implementing practitioners on two intervention methods through a single case ATD. Four preschool aged students with autism were recruited from two similar local preschool programs (i.e., one participant was removed at the beginning due to noncompliant behavior) to participate in the study. Their diagnoses were consistent with the *DSM-IV-TR*. Inclusion criteria for the participants included: (a) diagnosis of autism, (b) receiving special education services under the category of autism, (c) vision and hearing within normal limits, (d) ability to watch a 3 minute video, and (e) attendance in a local preschool program. The treatment sessions were 3 minutes long. The DVs were measured in frequency from momentary-time sampling on whether the child was or wasn't paying attention to the model every 5 seconds (total of 36 times). Each participant was initially assessed using the *Vineland Adaptive Behavior Scales*, *2nd Edition* (*Vineland-II*), *Mullen Scales of Early Learning* (*MSEL*), and the *Preschool Language Scale, 4th Edition* (*PLS-4*).

The first participant was a 5 years and 4 months old boy with expressive and receptive language scores in the 13-18 months range on the *MSEL* and *PLS-4*. He made eye contact with others, used jargon, and used delayed echolalia. The second participant was a 4 years and 8 months old girl who also had diagnoses of microcephaly and craniosynostosis. Her scores on the *MSEL* and *PLS-4* placed her at 25 to 27 months range for receptive language and 10 to 14 months for expressive language. She was regarded as a happy child, made one-word requests, and sometimes used sign language. The third participant was a 3 years and 9 months old boy with language scores on the *ADOS* in the 8 to 26 months range. He had difficulty attending whole group activities and rarely interacted with his peers. He would attempt to repeat words, imitate complex actions, and was friendly towards familiar people. The fourth participant was a

4 years and 3 months old girl. She scored 13 to 20 months on the *ADOS* in receptive and expressive language. At the beginning of the study she began taking anxiety medication, and was often seen pulling out her hair. She was described as a child who enjoyed attention from adults, engaged in solitary play a majority of the time, and communicated through gestures.

Each target behavior was individualized to each participant (e.g., using gestures to request more for items). The interventions were randomly assigned. The target behaviors and intervention contexts were included in detail in Table 1 of the study. The teacher and teacher's assistant received training prior to the start of the intervention using a semi-structured script. Each treatment session lasted for 3 minutes and included a 1-hour break activity in between each intervention. Due to uncontrollable circumstances (e.g., school calendar), the length of the intervention varied for each participant (e.g., five to 15 sessions). Gestural and verbal prompts were used when a participant wasn't paying attention.

The data of the three DVs were analyzed using three methods: (a) visual analysis, (b) non-parametric data overlapping method (NAP), and (c) a non-parametric binomial test. The NAP method was selected in order to see the treatment effects within and across participants. For social communication skills, the first participant had 63% NAP for video modeling (i.e., weak effect) and 81% NAP for in-vivo modeling (i.e., medium effect). There was a significant difference (p = .011) in the first participant's target behavior showing preference to in-vivo modeling. The second participant had a predictable pattern only with the in-vivo modeling treatment; since there was no positive change in trend or level, further analyses was stopped. The third participant also had a predictable baseline pattern for in-vivo modeling. After eight VMO treatment sessions, the third participant showed an increase in trend, level, and variability, and therefore there was overlap in data points. The binomial tests show no significant difference

between the two treatments (p = .059). The fourth participant had predictable patterns between both treatments and there was no significant difference. There was a low overlap of points between baseline and treatment that demonstrated a medium effect for both treatments (NAP = 80% VMO, NAP = 86% in-vivo modeling). There was minimal maintenance of the target skills for both of the treatments.

The VMO treatment suggested significantly greater visual attention for three of four participants (t11 = .65, p = .526; t11 = 3.96, p = .002; t14 = 16.18, p < .001; t10 = 3.66, p = .004). When assessing the implementers' attitudes, the teacher and teacher's assistants completed two tasks: (a) the *Intervention Rating Profile* (*IRP-15*) assessing their views of the acceptability and practicality of the interventions and (b) a questionnaire about their personal and professional background (e.g., training experience, demographic information). VMO scored slightly higher among the practitioners through the *IRP-15* survey (i.e., M = 82 compared to M = *79*). Treatment fidelity checklists and video recordings for both VMO and in-vivo modeling were completed for 26% of sessions (M = 96%). IOA was calculated for 28-50% of baseline, treatments, and maintenance phases.

Overall, three of four participants favored one or both of the treatments. One participant favored VMO, one participant favored in-vivo modeling, and one participant favored both treatments. This is inconsistent with previous literature that suggests VMO is just as effective or more effective than in-vivo modeling (Charlop-Christy et al., 2000; Gena et al., 2005).

Palechka and MacDonald (2010) investigated the effects of a commercially available video model (CAVM) compared to an instructor-created video model (ICVM) (i.e., both versions of VMO) on play skills of young children with autism through a single case multi-

element, multiple-probe within participant and across models design. The three participants were diagnosed with autism and enrolled in an intensive behavioral intervention center-based program. Participants were selected based on their targeted IEP goals (i.e., play skills) and their difficulty demonstrating appropriate socio-dramatic play skills. The first participant was 5 years old and scored 4 years and 7 months on the *Peabody Picture Vocabulary Test-Third Edition Form IIIB* (*PPVT-IIIB*). The second participant was 5 years old and scored 5 years and 7 months on the *PPVT-IIIB*. The third participant was 4 years old and scored 4 years and 5 months on the *PPVT-IIIB*. All participants were included in the general education setting for approximately 3.5 hours per day, spoke in full sentences, and imitated delayed objects and gross motor movements.

Training and probe sessions occurred in a therapy room in the participants' preschool. The participants sat at the table to view the videos while the materials were on the floor next to them. The daily sessions were video recorded for later scoring. The same materials were used during baseline and training. Two episodes of the *Fisher Price Little People* © stop-motion animated series were used (i.e., *Sonya Lee and the Super Sundae*, and *Faster than a Speeding Frog*). The two video recordings were used during the CAVM model treatment, while the ICVM treatment used other videos with representative materials (e.g., cloud in the CAVM treatment was represented by cotton balls on a candelabra in the ICVM treatment). More specifically, the ICVM treatment used a trained adult and the representative figurines to act out the video script. The CAVM model and ICVM model were edited to be the similar in length, equal number of actions, and equal number of vocalizations.

The DVs were: (a) scripted vocalizations (measured in frequency), (b) scripted play actions (measured by percentages correct), (c) attending to video (measured by total duration), and (d) attending to the materials when watching the video (measured by total duration). The

duration for attending to the video and materials was measured by real-time measurement method. Scripted vocalizations were defined as vocal statements that were comparable or matched the statements on the video, including omissions of words, paraphrasing, or substitutions. Scripted play actions were defined as physical actions that mimicked or were the same as in the videos and resulted in the same change in the session environment. Attending to the video and toys were defined as having their head and eyes oriented towards the video.

Each video was shown two consecutive times in a session. Each session was 5 minutes long. There were 28 scripted actions and 29 vocalizations in the ICVM treatment, and 31 scripted actions and 28 vocalizations in the CAVM treatment. Mastery criterion was set at 75% of script completion over three consecutive sessions. Mastery probe procedures were executed the same way as the baseline phase (i.e., sans videos). Mastery probe criterion was set at 70% accuracy of the completed script for two consecutive sessions. During baseline and training sessions the materials were presented as they were in the first scene of the videos (i.e., not all materials were out because they were featured later in the video). In baseline, once prompted the participants had 5 minutes to engage with the materials. Participants began the ICVM model treatment immediately upon sitting down. During the CAVM model, the experimenter began by first explaining to the participant what each item represented in the video.

The first participant met mastery criterion for both ICVM and CAVM in 12 sessions. The second participant met mastery criterion for ICVM in four sessions and CAVM in eight sessions. The third participant met mastery criterion for ICVM in 16 sessions but was unable to meet criterion for the CAVM. In baseline the first participant had almost no scripted actions, but in mastery probes he increased to an average of 23 actions and 27 vocalizations in ICVM treatment, and 21.5 actions and 29 vocalizations in CAVM treatment. In baseline the second

participant was not responsive to either treatment, but in mastery probes, he increased to an average of 25 actions and 28 vocalizations in ICVM treatment and 22 actions and 28.5 vocalizations in CAVM treatment. In baseline the third participant had minimal scripted actions in both treatment (e.g., 0, 2), but in mastery probes, he averaged 21 actions and 28 vocalizations in ICVM treatment. The third participant's response to the CAVM treatment remained low, with 4.5 actions and 3 vocalizations. Data for percentage of duration attending to the video and materials were collected over three or four sessions per participant. Attending to videos varied among participants (M = 85% videos, M = *13*% of the toys; M = 90% videos, M = 7% toys; M = 80% videos, M = 9% toys). There appeared to be no apparent difference for the treatments and attending to the videos or toys for the participants. As the second and third participant worked towards mastery criterion, they shifted and attended to the videos less and the toys more. IOA was completed for both treatments. IOA were collected for both videos at an average of 33% of sessions per video, with 92% average agreement.

The data suggests the ICVM treatment, a version of VMO, was more effective in teaching complex scripted play to young children with autism. The three participants learned the complex scripted verbalizations and actions more quickly, and the second and third participants greatly benefitted from the ICVM treatment. Whereas, in the CAVM treatment two participants made progress but the third was not impacted by the treatment. Potential reasons for the discrepancy between the treatments is the CAVM treatment deleted distracting noises often found in videos (e.g., sound effects) and the actions depicted may have been harder for the participants to recreate. One limitation of the study includes the participants' familiarity with previous ICVM modeling. Another limitation was the minimal information provided for how or why the videos and toys were selected, as they may not have been motivating or of interest to the

participants. (e.g., one participant only attended 13% of the time to toys). Overall, the VMO treatments were effective in increasing complex scripted play for children with autism.

Paterson and Arco (2007) examined the effects of VMO on generalized independent play with toys for two young children with autism. The authors employed two separate single case multiple baseline designs with withdrawals across toys. The number of participants quickly decreased from four to two due to their distractibility during introductory sessions. Selection criteria included basic nonverbal imitation skills, regular television viewing inside their home, the ability to watch a television clip for 90 seconds or more, and the diagnosis of autism. The first participant was a 7 years old boy and was enrolled in his second year of primary school. He required supports in verbal instructions, comprehension, and often used social stories or scripts. He sometimes interacted with others but he mainly engaged in stereotyped motor behaviors (e.g., spinning wheels on cars). The second participant was a 6 years old boy who was enrolled in a preprimary class. He was described as high functioning, engaged in stereotyped behaviors, and wanted to engage with others but didn't necessarily know how

The study took place in a playroom within a primary school in Perth, Western Australia. Treatment sessions occurred two times per school day over four weeks (25-26 sessions). The materials were placed in two categories and were selected due to the participants' interests in methods of transportation: (a) related toys (i.e., crane, bulldozer, dump truck, background mat) or (b) unrelated toys (i.e., construction site, helicopter play set, jet ski). The videos were 2 minutes long. Each of the videos had a male adult playing with one of the related toys and demonstrated appropriate verbal and motor play based on real actions of 5 and 7 year old typically developing boys.

DVs were percentages of intervals of appropriate verbal and motor behavior, and

percentages of intervals of repetitive verbal and motor behaviors (i.e., both had to be included for it to be counted as appropriate). Data were collected on up to four target behaviors at a time. Appropriate verbal play was described as verbal expressions or sounds that related to the toy and the scenario (e.g., "vroom vroom" for a car or truck). Appropriate motor play behavior was defined as a play-type action related to the toy and situation. Data were collected using a partial interval scoring method. Repetitive verbal play behavior was defined as expressions or sounds that were similar or matched previous verbal statements or play sounds within the session (e.g., "walk walk" in the 40 seconds interval and repeated again in the 2 minutes-10 seconds interval). Two or more different verbalizations (e.g., "walk to the truck" and "walk to the house") that were stated in a 10-seconds interval were recorded separately. Repetitive motor play was defined as the same as repetitive verbal play but focused on motor play skills.

In baseline the participants were told to play with a (specific) toy for two consecutive 3-minute sessions (total of 6 minutes). There were no breaks between toys. Reinforcement, prompting, and correction procedures were not used in baseline. The materials were placed in the same order during each session. A session was terminated if the participant left the area for 40 seconds or more. In intervention, the participants watched the video two consecutive times. If the child was inattentive for more than 5 seconds of the video, the researcher modeled watching the video. The procedures were the same as in baseline, except the participants were provided positive feedback one to two times per toy when they engaged in appropriate play behavior. The withdrawal and follow-up sessions of one toy per participant occurred 1-week post treatment and used the same procedures as in baseline. The IOA was calculated for 47% of sessions (range 97-100% on all four measurements).

The data suggest there was an increase in appropriate play behaviors for both participants post-VMO treatment. At follow-up, the levels remained higher than baseline, but at times lower than the treatment phase. The data indicated a decrease in repetitive motor play; however, it had limited effects on repetitive verbal play. In conclusion, VMO was found to be effective in teaching appropriate play skills to young children with autism.

The purpose of Maione and Mirenda's 2006 study was to determine the effectiveness of VMO and video feedback (VF) on social language of a child with autism when playing with similar-aged peers using a multiple baseline design across activities. The participant was a 5 years and 7 months old boy. He attended kindergarten five days per week. His language ability was described as significantly below (3 years and 6 months to 4 years on the *Clinical Evaluation of Language Fundamentals-Preschool*; *CELF-P*). It was reported he made progress with his home intervention program but he still struggled with social language skills and interacting with peers. The two untrained, volunteer peer models were 5 and 7 years old and they had interactions with the participant prior to the study.

The intervention took place in different locations within the participant's home (e.g., kitchen table, living room) with the assistance of multiple trained interventionists. The DVs were the total number of verbalizations by the participant, frequency of scripted and unscripted verbalizations, and frequency of initiations and responses. Some example materials were play-doh, chevron cars, and Caillou's tree house. Scripted verbalizations were defined as nearly identical phrases from the VMO (e.g., "I'm gonna eat" and "I'm going to eat"). If the phrases did not match, they were coded as unscripted. Initiations were defined as a statement that was not dependent on the peer's first initial action or request and: (a) introduced a new topic, (b) requested an action, object or information from a peer, and (c) included appropriate comments

about objects or actions (including social praise comments). Responses were defined as phrases or statements that depended on a peer's prior phrase or statement. These included: (a) acknowledgments; (b) agreements (e.g., "ok"); (c) answers to a peer's question; (d) appropriate comments about objects or actions, including social praise comments; (e) questions related to peer's comments; and (e) clarifications or questions directed towards the peer. Other simple words (e.g., yes, no, ok), repeats, unintelligible words, and self-stimulations were coded. Words were coded as repeats if they were said within 5 seconds of it originally being stated.

Each activity varied from three to six phases but always included baseline, VMO, and follow-up. The two additional phases were: (a) VMO and video feedback (VMF) and (b) video modeling, video feedback, and prompting (VMFP). The researchers established a stable baseline before administering the intervention. The baseline and intervention phase activity sessions were 15 minutes long (5 minutes per activity) and occurred two to three times per week. The VMO sessions were 3 minutes long (i.e., 1 minute per video for each activity). There were nine videotaped vignettes (three per activity). Two adult models served as actors and used a similar language level range of the participant (e.g., short phrases of three to six words). The materials were only offered during the sessions, and the orders of activities were offset in order to control for order of effects.

The data were analyzed through visual analysis of trend, level, and frequency. IOA were collected for 35.7% of sessions (M = 93.7%). The treatment fidelity measures were scored for 39.3% of sessions (100% agreement). The VMO had a positive effect on social language in two of the three activities (i.e., Caillou's tree house, play-doh), as a result of VMO alone. The participant perseverated on the cars in the Chevron activity and was not making progress, so VMF was incorporated. The data suggest a positive effect of VMF to promote social interactions

and response skills with typically developing peers. The participant had a higher rate of almost 2:1 unscripted to scripted verbalizations. In the follow-up phase, the participant initiated more than waiting to respond to peers. This supports the intervention's ability to increase independent social skills. Post-intervention, the parents and the researchers stated the participant was happier once he became more socially engaged. Although follow-up data were collected, one weakness of the study was the lack of generalization data. Overall, the VMO intervention was effective at increasing social language skills for a young child with autism by means of untrained peers.

Marcus and Wilder (2009) compared peer video modeling (VMO) to self-video modeling (VMS) on the effects of textual responses for children with autism using a combination of multiple baseline and multi-element designs. The participants were three young children with autism ranging in age from 4 to 9 years. They spoke in sentences and could imitate others when prompted. The settings were tailored to each participant, that being the first participant's school and the second and third participants' homes. Each participant previously participated in at-home behavior interventions. In order to control for prior exposure, materials selected were Greek and Arabic printed letters on index cards.

Due to their reading ability at the time of the intervention, the second and third participants were assessed using strings of three letters. Each child had two videos that featured five trials of letters or letter strings. The VMO featured the interventionist asking questions to a familiar friend of the participant (e.g., "What letter is it?"). Five letters were each randomly assigned to VMS and VMO. The same format and questions were used for VMS, with the exception that the participant was featured in the video. The interventionists edited the video footage of the VMO video so the participant only had to state letters that corresponded with a blank index card.

The DV was percentage of correct trials. A correct trial was defined as a vocalization that exactly matched the index card. Each session consisted of five trials, or five of ten cards with words. Baseline procedures consisted of asking the participant to identify the letter or string of letters on the card. There was no feedback provided to the participants. During intervention the participants watched the videos three times per day (i.e., morning, after school, night time) for two days prior to beginning the study under parent supervision. The intervention took place three to four days per week and both videos were shown in random order each session. Immediately following the video, the therapist began five trials of the first intervention, followed by the viewing of the other video and corresponding trials. Verbal praise was provided for correct responses. After a 10-second wait period for a correct response, the therapist intervened with the correct response. The observer sat in the back of the room and took data in order to minimize distractions. Mastery criterion was set at 80% correct over three consecutive sessions for each treatment. IOA data was collected for 35% (M = 98% for baseline and intervention sessions).

Mastery criterion was set at 100%. There were no correct responses in baseline for any participant in either treatment. The first participant met mastery in VMS in 13 sessions, but did not meet criterion in VMO (reached 80%). The second participant met criterion for VMS in 16 sessions and took 19 sessions to reach criterion in VMO. The third participant met criterion for VMS in 30 sessions, but did not reach criterion for VMO (reached 80%). It was reported the participants requested to watch VMS more often than VMO.

Although the VM had a positive effect on participants in increasing their textual responses, VMS was found to be more effective. In the VMS phase, all three participants met mastery criterion and met it more quickly; whereas only one participant met mastery criterion in

VMO and it was at a slower pace. Limitations of the study include: (a) the peers selected for the videos (by the parents) may not have been highly preferred peers, (b) the purpose of teaching the participants Greek letters did not appear to be socially valid or age appropriate, and (c) practice with the content of the word cards prior to the study could have impacted their results.

MacDonald et al. (2009) investigated the effects of VMO on reciprocal pretend play of young children with autism by using a multiple-probe across three play sets design. The models in the videos were adults representative of the selected participant's gender. The participants were in intensive behavioral interventions 5 days per week, 6 hours per day. Both participants had been previously exposed to different VMs. The first participant was a 7 years old boy who received 27 months of behavioral interventions prior to the study. He needed adult prompting to initiate requests but spoke in complete sentences. The second participant was a 5 years old boy who received 16 months of behavioral interventions prior to the study. He engaged in solitary play a majority of the time. He communicated in full sentences about various topics. The two participants with autism were paired with a typically developing peer. The typical peers were enrolled in the same general education class as the assigned participant. The typical peers were a 5 years old boy and girl who met selection criteria. The typical peers were provided limited training prior to the administration of the treatment.

To minimize distractions, baseline and intervention sessions took place in a small testing room. The 4-minute play long sessions occurred once per day. Three play sets were utilized in the study and each contained seven characters or components (i.e., *Fisher Price Little People* © *airport, Fisher Price Little People* © *zoo, Playskool* © grill). The videos each had 14 to 17 scripted verbalizations and play actions. There were six DVs (a) scripted verbalizations, (b) unscripted verbalizations (c) scripted play actions, (d) unscripted play actions, (e) cooperative

play, and (f) reciprocal verbal interaction chains (MacDonald et al., 2009). Cooperative play was defined as the participant engaging in the same or shared play with the peer and being in close proximity. Reciprocal verbal interaction chains were defined as a strand of two or more verbalizations that occurred within 2 seconds of the last statement.

Unscripted behaviors were only recorded during baseline and probe sessions. The sessions were videotaped for later scoring. Data were collected using a real-time second-by-second measurement method to calculate percentage of intervals of cooperative play and duration of reciprocal verbal interaction chains. Scripted verbalizations and actions were defined as similar or identical statements or actions that matched those depicted in the VMO. Unscripted verbalizations and actions were defined as novel statements or actions from those displayed in the VMO, but were appropriate to the context of the specific toy.

During baseline the participants were instructed to play with the toys. In the VMO phase, the pair: (a) watched the videos two times, and (b) they were instructed to play with the proided toys. No reinforcement or prompts were provided in any phase. When mastery criteria were met in the VMO phase, mastery probes were given for the corresponding play set. When mastery criteria were met in the mastery probes (e.g., 13 out of 15 actions, 12 out of 14 verbalizations), the participant moved on to the next toy set. Follow-up probes were given one month after the last session. IOA across play sets for scripted behaviors were collected for 45% of sessions (M = 94% agreement), unscripted behaviors were collected for 33% of sessions (M = 96% agreement), and cooperative play and reciprocal verbal chains were collected for 83% of sessions (M = 95% agreement).

The participants demonstrated low levels of unscripted and scripted actions and verbalizations during baseline across the play sets (e.g., M = .33 per session), but increased in all

four areas during mastery probes (e.g., 12 out of 14 actions). Cooperative play intervals occurred at low levels in baseline (*M* = 10.7%, *M* = 3.33%) and increased in mastery probes (*M* = 87.3%, *M* = 73.2%). Number of reciprocal verbal chains occurred at low levels in baseline (*M* = .75, *M* = 0) and increased in mastery probes (*M* = 5.5, *M* = 4.77).

The implementation of VMO increased the use of verbalizations and actions, and lengthened the sequences of reciprocal pretend play between children with autism and typically developing peers. These skills were maintained overtime. The first participant increased his use of scripted verbalizations. The second participant increased his use of unscripted verbalizations, which could be attributed to his previous experience using VMO and pretend play in home and school. VMO also had a positive effect on cooperative play and reciprocal verbal interaction chains in both participants. Weaknesses of the study included the lack of novel play within the sessions and the potential impact of the adult standing behind the pair during the play sessions. Overall, the results demonstrated both participants with autism acquired new scripted verbalizations and play actions, maintained the skills, and the participants demonstrated more novel (i.e., unscripted) verbalizations than play actions.

Sherer, Pierce, Paredes, Kisacky, Ingersoll, and Schreibman (2001) investigated the effects of VMS and VMO on acquisition of skills for young children with autism by using a multiple baseline and an ATD. The authors analyzed individual characteristics that may have contributed to positive treatment outcomes. Five boys with autism participated in the study (*M* = 7 years and 5 months). Selection criteria were based on the participants' inability to hold a social conversation and parent request to teach the participants how to respond to simple questions. Four of five had diagnoses of autism (*DSM-IV*) and the fifth participant had a second diagnosis of PDD-NOS. Multiple measurements to assess verbal skills (*M* = 3 years and 3 months), mental

age (*M* = 4 years and 2 months), and severity of autism (*M* = 37.3) were used (e.g., *PPVT*, *CARS*). All participants communicated in short phrases. Six typical peers (*M* = 7 years) were selected to participate based on age and gender. Four participants received the intervention in their home and the fifth participant received the intervention in a combination of their home and a research laboratory (i.e., furniture could be those found in a living room).

Two videotapes were created for each child (total of 10 tapes) featuring an adult and either a peer (VMO) or the target child (VMS). The treatments were provided on alternating days. Eight of 20 individualized questions were each randomly assigned to the VMS and VMO phases, while the remaining questions were saved for generalization (e.g., "where do you live?"). After the question was asked and the participant was provided a 5-second wait period, the therapist would provide a return example response that was developmentally inappropriate for the participant to respond with (e.g., "I go to bed at midnight"). All sessions were videotaped for later scoring.

In baseline the participants were asked all 20 questions. After a participant's response, the therapist provided a targeted response. Parents were instructed to show one video three times each evening before going to bed. The following day the therapist would administer the questions for the corresponding video. Mastery criterion was set at 100% or when the participant failed to make progress over multiple weeks. Maintenance data were collected 2 months post-intervention. The participants' answers were scored as correct or incorrect based on parent report. Generalization probes in baseline were collected and included setting, questions, and peer probes. Inter-rater reliability data were collected for 33% of sessions (*M* = 99%).

The participants showed mixed results, with one favoring VMO, one favoring VMS, and three not indicating a preference. Two participants quickly reached criterion in both treatments,

one participant reached criterion but at a slower pace, and two participants made minimal progress. One of the two participants who showed progress with the treatments reached mastery criterion more quickly with VMS (two sessions) than VMO (14 sessions). The second participant met mastery criterion in a comparable number of sessions for each treatment (VMS = 6 sessions, VMO = 5 sessions). Two participants generalized conversational behavior to settings, peers, adults, and maintained the skills at follow-up. The third participant reached criterion (90%) after seven VMO sessions, but only reached 70% in 17 VMS sessions. The two remaining participants showed minimal response to the treatments, with one participant achieving 60% in VMO and 68% in VMS over 54 treatment sessions (0% at baseline), and the fifth participant achieving 25% correct responses in 18 treatment sessions (0% at baseline).

Through observational data and parent report, the two participants who met criterion had visual memories and preferred visual stimuli. This may indicate a possible prerequisite skill in having a higher visual learning ability in order to benefit from these types of treatments. One limitation of the study was the inability to alter or add to the intervention for the one participant who endured 54 sessions with minimal progress. Overall, the use of VM was effective in helping two participants reach mastery criterion, rapidly acquire skills, and generalize them to novel settings and novel peers.

Apple, Billingsley, and Schwartz (2005) investigated the effects of combining two treatments, VMO and embedded, explicit rules for giving compliments, on teaching compliment-giving responses and initiations for two young children with autism using a multiple-baseline across participants design. The participants were two 5 years old boys diagnosed with autism. Data indicated both participants were high functioning and scored within low- to above-average on the *PVT-III*. Both participants lacked the skills to give compliments and have sustained

interactions with peers. On a Likert scale of 1 to 5 for social skills compared to typical peers, the first participant was ranked a "3" and second participant was ranked a "2." Both participants attended a half-day inclusive preschool and an extended day for children with autism. There were two settings for the intervention. The videos were shown in a separate classroom. Data were collected in 30-minute blocks during child-directed learning centers within the inclusive preschool classroom.

Compliment-giving behaviors were defined using three distinct sentence structures: (a) a positive describing word related or unrelated to the context (e.g., "cool shoes!"), (b) adding in "I like" to the previously stated part of a sentence (e.g., "I like your shoes"), and (c) including "You have/made" to the phrase (e.g., "You made a pretty puppet.") (Apple et al., 2005, p. 35). Any novel complimentary statements that were made were scored as either "I" (self-initiated compliment) or "R" (response compliment). If the child produced a written compliment, the parent, teacher, and a typical peer determined it counted as a compliment.

Eight videos were created (four for each participant) that featured four typical peers in conversation and an adult providing explicit instructional rules for giving compliments (e.g., "When a peer says, 'Look,' we can say 'cool.' "). The videos were each 1-minute long and had six compliment exchanges between the speaker and the peer models. Three of the videos featured one of each type of compliment, and the fourth video featured compliment-giving initiations and examples of all three defined compliments.

Frequency data were collected separately over 15-minute periods for initiations and responses. There were five phases: baseline, VMO, two VMO review phases based on the results of the VMO phase, and a withdrawal phase (identical to procedures in baseline). Baseline included specific discriminative stimuli to evoke verbalizations and create opportunities for the

participants to respond or initiate compliments. Positive praise for compliments was given to the participants when appropriate. After 7 minutes, peers could initiate interaction two times. In the VMO phase, participants watched the videos three times per week in another classroom. The peers could also initiate interaction any time within the 15-minute block. Due to low levels of initiations from the participants in the VMO phase, a VMO plus tangible reinforcement (VM+R) phase was added. The VM+R phase added in preferred, tangible reinforcement after watching the video and before entering the classroom. The fourth phase, reinforcement phase, the VM was removed but all other procedures continued. In the withdrawal phase, the baseline procedures were implemented.

IOA was collected for 33% of sessions (100% agreement). Procedural reliability was collected for 50% of sessions (M = 90%). The participants increased their number of responses from baseline (i.e., 2 responses each) in the VMO and VM+R phase, and maintained response compliments. The first participant had 0 initiations in the first two phases, increased initiations in the third and fourth phases, and maintained the response rate but decreased initiations during the withdrawal phase. The second participant had similar results, except he did not make any initiations in the final withdrawal phase. Post-intervention ratings for social interactions with peers showed the teachers rated the first participant at a "3" again, but also indicated an increase in social interactions with peers. The second participant moved from a "2" to a "3" on the same rating scale. Post-intervention interviews with teachers indicated the participants were able to provide different compliments that were reflective of those modeled in the VMO.

Upon further inspection it appeared they did not require tangible reinforcement because they maintained compliment response skills throughout the intervention. However, they needed adult support, prompting, and some reinforcement to initiate compliments. Overall, the VMO

intervention served its purpose in being effective in increasing compliment-giving behaviors in young children with autism.

Nikopoulos, Canavan, and Nikopoulou-Smyrni (2009) investigated the effects of VMO on establishing instructional stimulus control over simple behaviors for young children with autism. The authors employed a multiple baseline across participants design. More specifically, the stimulus control required the conclusion of a preferred activity for each participant. Three children with autism who met the criteria for the *DSM-IV* participated in the study. The *CARS* was administered to all participants. The first participant was a 7 year old boy who had limited interests in objects, did not initiate interactions with peers or adults, and often calmly ignored adult requests. The second participant was an 8 years old girl who was partially deaf, could not communicate using words (e.g., babbles), played independently, had difficulty attending to tasks, and had difficulty following adult directions. The third participant was a 9 years old boy who played mainly by himself, lacked nonverbal cues (e.g., facial expressions, eye contact), and became aggressive when demands were placed on him.

The setting of the intervention took place in a classroom in their school. The toys were selected because the participants had previous interactions with them (e.g., wooden shape matching board, Lego blocks). The 30-second video featured an unfamiliar peer model. The video included four parts: (a) adult turning off the video and leading the peer to the toy on the table, (b) the peer playing with the toy for 10 seconds, (c) the adult prompting the peer to put the toy away, and (d) the peer willingly putting the toy away.

The DV was the toy cleanup through a latency recording system from when the experimenter prompted playtime was over to when the participant put the toy in the box. Toy cleanup was defined as complying with the experimenter's request similarly to the model in the

video. The phrase to "clean up" was consistently used in the classroom and was therefore incorporated into the intervention. In baseline, a participant sat at the table with one of four selected toys and played with the toy for up to 10 seconds, was prompted to put the toy away (lasting up to 100 seconds), and was moved to a supervised playground area. In the playground area approximately 3 minutes later, the participant would begin another session with a second toy. The VMO treatment followed the same procedures with the addition of watching the VMO for 30 seconds prior to playing with the toy and the instructions to clean up.

Two to three sessions occurred each day for baseline and the VMO treatment. Mastery criterion was set for cleaning up the toy within 5 seconds of the request over five consecutive days. When mastery criterion was met, the participant moved to the generalization across toys (GT) phase. The GT phase removed the video, utilized the remaining three toys at random (6 sessions), and set mastery criterion at correctly putting away the toys for three consecutive sessions. In the generalization across subjects (GS) phase, a novel adult was used. Follow-up data were collected one month post-intervention for four sessions across four different toys. IOA was taken for 31% of sessions (M = 98%). In baseline, participants were not responsive to putting away the toys. In the VMO session, all participants met criterion within 5 to 7 sessions. The first and second participants positively responded to GT, GS, and maintained the skills at the 1-month follow-up. The third participant had varied results across phases, which may have been attributed to difficulty in imitation skills. Limitations of the study included the high frequency of sessions run per day and the intervention moving at a fast pace (i.e., no distracting activities between playing indoors to on the playground). Consequently, the data suggest the VMO procedure was effective for children with autism who had lower levels of disruptive behavior and a larger repertoire of imitation skills.

Summary of Research Related to VMO

The literature supports the use of VMO with young children with and without DD to teach play (MacDonald et al., 2009; Palechka & MacDonald, 2010; Paterson & Arco, 2007; Plavnick et al., 2015) and social skills (Apple et al., 2005; Boyd et al., 2011; Charlop-Christy, et al., 2000; Marione & Mirenda, 2006; Wilson, 2013). These strategies can also be used to improve age appropriate skills that improve play and social interactions, such as answering questions (Sherer et al., 2001) or completing daily living skills (Charlop-Christy et al., 2000). These strategies can also be combined with other interventions (Apple et al., 2005). Interventions related to play and social skills generalize to settings, people, and/or materials (Charlop-Christy et al., 2000; Nikopoulos et al., 2009). Working with young children with DD can be challenging because of their rapid development and changes in preferred items and activities (Charlop-Christy et al., 2000; Nikopoulos et al., 2009). Fortunately, VMO is cost effective and time effective compared to other interventions (e.g., in-vivo modeling; Wilson, 2013). If an instructor lacks technology skills or resources to make a video model, VMOs can be bought commercially (Palechka & MacDonald, 2010). The VMOs followed the same general guidelines, but some authors added in direct instruction, prompting, reinforcement or other supports to ensure student success. The literature emphasizes the need for research to address previously cited limitations and to replicate VMO studies.

Review and Analysis of Studies Related to PIPRT

Another strategy used to teach children positive social interactions and social play skills to children with DD is PIPRT. PIPRT as a strategy has been cited in the literature repeatedly. Many of the studies suggest the intervention is effective for young children with DD (Baker-Ericzen et al., 2007; Banda et al., 2009; Koegel, Symon, & Kogel, 2002; Koegel et al., 2009;

Kuhn et al., 2008; Harper, Symon, & Frea, 2008; Pierce & Schreibman, 1997; Stahmer, 1995; Stahmer, et al., 2006; Thorp et al., 1995).

The primary purpose of Banda et al.'s 2009 study was to investigate the effects of direct instruction and peer training on social initiations and responses during academic-related learning centers time for students with autism and their typical peers using multiple baseline across participants design. Two 6-year-old boys diagnosed with PDD-NOS served as participants in the study. Both participants were fully included in the general education classroom. The first participant had an IQ score of 86 on the *Kauffman Assessment Battery for Children* (*Kauffman*) and a 78 on the *Preschool Language Scales – 3* (*PLS-3*). He rarely responded or initiated play with peers and he lacked advocacy skills (e.g., when peers skipped his turn). The second participant showed a 20 month delay in self-help and social skills on the *Developmental Profile II*. He would not initiate, respond, or sit with his peers, but he would respond to adults when they were within close proximity. Each participant worked with three typical peers (six peers total).

The study took place in two inclusive general education kindergarten classrooms. The intervention occurred during academic learning centers that involved cooperative play and/or shared materials. Their centers included three to five students per center with a rotation every 10 to 15 minutes. Data were collected for 10 minutes using frequency count during one center in the rotation for 2 to 3 days per week. "Initiations were defined as verbal peer-to-peer interactions consisting of a question asked of or a comment made toward another student to begin a conversation. Responses were defined as verbal, peer-to-peer interactions consisting of questions, comments, or responses to questions occurring during an ongoing conversation." (Banda et al., 2009, p. 621).

Although the intervention totaled 4 to 5 minutes, half of the intervention occurred before data collection began. Part one of the intervention included the participant and peer training, prompting and modeling of initiations and responses (i.e., when needed and appropriate), and specific praise to the participant. The researcher would model and have the participant repeat back specific phrases. The second part of the intervention included adult prompting, when needed, and this occurred during data collection. The researcher prompted randomly selected students in the group to initiate a question, and provided prompts for responding, as needed. The prompting only occurred when there was a 5-second break between questions and/or responses.

There was an increase in initiations and responses for each participant from baseline to intervention. Initiations and responses for the first participant increased from baseline to intervention, respectively (M = 1.0 to 9.7, M = 1.0 to 9.3). Initiations and responses for the second participant increased from baseline to intervention, respectively (M = 0.5 to 9.4, M = 0.63 to 8.2). The PND for both participants was 0%. IOA was collected for an average of 26% of sessions (M = 77% initiations, M = 84.5% responses). Procedural fidelity was collected for 19.5% of the sessions (M = 95%). The intervention enhanced the initiation and responses for the two participations with autism. Some strengths of the study included incorporating the intervention in the participants' regular classroom schedule and utilizing peers as models for the skills within the classroom routine. Limitations included no maintenance or generalization data, and the lack of specificity for the frequency of adult prompts. Overall, direct instruction and peer training increased the social initiations and responses for students with autism during academically related classroom activities.

Pierce and Schreibman (1997) investigated the effects of PIPRT strategies on the social behaviors of elementary-aged children with autism by using a multiple baseline across peer

trainers design. This was a follow-up study to Pierce and Shreibman's 1995 PIPRT study (i.e., naturalistic intervention) by adding a generalization phase using untrained peers. The participants were two 7 and 8 years old boys diagnosed with autism. Their IQ scores were 76 and 50. Their language skills revolved around requesting items. There were a six trained and two untrained typical peers in the study. The first participant's training sessions occurred in his classroom, while the second participant's training took place inside a recreation room. The generalization phase was located in a novel third grade classroom when most of students from that classroom were outside for recess. A total of 20 toys were used in each phase (i.e., 40 toys altogether).

The PRT strategies utilized were didactic instruction, (peer) modeling, role-playing, and providing feedback. Each session was video taped for 30 minutes and included 10-minute pre- and post-intervention play sessions. Training sessions occurred one to two times per day. Generalization and post-treatment probes were given in four scenarios: (a) training setting, (b) generalization setting, (c) with a generalization peer, and (d) with generalization toys. Each session consisted of a dyad of one participant and one typical peer. During baseline, the children were prompted to play together with one of the 20 toys. Data were collected in 10-second intervals for three social behaviors: (a) maintains interactions, (b) initiates conversation, (c), and initiates play. IOA was calculated for 33% of sessions (ranging from 86-100%). Data were analyzed using percentage of occurrences divided by total occurrences.

The findings of the study suggest that PIPRT strategies were effective on decreasing the negative social behaviors of children with autism. With trained peers, the first and second participant increased from baseline to post-treatment, respectively (7% to 19%, 4% to 16%). There were no noticeable differences between the peer trainers during baseline or treatment

phases. For untrained peers and interaction data collection, baseline data for both participants hovered around 0%, and increased to nearly 100% at post-treatment. For maintaining interactions, both participants were varied at baseline, but extended to 100% during post-treatment. Strengths of this study included this study being a replication study, demonstrating the effectiveness of PIPRT with both trained and untrained peers in a school setting. Additionally, collecting baseline data for four scenarios gave a clearer vision of the progress the participants made pre- to post-intervention. A few noted limitations included lack of procedural fidelity data and (minimally) unstable baseline data. Moreover, the naturalistic PIPRT intervention was effective in eliciting positive social behavior changes for children with autism using trained and untrained peers.

Stahmer, Shreibman and Powell (2006) investigated the social significance effects of PRT to teach symbolic play skills for children with autism. This study is a byproduct of Stahmer's 1995 study and focused solely on the social acceptability of the participants' play skills compared to their peers. Sixty-three naïve undergraduate students (23 male and 30 female) rated the children's interactions and play abilities. They used a 6-point Likert scale and rated the following: (a) the participants' overall play ability, (b) the creativity and spontaneity in the participants' play, (c) the amount of enjoyment shown by the participants, (d) the participants' interaction skills, and (e) the complexity of the participants' play. Using MANOVA for pre-training, post-training, and typical peers, there was a significant effect F [2,375] = 15.26, p< .01). A follow-up analysis was completed using ANOVA and the results were: overall play ability (F [2,375] = 59.20, $p < .01$); creativity (F [2,375] = 51.17, $p < .01$); enjoyment (F [2,375] = 62.18, $p < .01$); social interaction (F [2,375] = 71.82, $p < .01$); and play complexity (F [2,375] = 33.26, $p < .01$).

Tukey HSD tests ($p < .05$) were performed to examine the differences between groups. Overall, the raters stated that three of the six participants significantly improved their play skills, where two of them had scores similar to typical peers. This study demonstrates that naïve observers will notice changes in skill level of children with autism pre- and post-intervention, and when the skill levels were compared to their typical peers.

Kuhn et al. (2008) examined the effects of PIPRT on the frequency of social interactions for two children with autism using an ATD across participants. There was no specific inclusion criterion for participants. The authors selected peers with disabilities to implement the PRT strategies. The participants were 7 and 8 years old and were diagnosed with autism. The special education teacher reported that both participants rarely engage in social interactions unless prompted by others. The two participants sometimes engaged in self-stimulation and repetitive behaviors. The inclusion criterion for peers was based on their functioning level and compliance. The peers had a variety of disabilities (e.g., specific learning disability, mild mental retardation or intellectual disability), ranged in age from 6 to 8 years old, and spent varying amounts of time in general education. The study took place in a rural southeastern town. The intervention took place in multiple empty classrooms in the participants' school.

The peers were split into two treatment groups (two in the first group, three in the second group). The authors used a modified form of the PRT from Pierce and Schreibman (1995) and Koegel et al. (1989) to meet the peers' comprehension levels. There were six strategies utilized: (a) paying attention, (b) child's choice, (c) reinforce attempts, (d) extend conversation, (d) turn taking, and (e) narrative play. The training sessions were 20 minutes long and held two to three days per week for a total of eight weeks.

The treatment sessions were 10 minutes long and were videotaped. The DVs were measured by: (a) the participants' responses to peer prompts defined as a verbal, gestural, or related physical movement (e.g., eye contact, nodding); (b) rate of responses to prompts, as defined as the number of responses divided by the number of prompts presented by the peers; and (c) initiations, as defined by the participant initiating a conversation or approaching a peer to play without prompts. The peers were prompted with a picture card displaying a PRT strategy and they were provided specific feedback until they reached mastery. The toys were placed in the designated rug area in the middle of the room. The students were not prompted during the session, but were asked to help clean up after the session was over. During treatment, the researchers began with 10 picture card prompts (used in the baseline), and were faded as the peers became independent with the strategies. The peers were provided with one sticker for each interaction or prompt, and a prize every 10 stickers earned.

The first participant responded an average of 20% of the time in baseline with the first group and an average of 84.16% during treatment. With the first group, the second participant responded an average of 18.7% of the time in baseline and an average of 73.8% during treatment. In treatment he responded 41.3% of the time with the second group. During the treatment phases, the peers used more intrusive prompts when needed (e.g., gestural to physical). For the second DV, the first participant had two initiations in five baseline sessions, and five initiations in three treatment sessions. The second participant did not have a difference in frequency of initiations between baseline and treatment for the second group. The second participant had one initiation during baseline and eight initiations in the treatment. However, the second participant's initiations with the second group increased from an average of two initiations per baseline session to 3.25 initiations during treatment sessions.

The PIPRT intervention demonstrated to be effective for increasing frequency of initiations and responses to peers. The functioning levels of the peers implementing the PRT strategies appeared to have an impact on the participants. A limitation was the PIPRT training sessions were not individualized to student need. Generalization data were also not collected. Moreover, the study suggests PIPRT can be taught to students with a variety of disabilities, and that the PRT intervention was effective for elementary-aged children with autism.

Baker-Ericzen et al. (2007) implemented a large-scale PRT with parents in a community-based program for young children with autism. The authors sought to see if specific child variables (i.e., age, gender, race, ethnicity) had an impact on the results. The sample included 158 heterogeneous families and children over a 12-week parent education-training period. There were 269 parents enrolled in the parent training classes and 158 parents completed the intervention. Inclusive criteria stated the families had to have a child diagnosed with autism or PDD-NOS. The children ranged in age from 24 to 113 months (M = 49.36 months). Fifty-five percent of the children were 3 years old or younger and there were approximately four males to every female. The parent training sessions occurred in an outpatient clinic in a children's hospital.

The authors used the *Vineland* to measure adaptive functioning at the first and last treatment sessions in four areas: (a) communication, (b) daily living skills, (c) socialization, and (d) motor skills. During each of the 12-week parenting sessions, the parents met with the therapist one-on-one for 1 hour per week. The parents were each given a copy of the PRT manual from Koegel, O'Dell, and Koegel (1987) in either English or Spanish, and were provided a translator if needed. The specific strategies taught to the parents were: (a) clear instructions/questions, (b) intersperse maintenance tasks, (c) child choice/shared control, (d)

direct/natural reinforcers, and (e) reinforcement of attempts.

Results of the paired *t* tests suggest a significant increase in all four measured areas from pre- to post-treatment in both genders ($t(151) = -10.648$, $p < .001$), except for the communication domain for girls. The area with the greatest increase was the communication domain ($t(58) = -.7523$, $p < .001$). There was no significant difference for gender in any of the four areas pre-to post-treatment. For age, a one-way ANOVA indicated significant differences between pre- and post-treatments for all age groups in every domain and also in the Adaptive Behavior Composite [$F(2, 148) = 15.208$, $p < .001$ for adaptive behavior; $F(2, 148) = 8.585$, $p < .001$ for communication; $F(2, 148) = 25.955$, $p < .001$ for daily living, and $F(2, 148) = 4.501$, $p = .013$ for socialization]. Further analysis via Tukey's post-hoc showed children in the youngest age group had the least amount of impairments in the adaptive behavior composite, communication, and daily living areas, yet the youngest children made the largest gains. Paired sample *t* tests demonstrated that the oldest children made the smallest gains in overall standard scores (i.e., significant improvement in only the socialization domain). For race/ethnicity, independent sample *t* tests indicated there was no significant difference in any domain at pre-treatment, but Caucasian children [$t(31) = -5.320$, $p < .001$] and Hispanic children [$t(39) = -5.610$, $p < .001$] demonstrated significant improvement from pre- to post-treatment with the Adaptive Behavior Composite.

The intervention was demonstrated to be effective in teaching parents to use PRT strategies to teach children with autism by increasing scores on the *Vineland*. This intervention supports the use of the PRT intervention with Spanish-speaking families when provided modifications and support. A limitation to this study is the lack of data regarding the specific information of the intensity and details of strategies used inside the home (e.g., one time per

week, four times per day). Additionally, another limitation is only having the parent completing the *Vineland* rating scale. The results demonstrated that the children showed significant improvement in all areas, except for the females in the Communication domain and children ages 6 years and older in the Daily Living Skills domain.

Using a concurrent multiple baseline across subjects design, Harper et al. (2008) investigated the effects of peer-mediated PRT on the social play interactions, specifically initiations and appropriate turn taking, of two children with autism. Both students had the diagnosis of autism and were fully included in the general education classroom. Their academic and social skills functioning were at different levels. The two participants were selected on three criteria: (a) diagnosis of autism, (b) placement in an inclusive setting (i.e., percentage not specified), (c) and social skills goals listed on their IEP. The first participant was 8 years and 6 months old. In school, he had minimal and inappropriate interactions with typical peers. With adult prompting, he would engage with his peers, but only for a short period of time. He exhibited delayed echolalia and would use self-talk during recess. Academically, he was on grade level in math, science, and social studies. The second participant was 9 years and 1 month old. He also exhibited delayed echolalia and only spoke in short phrases. He participated in self-stimulatory behaviors, such as repetitive vocalizations and hand movements. He had difficulty interacting appropriately with peers (e.g., aggressive, non-compliant). He was typically seen running around the playground or playing on the swings independently. The second participant was academically working three to four years below his age level and received some one-on-one support.

The intervention used triads of two peer trainers and one participant with autism. There were six third grade students selected as peer-mediators. Peers were nominated by their

teachers because of their regular school attendance and their social and communication skills. Seven training sessions for typical peers occurred across seven consecutive school days. Peers and participants were taught five PRT strategies, visual training cards, and cue cards of the following: (a) gaining attention, (b) varying activities, (c) narrating play, (d) reinforcing attempts, and (e) turn-taking. The materials used for the training were typical, age appropriate toys (e.g., basketball and hoop, beanbag toss, Velcro ball-catch game). The training mastery criterion level was 80% accuracy. Baseline, intervention, and generalization phases took place on the recess playground during recess activities.

The materials used for the intervention were selected based on pre-study observations of the participants and because of the materials' popularity with the general education students (e.g., balls, jump rope, basketball hoop, and a swing set). Since the participants were functioning at different levels, their individualized DVs were determined through teacher input, IEP social goals, and observations. The DVs for Participant A were the number of attempts at gaining attention of peers and the number of turn-taking interactions. For Participant B, the DVs were the number of initiations to play and the number of turn-taking exchanges.

Training cue cards used by the trained peers were developed for each strategy and were used to define and clarify each naturalistic technique in child friendly terms. The cue cards were used as a tool to help facilitate peers in gaining the attention of their peers with autism, to aid in varying activities and /or choice making, and could be referenced during the intervention phase. The strategies were represented to the peers pictorially on cue cards, play routine cards, and in simple sentences the children could read. The baseline phase was reflective of a typical recess period; no additional prompts or directions were provided to the students. Baseline data were collected until data stabilized (i.e., 13 and 18 sessions). Data were collected during the first 10

minutes of recess.

In intervention, the peers strategically used the cue cards to engage the participant. Intervention data were collected for 10 minutes during recess. Based on recorded data and visual analysis (i.e., level, trend, variability), both peers made improvements on their individualized social interaction goals during intervention and maintained the skills over time. In maintenance, four to five generalization probes were taken on the playground during recess. The first participant showed more growth (baseline $M = 0$; treatment $M = 5.61$, range of zero to eight times per session; generalization $M = 4.6$) compared to the second participant from baseline to intervention (baseline $M = 0.83$; treatment $M = 1.93$, generalization $M = 3.25$). For independent turn-taking with peers, the first participant increased from zero attempts in baseline to an average of 12.3 attempts in intervention and 10.6 in maintenance. The second participant also had zero attempts during baseline and increased an average of 1.56 attempts during intervention and 2.5 during maintenance. IOA was taken for 33% of sessions ($M = 93\%$). Fidelity of implementation was recorded via a checklist (ranged from 80-100%). This study demonstrates that the use of cue cards aided the trained peers in implementing the strategies when they were written at an age appropriate level, and that the trained peers were effective in their implementation of the PIPRT strategies. The data suggest that PIPRT was effective at increasing the social interactions during recess activities for two third grade students with autism.

Stahmer (1995) studied the effects of PRT on symbolic play behaviors of seven children with autism using a single subject multiple-baseline across subjects design. More specifically, he examined: (a) the feasibility of using PRT with children with autism, (b) unique participant differences that could impact the results, (c) generalization, (d) maintenance, (e) increase in symbolic play skills independent and when compared to the control group, and (f) to control for

two variables, adult interactions and exposure to toys. There were seven boys diagnosed with autism participating in the study. The participants ranged in age from 4 years and 3 months to 7 years and 2 months. Criteria for participation included a language ability of 2 years and 5 months or higher and a diagnosis of autism. Scores were reported for the *PPVT*, *Expressive One-Word Picture Vocabulary Test – Revised (EOWPT-R)*, *Stanford-Binet Intelligence Test (4th ed.)*, *Leiter International Performance* Scale, and the *MacArthur Communicative Development Inventory*. Seven typical peers were matched with the participants based on their *EOWPT-R* scores. The training session settings occurred either in a location inside the participant's home or their school. Materials were consistently used throughout the study, with additional materials introduced during the generalization phase (e.g., Disney toys, dolls, shoe box). The DVs were measurements of symbolic play, complexity of play behavior, and creativity of play. Sessions were video taped for further analysis.

For language, the participants had a control condition, language training (LT), to determine "whether specific play training was necessary to increase symbolic play and interaction skills, or whether interaction with an adult and toys was sufficient to increase symbolic play in these children with autism" (Stahmer, 1995, p. 129). In baseline, the standardized tests were administered and measures for the symbolic play training (SPT) and language training (LT) were gathered. Baseline lengths varied among participants. Data were collected during a free play assessment throughout the study. This involved the parent, peer, or experimenter joining in on play for 14-minute segments in the generalization and training sessions. Both the symbolic play training (SPT) and the LT used the same setting. The SPT used Koegel et al.'s (1989) PRT manual. Five of the participants received SPT first while two of the

participants received the LT training first. The SPT and LT sessions were three times per week in 1-hour sessions for 8 weeks.

The participants were video taped in 14-minute segments before and after the training; the first 7 minutes of the video the participant played alone and the second 7 minutes the participant interacted with a designated person. Interaction recording data were only collected when the participant was with their primary caregiver, the researcher, and their matched typical peers. Symbolic play was measured in 30s intervals and was defined as: "(a) using one object as if it were another object, and/or (b) attributing properties to an object which it did not have, and/or (c) referring to absent objects as if they were present" (Stahmer, 1995, p. 128). Complexity of play was defined as three or more actions related to the same play theme. Every participant engaged significantly less in positive behavior pre-intervention compared to post-intervention and maintenance. Tukey HSD ($p < .01$ or .05) analyses were used. The participants' scores on both the *EOWPVT* and the *PPVT* had correlated significance at $r = .902$ ($p < .05$) and $r = .824$ ($p < .05$). For spontaneous symbolic play and sentence complexity correlated significantly for pre-intervention at $r = .926$, ($p < .01$) and for post-intervention $r = .859$ ($p < .05$). Combined, overall symbolic play levels and spontaneous symbolic play levels correlated with play complexity at $r = .851$($p < .05$) and $r = .859$ ($p < .05$). Through visual analysis, the trend, level, and direction of the DVs positively changed for each participant with the exception of one. The greatest results were in symbolic play and the most positive, drastic changes were in the probes involving the experimenter and training toys. The LT did not appear to have an impact on the participant's play abilities. Six of seven participants generalized the skills across new toys, and skills were maintained at three months. Inter-rater reliability was collected for 33% of sessions (ranged from 71 – 87%). Overall, the results of this study suggests

the participants with adequate language skills can learn symbolic play skills similar to typical peers through supportive and targeted interventions. The data indicate that children who engaged in higher levels of symbolic play could also engage in complex play with typical peers.

Koegel et al. (2009) examined the effects of embedded social interactions in reinforcers and PRT on child-initiated social behaviors for young children with autism. They utilized an ATD across participants design with three participants ages 3 years and 2 months to 3 years and 5 months. Selection criteria included participants must be under the age of 5 and have social deficits in eye contact or eye gaze across settings. The participants were diagnosed with autism using the *DSM IV-TR*. Scores from the *ADOS*, *Autism Diagnostic Interview-Revised* (*ADI-R*), informal parent interviews, and direct child observations were used to collect more information about the participants. The first participant was 3 years and 2 months and had approximately ten functional expressive words (e.g., food). He demonstrated self-injurious behaviors, was aggressive towards adults, sometimes engaged in tantrums, and did not show affection towards others. The second participant was 3 years 3 months old and had approximately 75 functional expressive vocabulary words. He had a neutral affect towards others when approached, and would sometimes elope the area to avoid social contact. He did not show interest in playing with others, affection towards family members, or play simple games with others. The third participant was 3 years and 3 months and had five functional expressive vocabulary words. He also showed neutral affect, did not make eye contact with others, did not respond to name consistently from his mother, and did not play social games with peers. The intervention took place in the participants' homes.

A language opportunity for the participants was defined as a bid from the researcher that sought a verbal response from the participant. The DVs were strength of different tangible

objects (referred to as "reinforcers" in the study), self-initiated social engagement during communication (i.e., physical orientation or facing adult, direct affect toward the adult), and nonverbal dyadic orienting (i.e., eye contact following an action by the adult). A fourth DV was assessed, general child affect, which included a 6-point Likert rating scale measuring the child's interest in the activity and happiness during the first 5-minutes of each probe. Sessions occurred one time per week for approximately 2 hours at a time. Sessions were recorded in 10-second intervals to determine an overall percentage for occurrence versus non-occurrence of social engagement. The sessions were videotaped for further inspection. The tangible object menu was determined through parent report and observations. Specific tangible objects were selected each day based on the chosen activity.

There were four steps in the experimental condition procedures, with step number four differing based on the first or second treatment condition: (a) the researchers or parent presented a discriminative stimulus (i.e., child selected or preferred stimulus selected earlier in the day), (b) potential verbal response from the child, and (c) delivery of a preferred and natural reinforcement if the participant elicited a verbal response, and (d) time for the participant to enjoy the selected tangible object. For the non-embedded social condition, the child would enjoy the tangible object independently. For example, if the child elicited the response "jump," the researcher would provide time for the child to jump by himself on the trampoline, reinforcing his verbal response. For the embedded social condition, the tangible object would be paired with a social interaction, such as the researcher jumping on the trampoline with the child.

The PRT utilized procedures focused on five main areas: "(1) providing the child the opportunity to select preferred stimulus items, (2) presenting a clear opportunity for the child to make a verbal attempt, (3) reinforcing the verbal attempt contingently, (4) interspersing

maintenance and acquisition trials, and (5) using natural reinforcers" (Koegel et al., 2009, p. 1242). There were immediate changes in trend, level, and variability between the non-embedded and embedded social conditions. Social engagement during communication, nonverbal dyadic orienting, and general child affect for all children was calculated using Cohen's *d*. All three participants had a large effect size for social engagement during communication, respectively (d = 11.2, d = 4.2, d = 4.3). Although not as strong indicators, nonverbal dyadic orienting (d = 7.8, d = 3.6, d = 4.4) and general child affect (d = 2.9, d = 4.3, d = 3.5) had large effect sizes for each individual child.

Reliability was scored for approximately 30% of the sessions (means ranged for DVs 82% to 98%). The authors used Cohen's kappa to correct for chance agreement. The kappa scores ranged from .64 to .91. The data show the various selected tangible objects were comparable in strength across the two conditions. Higher rates of social engagement were evident in the embedded social condition (e.g., 81% compared to 6%, respectively). The data suggest the incorporation of embedded social interactions in the tangible objects increased participants social engagement levels, improved their dyadic orienting, and results in higher child affect scores. Additionally, the use of social interaction and engagement as positive reinforcement versus tangible items or access to activities lies within age appropriate guidelines because it is a naturally occurring interaction that can occur in a variety of settings. These types of tangible objects may also increase motivation for social engagement. Limitations of the study were the lack of information related to procedures (e.g., procedural fidelity was not measured, how conditions were alternated, why intervention was conducted for 2 hours for a 3 year old child). Overall, the use of embedded social interactions in reinforcers and PRT were both effective interventions for children with autism.

Thorp et al. (1995) examined the effects of PRT on the socio-dramatic play skills of children with autism using a single subject multiple baseline across subjects design. Three individuals diagnosed with autism with the *DSM-III-R* participated in the study. Selection criteria for participants were their lack of socio-dramatic play skills and having verbal abilities higher than 3 years and 6 months. Language and IQ scores from the *Stanford-Binet, Fourth Edition* were reported for each participant. The first participant was 5 years and 4 months. The second participant was 9 years and 9 months and often engaged in self-stimulating behaviors. The third participant was 8 years and 2 months old. He engaged in self-stimulating behaviors, some echolalia, and would not play with peers. The setting for each of the participants differed (e.g., family room, resource room) and the generalization phase occurred in a clinical setting. The materials used in the training and generalization settings were age and developmentally appropriate. The generalization toys were used only in the baseline, post-training, and follow-up sessions.

The DVs were measures of play skills, social behavior, and language skills. The intervention sessions ran a few times times a week until a total of 16 hours was reached (i.e., two to three times). Each session was recorded in 30-second intervals for 12 minutes. The five nonexclusive categories were: (a) role playing, (b) make-believe transformations, (c) persistence, (d) social behavior, and (e) verbal communication. During the first 4 minutes, the adult only responded if the participant addressed them. In the remaining 8 minutes, the adult would attempt to engage the participant. The researchers followed the same routine during each of the training sessions, including using varied and preferred toys from the reinforcement menu during each session. If needed, the researcher took turns playing with the toys and modeled appropriate toy interactions for the participants up to two times during the session. There were loose and

changing criterion for reinforcement contingencies, so as a participant made progress in the training sessions, the expectations for mastery were raised (i.e., not specified). The reinforcement items were also tailored to the task (e.g., an eating story plot included play foods). The selected reinforcement themes were a mix of mastered and novel themes in order to increase the success rate of the participants.

For the percentage of time engaged per session, there was a clear level, trend, and slope change for each participant. The play behavior results demonstrated a substantial increase in all three participants' skills in "role playing." The participants generalized these skills across settings and play partners. IOA was calculated for 33% of sessions using kappa coefficients. Reliability percentages ranged from 62% (i.e., role playing) to 93% (other appropriate verbal). At baseline for "role playing," the participants' engagement ranged from 0-25%. In post-training, the participants' engagement ranged from 40-100%, 30%-100%, and 70-100%. The participants increased "persistence" skills pre- to post-training sessions. In the "make-believe transformations" category, two participants' scores increased pre- to post-training. The participants positively responded and increased their skill repertoire in play, language, and social skills. Thorp et al. (1995) found the skills generalized across toys and settings, but did not show as much growth in generalizing to other peer partners.

Koegel et al. (2002) trained geographically distant parents to use PRT strategies with their child with autism using a non-concurrent multiple baseline across participants design. The researchers sought to assess the changes in the children's communication post-intervention, the parents' acquisition of the PRT skills taught, and parental affect throughout all phases of the intervention. All parents reported difficulties with communication as a high priority. There were nine parents (five families) involved in the study. The families lived in rural or metropolitan

areas all over the United States that were far from autism training centers, preventing their child from ongoing participation in training and/or therapy sessions. The participants were diagnosed with autism according to the *DSM-IV*. The children ranged from 3 years and 10 months to 5 years and 7 months. Four of the five children attended special education preschool classes and the other child was included in a general education classroom. The trainings occurred in small clinic playrooms and nearby community settings (e.g., playground, restaurants).

The length of the study varied for each family based on follow-up data (range = 4 to 13 months). The baseline and post-intervention data were collected in the child's home during the family's regular routine 2 to 4 weeks pre-intervention. Pre-intervention data consisted of informal telephone interviews and video recordings of the children in their natural environments taken by the parents. The first 10 minutes of the videotapes were used as the baseline. The intervention included the caretaker, the child with autism, and the interventionist for 5 hours each day over 5 consecutive days (i.e., total of 25 hours).

Six precise PRT motivational strategies were taught to the parents. In order to make interactions more meaningful and relevant, the activities selected for the intervention related to everyday activities (e.g., meal time, playing in the park). The first day of the intervention consisted of 1 to 2 hours of modeling by the interventionist and the remaining time allowed the parent to practice with the child while receiving feedback. Data were collected in 10-minute video taped segments. At the conclusion of the five days, there was a 1 hour follow-up meeting to summarize the strategies, provide feedback, answer questions regarding IEPs and placement, provide future recommendations, and encourage families of future communication (e.g., email, telephone). Follow-up data were collected from 3 to 11 months post-intervention in the child's home.

Three functional verbal responses were analyzed: (a) normal loudness, (b) body oriented towards the adult, and (c) a purposeful or functional response. The baseline levels of all children varied (range = 15 to 75 words or utterances). Communication and attempts increased over time and at follow-up (range = 26 words/utterances at baseline, range = 54 intervention, range = 112 follow-up). The parents' implementation of the motivational strategies from PRT was analyzed in five 2-minute segments for correctly using the strategies. The parents increased their correct use of PRT strategies from baseline to intervention, respectively (range = 15% to 37%, 80% to 100%). For parent and/or child affect measurements, a 6-point Likert scale was used. Each family saw an increase in positive affect with their child. IOA was collected for 33% of sessions. Researchers blind to the purpose of the study collected procedural fidelity data.

The data suggest the parents increased their use of motivational technique from PRT, the children's expressive communication increased, and parents had more positive affect during parent-child interactions. Parents can be effective implementers when using PRT strategies within their home. A few weaknesses were the lack of diversity within the participants (i.e., self-recruited, educated, middle- to upper-middle class families). Overall, using parents are implementers of PRT strategies can be effective for young children with autism.

Lydon, Healy, and Leader (2010) compared the effectiveness of PRT to VMO in learning scripted and novel play verbalizations and actions for young children with autism using a single-case alternating treatment design. Five participants in this study were diagnosed with autism (met the criteria of the *DSM-IV-TR*) ranging in age from 3 years and 10 months to 6 years and 1 month. Selection criteria included language abilities of 2 years or above and similar characteristics to other participants selected for the study. Three supplementary assessments were also conducted (the verbal comprehension and naming vocabulary subscales of the *BAS-II*

for language skills, *Autism Behavior Checklist* (*ABC*) for autism severity, and *Preschool Play Behavior Scale* (*PPBS*) for play skills. This study took place in the participants' school in Ireland and generalization occurred in their classroom.

One VMO was selected per individual from the New England Centre for Children (NECC). Different toys were used for each training session (e.g., Fisher Price ® Little People). In the VMO treatment the same materials as those in the video were used. In the PRT treatment preferred items were used. Each participant was video taped for 4 minutes before and after treatment (baseline and follow-up probes, respectively). The DVs were duration of interaction with toys and the frequency of scripted and unscripted verbalizations appropriate to the play theme in each treatment. Play verbalizations were defined as short verbal phrases or sounds in context to the ongoing play theme. If the phrase or sentence was from the video, it was coded as a scripted verbalization. A phrase was coded as unscripted when it was unrelated to the toys the individual was playing with or when the sounds weren't appropriate. Repetitious verbalization or actions were not coded. Play actions were defined as motor responses that matched the context and had the same outcome as the one modeled. Independent play actions and verbalizations were those that did not match the treatment model, but were stated or acted in context of play.

VMO included: (a) visual images projected on a screen of the new (target) behavior, (b) repeated viewings of the VM, (c) discrete trials of the target skills, and (d) generalization probes across settings. Two VMO sessions were conducted daily until mastery criterion was reached (90%). The videos were 90 seconds long, highlighted 12 actions and verbalizations, and were shown to the participant two times per session. Data were collected when the participant had the opportunity to independently interact with the toys in a 4-minute period. In the PRT treatment,

sessions were conducted two to three times each day for 30-minute sessions until there were 10 calculated hours. The PRT treatment phase allowed the participant to select from a variety of preferred toys and they were praised for exact imitation and approximations. The follow-up probes were similar to baseline.

IOA data were collected for 50% of probe sessions (M = 98.4%). Baseline and follow-up comparisons were analyzed through four paired samples t-tests. Results indicate a significant difference from baseline to follow-up probes in the training and generalization environments between the numbers of play actions in PRT, respectively (t (4) = -6.86, p = .002; t (4) = -5.46, p = .005). Results indicate a significant difference from baseline to follow-up probes in the training environments between the numbers of play verbalizations in VM, respectively (t (4) = -3.14, p = .035; t (4) = -5.46, p = .005). Limitations of the study include the opportunity for participants to use preferred objects in the PRT training and treatment phases compared to the exact-match toys in the VM phases. Additionally, the procedures and length of the interventions were vastly different. Overall, results indicated that there was a significant increase of number of play actions for both the PRT and VM treatments. However, there was a greater increase and generalization in PRT compared to VM.

Summary of Research Related to PIPRT

The literature supports the use of PIPRT with young children with and without DD to teach play (Stahmer 1995; Stahmer et al., 2006; Thorp et al., 1995) and social skills (Banda et al., 2009; Harper et al., 2008; Koegel et al., 2009; Kuhn et al., 2008; Pierce & Schreibman, 1997). PIPRT has been found to be effective when implemented by typical peers (e.g., Harper et al., 2008), children with disabilities (Kuhn et al., 2008), and parents (Baker-Ericzen, Stahmer, & Burns, 2007; Koegel et al., 2002). The strategies used in PIPRT may differ, but all maintain the

same principles focused on motivation and support for generalization across people, settings, and objects. Many interventions select to only use a few PRT strategies (e.g., paying attention, reinforce attempts, extend conversation). Naïve raters noticed the difference in play skills for children with autism pre- and post-treatment (Stahmer et al., 2006), supporting the social significance of PRT strategies.

Review of Literature Summary

Social skills help children with autism adapt to their environment and be successful in school (Matson et al., 2007). Children diagnosed with DD often lack a desire to interact and please others (Ali & Frederickson, 2006). These deficits interfere with their education and integration in society. Effective interventions for social play skills allow children to be successful in interacting and engaging with others around them, leading to better school and friendship outcomes. These interventions establish basic skills children need for social approval and building relationships in their school years and into their adult lives. As the number of children diagnosed with DD increases (U.S. Department of Education, 2013), the urgency for effective, relevant, time and cost efficient, and socially valid interventions continues to persist. The array of literature targeting the promotion of proscocial behaviors demonstrates their value and necessity to advance research for children with DD (see Bellini & Akullian, 2007; Jung & Sainato, 2013; Mason, Davis, Boles, & Goodwyn, 2013; Matson, Matson, & Rivet, 2007; Rogers, 2000; Utley, Mortweet, & Greenwood, 1997; Volkmar, Lord, Bailey, Schultz, & Klin, 2004). Although social deficits occur at early ages for children with autism (Boyd et al., 2011; Carter et al., 2004), interventions provided at earlier ages yield positive results for promoting social skills (Krantz, 2000). Even in a VMO and PIPRT comparison study of scripted and novel play verbalizations, Lydon et al. (2010) found both strategies increased the target behaviors.

Both VMO (Apple, et al., 2005; Boyd, et al., 2011; Charlop-Christy et al., 2000; MacDonald et al., 2009; Marione & Mirenda, 2006; Nikopoulos et al., 2009; Palechka & MacDonald, 2010; Odom et al., 2010; Paterson & Arco, 2007; Plavnick, et al., 2015; Sherer et al. 2001) and PIPRT (Baker-Ericzen et al., 2007; Banda et al., 2009; Koegel et al., 2002; Koegel et al., 2009; Kuhn et al., 2008; Harper et al., 2008; Pierce & Schreibman, 1997; Stahmer, 1995; Stahmer, et al., 2006; Thorp et al., 1995) have found to be effective interventions for young children with DD.

CHAPTER 3

METHODOLOGY

This study examined the relative effectiveness of VMO versus VMO-PIPRT for young children with DD. In the literature, many interventions have been identified as effective for teaching social skills to young children with DD. Specifically, this study focused on two of those identified interventions: VMO (Apple et al., 2005; Boyd et al., 2011; Charlop-Christy, et al., 2000; Marione & Mirenda, 2006; MacDonald et al., 2009; Palechka & MacDonald, 2010; Paterson & Arco, 2007; Plavnick et al., 2015; Wilson, 2013) and PIPRT (Baker-Ericzen et al., 2007; Banda et al., 2009; Koegel et al., 2002; Koegel et al., 2009; Kuhn et al., 2008; Harper et al., 2008; Pierce & Schreibman, 1997; Stahmer, 1995; Stahmer, et al., 2006; Thorp et al., 1995). However, no studies to date have combined the two interventions and compared the combination to one of the interventions alone. Would the combination of VMO and PIPRT be more effective than VMO alone? Would research participants learn skills more quickly, or would they show more generalization of the skills when VMO and PIPRT were combined than when VMO alone was employed? To answer these questions, this study used an ATD to compare the relative effects of VMO-PIPRT and VMO alone at increasing the frequency of positive social play interactions for young children with DD in an inclusive school setting. This study also utilized a best treatment phase to determine if the best treatment generalized to an unstructured playground setting and to test for multi-treatment interference. This chapter describes the participants, settings, instrumentation, materials, training, design, procedures, data collection, and treatment of data.

Research Questions

This study focused on the following research questions:

1. Is VMO-PIPRT more effective than VMO alone at increasing the number of positive social interactions in young children with DD in an inclusive setting? I predicted that there would be a significant difference between VMO alone and VMO-PIPRT favoring VMO-PIPRT.
2. Will the positive effects of the best treatment generalize to the playground setting? I predicted the effects of VMO-PIPRT would generalize to the playground setting.

Participants

Students with DD

There were five children diagnosed with DD who participated in this study. Each of the five research participants attended the Lynn Bennett Early Childhood Development Center on the campus of the University of Nevada, Las Vegas. The inclusive preschool served infants, toddlers, and children ages six weeks to five years. Participants for the study were selected based on preschool staff recommendations. Participant selection criteria included: (a) receiving special education services under Part B of the Individuals with Disabilities Education Act (IDEA, 2004), (b) between ages three to five years, (c) no diagnoses of a hearing or vision loss, (d) able to follow simple directions, (e) able to imitate ten or more motor movements, (f) able to imitate ten or more verbal phrases, and (g) demonstrate inappropriate or a lack of positive social behavior interactions towards peers at the time of the recommendation. The diagnosis of DD included children with autism, mild to severe intellectual disabilities and individuals with multiple disabilities (Browder et al., 2011). Students diagnosed with developmental delay who had social skills deficits were also considered to be eligible to serve as participants.

The participants were randomly assigned to the order of interventions in the study. To protect their identity, participants were renamed Participant One, Two, Three, Four, and Five. Demographic information for the five participants are presented in Table 1.

Parent(s) of each participant and peer participant signed a consent form for their child to participate in the study (Appendices A and B). Each participant and peer participant assented to his or her participation in the study (Appendices C and D). Parent(s) were able to ask for the child to be removed from the study at any time without repercussions. Peer participants were free to tell the researcher at any point in time s/he no longer wished to participate in the study.

Table 1. *Research Participant Demographic Information.*

Research Participant	Age	Gender	Ethnicity	Disability
One	4yr 7 m	Female	Caucasian	Developmental Delay
Two	4yr 11m	Female	Caucasian	Autism
Three	4yr 1m	Male	Caucasian	Developmental Delay
Four	4yr 7m	Female	African American Asian	Autism
Five	3yr 11m	Male	American	Autism

Peer Participants

Ten peer participants without an apparent disability were recruited to participate in the study. The peer participants were randomly selected from suggestions of the preschool staff. Each peer participant had to meet all selection criteria. The criteria included: (a) demonstrate appropriate social, behavioral, language, and play skills; (b) be well liked by other peers; (c) be compliant to adult directives; (d) be able to attend to a task or activity for 10 minutes; (d) be willing to participate; (e) consistently attend school; (f) similar-aged to the research participant

(i.e., 3 to 5 years old); and (g) have socially engaged with peers during classroom activities (Odom & Strain, 1986; Pierce & Schreibman, 2007). Parent(s) of the peer participants provided consent for their participation (Appendix B), and peer participants signed assent forms (Appendix C). Parent(s) were able to ask for the child to be removed from the study at any time without repercussions. The peer participants were free to tell the researcher at any point in time s/he no longer wished to participate in the study.

Teachers

Teachers participating in the study held a valid teaching license from the state of Nevada. Their teaching license had to indicate they were certified to teach early childhood, children with autism, and/ or children with DD. Each teacher participant consented to his or her participation in the study (see Appendix E). The consent form discussed the procedures, benefits and potential risks of participation, cost/compensation, confidentiality, and contact information for the researcher and university IRB.

Inter-Rater Observers

One doctoral student and two Ph.D. graduates from the Educational and Clinical Studies Department served as inter-rater observers for this study in order to calculate inter-observer agreement (Horner et al., 2005). Each observer had five or more years of experience working with students with disabilities or as an instructor of pre-service teachers who worked with students with disabilities. Each served as an inter-rater observer for a previous SCRD study. The observers were trained prior to the study and were required to reach 90% or higher agreement on the target social play behaviors over two consecutive training sessions. Each observer reviewed 25% of randomly selected post-intervention recorded videos in the classroom and 25% of recorded videos on the playground. The third rater reviewed 20% of randomly

selected procedural fidelity measurement videos (see Appendices G and H). Observers scored the frequency of positive social interactions in the classroom. A partial-interval recording system with 30-second intervals was used to record whether positive social play actions (i.e., reciprocal interactions of initiations and responses) occurred at any time during the interval (Cooper et al., 2007). Inter-rater agreement was calculated using the interval-by-interval comparison agreement = (interval agreements/total opportunities) x 100 (Cooper et al., 2007).

Settings

The study was conducted in two early childhood settings, inclusive preschool classrooms and the preschool playground area. Although the preschool served children ages 6 months to 5 years, the classrooms selected for the study served preschool aged children (ages 3 to 5 years old). Each classroom was accredited by the National Association for the Education of Young Children (NAEYC). Each classroom were reviewed annually on the Early Childhood Environment Rating Scale®, Third Edition (ECERS-3) guidelines.

Classrooms

Each classroom included children with and without disabilities. Children in the classrooms ranged in age from 3 to 5 years old. Each classroom had approximately 15 students at any given time. The classroom cap for student enrollment was set at 22 students. Each classroom had one teacher who was consistently with the same group of students (i.e., general or special education teacher) and one or more teaching assistants. Throughout the day university student teaching assistants provided support to the classroom teacher (i.e., enrolled in an undergraduate, teacher accreditation program).

Playground

Outdoor time on the playground was part of the typical early childhood programs' routine. Outdoor play allowed time for unstructured social and play activities. Often there were high rates of adult-to-peer interactions because staff members were trying to facilitate student engagement and monitor safety (Anderson et al., 2004). Children with disabilities can be isolated from peer-to-peer interactions because they may be unsure of what to do, placing them at-risk of social isolation from same-aged peers (McConnell, 2002). By implementing interventions that target how to initiate and respond to peers, students with disabilities had opportunities to refine social skills, positive interactions, and resolve peer conflicts (Frankel, Gorospe, Chang, & Sugar, 2010; Kasari et al., 2011).

The playground was a shared space for preschool students. A majority of the playground area was covered with rubber matting to protect the students from major injuries. The remaining playground area was a cement area for free play (e.g., riding tricycles), playground structures, and a grassy area. The playground equipment included a sand area, balance beam, ladders, chin-up bar, slide, and ramps. There were typically two to three classrooms outside at a time with appropriate student-to-teacher ratio in order to ensure safety. The playground was utilized to record generalization sessions.

Instrumentation

Baseline, Intervention, and Playground

All phases of the study were recorded with digital video in 15-minute segments. Three individuals, the researcher and two comparison raters, reviewed a set number of digitally recorded videos for baseline, intervention, and playground, phases for each participant in 15-minute segments. The reviewers watched the video and recorded responses on a data sheet

(Appendix F) using a partial-interval recording system (Cooper et al., 2007). The time was separated into 30-second intervals (e.g., 0 to 30 seconds, 31 to 60 seconds). The reviewers indicated if the target behaviors occurred at any point during the 30-second interval or not at all (Cooper et al., 2007). The target behaviors for the intervention were social play actions: initiating and responding to a peer/participant. Social play actions included but were not limited to engaging with peers, playing or sharing toys, communicating, or engaging in one of the stages of play. Specifically, an "initiation" was defined as an attempt to involve a peer in a mutual activity and included a vocalization stated for a peer (Garrison-Harrell et al., 1997). The behavior must have fit (i.e., in the schema) and been appropriate to that current situation and had come from either the participant or a same-aged peer (either with or without disabilities). A "response" was defined as "any verbal or motor behavior directed back to an initiating peer within 5 seconds of the initiation. Responses serve to acknowledge initiations." (Garrison-Harrell et al., 1997, p. 243). This behavior must also have fit (i.e., in the schema) to that current situation, been performed within 5 seconds of the initiation, and occurred between two or more individuals, one who was a research participant. Each reviewer watched and rated each clip independently of other raters or the researcher. The reviewers were each given 25% of the video clips randomly selected to score.

Using the data form, the researcher and raters indicated whether a social play action occurred. The reviewer needed to indicate the child who initiated and the child who responded (i.e., participant or peer participant). Additionally, the rater marked when a participant initiated play, but the peer participant did not respond. This is to see if participants were initiating but peers were not responding because they were unable to recognize the initiation (e.g., initiation

not appropriate, loud enough), chose not to respond (e.g., want to play elsewhere), or other reasons unknown at the time.

A participant initiation was represented as "SI" (subject initiation); a peer initiation was represented as "PI" (peer initiation); a participant response was represented as "SR" (subject responds); and a peer response was represented as "PR" (peer response). If a participant demonstrated a positive social interaction and a peer responded, both "SI" and "PR" were indicated on the data collection form. If a participant initiated and a peer did not respond, only "SI" was noted. If a peer demonstrated a positive social interaction and a participant responded, both "PI" and "SR" were indicated on the data collection form. Any initiation or interaction between the participant and an adult or student teacher was not marked on the data collection form.

In baseline (phase one), data were collected for 15-minute segments in the classroom and 15-minute segments on the playground. In baseline, the participants participated in their daily routine in the classroom and on the playground. Toys and materials typically found in his/her preschool classroom and on the playground were present. The participants were not provided any additional prompts, reinforcement, or directions other than what they would already have been receiving based on their prescribed curriculum. If a participant attempted to leave the area, s/he was redirected back to the play area (i.e., classroom or playground). Each session was scored for 15-minutes; if a video happened to be longer, only the first 15-minutes were viewed and rated (0:00 to 15:00 minutes).

In the intervention phase (phase two), participants were given either Treatment A (VMO) or Treatment B (VMO-PIPRT). The administration of both treatments were digitally video recorded in order to score for fidelity of treatment. The order of the treatments were randomly

assigned and counterbalanced for each participant (Barlow, Nock, & Hersen, 2009; Wolery et al., 2011). The same treatment was not administered more than two successive sessions for each participant (Gast, 2010). In the VMO-PIPRT treatment, the participant first received VMO and then received PIPRT. After the VMO treatment or the VMO-PIPRT treatment was administered, a 15-minute post-treatment segment of structured classroom play was recorded (i.e., centers, child-directed activities). Visual analysis and percent of non-overlapping data (PND; Mastropieri & Scruggs, 1985-1986) were used to interpret the data and to determine if one treatment (VMO-PIPRT or VMO) was superior to the other treatment (Gast, 2010). Based on the results from the analysis, the identified best treatment was used in phase three.

In the best-alone phase (phase three), session procedures and data collection were the same as in baseline and in intervention for the corresponding treatment. Generalization data on the playground were collected. Collection of post-treatment data followed the same procedure as in phase two. If neither treatment was found to be effective or had a minimal effect, the researcher conducted a revised, individualized intervention based on the individual participant's preferences (e.g., peer and adult interaction) during phase three.

Behaviors

Social play skills. The term "social play skills" is defined as a social interaction with one or more individuals over a given period of time, such as initiating, maintaining, and engaging in one of the phases of play (Yang, Wolfberg, Wu, & Hwu, 2003). This includes but is not limited to pretend play (Lillard, Lerner, Hopkins, Dore, Smith, & Palmquist, 2012), playing with varieties of toys (Hine & Wolery, 2006; Kleeberger & Mirenda, 2010), communicating with others and getting ones views across (Wilson, 2013), social play, cooperative play (Charlop-Christy & Freeman, 2000), and spontaneous play (Van Berckelaer-Onnes, 2003). A positive

social interaction was a behavior that included a single or group of initiations followed by responses, must have been based on the child's individual communication, and a positive social initiation must have been followed by a positive social response (i.e., verbal or non-verbal response). (Haring & Breen, 1992). The first dependent variable, a social "initiation", was an attempt to involve a peer in a mutual activity and included a vocalization pointed toward a peer must have fit the current situation (Garrison-Harrell et al., 1997). The second dependent variable, a social "response", was "any verbal or motor behavior directed back to an initiating peer within 5 seconds of the initiation." (Garrison-Harrell et al., 1997, p. 243). Measures of initiations and responses were the dependent variables in this study.

Fidelity of Implementation Measures

In order to demonstrate the integrity and consistency of the implementation of the two treatments, fidelity of implementation was scored using the recorded videos and a procedural checklist (adapted from Peterson et al., 1982). Two individuals, the researcher and one of the comparison raters, completed the procedural checklist. The inter-rater agreement was calculated and reported. See Appendices G and H for the treatment procedural fidelity checklists.

Social Validity Measure.

Social validity is an important component to SCRD (Schwartz & Baer, 1991; Wolf, 1978) and it is a quality indicator (Horner et al., 2005) of well-designed research. In order to assess the value of research to the needs of the classroom teachers (Snell, 2003), social validity data were collected. Three components of social validity were assessed (Wolf, 1978) along with additional questions. After the study was completed, the classroom teachers, participants' parent(s), and peer participants' parent(s) were asked to complete the social validity questionnaire (Appendices I, J, and K, respectively).

Materials

iPad

One iPad was used in the study. The iPad had a copy of the recorded videos used in both treatments (VMO and VMO-PIPRT). The participants and peer participants only had access to the iPad with the video models during training and treatment sessions. A 16GB Apple iPad 2 (Model Number: MC769LL/A) with a black iPad 2 Otterbox Defender case (Model Number: 77-18640) was utilized in this study.

Recorded Videos for VMO

Two VMO digitally recorded videos were created for each play set (i.e., train, dramatic play, barn) for a total of 6 videos. The videos included a variety of peer participants. The VMO recorded videos featured familiar peers who met the training requirements. Familiar peers were used in the videos because of the likelihood the participants would pay closer attention to children they knew (Bandura, 1977). The peers in the recorded videos were some of the same peer participants used to implement the treatments. The same VMO recorded videos were used for both treatments but on alternating days.

One script was created for each of the three play sets used in the videos and interventions (i.e., three scripts total). Each script had ten scripted motor movements and ten scripted phrases. The scripts matched in length. Two videos per toy play set were created (i.e., six videos total) in order to have a variety of peers and interactions modeled in the videos. The six VMO recorded videos were created and edited to maximize peer interactions, minimize distractions, and be as similar to one another as possible. Each video was similar in length and 2-3 minutes long. The recorded videos were shown to the participants on the iPad. The six videos were shown in both the VMO and the VMO-PIPRT treatments.

Ages and Stages Questionnaire: Social Emotional, Second Edition (ASQ:SE-2)

The ASQ:SE-2 (Squires & Bricker, 2014) is a social-emotional developmental screening tool that was administered to the participants' parents and classroom teachers during in phase one. This screening tool helps identify the child's strengths and areas of concern in the social-emotional domain. This tool helps capture what a child's social-emotional development looks like in multiple settings. The corresponding age form was administered to each of the parents and teachers to ensure accuracy in age comparisons (i.e., 36, 48, 60 months). The ASQ:SE-2 is a valid and reliable screening tool. Data collected from the ASQ:SE-2 will be used to describe the participants social-emotional behaviors typically observed in school and at home. Parent(s) were asked to give consent for their child's participation assessments. It should be noted that after the researcher's multiple attempts to get the forms, one of the parents returned the form post-intervention.

Social-Emotional Assessment/Evaluation Measure (SEAM)

The SEAM (Squires, Bricker, Waddell, Funk, Clifford, & Hoselton, 2014) was administered to the participants' classroom teacher and parent in phase one. The SEAM assesses social-emotional development and parenting competence and can be used as a follow-up to the ASQ:SE-2. The SEAM provides assessment information and allows for progress monitoring for individuals at-risk or with social-emotional delays. The Preschool (36-66 months) interval was distributed to teachers. The SEAM Family Profile was distributed to parents of participants corresponding to the participants' ages. The SEAM Family Profile specifically examined parent(s) strengths and helps identify areas in which they may need support to provide social-emotional supports and resources for their child. The SEAM assesses 10 child benchmarks, such as expressing a range of emotions, engaging with others, and shows empathy for others. The

SEAM is a valid and reliable assessment tool. Data collected from the SEAM were used to describe the participants social-emotional behaviors typically observed in school and at home. Parent(s) were asked to give consent for their child's participation in assessments. It should be noted that after the researcher's multiple attempts to get the forms, one of the parents returned the form post-intervention.

Video Recording Equipment

There were five video cameras used throughout the duration of the study. A tripod, hand-held video recorder and accompanying wireless microphone were used in all three phases. Four stationary video cameras, Sanyo VCC-9500P High-Speed-Dome Cameras, were used and they were mounted to the ceiling of one of the classrooms of where the treatments were delivered. These cameras interface with two MGW 400 Optibase devices that are used to save videos. For inter-observer rating purposes, the recorded videos from the four stationary cameras were transferred to a Seagate Backup Plus for Mac Portable Drive 2 Terabyte USB external hard drive (Model Number: SRD00F1). The four cameras were controllable 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, and a Windows XP operating system. There were also an Apple Mouse and Keyboard accompanying the equipment.

The fifth camera, a portable Sony High Definition Handycam camcorder (Model Number: HDR-PJ260V), was frequently used in all three phases because of its portability to move around the playground and other classrooms. The camcorder was used in combination with a Sony Remote Control Tripod (Model Number: VCT-60AV). Videos recorded using the portal video camera were stored on a SeagateBackup Plus Portable Drive (Serial Number: NA72C1NQ). When outside noises became loud or distracting (i.e., children playing, garbage

truck), a Sony Wireless Microphone (Model Number: ECM-AW3) was used. Sessions in all three phases, including baseline, treatment implementation, and post-treatment, were video recorded for further analysis by the two raters for IOA purposes.

Toy Sets

The toy play sets were selected because of their age appropriateness, opportunities for the participants to perform multiple associated actions and verbalizations (i.e., 10 actions and 10 verbalizations), and novelty to the participants in the study. The teachers verified the toy sets had not been used in their classroom for the 3 months prior to the start of the study. Parents verified that they did not own the exact toy set in their home. Three toy sets were selected in order for the participants to be exposed to a variety of materials in order to generalize social play skills using a variety of materials.

Train. The train was a toy set that was found in storage. The train was similar to a train set in the classroom, but it had some different characteristics. The wooden train set has approximately 30 connecting-track pieces and 10 wooden train cars. Some of the train cars had magnets on either end in order to connect them to one another and others were miniature train cars. There were also trees, road signs, and buildings that could be used to set up the environment. The train set was stored in an identical laundry basket as the other toy sets.

Barn. The barn was also a toy set found in storage. The barn was approximately 12 inches long, 10 inches high, and 5 inches wide. The barn had two levels. The barn was made out of red plastic. There were approximately 30 animals or people (e.g., farmers) that accompanied the barn toy set (e.g., cow, horse, pig, fence). The barn animals were a combination of realistic and cartoon-like toys. The barn set was stored in an identical laundry basket as the other toy sets.

Dramatic Play. The dramatic play toys included a variety of materials that would traditionally be found in a dramatic play learning center in a preschool classroom. Materials included plates, bowls, cups, mixing bowls, play food (e.g., rice, chicken), utensils, apron, baby doll, dishtowel, infant bath tub, duster and pan, and so forth. There were approximately 25 items in the dramatic play set. The dramatic play set was stored in an identical laundry basket as the other toy sets.

Training

VMO Peer Participant Models

The peer participants met the inclusion criteria (see above). One script was created for each of the toy play sets (i.e., three scripts total). Two adults (i.e., the teacher and researcher or research assistant) taught the scripts to the students. The two adults taught the scripts to the peer participant pair given their respective assigned roles (i.e., one acted as the participant and one as self, or a peer participant), and the two adults modeled the script to the peer participants. Peer participants were given the opportunity to play and practice with one another while the researcher and research assistant provided specific and immediate feedback. Next, the script was practiced with the peer participants until they mastered the scripts with 80% accuracy, or eight out of ten on both the verbal and physical actions (16 out of 20 total).

One script was taught at a time until the videos were created (i.e., verbal and physical actions). When the peer participants achieved 80% criterion for mastering the scripts, the videos were created and transferred to the iPad for later viewing. Any errors or long pauses in the videos were edited. The first recorded video was used in subsequent training sessions with additional peer participant pairs. Each video featured two peer participants interacting and playing. The same process was repeated for each video and each participant until six videos

were created (i.e., two for each play set). As the schedule allowed, training sessions occurred in 20-30 minute time block sessions one to two times per day until the skills were mastered and the videos were created. There was a maximum of twelve training sessions.

PIPRT Peer Participants

As suggested by Pierce and Schreibman (2007), the peer participants should have been able to master the eight PIPRT strategies in 3.5 to 4 hours of didactic training sessions. The peer participants were trained in pairs by the researcher and the respective classroom teacher. Pierce and Schreibman broke down the PIPRT peer training in five sessions; however, more sessions may have been needed due to classroom schedules and peers' interest in the trainings. In order to keep training requirements consistent, the first group of trained peers determined the number of trainings for the remaining peer groups (i.e., it took five training sessions to reach mastery criterion, therefore, all subsequent peer groups were provided five training sessions). Each training session was 20 to 30 minutes long.

The first session was an "explanation" of the purpose of their help, strategies to use, and asking questions to confirm their comprehension. The second session was titled "role playing," where the researcher/classroom teacher and peer participants took turns role-playing. The role-playing included providing positive and negative examples, and asking the peer participants questions. The third session, "more role playing" began with the researcher and classroom teacher role-playing and then transitioning to the peer participants taking over the role-playing. As Pierce and Schreibman (2007) suggested the peer participants provided feedback to one another until mastery criterion was met at 80%. The fourth session, "role playing and questions" included the same steps as above and also served as another opportunity to practice, ask questions, and meet the 80% or higher criterion. Pierce and Schreibman suggested that in the

last and final session, bring the peer participants and participants together in order to begin practicing the newly learned strategies. However, in order to avoid interference, the last training session served as a follow-up to the fourth session (i.e., "role playing and questions") until 80% or higher criterion was met. The researcher stepped back and allowed only the classroom teacher to provide feedback, suggestions, and verbal praise to the peer participants for their effort and focus (Pierce & Schreibman).

VMO-PIPRT Peer Participant Training

Since one of the treatments was VMO-PIPRT together, the peer participants needed to be taught how to implement them in combination. Since the treatment was a combination of the two interventions and the expectation was that the peer participants would have already mastered the two interventions (in addition to the data from the Peer Fidelity Measures), the training was expected to be short. Once the peer participants reached mastery criterion of 80% correctly implementing VMO-PIPRT, the study transitioned from training to phase two.

VMO. Since VMO was in both treatments, it was taught first. The researcher was responsible for training the peer participants with the classroom teachers' support. The researcher also provided additional training to the peer participants if practice training scores dipped below 80%, or they had difficulty using the strategies.

PIPRT. Two adults were responsible for training the peer participants, the researcher and the classroom teacher. The researcher also provided additional training to the peer participants if they did not deliver the intervention in practice with at least 80% accuracy. The PIPRT training was based on the information in Pierce & Schreibman's "Kids Helping Kids" Manual for PIPRT (2007). The PIPRT training included using eight strategies centered on motivation and attention (Pierce & Schreibman, 2007). The PIPRT manual training procedures

were based on those used by Koegel et al. (1989). The eight strategies included orienting attention (i.e., paying attention), using developmentally appropriate language (i.e., easy sentences), enhancing motivation by offering choices, modeling appropriate and complex play skills, encouraging conversation (i.e., asking your friend to talk), teaching turn taking, reinforcing appropriate social behavior (e.g., "good," "nice try"), and increasing observational learning (i.e., tell what you are doing). In Pierce and Schreibman's peer training manual, each of the eight strategies suggested peer do's and peer don'ts, lending to the five peer training sessions.

VMO-PIPRT. The researcher was responsible for training the peer participants for the combination of VMO-PIPRT treatment. The researcher provided additional training to the peer participants if they did not deliver the intervention in practice with at least 80% accuracy. See the discussion below for how VMO-PIPRT was implemented.

Design and Procedures

The study utilized an ATD to determine which treatment was more effective, VMO or VMO-PIPRT, and to determine if there was a significant difference between the two treatments. The ATD was selected because both treatments had evidence that supported their effectiveness in increasing social play actions in young children with DD and the target behaviors were reversible (Wolery, Dunlap, & Ledford, 2011). There were three phases to the study: (a) baseline, (b) intervention, and (c) best alone treatment. The frequency of intervals with social interactions (e.g., initiations and responses reciprocated between peer participants and peers) was calculated.

There are several advantages to the ATD. It does not require a lot of time to implement, allowing the participants in the study to be minimally removed from the classroom environment

and it does not require a withdrawal of the interventions. An ATD is flexible, can be used with a variety of interventions, and order effects can be minimized (Wolery et al., 2011).

Pre-Phase Procedures

The pre-phase consisted of many tasks, including identifying participants, selecting peer participants, getting parent consent and student assent (Appendices A, B, and C), training classroom teachers and peer participants in VMO, PIPRT, and VMO-PIPRT, and creating video modeling videos.

Selection of research participants and peer participants. Informational bulletins were placed in multiple areas of the preschool (e.g., main office, entryways into classrooms) requesting participants, peer participants, and teacher volunteers for the study. School administrators and teachers at the preschool were also asked to recommend participants and peer participants. Once identified, a letter explaining the purpose of the study and requesting consent was provided to the parent(s). Once potential participant and peer participant lists were gathered, consent forms for parents of participants (see Appendix A) and informed consent forms for parents of peer participants (see Appendix B) were distributed. If the consent form was signed and returned, their name was added to the list as a potential participant or peer participant for the study. Peer and research participants were asked for their verbal assent to participate in the study (Appendices C and D).

Peer participant training. Since VMO was in both treatments, it was taught in the training sessions first. The researcher was responsible for training peer participants to meet 80% accuracy. The PIPRT training included using eight strategies centered on motivation and attention (Pierce & Schreibman, 2007). Once the peers reached mastery criterion at 80%, the study transitioned from training to phase two.

Video creation. The researcher created three scripts to be used in the videos. Two videos per play set were created (i.e., six videos total). One script per play set was created that delineated toy play actions and verbalizations. Each play set had 10 play actions and 10 play verbalizations. The scripts were used to teach the peer participants a variety of verbalizations and actions (i.e., 10 each) to act out in the videos. Once the videos were created and some peer participants were trained, baseline data began to be collected for Participant One. This phase continued until all peer participants were trained and videos were created.

Phases One and Two – Baseline (Playground and Classroom) Procedures

Baseline session videos were recorded in 15-minute sessions in two settings, the classroom and the playground. In both settings, there were no changes to the regular routine. The same peers who were typically present remained the same. Materials that were typically in the classroom remained consistent throughout the study. If the classroom typically utilized an iPad as a learning station or teaching tool, the iPad remained available for student use. Since the recording occurred during their regular routine (e.g., centers, child-initiated activities), no prompts were needed to begin video recording. During both settings the children were not be provided with any additional instructions, rewards, prompts, or corrections. In the classroom setting, if a participant attempted to leave the area before the end of 15-minutes, s/he was redirected back to the play materials area. Classroom baseline data were collected during phases one and two.

Sessions were recorded using a portable DV camcorder. The researcher and two comparison raters viewed and recorded the frequency of intervals for initiations and responses between the participant and typical peers in the classroom or on the playground (Garrison-Harrell et al., 1997). Baseline data were collected for five sessions until a stable baseline had

been established (Wolery et al., 2011). Only one participant per classroom was in phase one at a time.

Phase Two – Treatment Comparison Procedures

At the completion of phase one, the participants transitioned into phase two. In phase two, the treatment order (i.e., VMO-PIPRT and VMO) was randomly assigned and counterbalanced for each participant (Wolery et al., 2011). Only one treatment was administered per calendar day. The same treatment could not be administered more than two successive sessions and they were alternated across treatment days for each participant (Gast, 2010; Wolery et al., 2011). The participants each received a minimum of five sessions per treatment, equaling a minimum of 10 treatment sessions.

Each treatment session was video recorded on the portable DV camcorder and/or four classroom stationary cameras in order to evaluate fidelity of implementation (see Appendices F and G). After the selected treatment was administered, the researcher or research assistant(s) video recorded a 15-minute post-treatment session. The researcher was a bystander in the classroom and did not interact with any students during the post-treatment recording session. However, if a participant was seen acting inappropriately during any part of a treatment session or recording session (e.g., severe behavior, hitting, biting), the researcher notified the classroom teacher. If the participant became extremely distressed or refused to participate in the treatment, the intervention session ended for the day. Treatment sessions continued as normal the following day. Teachers, instructional aides, and student workers were reminded to proceed as normal and to refrain from providing additional prompting or reinforcement (Bellini & Akullian, 2007).

Playground generalization videos were also recorded daily. There were 15 minutes or longer time (i.e., 60 minutes) in between the video recordings of post-treatment sessions and playground generalization video recorded sessions. The time between video recordings would preferably have been longer, but on some days there were classroom schedule time constraints. The video recordings of the playground generalization sessions did not necessarily occur after a treatment session. The video recorded playground generalization sessions and the post-treatment sessions were video recorded for later viewing. The primary researcher and the two comparison raters reviewed the videos and recorded the frequency of intervals for initiations and responses (Garrison-Harrell et al., 1997).

VMO. Each participant received a minimum of five VMO sessions. The VMO alone treatment sessions were expected to be approximately 10 minutes long. The VMO treatment included one participant and the researcher. The participant (and the researcher) watched the video a total of two times during the treatment session. The VMO session had three main components: (a) the pair watched the video, (b) the pair played with the selected toy set (i.e., corresponding to the toy set shown in the video), and (c) the pair watched the video for a second time. Each video was similar in length and 2-3 minutes long. The specific toy play set was available in the adjacent area in the classroom for the participant and the researcher to play with in between watching the video the first time and the second time.

Immediately following the treatment session, the 15-minute post-intervention recording began (i.e., when the participant rejoined his/her class for learning centers). The toy play sets could not be used for two successive sessions of the same treatment. If a toy set was used for two days in a row, it was removed as an option on the third day (i.e., following day) in order for the participant to select another toy set. In this occurrence, only two toy sets were provided as

options. During the next treatment session, the research participant was given the opportunity to select from all three toy sets.

The researcher invited the participant to another area of the classroom. Per participant preference, the pair stood or sat at a table or on the floor in order to watch the video. The researcher presented three visuals (i.e., pictures) of the toy sets on the iPad and said, "You are going to watch a video and play with some toys today. Please pick a video!" The pair watched the video one time. Once the pair finished watching the video, the researcher prompted the participant, "Come play with me!" and they transitioned to the toy play area (see below). After playing together for approximately 5 minutes, the researcher pulled out the iPad for the pair to watch the same video a second time. The researcher said, "We are going to watch the video one more time." Once the second viewing of the video was complete, the researcher said, "Go play with your friends" and the participant returned to his/her normally scheduled routine. The treatment sessions were recorded using a portable DV camcorder for later scoring of treatment fidelity. See Appendix M for a Task Analysis of VMO Treatment sessions. Immediately following the treatment session, the 15-minute post-intervention recording began.

During the play session between the two video viewings, the researcher attempted to engage the participant by modeling the toy play actions and verbalizations in the video. The researcher prompted the participant as needed (i.e., up to three prompts at approximately one prompt per minute). The research participant was not provided with any additional directions, rewards, or feedback. If the participant did not engage with the researcher, the researcher continued to model playing with the toy set. If the participant attempted to leave the designated play area before the end of the treatment session, s/he was redirected back to the toy play area.

VMO-PIPRT. Each participant received a minimum of five VMO-PIPRT sessions. The VMO-PIPRT treatment sessions were approximately 10 minutes long (i.e., same length as the VMO treatment). In the VMO-PIPRT treatment, the participant first received the VMO component and then received the PIPRT component. The VMO-PIPRT treatment consisted of one participant and one peer participant. The VMO-PIPRT session included two parts: (a) the pair watched the video (VMO), and (b) the pair played with the selected toy set (PIPRT). Each video was similar in length and 2-3 minutes long. The research-peer participant play took up the remaining time, or approximately 7-8 minutes long. The researcher had a more passive role and interacted as little as possible with the pair during the PIPRT portion of the VMO-PIPRT treatment. See Appendix L for a list of the PIPRT strategies that were taught in this study.

The trained peer participant was invited by the classroom teacher and asked to join the treatment. If the peer participant declined the invitation, the classroom teacher invited another peer participant. Before beginning the treatment, the peer participant was reminded of the PIPRT strategies that were taught and mastered during the training. Most of the time all of the PIPRT models wanted to participate and the teacher would choose one to work with the participant. There were two peer participants who did give assent to participate, but were less engaged during VMO-PIPRT and were used less than the other PIPRT peer models.

The peer participant and the researcher moved to the adjacent classroom at the preschool. Per the participant's preference, the researcher and research participant with stood or sat at a table or on the floor in order to watch the video. The participant was presented with up to three visuals (i.e., pictures) of the toy sets on the iPad. The researcher said, "You are going to watch a video and play with some toys today. Please pick a video" and allowed the participant to select a video. The pair watched the video one time. Once the pair finished watching the video, the

researcher said, “Go play with the *toys*!” (i.e., corresponding to the toy set available) and rapidly invited the peer participant to join the adjacent area to play with the participant. The corresponding play toy set was readily available. During this play session, the peer participant implemented the PIPRT strategies (discussed below). The participant and peer participant remained in the designated play area with the toy play set for the remainder of the treatment session time (i.e., approximately 7-8 minutes). At the end of the treatment, the researcher told the participant and peer participant that they could go to another area or go back to play with their other friends if they so chose to.

The researcher remained in the room but did not explicitly interact with the student during the VMO-PIPRT session. The toy play sets could not be used for two successive sessions of the same treatment. Therefore, a toy set was eliminated later on during the treatment sessions due to repeated use or consecutive sessions, and thus the participant was only provided two visual representations to choose from.

As needed, if the peer participant was not using any of the PIPRT strategies during that part of the treatment, the researcher verbally prompted the peer participant up to three times and the verbal prompts needed to be at least 1-minute apart. If the participant attempted to leave the designated area before the end of the treatment session, s/he was redirected back to the toy play area. If the participant or peer participant attempted to initiate or interact with the researcher, the researcher ignored the initiation and simply did not respond. When the VMO-PIPRT treatment session was complete, the researcher said, “Go play with your friends” and the participant and peer participant returned to their normally scheduled routine. See Appendix K for a Task Analysis of VMO-PIPRT Treatment sessions.

Immediately following the treatment session, the 15-minute post-intervention recording began. During the VMO-PIPRT treatment session and the classroom for post-treatment, the children were not provided with any additional instructions, rewards, prompts, or corrections.

There were a minimum of 15 minutes or more time in between the completion of the treatment session and playground generalization video recorded sessions. The video recorded playground sessions were viewed to determine the frequency of intervals with initiations and responses between the participant and any peer on the playground. If the participant acted inappropriately (e.g., severe behavior, hitting, biting), the researcher intervened as necessary, implemented school procedures, and notified a teacher. If the participant became extremely agitated or refused to participate in the intervention, the treatment session ended for the day. The video recordings of the playground sessions did not necessarily have to occur after the treatment session. Treatment sessions continued as normal the following day.

Phase Three – Best Treatment

After both treatments were implemented at a minimum of five times each (e.g., 10 times total), the data were analyzed. The data suggested the most effective intervention and that treatment was implemented in the best alone phase, or phase three. This was selected in order to control for multi-treatment interference from rapid alterations (Gast, 2010). A 15-minute session post-best alone treatment was recorded. An additional 15-minute generalization session on the playground was also recorded.

The recorded videos were viewed to determine the frequency of intervals for peer and participant initiations and responses. The researcher and two comparison raters viewed and recorded the frequency of intervals with initiations and responses between the participant and typical peers (Garrison-Harrell et al., 1997). Data were also collected on the playground and the

video recorded sessions were viewed to determine the frequency of intervals with initiations and responses between the participant and any peer on the playground. If the participant acted inappropriately (e.g., severe behavior, hitting, biting), the researcher intervened, implemented school procedures, and notified a teacher if necessary. If the participant became extremely agitated or refused to participate in the intervention, the treatment session ended for the day.

Data Collection

Baseline, Intervention, and Best Treatment

Data were collected during all three phases: (a) baseline, (b) both the VMO and VMO-PIPRT treatments, and (c) best-alone phase. Data were collected in baseline in order to determine if multi-treatment interference occurred. The data were graphed and a visual analysis of each phase and treatment occurred. The trend, level, and variability of each group of data were analyzed (Horner et al., 2005), along with the calculation of PND to determine whether VMO or VMO-PIPRT were more effective in increasing the frequency of social play actions.

Data were assessed using the frequency of positive reciprocated social interactions (i.e., initiations and responses) from videos recorded across all three phases in both the classroom and playground settings. See Appendix F.

Researcher Fidelity Measure

The researcher and comparison rater completed an inter-rater checklist using the recorded videos during the delivery of the selected intervention. The comparison rater assessed 20% of randomly selected videos. The data from the checklists were used to calculate the IOA between the researcher and the comparison rater. See Appendices G and H. The IOA was calculated using the following formula: (number of matching agreements – non-matching agreements /total opportunities) x 100 = total count IOA, and represented using a percentage (Cooper at al., 2007).

Inter-Observer Agreement

The researcher reviewed all of the recorded videos from the post-treatment and playground sessions. The researcher and comparison raters used the Partial-Interval Recording Social Interactions Data Collection form, adapted from Cooper et al. (2007; see Appendix F). Each comparison rater viewed and scored 25% of random videos. The two raters scored a total of 50% of the digitally recorded videos.

Social Play Actions

During all treatment phases, frequency counts of social play actions were collected using partial interval recording procedures. Data were recorded in 30-second intervals. The participant and any peer could either initiate or respond. If the participant initiated and a peer did not respond, the initiation was marked on the form. However, if a peer initiated and the research participant did not respond, the peer's initiation was not marked. The data collection form specifies for the reviewer to circle the appropriate role executed by the participant and peers (e.g., participant initiated and the typical peer responded).

Social Validity Measure

Social validity forms were distributed to the teacher, research participants' parent(s), and the peer participants' parent(s). If a teacher had more than one participant in his/her classroom, the teacher only needed to fill out one. The social validity measure was adapted from three studies: Jung et al. (2008), Garfinkle and Schwartz (2002), and Storey et al. (1994). See Appendices I, J, and K for the Social Validity Measures for the classroom teacher, parents of research participants, and parents of peer participants.

Treatment of Data

The data were analyzed using two procedures. The first was a visual analysis of the trend, level, and variability across participants in each treatment. The second involved calculating the percent of non-overlapping data (PND) across participants in each treatment (i.e., VMO or VMO-PIPRT) in order to incorporate quantitative data (Gast, 2010). The ATD suggests rapid alternation of treatments, random sequential order of treatments, and counterbalancing treatments in order to demonstrate experimental control (Barlow, Nock, & Hersen, 2009; Horner et al., 2005). Data were collected on the frequency of intervals for social play action (i.e., reciprocal initiations and responses). Replication across five participants across the two treatments demonstrated inter-subject replication and support experimental control (Horner et al., 2005). Although the researcher tried to control for any variables, there may have been additional confounding variables at work (Cooper et al., 2007). These are discussed further in Chapters 4 and 5. A functional relationship was determined by visual analysis within both conditions (intra-subject replication) and across the five research participants (inter-subject replication; Gast, 2010). Data were presented in many ways, such as in percentage of time engaged in social play actions of the 15-minute observation period (Cooper et al., 2007).

CHAPTER 4

RESULTS

This study investigated the relative effects of VMO-PIPRT compared to VMO alone on number of positive social interactions for young children with DD. An ATD was used to compare the two treatments (VMO) at increasing social play actions in an inclusive setting. Data relative to the two research questions were collected. Chapter 4 restates the two research questions and then presents the data analysis results for each participant.

Summary of Findings

Data were collected from post-treatment sessions in 30-second intervals (Cooper et al., 2007). Sessions were scored from recorded observations. The dependent variable for this study was social play actions, or the reciprocal interaction containing an initiation and response of a peer and research participant (Garrison et al., 2007). Data were graphed on a line graph for visual analysis to determine the effects of the treatments by examining the differences in trend, level, and variability (Gast, 2010). The 80%-25% rule was used to determine stability envelope parameters when describing stability of conditions (i.e., data are considered stable if 80% of data points fall within a 25% range; Lane & Gast, 2013). Percentage of non-overlapping data (PND) was also used as a second analysis. PND was calculated by the number of data points in the second condition outside of the range of the first condition, then dividing the number of data points outside the range of values of the first condition by the total number of data points in the second condition, and lastly multiplied by 100 (Gast, 2010; Mastropieri & Scruggs, 1985-1986).

Phase One – Baseline

Participants were randomly assigned to the order in which they received the treatment. Data were collected for five sessions in phase one and 10 sessions in phase two, totaling 15

baseline classroom sessions recorded over the course of the study before the first treatment was introduced. The first treatment was introduced after five baseline sessions (Wolery et al., 2011), as indicated on the parent consent form (i.e., parents signed consent for baseline to be a maximum of five sessions). Each classroom baseline data session was recorded in 15-minute segments. Baseline data in the classroom and on the playground were recorded on the same day but with 30 minutes or more in between recording sessions (Wolery et al., 2014). During phase two baseline data were collected for 10 sessions, five sessions per treatment, to discern if there was multi-treatment interference (Gast, 2010). In addition, the baseline data in phase one was used to compare participant results both pre- and post-treatment.

All five participants demonstrated social play actions during baseline in either the classroom, the playground, or both settings in phase one. This indicates that social play actions were in their repertoire. Social play actions were defined as a social interaction with one or more individuals over a given period of time, such as initiating, maintaining, and engaging in one of the phases of play (Garrison et al., 2007). Moreover, an interaction was only counted if there was an initiation and response together, and information was recorded as to whether a peer or a participant initiated or responded. Participants one, three and four demonstrated higher levels of social play actions than participants two and five during phase one baseline in the classroom. Participant one demonstrated higher levels of social play actions than the other participants during phase one playground. Due to approaching the end of the semester, winter break, and parental consent limitations, it was necessary to have participants four and five move on from phase two (i.e., alternating treatments) to phase three (i.e., best-treatment) earlier than anticipated.

Phase Two – Comparison Treatments

Baseline data were collected during phase two for both treatments. Phase two included a recorded of 10 baseline sessions, 10 treatment sessions, and 10 playground sessions for each participant. Sessions were recorded for later viewing and scoring by the researcher and inter-rater. All five participants were administered five VMO alone treatments and five VMO-PIPRT treatments. Phase two baseline data were collected 30 minutes or more before or after the selected treatment for the day was implemented (i.e., baseline data collected from 1:30 – 1:45 pm, treatment administered at 2:15 pm). There was an overall increase of social play actions from initial baseline levels to phase two post-treatment in the participants; however, results across each participant varied. Results are discussed below.

Overall, data reflected a post-treatment increase for participants one and three. When comparing the difference between phase one and phase two, there was a minimal increase in social play actions for participants two, four and five. In the phase two baseline, there was a performance change for participants one and three, indicating the possibility of multi-treatment interference. There was a discernable difference between the two interventions for participants one and three, and less noticeable differences (i.e., PND) between the two treatments for participants four and five. Participant two was provided a modified treatment package in phase three that is discussed below. Overall data reflected a post-treatment increase for participant one and three on the playground. Participants one, three, and four had a minimal increase in reciprocal positive social play actions.

In order to determine the best treatment for each participant, visual analysis and PND calculations were used. VMO-PIPRT was identified as best treatment for participants one and four, and VMO was identified as best treatment for participants three and five.

Research Questions and Related Findings

Visual analysis of Figure 1 suggests that there was an overall increase in level and trend from phase one baseline level to phase two treatment comparison for two of five participants' social play actions, with two additional participants showing minimal effects. Results varied across each participant. The following research questions were addressed in this study and are discussed below.

Research Question One

Is VMO-PIPRT more effective than VMO at increasing the number of positive social actions in young children with DD in an inclusive setting? In Chapter One it was predicted that VMO-PIPRT would be more effective than VMO alone at increasing the number of positive social interactions in young children with DD in an inclusive setting.

Data were recorded in 30-second intervals over a 15-minute period post-treatment during child-directed learning centers (Cooper et al., 2007). Data were collected on positive social actions (i.e., reciprocal initiation and response) between a participant and typical peer(s). Data were analyzed using two different methods. Visual analysis of trend, level, and variability were used to analyze the data in order to determine which treatment, VMO or VMO-PIPRT, was more effective at increasing social play actions. Data were also analyzed using PND (Scruggs & Mastropieri, 1998; Gast, 2010). As indicated by Figure 1, visual analysis of the trend, level, and variability from phase one baseline to phase two – comparison phase indicate that VMO-PIPRT was more effective for participants one and five. VMO was more effective for participants three and five. Neither treatment was more effective than the other for participant two. Trend and stability envelope were also calculated through Microsoft Excel for each participant (Gast, 2010; Lane & Gast, 2013). Further details as to the degree of effectiveness are presented below and

also discussed in Chapter 5.

Participant one. Visual analysis of Figure 1 of participant one in phase one suggests a variable and low-level performance. As presented in Table 2, the range was 0-3.33% of intervals and the mean was 0.67% of intervals. Table 3 displays the median performance as 0%, the stability envelope was set at 0%, resulting in 80% of baseline data points placing within 25% above or below the median, indicating a stable level (Gast, 2010; Lane & Gast, 2013). Using Excel to draw the trend line, a decelerating trend was noted with all five data points outside 25% of the stability envelope, indicating variability in respect to trend. However, participant one's performance peaked in the second session 3.33% of intervals (one positive social play action) and then returned to 0% of intervals for the remaining baseline sessions. Table 4 includes PND data of the comparison for treatments and baseline scores.

Visual analysis of Figure 1 suggests a variable, mediocre performance of social play actions for VMO-PIPRT, from 0% in the last baseline session to 6.67% of intervals in the first VMO-PIPRT treatment session. Visual inspection indicates a variable performance, beginning the first three sessions at a higher level than the last two VMO-PIPRT sessions, and peak performance during session two (13.3%). Although the median remained stable from baseline to phase two VMO-PIPRT (0% found in Table 3), data points did not indicate level stability, with only 40% of data points placing at or within 25% above or below the median. The mean score of the social play actions increased from 0.67% to 6% and the range increased from 0%-3.33% to 0%-13.33% between phase one baseline and phase two VMO-PIPRT. Trend line indicates a decelerating trend. There was trend variability due to 20% of data points (i.e., one out of five) placing at or within 25% of the stability envelope. Calculated PND as presented in Table 4 for participant one between VMO-PIPRT and phase one baseline was 20% and VMO-PIPRT versus

VMO alone was 0%, suggesting an ineffective treatment (Scruggs & Mastropieri, 1998).

Visual analysis of Figure 1 suggests a variable low-to-mid-level performance for VMO alone. There was no change in level from the last baseline session to the first VMO alone, both 0% of intervals. Peak performance of social play actions during VMO alone was during the fourth session, or 16.67% of intervals. The median for baseline and VMO alone were both 0%, resulting in the stability envelope set at 0% with only 60% of the data points placing within 25% of the median, indicating an unstable level. The range increased from 0%-3.33% to 0-20% of intervals from baseline to VMO. The mean increased from 0.67% to 5.3% of intervals from baseline to VMO alone (see Table 2), and baseline phase one increased from 0.67% to 3% in phase two, and the range increased from 0%-3.33% to 0-16.67% (i.e., one day at 16.67%), indicating the possibility of multi- treatment interference. The VMO alone trend line was accelerating and 20% of data points fell at or within the stability envelope. This suggests variability in respect to trend stability. Table 4 presents calculated PND for participant one between VMO alone and phase one baseline as 40% and VMO alone to VMO-PIPRT as 20%, suggesting an ineffective treatment (Scruggs & Mastropieri, 1998).

Clear separation of data points between VMO-PIPRT and VMO alone was not easily discernable thus additional analyses were employed to determine the best-treatment to be used in phase three. Following a session-by-session, median, and mean comparison, it appeared participant one had more social play actions following the administration of the VMO-PIPRT treatment. Therefore VMO-PIPRT was determined as the best-treatment for the social play actions and was therefore used in phase three. Visual inspection of Figure 1 suggests an immediate increase in social play actions from phase two VMO-PIPRT to phase three VMO-PIPRT, and a variable mid-level performance. Results increased from 3.33% in the last session

to 33.33%, also being the highest peak performance during the entirety of the intervention (highest data point for VMO-PIPRT in phase two was 13.33%). The median remained the same from phase two VMO-PIPRT to phase three best-treatment VMO-PIPRT at 6.67%. Only one of the five best-treatment phase three data points fell within the 25% stability envelope. This suggests level variability. There was a decelerating trend calculated from Excel with two data points placing at or within 25% of the stability envelope (i.e., 40%). This suggested variability in respect to trend. The mean increased from 6% in phase two VMO-PIPRT to 11% phase three best-treatment VMO-PIPRT. Reviewing data from all phases, participant one's performance during phase two baseline appeared to be higher than data of percentage of intervals collected throughout all other phases of the study, suggesting neither treatment was more effective and the inability to demonstrate experimental control (Lane & Gast, 2013).

Participant two. Visual analysis of the performance in Figure 1 of participant two in phase one indicates a zero-celerating baseline with median, mean, and range all equaling 0% of social play actions. With the median being 0%, stability envelope was set at 0% and all five points fell at or within 25%. Excel results demonstrated a zero-celerating trend line, or 100% of data points occurring at or within 25% of the stability envelope. The 100% calculation represents trend stability.

Participant two displayed some, although minimal, social play actions during phase two VMO-PIPRT treatment compared to zero observations of the behavior during baseline. As presented in Table 2, from phase one baseline to phase two VMO-PIPRT treatment, the mean increased from 0% to 0.33% social play actions and the range increased from 0% to 0%-3.33%, or one occurrence of a social play action. The median scores in both phase one baseline and phase two VMO –PIPRT were 0% social play actions (see Table 3). Since the median social

play actions was 0% for phase two VMO-PIPRT, stability envelope was set at 0%. Four of five, or 80% of data points felt at or within 25% stability envelope. Using Excel to draw the trend line, there was a stable, decelerating trend line with 80% of data points falling at or within 25% of the stability envelope. The PND was 20% when compared to baseline and VMO alone, suggesting an ineffective treatment (Scruggs & Mastropieri, 1998).

The median, mean, and range from phase one baseline to phase two VMO alone treatment remained at 0% of intervals for social play actions. Repeatedly, with the median calculated at 0%, stability envelope was set at 0% and all five points fell at or within 25%, indicating a stable level. Excel displayed a zero-trend; therefore, 100% of data points fell at or within the stability envelope.

Using visual analysis, PND indicating little effect the researcher decided to implement a secondary combination treatment for the best-treatment phase to see if there would be a positive impact on social play actions (e.g., ABBAB...C). A modified treatment package for participant two was utilized in phase three due to the lack of effectiveness of either treatment on increasing social play interactions. In anecdotal observations outside of treatment time, participant two displayed pro social skills, such as moving in closer proximity to peers and increasing eye gaze in peers' direction. Due to participant two's selective spontaneous expressive communication, a combination of VMO and VMO-PIPRT was used. In the revised treatment package, hereby known as "VMO-PIPRT+R" included both a peer and an adult during the "PIPRT" portion. Participant two watched the video with the researcher, and then the researcher remained in the play area to play with both participant two and the peer participant, allowing for more opportunities for prompting, modeling, and engaging the participants in play together. Despite the adaptation to the treatment made for phase three, the median, mean, and range all remained at

0% of intervals for social play actions. There was a zero trend, and all five points fell at or within the stability envelope set at 0%, indicating trend and level stability.

Participant three. Visual analysis of Figure 1 participant three in phase one baseline suggests a stable low-level decelerating trend performance. In his first two baseline sessions, he had one social play action (3.33%), and then decreased to zero social play actions for the remaining three sessions. As indicated in Table 2, the median score was 0%, resulting in three of five data points (60%) occurring at or within stability envelope, signifying level variability. Excel presents a decelerating trend with 100% of data points occurring at or within 25% of the stability envelope. This suggests trend stability.

Visual inspection indicates a stable, low-to-mid-level performance during phase two VMO-PIPRT. From the last phase one baseline session to the first phase two VMO-PIPRT session, there was no immediate change in level since the data points were both at 0% of intervals for social play actions. VMO-PIPRT phase two data peaked on session seven (day two of VMO-PIPRT treatment) with 6.67% intervals of social play actions. The mean VMO-PIPRT phase two score slightly increased from 0.33% to 2% of intervals. Median scores from phase one baseline to phase two VMO-PIPRT remained the same at 0%. Three of five data points fell at or within 25% of the stability envelope (Gast, 2010; Lane & Gast, 2010), indicating a variable level. Excel suggests a decelerating trend for VMO-PIPRT and 80% of data points (i.e., four out of five) falling at or within 25% of the stability envelope. PND as presented in Table 4 for VMO-PIPRT and phase one baseline comparison was 20%. Comparing VMO-PIPRT to VMO alone there was 0% PND between the two treatments.

Visual analysis indicates a variable performance for VMO alone. Although small, visual inspection of Figure 1 displays a step-up from the last session in phase one baseline, 0% of

intervals, to the first session in phase two VMO alone treatment, 10% of intervals. As presented in Table 3, the median level of social play actions for phase two VMO alone treatment was 6.67% of intervals, higher than the phase one baseline median (0%) but equal to phase two baseline median. Participant three peaked during the third session of VMO alone with 13.33% intervals with social play actions. His mean score for phase two VMO alone was larger than VMO-PIPRT or baseline scores in either phase, with 7.33% of intervals and a range of 3.33% to 13.33% intervals of social play actions. However, one of five data points fell at or within 25% of the stability envelope, indicating level variability. There was a decelerating trend during phase two VMO alone. Three out of five, or 60% of data points, fell at or within 25% of the stability envelope. These results suggest variability in respect to trend. PND presented in Table 4 for VMO alone and phase one baseline was 40%. VMO alone and phase two baseline PND was 0%.

The purpose of collecting phase two baseline data during all ten treatment sessions was to detect if there was multi-treatment interference (Gast, 2010). Phase two baseline data were variable. Thirty percent of data points fell at or within 25% of the stability envelope (three out of 10 sessions) indicating a variable level. Phase two baseline data suggest an accelerating trend. Only three out of 10 data points, or 30%, fell at or within 25% of the stability envelope, suggesting trend variability. The combination of data suggests the possibility of multi-treatment interference between VMO-PIPRT and VMO alone treatments.

VMO alone was determined to be the most effective treatment used in phase three best-treatment. Participant three had the highest interval level of social play actions in phase three during session 18 with 20% (i.e., the third best treatment session). The mean was 10%, the highest of all phases and the range was 3.33%-20%. The median was determined to be 10% of intervals. Twenty percent of the data points in phase three best-treatment fell at or within 25% of

the stability envelope, revealing a variable level. The phase three best treatment demonstrated a decelerating trend line. There was trend variability with 60% of data points at or within 25% of the stability envelope. Reviewing data from all phases and treatments, phase two baseline on session 14 had the highest percentage of intervals. This suggests that there was a high likelihood of multi-treatment interference between VMO-PIPRT and VMO alone (Gast, 2010; Lane & Gast, 2013).

Participant four. Visual analysis of phase one baseline for participant four in Figure 1 suggests low-level, stable performance. Four of five sessions had zero (0%) positive social play interactions, with an increase during session three to 10% and then an immediate return to zero (0%). The increase of 10% of intervals is addressed further in Chapter 5. As indicated in Table 2, the mean was 2% and the range determined to be 0%-10% of intervals. The median was 0%, lending to 80% of data points occurring at or within 25% of the stability envelope. There was a stable but slightly decelerating trend line with 80% of data points placing at or within 25% of the stability envelope.

In phase two VMO-PIPRT treatment, there were minimal changes from session to session with a slightly accelerating trend line. Participant four peaked with 3.33% of intervals during session 13 of the study, specifically the fourth session of VMO-PIPRT treatment, and then returned to 0% of intervals for the last remaining VMO-PIPRT treatment session. The mean score was 0.67% of intervals for social play actions, and the range was 0%-3.33% of intervals for VMO-PIPRT. These data were less than phase one baseline. With the median score being 0% of intervals, 80% (four of five) of data points fell at or within 25% of the stability envelope, indicating a stable level. Excel revealed 100% of data points fell at or within 25% of the stability envelope, supporting a stable, slowly accelerating trend line for phase two VMO-

PIPRT treatment. With session three in phase one baseline having 10% of intervals, PND of VMO-PIPRT - phase one baseline and VMO-PIPRT – VMO was 0% (see Table 4; Scruggs & Mastropieri, 1998).

The phase two VMO alone treatment had similar social play action results as the VMO-PIPRT treatment. Results were stable with a minimally accelerating trend line. Participant four peaked with 3.33% of intervals during session 12 of the study, the fourth session of VMO alone treatment, and then returned to 0% of intervals for the last remaining VMO treatment session. The mean score 0.67% and the range of 0%-3.33% of intervals for VMO was less than phase one baseline, and equal to VMO-PIPRT. With the median score being 0% of intervals, 80% (four of five) of data points fell at or within 25% of the stability envelope, indicating a stable level. There was a slow but accelerating trend line with 100% of data points occuring at or within the stability envelope for phase two VMO alone treatment.

Using visual inspection and PND with both treatments, results appeared to be equivalent, indicating neither treatment was more effective than the other. Due to scheduling constraints, treatment sessions could not be extended past five days per treatment, or 10 days total for phase two comparison treatments. Examining generalization data from the playground VMO-PIPRT was found to be slightly more effective at generalizing and thus was used during phase three best-treatment. In the classroom, although the median remained the same at 0% of intervals for participant four, there were two days where participant three had 3.33% of intervals in phase three best-treatment, whereas in phase two there was only one session per treatment with 3.33% of intervals. A 0% median indicates 60% of data points fell at or within 25% of the stability envelope, or an variable level. The mean was slightly higher during best treatment of 1.33% of intervals, and the range remained the same with 0%-3.33% of intervals for social play actions.

Excel's drawn trend line displayed a slowly accelerating trend line for phase three best-treatment. All data points, 100%, fell at or within 25% of the stability envelope, suggesting trend stability. All data taken into consideration, participant four's performance during phase one baseline appeared to be higher than data points collected throughout the remainder of the study, suggesting neither treatment was more effective indicating failure to demonstrate experimental control (Lane & Gast, 2013).

Participant five. Visual analysis of participant five during phase one indicates a zero-celerating baseline, with a median, mean, and range of 0%. He did demonstrate social play actions on the playground during phase one baseline, indicating he does have the skills in his repertoire, but the skills were not evident in the classroom setting. All five of five data points fell at or within 25% of the stability envelope (100%). Excel calculations of the trend line shows a zero-celerating trend and 100% of data points falling at or within 25% of the stability envelope.

During phase two of VMO-PIPRT, social play action results were similar to phase one baseline, with all five data points being 0% of intervals, as displayed in Figure 1. Therefore, all five of five data points fell at or within 25% of the stability envelope (100%), and all five data points fell at or within 25% of the stability envelope via Excel trend drawing, suggesting zero-celerating, stable level and trend.

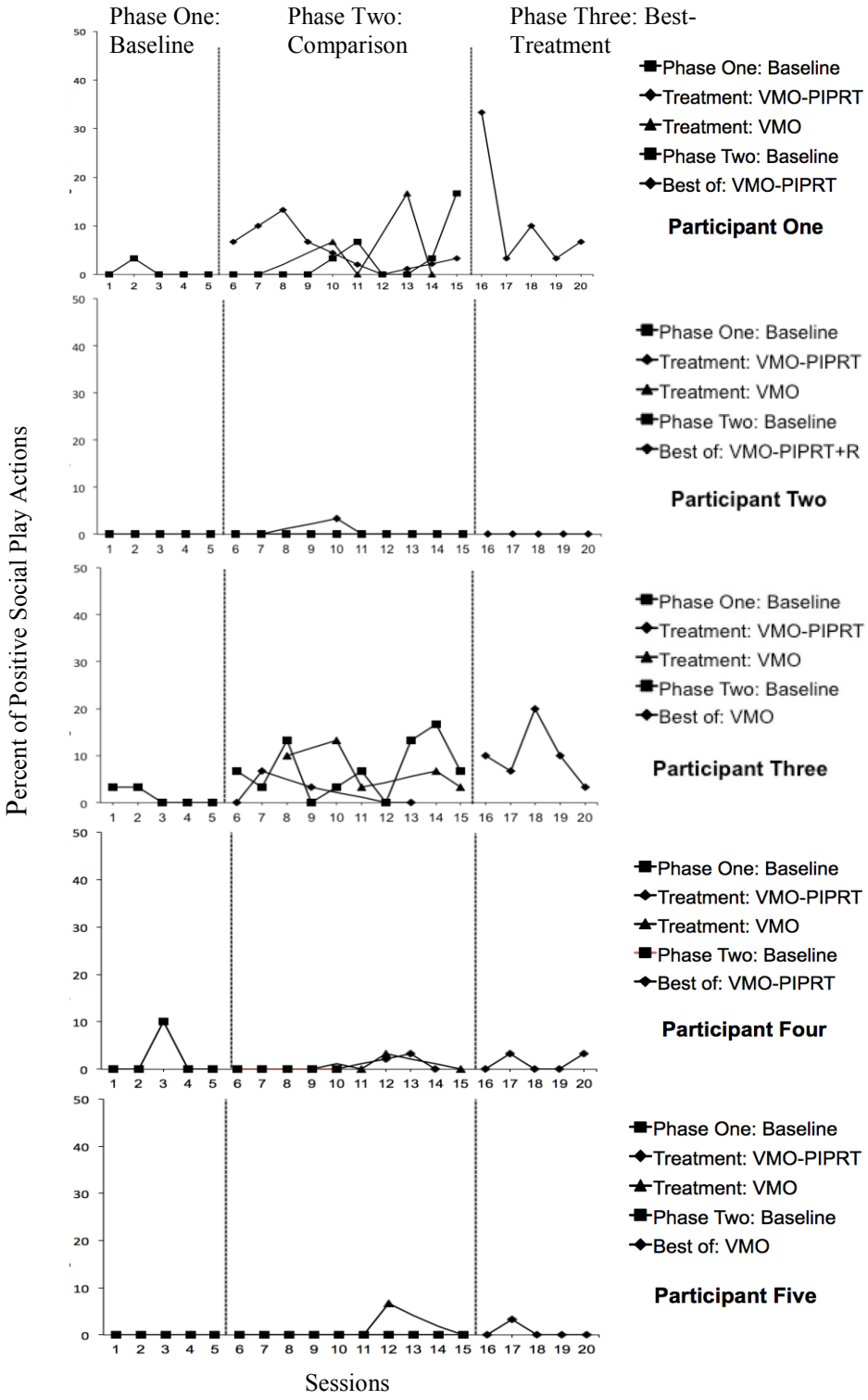
Results were different for VMO alone during phase two due to a variable trend. Four of five data points were 0% of intervals, with the exception of the fourth VMO alone data point at 6.67%, or two social play actions. Aside from phase three best treatment, this is the only session where participant five demonstrated social play actions. This data point increased the mean to 1.33% and the range to 0%-6.67%. However, the median remained constant at 0% (see Table 2). Using 0% median for stability envelope calculations, 80% of data points fell at or within 25% of

the stability envelop measure. These results suggest a stable level. The trend line drawn from Excel indicated a slightly accelerating trend for phase two VMO alone. Three out of five, or 60%, of data points fell at or within 25% of the stability envelope, suggesting a variable trend. Additional specific behaviors of participant five will be discussed in Chapter 5. Calculated PND as displayed in Table 4 for VMO – VMO-PIPRT and VMO alone – baseline in phases one and two were 20%, slightly favoring VMO alone as a more successful treatment (Scruggs & Mastropieri, 1998).

Results were similar between phase one baseline and phase two baseline. With all five data points being 0% of intervals. 100% fell at or within 25% of the stability envelope (100%) suggesting level stability. A zero-celerating trend was determined and 100% of data points fell at or within 25% of the stability envelope, suggesting stability in respect to trend.

Although minimal, there was a visually apparent separation of results for the two treatments through suggesting VMO alone as the superior treatment. VMO alone was selected for use in phase three best-treatment. Similar to phase two VMO alone, he had one session where he displayed one social play action (3.33% of intervals in session 17). Mean percentage of intervals, 0.67% of intervals, were smaller than during phase two, but still higher than the comparison treatment and baseline data. The range was 0%-3.33% of intervals and median was 0%. Using the 0% median, 80% of data points fell at or within 25% of the stability envelope, indicating a stable level. Excel was used to calculate the trend of phase three best-treatment. A slightly decelerating trend was displayed. Four out of five data point, of 80%, fell at or within 25% of the stability envelope, suggesting trend stability.

Figure 1. *Percentage of Intervals for Positive Social Play Actions in the Classroom.*



Note. Participants are listed in the order they completed the study. The y-axis is scaled to 50% in order to more clearly show differences in performance.

Table 2. *Mean and Range Percentages for Positive Social Play Actions in the Classroom*.

Participant	Phase One Baseline M (Range)	Phase Two Baseline *M* (Range)	Phase Two VMO *M* (Range)	Phase Two VMO-PIPRT *M* (Range)	Phase Three Best Treatment *M* (Range)
One	0.2 (0-3.33)	2 (0-16.67)	4.67 (0-16.67)	6 (0-13.33)	11.33 (0-33.33)
Two	0 (0)	0.33 (0-3.33)	0.33 (0-3.33)	0 (0)	0 (0)
Three	0.33 (0-3.33)	7 (0-16.67)	7.33 (3.33-13.33)	2 (0-6.67)	10 (3.33-20)
Four	2 (0-10)	0 (0)	1.33 (0-3.33)	0.67 (0-3.33)	1.33 (0-3.33)
Five	0 (0)	0.33 (0-3.33)	1.33 (0-6.67)	0 (0)	0.67 (0-3.33)

Note. The best treatment for participants one and four was VMO-PIPRT. The best treatment for participants three and five was VMO alone. Participant two received VMO-PIPRT+R in phase three.

Table 3. *Median Percentages for Positive Social Play Actions in the Classroom.*

Participant	Phase One Baseline *Mdn*	Phase Two Baseline *Mdn*	Phase Two VMO *Mdn*	Phase Two VMO-PIPRT *Mdn*	Best Treatment *Mdn*
One	0%	0%	0.00%	6.67%	6.67%
Two	0%	0%	0%	0%	0%
Three	0%	6.67%	6.67%	0%	10%
Four	0%	0%	0%	0%	0%
Five	0%	0%	0%	0%	0%

Note. The best treatment for participants one and four was VMO-PIPRT. The best treatment for participants three and five was VMO alone.

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

Participant	VMO-Baseline	VMO-PIRPT-Baseline	VMO-VMO-PIPRT	VMO-PIPRT-VMO
One	20	60	20	0
Two	0	20	0	20
Three	60	20	40	0
Four	0	0	0	0
Five	20	0	20	0

Note. PND calculations of VMO and VMO-PIPRT are for Phase Two data only.

Research Question Two

Will the positive effects of the best treatment generalize to the playground setting? It was predicted that the effects of VMO-PIPRT would generalize to the playground setting.

Participant one. Visual analysis of phase one baseline data as displayed in Figure 2 for participant one indicates a variable performance during playground. Initially, phase one playground data were stable, and then during session four, participant one's performance increased from 0% in session one and 3.33% in sessions two and three to 23.33% intervals (seven interactions) during session four. Her performance returned to zero interactions for the last baseline session. The mean for phase one baseline was 6% and the range was 0% to 23.33%. The median, presented in Table 5, was 3.33%, resulting in 40% of data points occurring (i.e., two of five) at or within 25% of the stability envelope. This suggests instability in regards to level. Using Excel, the trend was found to be accelerating and variable, with 60% of intervals occurring at or within 25% of the stability envelope. Parents signed consent for phase one baseline to be a maximum of five sessions. Therefore, phase two began on session six and the researcher couldn't wait until the baseline was stable. Further discussion of phase one session four are included in Chapter Five.

VMO-PIPRT was the first treatment to be administered during phase two comparison treatment. There was an immediate change in level of the percentage of intervals from the last baseline session (0%) to the first session, session six, in phase two VMO-PIPRT (20%). As indicated in Table 6, the mean increased to 10.67% of intervals and a range from 0%-20% of intervals for social play actions. The median also increased from phase one baseline of 3.33% to 13.33% in phase two VMO-PIPRT. Results indicate 40% of data points for phase two VMO-PIPRT were at or within 25% of the stability envelope, suggesting a variable level. Excel was used to calculate the trend and demonstrated a slightly decelerating trend; however, 20% of data points fell at or within 25% of the stability envelope, suggesting variability in respect to trend. PND of VMO-PIPRT-baseline was calculated to be 0% or ineffective; yet VMO-PIPRT-VMO was 60%.

Examining the second treatment administered, VMO alone, there was an immediate increase in intervals of social play actions from phase one baseline; however, it was not as large of an increase as with VMO-PIPRT. The increase from the last session of phase one baseline was 0% intervals to 10% intervals for social play actions. The mean for phase two VMO alone was 5.33% of intervals and the range was 0%-10% of intervals. With a median of 10%, 40% of data points (two of five) were at or within 25% of the stability envelope, suggesting level variability. Excel was used to calculate the trend and demonstrated a slightly stable, decelerating trend. Four out of five, or 80%, of data points fell at or within 25% of the stability envelope. These results suggest trend stability. PND of VMO alone-baseline and VMO-VMO-PIPRT were calculated as 0%, or ineffective, as shown in Table 7 (Scruggs & Mastropieri, 1998).

Using visual analysis of Figure 2 for best-treatment phase three on the playground, there were variable results for level and trend. The mean was 10.66% of intervals and the range was

3.33%-20%. The median was 10%. This indicated 20% of data points fell at or within 25% of the stability envelope, or a variable level. Excel was used to calculate the trend and demonstrated an accelerating trend. Two out of five, or 40%, of data points fell at or within 25% of the stability envelope, suggesting trend instability.

Participant two. Visual inspection of playground data during phase one baseline for participant two indicated a minimal but stable baseline. Four of five data points were 0% of intervals, with the second data point being 3.33% of intervals for social play actions. As indicated in Table 6 presents the mean was 0.67% and range was 0%-3.33%. The median was 0% of intervals, indicating a stable trend in respect to level with 80% (four of five) data points placing at or within 25% of the stability envelope. Due to one of the data points within baseline being 3.33%, a decelerating trend existed for phase one baseline, otherwise it would have been a zero trend. Excel was used to calculate the trend and demonstrated a slightly decelerating trend. Four out of five, or 80%, of data points fell at or within 25% of the stability envelope, suggesting trend stability. Although they were different settings, participant two did demonstrate that she had at least minimal social play actions in her repertoire of skills with one interaction on the playground compared to zero interactions in the classroom.

Albeit minimal, there was an immediate increase of skills from the last session of phase one baseline, 0% of intervals, to the first VMO-PIPRT session, 3.33%, in phase two comparison treatment. However, the first session for VMO-PIPRT was the only session where participant two demonstrated social play actions. Further examination of participant two's repertoire of skills will be discussed later in Chapter 4 (i.e., initiations) and Chapter 5. The range of data points were 0%-3.33% and the mean was 0.67% of intervals. A median of 0% lent to 80% of data points occurring within 25% of the stability envelope, or a stable level. Excel was used to

calculate the trend and demonstrated a slightly decelerating trend for phase two VMO-PIPRT. Four out of five data points (i.e., 80%), fell at or within 25% of the stability envelope, suggesting trend stability. Table 7 shows VMO-PIPRT compared to baseline PND was 0% and VMO-PIPRT compared to VMO alone was 20%, indicating an ineffective treatment (Scruggs & Mastropieri, 1998).

In the VMO alone comparison treatment in phase two, all five data points indicated 0% of intervals. These results produced a mean, range, and median of 0% with a zero-celerating trend. All data points fell at or within 25% of the stability envelope with respect to the level and trend for VMO alone. Phase two baseline results were identical to phase two VMO comparison treatment, with a mean, range, and median of 0% of intervals and a zero trend (see Tables 5 and 6).

Visual analysis of Figure 2 for participant two's social play actions during the first two phases indicated she was minimally to not responsive to the two comparison treatments, VMO-PIPRT and VMO alone. A hybrid treatment, VMO-PIPRT+R was implemented, where the researcher remained in the play area and interacted with the participant and the typical peer. This treatment appeared to be effective for the first session in phase three best-treatment (session 16) due to the participant engaging in one social play interaction, or 3.33% of intervals. However, this was participant two's response throughout the entirety of phase three. The mean for phase three best-treatment was 0.67% of intervals, the range was 0%-3.33%, and the median was 0%. With a 0% median, 80% of intervals fell at or within 25% of the stability envelope, indicating a stable level. Excel revealed a slightly decelerating trend and four out of five, or 80%, of data points occurring at or within 25% of the stability envelope. These results suggest trend stability for phase three best-treatment.

Participant three. Visual analysis of playground data shown in Figure 2 for participant three in phase one baseline indicated a variable, minimal accelerating trend, ranging from 0%-3.33% and a mean of 1.33% intervals. The median was 0% intervals, with 60% of data points occurring at or within 25% of the stability envelope (three of five data points). This suggests a slightly accelerating trend. Three out of five, or 60%, of data points fell at or within 25% of the stability envelope, suggesting trend variability.

Visual analysis of playground data for participant three in phase two VMO-PIPRT indicates a decelerating trend that was stable but variable in respect to level. Visual inspection of VMO-PIPRT on the playground in phase two suggests a change in level, although minimal, from phase one baseline to phase two treatment with the introduction of VMO-PIPRT. The data points increase from 3.33% in phase one baseline to 10% of intervals with phase two VMO-PIPRT. However, participant three's scores continue to drop to 6.67% and then to 0% throughout the remaining four sessions for VMO-PIPRT. The mean percentage of intervals was 2% and the range was 0%-10% of intervals for social play actions. The median was 6.67% and 40% of data points were at or within 25% of the stability envelope, suggesting an instable trend in respect to level. Excel calculated the trend line to be decelerating trend. All five data points (i.e., 100%) fell at or within 25% of the stability envelope, suggesting trend stability. PND of VMO-PIPRT to baseline and VMO-PIPRT to VMO alone were both 60%, or questionably effective. This was one of the higher PND calculations (Scruggs & Mastropieri, 1998). Results for participant three were different in the classroom than on the playground; playground generalization results demonstrated VMO-PIPRT was more effective, but VMO alone was more effective post-treatment in the classroom.

Visual analysis of phase two VMO alone treatment on the playground indicates a variable

minimally decelerating trend line, with minimal interactions, ranging from 0% to 3.33%. The mean for Phase Two VMO treatment was 1.33% (see Table 5). The median data session for VMO alone treatment was 0% and therefore 60% of data points (three out of five data) fell at or within 25% of the stability envelope. Excel calculated the trend line to be a slightly decelerating trend, almost as if it appeared to be zero-celerating. Three out of five data points, 60%, fell at or within 25% of the stability envelope, suggesting trend variability. PND of VMO alone to VMO-PIPRT and VMO alone to phase one baseline were both 0%. Playground generalizability results conflicted with post-treatment classroom results for participant three. PND from classroom percentage of intervals was used to determine the treatment used in phase three best-treatment. Three out of five data points fell at or within 25% of the trend line, indicating variability.

Visual analysis of best-treatment VMO alone indicates a variable and accelerating trend during phase three. The mean of best treatment was 2% of intervals and the range was 0%-10% of intervals. The median was 0% (see Table 6) and this led to 80% of data points occurring at or within 25% of the stability envelope, or indicating a stable level. Using Excel to calculate the trend line, phase three best treatment indicated an accelerating trend. Three out of five data points fell at or within 25% of the trend line, indicating variability.

Participant four. Phase one baseline playground data for participant four appear to be stable and zero-celerating per visual inspection. Four of five sessions had 0% social interactions, and one peak performance in session three had 10% positive social interactions. As indicated in Table 5, participant four had a mean of 1.33% and a range of 0%-3.33% of intervals where social play actions were apparent. The median for phase one baseline data points was 0%, with 80% of data points occurring at or within 25% of the stability envelope. The reason for the dramatic increase to 10% of intervals during session three is discussed in further detail in Chapter Five.

Excel calculated the trend line to be zero-celerating, despite session three results. Therefore, four out of five, or 80% of data points fell at or within 25% of the stability envelope, suggesting stability in respect to trend.

Results from phase two VMO-PIPRT demonstrates a variable and slightly accelerating trend for participant four. Phase two VMO-PIPRT data had a slight increase of social interactions to 3.33% during the fourth session, and a return to 0% in session five. The range of percentages of social interactions for VMO-PIPRT was 0%-3.33%, with a mean of 0.67%, and a median of 0%. With the median being 0%, 80% of data points fell at or within the stability envelope, indicating level stability. Excel calculations show a slightly accelerating trend line with three out of five data points occurring at or within 25% of the stability envelope. This suggests trend variability in respect to trend. PND calculations shown in Table 7 for both VMO-PIPRT to VMO alone and VMO-PIPRT to baseline were 0%.

Visual analysis of Figure 2 from phase two VMO alone demonstrates a variable and slightly less accelerating trend for participant four (i.e., compared to the trend line of VMO-PIPRT). Phase two VMO alone data had a slight increase of social interactions to 3.33% during the fourth session, and a return to 0% in session five. The range of percentages of social interactions VMO alone was 0%-3.33%, mean 0.67%, and median 0%. With the median being 0%, 80% of data points fell at or within the stability envelope, indicating level stability. Excel calculations show a minimally accelerating trend line with three out of five data points occurring at or within 25% of the stability envelope, suggesting trend variability. PND calculations for VMO alone to VMO-PIPRT and VMO alone to baseline were both 0%.

VMO-PIPRT was selected for phase three best treatment. Phase three playground data were slightly more active than phase two comparison treatment sessions with two data points at

3.33% of intervals but still ranged from 0% to 3.33%. Phase three best treatment session 16 began at 0%, increased to 3.33% for one session, decreased to 0% for sessions 18 and 19, and ended at 3.33% in the last best-treatment session. The mean score for phase three was 0.67% of intervals and range was 0%-3.33% of intervals for social play actions. The median for phase three VMO-PIPRT was 0% and consequently 60% of data points fell at or within 25% of the stability envelope. Excel calculations show an accelerating trend line (i.e., slightly larger slope than phase two trends) with three out of five data points occurring at or within 25% of the stability envelope, suggesting variability in respect to trend.

Participant five. Visual inspection of Figure 2 for participant five indicates higher levels of positive social interactions on the playground than in the classroom. Participant five's phase one baseline playground data were variable and there was a zero-celerating trend. Session results alternated between 3.33% and 0% of intervals. The mean was 2%, median was 3.33%, and range was from 0% to 3.33%. Using 3.33% (median) to calculate, 60% of data points were at or within 25% of the stability envelope, indicating an variability in respect to level for baseline. There was a zero-celerating trend line. Two out of five, or 40% of data points, fell at or within 25% of the stability envelope, suggesting variability in respect to trend.

Participant five's percentage of positive social interactions post VMO-PIPRT was barely accelerating and stable in phase two. There was no immediate change in level on the playground for either the VMO-PIPRT or the VMO alone treatments. Four of five data points for participant five's VMO-PIPRT phase were 0% of intervals, with the third data point being 3.33% of intervals. The range was 0%-3.33% and the mean was 0.67% of intervals. The median was 0% and therefore 80% of data points fell at or within 25% of the stability envelope, indicating stability in respect to level for phase two VMO-PIPRT treatment. Excel indicated an

accelerating trend line that is close to parallel to the x-axis (i.e., could almost be mistaken for a zero-celerating trend line) show a minimally accelerating trend line. Four out of five data points fell at or within 25% of the stability envelope, suggesting stability in respect to trend. PND calculations for VMO alone to VMO-PIPRT and VMO alone to baseline were both 0% (Scruggs & Mastropieri, 1998).

Phase two VMO alone comparison treatment data points were similar to VMO-PIPRT; however, due to the session when a social play action did occur, there was a slightly more accelerating trend direction line. Four of five data points were 0% of intervals and one session, treatment day four (i.e., session 12) had 3.33% intervals of social play actions, or one occurrence of social play actions. The range was 0%-3.33% and the mean was 0.67% of intervals. The median was 0% of intervals, and therefore 80% of data points fell at or within 25% of the stability envelope, indicating a stable trend level for phase two VMO alone treatment. Excel displayed a minimally accelerating trend line, one with a larger slope than VMO-PIPRT. Four out of five data points fell at or within 25% of the stability envelope, suggesting stability in respect to trend. PND calculations for VMO alone to VMO-PIPRT and VMO alone to baseline were both 0% (Scruggs & Mastropieri, 1998), or an ineffective treatment.

The best-treatment indicated for participant five was VMO alone. On the playground for the best-treatment phase, there were two days where there were occurrences of social play actions, sessions 17 and 20 (days two and five). These data increase the mean to 1.67% of intervals where a social play action occurred on the playground, while the range remained the same from 0%-3.33% (see Table 5). The median also remained at 0% of intervals, resulting in 60% of data points occurring at or within 25% of the stability envelope, or variability in respect to level for phase three best-treatment VMO. An accelerating trend line (i.e., with a larger

slope, but fairly minimal) via Excel calculations was drawn. Four out of five or 80% of data points fell at or within 25% of the stability envelope, suggesting a stable trend line.

Figure 2. *Percentage of Intervals for Positive Social Play Actions on the Playground.*

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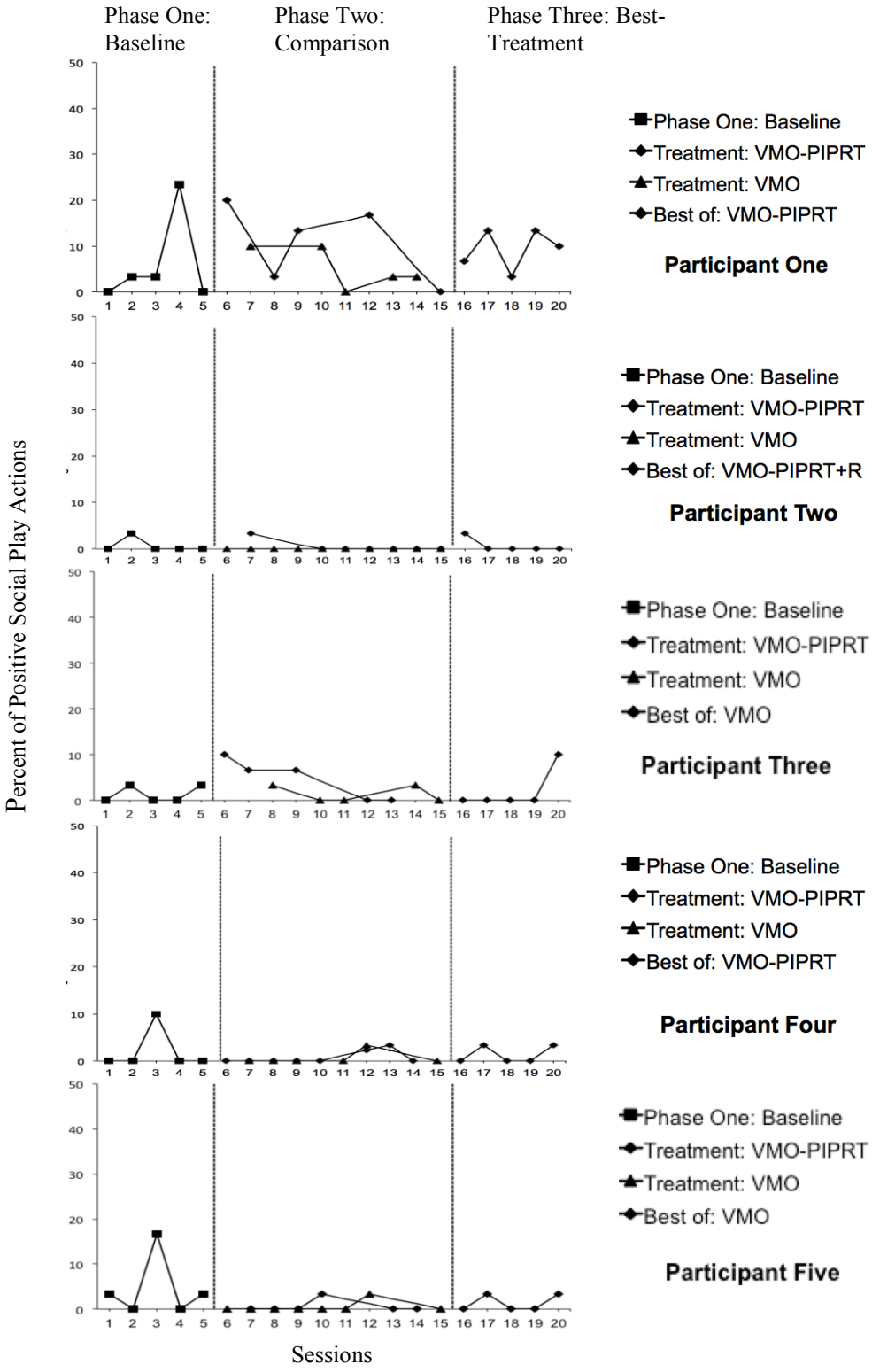


Note. Participants are listed in the order they completed the study. The y-axis is scaled to 50% in order to more clearly show differences in performance.

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

Participant	Phase One Baseline *M* (Range)	Phase Two VMO *M* (Range)	Phase Two VMO-PIPRT *M* (Range)	Phase Three Best Treatment *M* (Range)
One	6 (0-23.33)	5.33 (0-10)	10.67 (0-20)	8.67 (0.33-13.33)
Two	0.67 (0-3.33)	0 (0)	0.67 (0-3.33)	0.67 (0-3.33)
Three	1.33 (0-3.33)	1.33 (0-3.33)	4 (0-6.67)	2 (0-10)
Four	1.33 (0-3.33)	0.67 (0-3.33)	0.67 (0-3.33)	0.67 (0-3.33)
Five	2 (0-3.33)	0 (0)	0.67 (0-3.33)	1.33 (0-3.33)

Note. The best treatment for participants one and four was VMO-PIPRT. The best treatment for participants three and five was VMO alone. Participant two received VMO-PIPRT+R in phase three.

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

Participant	Phase One *Mdn*	Phase Two VMO *Mdn*	Phase Two VMO-PIPRT *Mdn*	Best Treatment *Mdn*
One	3.33%	10%	13.33%	10%
Two	0%	0%	0%	0%
Three	0%	0%	6.67%	0%
Four	3.33%	0%	0%	0%
Five	3%	0%	0%	0%

Note. The best treatment for participants one and four was VMO-PIPRT. The best treatment for participants three and five was VMO alone. Participant two received VMO-PIPRT+R in phase three.

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

Participant	VMO-Baseline	VMO-PIRPT-Baseline	VMO-VMO-PIPRT	VMO-PIPRT-VMO
One	0	0	0	60
Two	0	0	0	20
Three	0	60	0	60
Four	0	0	0	0
Five	0	0	0	0

Note. PND calculations of VMO and VMO-PIPRT are for Phase Two data only.

Initiations in the Classroom

There was concern that the intervention targeted participants to learn to initiate, but that there was a possibility their initiations were not going to be responded to. Therefore, data were also examined using only participant initiations (i.e., not reciprocal, social play actions). Moreover, peers could have or could not have responded in order for these data to be reflected in the analysis below.

Participant one. Visual analysis of Figure 3 of data during phase one baseline for participant one's initiations indicate that performance was minimal and stable, at 0% for the first two sessions, increasing to 6.67% for the third session, and then retreating back to 0% for the remaining sessions. The mean of phase one baseline scores was 1.33% and the range was 0%-6.67% (see Table 11). Four of five data points were 0% of intervals, or 0% of intervals for the median. Excel calculations show a zero-celerating trend line, despite percentage of intervals during session three. Four out of five, or 80% of intervals fell at or within 25% of the tend line, suggesting trend stability.

For initiations phase two baseline, visual analysis results were variable and there appeared to be an accelerating trend. The first day of treatment (session six) shows 10% of

intervals for the phase two baseline. Baseline results decrease, increase, decrease, and then end phase two at 20% of intervals. The mean of phase two baseline is 7.33% and the range is 0%-20% of intervals that contained initiations by participant one. The median of phase two baseline was 3.33%. In turn, 10% of data points fell at or within 25% of the stability envelope, indicating variability in relation to level. Calculations from Excel demonstrate an accelerating trend line. However, two out of 10, or 20% of data points fell at or within 25% of the stability envelope, suggesting variability and discrepancies in respect to trend. Although variable, an accelerating phase two baseline trend line suggests the possibility of multi-treatment interference, a suggestion from reciprocal social play actions analysis discussed earlier in this chapter.

Using visual analysis to examine VMO-PIPRT in phase two, social play actions data were minimally accelerating and variable, but at a higher level when compared to other phases and participants. The mean was 10.67% and the range of data in phase two was 3.33%-16.67%. Table 9 presents the median as 10% of intervals. Using 10% to calculate, 20% of data points (i.e., one out of five) fell at or within 25%of the stability envelope. The 20% of intervals suggests variability in respect to the level for phase two VMO-PIPRT. Excel calculations show a minimally accelerating trend line with only 20% of data points (i.e., one out of five) occurring at or within 25% of the stability envelope, suggesting trend variability. PND calculations for VMO-PIPRT to baseline were 80%, or an effective intervention. As indicated in Table 10, this PND comparison was the only 80% or higher PND calculation in the entirety of the study. However, VMO-PIPRT to VMO alone was 0%.

Visual inspection of Figure 3 displayed phase two comparison treatment for VMO alone displays an accelerating variable in respect to the trend. Phase two VMO alone begins as a low-performing level and peaks during session 14 (day four of VMO alone treatment). The mean of

phase two comparison treatment scores was 10.67% and the range was 3.33%-16.67%. The median was 10% of intervals. Calculations indicate 20% of data points fell at or within 25% of the stability envelope, or instability in relation to level. Excel revealed an accelerating trend line. Forty percent, or two out of five data points, fell at or within 25% of the stability envelope, suggesting trend variability. The PND calculations for VMO alone to VMO-PIPRT was 20% and VMO alone to baseline was 40%.

VMO-PIPRT was determined to be the best treatment and was utilized in phase three. Phase three trend was decelerating and variable. There was an immediate change in level from phase two to the first session in phase three, where the last two sessions in phase two VMO alone was administered. The mean scores for phase three comparison treatment for participant one was 12% and the range was from 0% to 30% of intervals (see Table 8). With the results greatly varying, the median was 6.67% with only 20% of data points (i.e., one out of five data points) occurring at or within 25% of the stability envelope. This suggests level instability in relation to phase three best-treatment. Excel calculations show a sharply decelerating trend line that has 20% of data points occurring at or within 25% of the stability envelope. This suggests variability in respect to trend. These calculations further support the likelihood of multi-treatment interference.

Participant two. Visual inspection of Figure 3 for participant two suggests a variable, low performing, decelerating trend. Looking only at phase one baseline, there are more occurrences of initiations than in phase one baseline for social play actions (i.e., reciprocal interactions). The range of scores for participant two in phase one baseline was 0%-3.33% and a mean of 1.33%. As displayed in Table 9, the median was 0%, and 60% of data points fell outside 25% of the stability envelope, indicating variability in regards to level. Excel

calculations draw a decelerating trend line with three out of five data points occurring at or within 25% of the stability envelope. These data suggest variability in respect to trend.

The highest occurrence of initiations for participant two was during phase two baseline in session seven. The mean was similar to that of phase one baseline at 1.33% of intervals, but the range was slightly larger with data points ranging from 0%-6.67%. The median score continued to be 0% and therefore 70% of data points fell at or within 25% of the stability envelope. These results suggest variability with respect to level. Excel calculations show a minimally decelerating trend line with 60% of data points occurring at or within 25% of the stability envelope, suggesting variability in respect to trend.

The VMO-PIPRT treatment comparison in phase two had a stable accelerating trend. Although minimal, participant two demonstrated initiations during two different session days compared to other phases (e.g., VMO-PIPRT in reciprocal social play actions). In the first three sessions of the VMO-PIPRT treatment there were zero initiations, and then she began initiating during sessions 13 and 15 (i.e., fourth and fifth VMO-PIPRT sessions), possibly indicating a carryover effect with no immediate increase in level. The mean was 1.33% of intervals and a range of 0%-3.33% during phase two VMO-PIPRT. As shown on Table 9, the median remained at 0% of intervals, indicating 60% of data points, or three out of five session days, fell at or within 25% of the stability envelope, indicating variability in respect to level. An accelerating trend existed with 80% of data points placing at or within 25% of the stability envelope, suggesting stability with respect to trend. PND calculations displayed in Table 10 for VMO-PIPRT to VMO alone and VMO-PIPRT to phase one baseline were both 0%.

In phase two VMO alone comparison treatment, there was one session where one initiation occurred, or 3.33% of intervals. This led to a slightly decelerating trend for phase two

VMO alone. The mean was 0.67% of intervals and range was 0%-3.33% (see Table 8). The median was 0%, suggesting 80% of data VMO alone data points placing at or within 25% of the stability envelope, or stability in respect to level. Using Excel to calculate the trend line, a decelerating trend was drawn. Four out of five data points fell at or above 25% of the stability envelope, suggesting a stable trend. PND calculations for VMO alone to VMO-PIPRT and VMO alone to baseline were both 0% (Scruggs & Mastropieri, 1998).

Due to the lack of progress a revised treatment was implemented during phase three best-treatment. This treatment, VMO-PIPRT+R, occurred during administration of the treatment. Although the addition of the researcher being involved in the new treatment made little impact during the reciprocal interactions data analysis, data suggest an impact during the initiations analysis. The mean score for phase three best-treatment increased to 2% of intervals and the range expanded to 0%-6.67% of intervals. However, with a median score of 0% of intervals, 60% of data points (three out of five) fell at or within 25% of the stability envelope, suggesting variability in respect to level for VMO-PIPRT+R. The trend line drawn by Excel displays an accelerating trend; however, 60% of data points fell at or within 25% of the stability envelope, suggesting instability in respect to the trend.

Participant three. Visual analysis of Figure 3 of participant three indicates variable results for all phases and treatments. First examining phase one baseline results, participant three's percentages ranged from 0%-13.33% of intervals, with the first session where baseline data were collected with the highest percentage of intervals. The mean score for phase one baseline was 3.33% of intervals. Despite the high percentage of intervals during session one, the median was 0% (see Table 9). Using 0% in the calculations, 60% of data points fell at or within 25% of the stability envelope. This shows there was some variability in the level during phase

one baseline. Excel calculations of the trend line demonstrate a decelerating baseline trend. Three out of five data points, or 60%, fell at or within 25% of the stability envelope, suggesting variability in trend.

Participant three's phase two baseline scores continued to be inconsistent, ranging from 0% to 10% of intervals throughout all ten sessions of phase two baseline with a minimally decelerating trend. The median score was 6.67% and through analysis, 30% of sessions (three out of 10 baseline data sessions) fell at or within 25% of the stability envelope. The mean for phase two baseline was 5.67%, an increase from phase one baseline. Using Excel to calculate the trend line, a minimally decelerating trend was drawn (i.e., close to being parallel to the x-axis). Three out of ten data points fell at or above 25% of the stability envelope (i.e., 30%), suggesting a variable trend. These data suggest level and trend variability and a higher likelihood of multi-treatment interference with inability to demonstrate experimental control.

VMO-PIPRT trend was stable and minimally decelerating through visual inspection of Figure 3. The VMO-PIPRT range of scores fluctuated between 0%-3.33% and had a mean of 1.33%. The median was 0%, and 60% of data points fell at or within 25%of the stability envelope. This indicates variability in respect to level for phase two VMO-PIPRT. There was a minimally decelerating trend line with four out of five data points placing at or within 25% of the stability envelope, suggesting a stable trend. As indicated in Table 10, PND calculations for VMO-PIPRT to VMO alone and to baseline were both 0%.

The results for VMO alone demonstrate a variable and slowly accelerating trend. The range of scores were from 0%-10% of intervals and the highest mean of any phase or treatment was 4.67%. The median score was 3.33% and only 40% of data points (two out of five) fell at or within 25% of the stability envelope, indicating an instable level with respect to trend. Excel

yielded an accelerating trend, but variable with 40% of data points occurring below or within 25% of the stability envelope. PND calculations for VMO alone to VMO-PIPRT was 40% and VMO alone to baseline was 0% (Scruggs & Mastropieri, 1998), as displayed in Table 10.

For participant three, VMO alone was determined to be the most effective through visual analysis and PND. The data points in phase three best-treatment were also variable from 0%-10% and had a similar range as VMO alone in phase two. The first half of the phases scores were low, then increased to 10% for two sessions, and decreased to 0% for the last best-treatment session. The mean was 4.67% and the median was 3.33%. Using 3.33% for calculations, only the first data session (i.e., session 16) fell at or within the stability envelope. The trend line drawn via Excel displays an accelerating trend with about the same slope at VMO alone in phase two. However, only 20% of data points fell at or within 25% of the stability envelope, suggesting variability in respect to the trend.

Participant four. In the classroom, participant four's results for phase one baseline were 0% for mean, range, and median percentage of intervals (see Tables 8 and 9). Results were identical for all ten phase two baseline sessions. There was stability in respect to trend and level via stability envelope calculations and analyzing trend lines drawn in Excel.

Reviewing VMO-PIPRT initiations data from comparison treatments in phase two, participant four demonstrated initiations towards peers in the classroom. Through visual analysis, there was a change in level from the last session of phase one baseline to the first VMO-PIPRT session in phase two. The level changed from 0% of intervals to 10% of intervals, or three initiations. The range of intervals was from 0%-10% and the mean was 4% of intervals, higher than both baselines and results in the social play actions analysis. The median data point was 3.33%. Although the VMO-PIPRT phase had the highest percentage of intervals with

initiations (i.e., 10% of intervals during session six), only 60% of data points fell at or within 25% of the stability envelope. This demonstrates a variable level. Excel's calculations displayed a decelerating trend. Four out of five data points fell at or within the trend line, indicating stability with respect to the trend. PND calculations for VMO-PIPRT to baseline and VMO-PIPRT to VMO alone were both 40% (Scruggs & Mastropieri, 1998).

Visual analysis of Figure 3 reveals that VMO alone for participant three showed the same results as phases one and two baseline. All five data sessions had 0% of intervals for initiations, resulting in a mean, range, and median of 0%. Therefore, there was a zero-celerating trend, 100% of data points fell within 25% of the stability envelope, and there was stability in respect to level and trend. PND of VMO alone to baseline and VMO alone to VMO-PIPRT were both 0%.

VMO-PIPRT was utilized during phase three best treatment and had a stable, minimally decelerating trend line. Participant three was responsive during the second session of the best-treatment phase and had one initiation, or 3.33% of intervals; however, the other best-treatment sessions had zero initiations. The range of initiations was 0%-3.33% and the mean was 0.67% of intervals. The mean of best-treatment VMO-PIPRT was 0%, showing 80% of sessions placing within 25% of the stability envelope, or a stable trend line. Because there was one session in best-treatment with 3.33% there was an overall decelerating trend line. Four out of five data points fell at or within 25% of the stability envelope, indicating a stable baseline.

Participant five. Participant five during phase one baseline had zero occurrences of initiations towards peers as displayed in Figure 3. In turn, this translates to a 0% mean, 0% range, and 0% median. Therefore, 100% of data points fell at 25% of the stability envelope and a zero-celerating trend was calculated via Excel, indicating stability in relation to the level and trend.

In phase two baseline, the first comparison treatment session day, session six, there were two initiations made by participant five, or 6.67%. However, after that day, there were no more occurrences of initiations as all data collected were 0% of intervals with initiations. Therefore, the range of intervals for phase two baseline were 0-6.67% and the mean was 0.67% of intervals. The median was 0% thus 90% of data points fell at or within 25% of the stability envelope. This suggests a stable trend in relation to level. Excel's calculations displayed a decelerating trend. Four out of five data points fell at or within the trend line, indicating stability in respect to the trend.

In the VMO-PIPRT sessions, there were zero occurrences of initiations made by participant one per visual analysis of Figure 3. The mean, range, and median were all 0%, citing a zero-celerating trend through Excel. These data also interpret 100% stability with respect to level and trend with all data points occurring at or within 25% of the stability envelope. PND calculated at 0% for VMO-PIPRT to baseline and also to VMO alone.

VMO alone results for participant five were variable and decelerating in phase two. The mean of VMO alone in phase two was 2% of intervals and a range from 0%-6.67%. Although minimal, these data are higher than other phases and suggest the participant did pick up some foundational skills relating to initiating play with peers. However, the median score was 0% (see Table 9), was only 60% of data points placing at or within 25% of the stability envelope. This indicates there may variability with respect to level. The Excel calculations displayed a minimally accelerating trend for VMO alone. Three out of five data points fell at or within the trend line, or 60%, indicating variability in respect to the trend. PND calculations for VMO alone to baseline and VMO alone to VMO-PIPRT were both 40% (Scruggs & Mastropieri, 1998).

Through visual inspection and PND computations of Figure 3, VMO alone was selected for participant five in phase three best-treatment. Best-treatment results were variable and had a decelerating trend. There were two days with occurrences of initiations towards, peers, days one and four of best-treatment, or sessions 16 and 19 throughout the duration of the study. As indicated in Table 8 the mean for phase three best-treatment scores was 1.33% of intervals with a range of 0%-3.33%. The median remained at 0% since only two of the five data points had any initiations. Using 0% to calculate, 60% of data points fell at or within 25% of the stability envelope, suggesting variability in respect to trend in the phase. The trend line displayed a decelerating trend through Excel calculations. Two out of five data points fell at or within the trend line (i.e., 20%), indicating variability in respect to the trend.

Figure 3. *Percentage of Intervals for Initiations in the Classroom.*

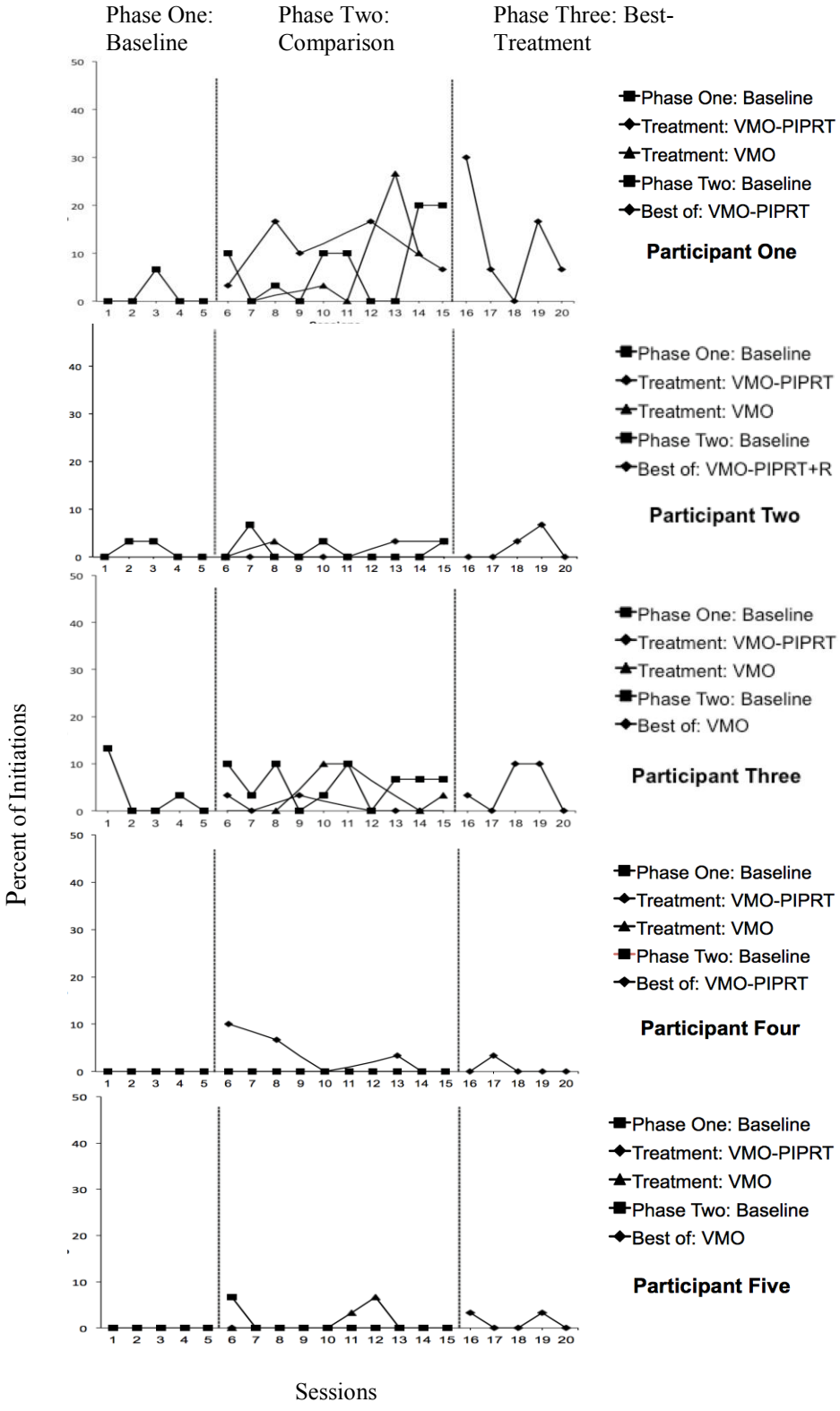


Table 8. *Mean and Range Percentages for Initiations in the Classroom.*

Participant	Phase One Baseline M (Range)	Phase Two Baseline *M* (Range)	Phase Two VMO *M* (Range)	Phase Two VMO-PIPRT *M* (Range)	Phase Three Best Treatment *M* (Range)
One	1.33 (0-6.67)	7.33 (0-20)	7.994 (9-26.67)	10.67 (3.33-16.67)	12 (0-30)
Two	1.33 (0-3.33)	1.33 (0-6.67)	0.67 (0-3.33)	1.33(0-3.33)	2 (0-6.67)
Three	3.33 (0-13.33)	5.67 (0-10)	4.67 (0-10)	1.33 (0-3.33)	4.67 (0-10)
Four	0%	0	0	4 (0-10)	0.67 (0-3.33)
Five	0	.67 (0-6.67)	2 (0-6.67)	1.33 (0-6.67)	1.33 (0-3.33)

Note. The best treatment for participants one and four was VMO-PIPRT. The best treatment for participants three and five was VMO alone. Participant two received VMO-PIPRT+R in phase three.

Table 9. *Median Percentages for Initiations in the Classroom.*

Participant	Phase One Baseline *Mdn*	Phase Two Baseline *Mdn*	Phase Two VMO *Mdn*	Phase Two VMO-PIPRT *Mdn*	Best Treatment *Mdn*
One	0	3.33	3.33	10	6.67
Two	0	0	0	0	0
Three	0	6.67	3.33	0	3.33
Four	0	0	0	3.33	0
Five	0	0	0	0	0

Note. The best treatment for participants one and four was VMO-PIPRT. The best treatment for participants three and five was VMO alone. Participant two received VMO-PIPRT+R in phase three.

Table 10. *PND for Initiations in the Classroom.*

Participant	VMO-Baseline	VMO-PIRPT-Baseline	VMO-VMO-PIPRT	VMO-PIPRT-VMO
One	40	80	20	0
Two	0	0	0	0
Three	0	0	40	0
Four	20	40	0	40
Five	40	0	40	0

Note. PND calculations of VMO and VMO-PIPRT are for Phase Two data only.

Initiations on the Playground

Participant one. Examining participant one's playground initiations reveal that there were variable results and with an accelerating trend. Sessions one and two had 0% of initiations and then increased to 3.33% in session three and 6.67% in session five. The range of scores for phase one baseline was 0%-6.67% and the mean was 2%. The median was 0% demonstrating that three out of five data points fell at or within 25% of the stability envelope. Using Excel's calculations, an accelerating trend was displayed and 60% of data points fell at or within the trend line. This suggests variability in respect to the trend.

Phase two comparison treatment VMO-PIPRT showed a variable, decelerating and then an accelerating trend line per visual inspection of Figure 4. In the first two treatment sessions there were 3.33% of intervals for initiations made by participant one. The percentage of intervals dipped to 0% of intervals, continued on an upwards trend and rested at 13.33% of intervals with initiations. The mean of phase two VMO-PIPRT was 4.67% of intervals and the range was 0%-13.33%. The median score was 3.33% of intervals. Examining data to determine stability, 60% of data fell at or within 25% of the stability envelope, indicating instability in

respect to the level. Excel's calculations displayed an overall accelerating trend. One out of five data points, or 20%, fell at or within the trend line, indicating variability in respect to the trend. As indicated in Table 13, PND calculations for VMO-PIPRT to baseline and VMO-PIPRT to VMO alone were both 20%, well below any suggestion of a significant difference.

Phase two comparison treatment for research participant one shows an accelerating trend for the VMO alone treatment. The range of scores for VMO alone in phase two are 0%-10% and the mean is 6%, indicating it is higher than VMO-PIPRT treatment. However, Table 12 states the median score for VMO alone is 3.33%. Only 40% of data points fell at or within 25% of the stability envelope during VMO alone. These data indicate instability for VMO alone in relation to the level. Excel's calculations displayed an accelerating trend. Yet, 20% of data points falling at or within the trend line. This suggests variability in respect to the trend. PND calculations for VMO-PIPRT to baseline and VMO-PIPRT to VMO alone were both 0% suggesting the VMO treatment as ineffective.

Using visual analysis and PND of Figure 4 during reciprocal social play actions in the classroom setting post-intervention, VMO-PIPRT was selected as the most effective treatment for participant one. There is an overall level change from phase one baseline to phase three best-treatment VMO-PIPRT, and an increase from the last data session in phase two VMO-PIPRT (13.33% of intervals) to phase three best treatment (20% of intervals). The mean of phase three best treatment was 10.66% and the range was 3.33%-20% of intervals, as found in Table 11). The median score for phase three best treatment for participant one was 10%. Calculations conducted by Excel's demonstrate a decelerating trend. Four out of five data points fell at or within the trend line, indicating stability with respect to the trend.

Research participant two. As presented in Table 11, mean percentage of intervals for

participant two was 2% and the range was 0%-6.67%. The median level for phase one baseline during the classroom was 0% (see Table 12). Using 0% for calculations, 60% (three out of five) data points fell at or within 25% of the stability envelope, suggesting variability in respect to the level. Calculations of the trend through Excel demonstrate a low-to-mid level accelerating trend line. Four of five data points fell at or within the trend line, indicating stability in respect to the trend.

During VMO-PIPRT sessions on the playground and presented in Figure 4, participant two continued to demonstrate higher rates of occurrence for initiations; however, data yielded a variable decelerating trend. The first comparison treatment day for VMO-PIPRT, session 7 (second day in phase two), there was an increase in level from 3.33% of sessions in the last day of phase one baseline to 6.67%. As found in Table 11, the mean was 3.33% and the range was 0%-6.67%. The median was 3.33% of intervals (Table 12), with 60% of data points (three out of five sessions) occurring at or within 25% of the stability envelope, showing a variable level for VMO-PIPRT. Excel's calculations displayed a decelerating trend with 20% of data points occurring at or within the trend line. This suggests variability in respect to the trend. PND calculations for VMO-PIPRT to baseline and VMO-PIPRT to VMO alone were both 40% (Scruggs & Mastropieri, 1998). Although the increase was only from one to two initiations between phase one baseline and VMO-PIPRT comparison treatment, this is noteworthy considering the majority of participant two's results in social play actions were zero-celerating or 0% of initiations. This supports that although not as frequent as one would hope, not all of participant two's initiations were being responded to. Further discussion of specific instances are reviewed in Chapter 5.

The VMO alone sessions in phase two demonstrated participant two was also more active

than just in the social play initiations analysis, but the results were still not as frequent as the VMO-PIPRT phase. The range of intervals was 0%-3.33%, with 3.33% of intervals occurring on two different sessions. The mean was 1.33% and the median was 0%, as found in Tables 11 and 12. With the median set at 0%, three out of five data sessions (60%) fell at or within 25% of the stability envelope, indicating an instable level during VMO alone phase. The trend line for VMO alone was minimally accelerating for initiations, a slope close enough to be parallel to the x-axis. Two out of the five data points were at or within 25% of the stability envelope, suggesting variability in respect to trend. PND calculations for VMO alone to baseline and VMO alone to VMO-PIPRT was 0% each (Scruggs & Mastropieri, 1998).

A combination of VMO alone and VMO-PIPRT were used in the best-treatment phase, renamed VMO-PIPRT+R. The trend line was found to be decelerating and variable. During the best-treatment phase, three there were three sessions where initiations occurred, on sessions 16, 17, and 20, an increase from other phases. The first two sessions began at a 3.33% intervals level and then dipped to 0% of intervals for two sessions, and then increased back up to 3.33%. The mean remained at 3.33%, an increase from social play actions only (i.e., reciprocal interactions, or initiations and responses together only) while the range was 0%-3.33%. The median was 3.33% indicating 60% of data points fell at or within 25% of the stability envelope. Excel's calculations displayed a decelerating trend. Three out of five data points fell at or within the trend line, or 60%, indicating variability in respect to the trend. PND calculations for VMO-PIPRT to baseline and VMO-PIPRT to VMO alone were both 40% (Scruggs & Mastropieri, 1998).

Participant three. Participant three's results for phase one baseline initiations were variable and minimally accelerating per visual analysis of Figure 4. Intervals of initiations

ranged from 3.33%-10% with a mean of 4.67% of intervals (see Table 11). The median percentage of intervals was 3.33%, or one initiation. With 3.33% being the median score, 60% of data points fell at or within 25% of the stability envelope, or three out of five data points. This demonstrates variability in respect to the trend level. Excel's calculations displayed an accelerating trend. Two out of five data points fell at or within the trend line, or 40%, indicating variability in respect to the trend.

VMO-PIPRT for participant three on the playground had slightly less intervals with initiations than phase one baseline. The mean was 2.67%, lower than phase one baseline and also lower than reciprocal social play actions. This indicates that many of the reciprocal interactions occurred due to peers initiating, versus the participant initiating play and interactions. The range for phase two VMO-PIPRT comparison treatment was 0%-6.67%, or zero to two intervals of initiations. As indicated in Table 12, the median was 3.33% of intervals, and 40% of data points placing at or within 25% of the stability envelope. This demonstrates variable level for phase two VMO-PIPRT. Using Excel to calculate, a decelerating trend was noted. Four out of five data points, or 80%, fell at or within the trend line, indicating stability in respect to the trend. PND calculations for VMO-PIPRT to baseline and VMO-PIPRT to VMO alone were both 0% (Scruggs & Mastropieri, 1998).

As displayed in Figure 4, VMO alone results were similar to those of VMO-PIPRT, with a variable decelerating trend, but the percentage of intervals occurred in a different order. The first half of the VMO alone trend line is decelerating and then changes to accelerating before dropping down to 0% of intervals on the last day of VMO alone treatment implementation. VMO alone descriptive statistics are identical to those of VMO-PIPRT but the order of percentage of initiations differed. The mean was 2.67% of intervals and the range was 0%-

6.67%. The median was 3.33% and 40% of data points fell at or between 25% of the stability envelope. Excel's calculations displayed a decelerating trend with 60% of data points occurring at or within the trend line. This suggests variability in respect to the trend. PND calculations presented in Table 13 for VMO-PIPRT to baseline and VMO-PIPRT to VMO alone were both 0% (Scruggs & Mastropieri, 1998).

VMO alone was selected as the more effective treatment through visual analysis and PND of Figure 4 using social play actions data (i.e., reciprocal initiations and responses). The data show through visual analysis they are variable and fluctuate. The descriptive statistics for phase three best-treatment VMO alone are a 4% of intervals mean and a range from 0%-20%, or the same highest percentage of intervals as the social play actions interval at 20%. The median remained at 3.33% and therefore only 20% of data points fell at or within 25% of the stability envelope, or an instable level. An accelerating trend line was determined through Excel's calculations. Twenty percent of data points fell at or within 25% of the stability envelope, suggesting trend suggests variability.

Participant four. On the playground examining initiations data, participant four's results for phase one baseline were 0% for mean, range, and median percentage of intervals. Results were identical for comparison treatment VMO alone initiations. These statistics are calculated and presented in Tables 11 and 12.

Examining VMO-PIPRT results phase two initiations treatment comparison from Figure 4, the trend was variable and minimally accelerating. There were two sessions where participant three initiated playing with peers on the playground (i.e., sessions 10 and 13). The range for participant four during VMO-PIPRT was 0%-3.33% and the mean was 1.33%. With only having two sessions with any initiations, that left the median of the five data sessions to be 0% (see

Table 12). Using 0% as the basis for the analysis, three out of five data sessions fell at or within 25% of the stability envelope, or 60%, indicating variability in respect to the level. Excel displays a minimally accelerating trend. Two out of five data points, or 40%, fell at or within the trend line, indicating variability in respect to the trend. PND calculations for VMO-PIPRT to baseline and VMO-PIPRT to VMO alone were both 20% (Scruggs & Mastropieri, 1998).

VMO-PIPRT was selected as the most effective treatment for participant four using visual analysis and PND examination of Figure 4 for social play actions in the previous data analysis. VMO-PIPRT best-treatment was variable and decelerating. One of five data sessions in phase three best-treatment had any initiations, that being the second session or overall session 17. As shown on Table 11, the mean was calculated to be 0.67% of intervals and a range of 0%-3.33%. The median was 0%, resulting in 80% of data points occurring at or within 25% of the stability envelope. These results suggest a stable trend level for phase three best-treatment, VMO-PIPRT. Excel's calculations displayed a decelerating trend. Three out of five data points fell at or within the trend line, or 60%, indicating variability in respect to the trend.

Participant five. As found in Figure 4, participant five showed further initiations throughout the course of the study on the playground compared to results from reciprocal interactions. The statistics for phase one baseline ranged from 0%-13.33% (reasons behind the high rate of interval occurrences are further discussed in Chapter 5) and the mean was 2.67% of intervals. The median for phase one baseline was 0%, therefore resulting in 80% of the data points (four out of five) placing at or within 25% of the stability envelope. The 80% signals there was stability in phase one with respect to level, even with having one data point being significantly different than the remaining data points (i.e., 13.33% of intervals). Zero data points fell at or within the trend line, signaling variability in respect to the trend line.

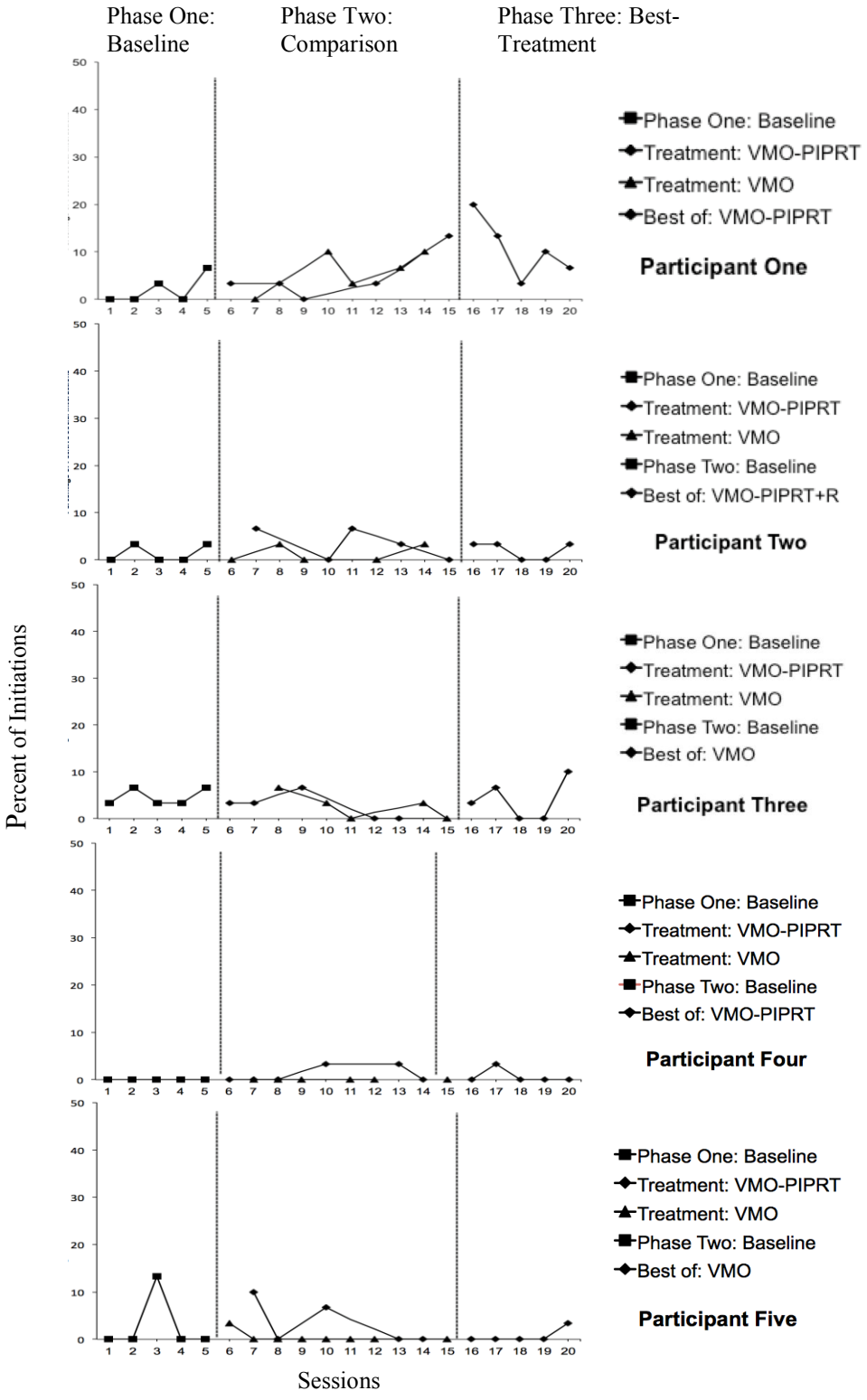
Results for VMO-PIRPT initiations were variable and produced a decelerating trend. Using visual inspection of Figure 4 for phase two treatment comparison for VMO-PIPRT demonstrated an immediate change in level from the last data point in phase one to the first data point in phase two for VMO-PIPRT (session 7), or from 0% of intervals to 10% of intervals. The trend line decreased to 0% on the second day of VMO-PIPRT and then increased back to 6.67%, or two initiations, during the third session. Nevertheless, Table 11 displays the range of initiation scores for phase two treatment comparison for VMO-PIPRT was 0%-10% 3 and the mean was 3.33%. The median score for initiations during phase two VMO-PIPRT was 0% of intervals. Since the median score was 0%, only three out of five data points fell at or within 25% of the stability envelope. This suggests there was variability in relation to the level. The trend calculation through Excel displays a decelerating trend with 40% of data points falling at or within the trend line. This indicates variability in respect to the trend. PND calculations found in Table 13 for VMO-PIPRT compared to baseline was 0% and VMO-PIPRT to VMO alone was 40% (Scruggs & Mastropieri, 1998), suggesting both as ineffective.

Results for VMO alone were minimally decelerating and stable. Visual inspection of Figure 4 suggests there was an immediate change in level from the last day of phase one baseline to the first day in phase two treatment comparison VMO alone, however, the change was only minimal from 0% to 3.33%, and the remaining four days of data collection on the playground for VMO alone were 0% of intervals containing initiations. This resulted in the range of scores being 0%-3.33% and a mean of 0.67% (see Table 11). The median remained at 0%, indicating four of five data points occurring at or within 25% of the stability envelope. Excel calculated a minimally decelerating trend (i.e., almost parallel to the x-axis, or a zero-celerating trend). Four out of five data points fell at or within the trend line, or 80%, indicating stability in respect to the

trend. PND calculations for VMO-PIPRT to baseline and VMO-PIPRT to VMO alone were both 0% (Scruggs & Mastropieri, 1998).

The best-treatment for participant five was determined to be VMO alone. Results demonstrate a stable accelerating trend line. One of five days of data collection resulted in any initiation for phase three best-treatment, that being day five or session 20. In session 20, there were 3.33% of intervals. As found in Tables 11 and 12, the range of scores were 0%-3.33% and the median was 0.67% of intervals. There were 80% of data points that fell at or within 25% of the stability envelope, or four of five days. Excel's calculations displayed an accelerating trend. Four out of five data points fell at or within the trend line, or 80%, indicating stability in respect to the trend.

Figure 4. *Percentage of Intervals for Initiations on the Playground.*



Note. Participants are listed in the order they completed the study. The y-axis is scaled to 50% in order to more clearly show differences in performance.

Table 11. *Mean and Range Percentages for Initiations on the Playground.*

Participant	Phase One Baseline M (Range)	Phase Two VMO *M* (Range)	Phase Two VMO-PIPRT *M* (Range)	Phase Three Best Treatment *M* (Range)
One	2 (0-6.67)	6 (0-10)	4.67 (0-13.33)	10.66 (3.33-20)
Two	1.33 (0-3.33)	0.67 (0-3.33)	1.33 (0-3.33)	2 (0-6.67)
Three	4.67 (3.33-10)	2.67 (0-6.67)	2.67 (0-6.67)	4 (0-20)
Four	0	0%	1.33 (0-3.33)	0.67 (0-3.33)
Five	2.67 (0-13.3%)	0.67 (0-3.33)	3.33 (0-10)	0.67 (0-3.33)

Note. The best treatment for participants one and four was VMO-PIPRT. The best treatment for participants three and five was VMO alone. Participant two received VMO-PIPRT+R in phase three.

Table 12. *Median Percentages for Initiations on the Playground.*

Participant	Phase One *Mdn*	Phase Two VMO *Mdn*	Phase Two VMO-PIPRT *Mdn*	Best Treatment *Mdn*
One	0	3.33	6.67	10
Two	0	0	0	0
Three	3.33	3.33	3.33	3.33
Four	0	0	0	0
Five	0	0	0	0

Note. The best treatment for participants one and four was VMO-PIPRT. The best treatment for participants three and five was VMO alone. Participant two received VMO-PIPRT+R in phase three.

Table 13. *PND for Initiations on the Playground.*

Participant	VMO-Baseline	VMO-PIRPT-Baseline	VMO-VMO-PIPRT	VMO-PIPRT-VMO
One	40	20	0	20
Two	0	40	0	40
Three	0	0	0	0
Four	0	20	0	20
Five	0	0	0	40

Note. PND was calculated for phase two only.

Interobserver Agreement

Inter-observer agreement percentages were calculated from data collected on the Partial-Interval Recording Positive Social Interactions Data Collection Sheet (refer to Appendix F), split into 30-second intervals. The researcher reviewed 100% of the videos from all three phases, treatments, and settings (e.g., phase one baseline, phase two treatments, phase two baseline, phase three best-treatment, playground). One UNLV doctoral student and one UNLV doctoral graduate scored videos that were calculated below in Table 14 (Horner et al., 2005). The raters independently reviewed a randomized set of 25% of the videos of each phase, treatment, and setting with an agreement threshold of 80% or higher, as recommended by Gast (2010). The IOA formula was calculated based on recommendations from Cooper, Heron, & Heward (2007). IOA was calculated using the following formula: (interval agreements/total opportunities) x 100 (Cooper et al., 2007). The overall IOA agreement between both raters and the researcher for participant one was 94.99%, participant two was 93.91%, participant three was 93.41%, participant four was 95.40%, and participant five was 94.04%.

Table 14. *Percentage of IOA Agreement between Raters and Researcher.*

Participant	IRR #1 IOA	IRR #2 IOA
One	95.26%	94.71%
Two	94.95%	92.86%
Three	93.64%	93.17%
Four	96.17%	94.63%
Five	95.85%	91.89%
Total	94.63%	93.45%

Fidelity of Treatment

The administration of the VMO-PIPRT and VMO alone intervention were received independently by the researcher and one comparison rater. Scores were calculated from the researcher and the rater by the percentage scored "yes" and "no" on the Treatment Fidelity Forms (see Appendices G and H). The comparison rater reviewed at least 20% of all treatment sessions of each VMO-PIPRT and VMO alone for the five participants. Table 15 presents the mean percentage rating for each participant per each reviewer.

Table 15. *Percentage of Fidelity of Treatment Between the Researcher and Comparison Rater.*

Research Participant	Researcher	Comparison Rater
One	95.85%	89.29%
Two	89.13%	87.48%
Three	93.77%	88%
Four	84.78%	84.81%
Five	92.16%	87.19%
Total	92.14%	87.35%

Social Validity Measure

There were three different social validity measures distributed on paper to classroom teachers, parents of research participants, and parents of peer participants. The social validity measures were adapted from Jung, Sainato, and Davis (2008), Garfinkle and Schwartz (2002), and Storey et al. (1994). Social validity forms were distributed to three different groups: classroom teachers, parents of peer models, and parents of participants. Paper copies were distributed on three separate occasions. Of the social validity forms distributed, two out of three were returned from classroom teachers, one out of five was returned from parents of research participants, and two out of nine were returned from parents of peer participants. The classroom teacher social validity questionnaire had 18 total questions, 17 were Likert-scale and one open-ended question. Results from the classroom teacher social validity questionnaire are presented below in Table 16. The social validity measures for both sets of parents were different and were adapted from the classroom teacher question since questions related to using the treatments in a classroom were not applicable. The parents of research participants' social validity questionnaire had 10 total questions, nine were Likert-scale and there was one open-ended question. Results from the parents of research participants questionnaire are presented below in Table 17. The parents of peer participants' social validity questionnaire had eight questions, with seven written in Likert-scale format and one was an open-ended question. Results from the parents of peer participants' questionnaire are presented below in Table 18. The Likert rating scale was 5 = Strongly Agree, 4 = Agree, 3 = Neither Agree or Disagree, 2 = Disagree, 1 = Strongly Disagree, and N/A = Not Applicable.

As indicated on Table 16, mean and range scores for VMO-PIPRT were equal to or higher than VMO alone on all comparison questions (e.g., questions 12 and 13). Teachers

reported working on increasing the student's number of social interactions was a valid and appropriate goal. The parent(s) of the participant indicated "agree" on question four stating they could implement VMO at home. However, they indicated "disagree" on being able to implement PIPRT and VMO alone, more than likely due to the requirement of needing a peer to implement the PIPRT strategies whereas in VMO alone, the treatment can be administered by an adult and is transferable across settings. Parents of peer participants indicated they "agreed" and "strongly agreed" their child benefited from helping others with VMO, they would like to learn more about the procedures for VMO-PIPRT, and the two treatments (VMO and VMO-PIPRT) were appropriate for a preschool setting (see Table 18).

Table 16. *Social Validity – Mean and Range Results from Classroom Teachers.*

	M	Range
1. The goal of having the student's number of social interactions increase is a valid and appropriate goal.	4	3-5
2. Video modeling was effective at increasing the number of social interactions of the target student.	3.5	3-4
3. The combination of the video modeling and peer implemented pivotal response training intervention was effective at increasing the number of social interactions of the target student.	3.5	3-4
4. The other peers involved in the intervention benefitted from the use of video modeling.	4	4
5. The other peers involved in the intervention benefitted from video modeling and peer implemented pivotal response training	4	4
6. Other children **not involved** in the intervention benefitted from video modeling.	2.5	2-3
7. Other children **not involved** in the intervention benefitted from video modeling and peer implemented pivotal response training.	2.5	2-3
8. Video modeling is something I could do in my classroom.	3.5	3-4
9. Video modeling and peer implemented pivotal response training is something I could do in my classroom.	3.5	3-4
10. Video modeling is something I could do on the playground.	1.5	1-2
11. Video modeling and peer implemented pivotal response training is something I could do on the playground.	3	3
12. I would like to learn more about video modeling so I could use it in the future with my students.	2.5	2-3
13. I would like to learn more about the procedures for video modeling and peer implemented pivotal response training so I could use it in the future with my students.	3.5	3-4
14. I would use video modeling with a new group of students.	3	3
15. I would use video modeling and peer implemented pivotal response training with a new group of students.	3.5	3-4
16. Overall, the use of video modeling was appropriate for a preschool setting.	2.5	2-3
17. Overall, the use of a combination of video modeling and peer implemented pivotal response training was appropriate for a preschool setting.	4	4

Table 17. *Social Validity – Mean and Range Results from Parents of Research Participants.*

	M	Range
1. The goal of having your child's number of social interactions increase is a valid and appropriate goal.	5	5
2. Video modeling other was effective at increasing the number of social interactions of your child.	3	3
3. The combination of the video modeling and peer implemented pivotal response training intervention was effective at increasing the number of social interactions of your child.	3	3
4. Video modeling is something I could do at home or in the community.	4	4
5. Video modeling and peer implemented pivotal response training is something I could do at home or in the community.	2	2
6. I would like to learn more about video modeling so I could use it in the future with my child.	4	4
7. I would like to learn more about the procedures for video modeling and peer implemented pivotal response training so I could use it in the future with my child.	4	4
8. Overall, the use of video modeling was appropriate for a preschool setting.	4	4
9. Overall, the use of a combination of video modeling and peer implemented pivotal response training was appropriate for a preschool setting.	4	4

Table 18. *Social Validity – Mean and Range Results from Parents of Peer Participants.*

	M	Range
1. The goal of having the student's number of social interactions increase is a valid and appropriate goal.	5	5
2. The combination of the video modeling and peer implemented pivotal response training intervention was effective at increasing the number of social interactions of the target student.	4	3-5
3. My child benefitted from helping other students use video modeling to increase social interactions.	4.4	4-5
4. I would like to learn more about the procedures for video modeling so my child could help others with it in the future.	4	3-5
5. I would like to learn more about the procedures for video modeling and peer implemented pivotal response training so my child could help others with them in the future.	4.5	4-5
6. Overall, the use of video modeling was appropriate for a preschool setting.	4.5	4-5
7. Overall, the use of a combination of video modeling and peer implemented pivotal response training was appropriate for a preschool setting.	4.5	4-5

CHAPTER 5

DISCUSSION

There were two purposes to this study. The first was to compare the relative effects of VMO-PIPRT to VMO alone at increasing the number of positive social interactions in young children with DD in an inclusive setting. Secondly, the study involved an investigation of whether the positive effects of the best treatment, either VMO alone or VMO-PIPRT, generalized to the playground. Chapter One stated the prediction that the combination of VMO-PIPRT would be the more effective at increasing positive social interactions for five participants in an inclusive setting. It was also predicted that the relative effects of the more effective treatment would generalize to the playground. This study utilized a quantitative single case ATD to examine the relative effects of the comparison between the two interventions, VMO-PIPRT versus VMO alone, and generalization to the playground setting. The two treatments were implemented in an inclusive classroom during child-direct learning centers and generalization data were collected on the playground. The results of the research questions are discussed below. Implications and suggestions for future research are also presented.

Research Question One

Is VMO-PIPRT more effective than VMO alone at increasing the number of positive social interactions in young children with DD in an inclusive setting? It was predicted that there would be a significant difference between VMO alone and VMO-PIPRT favoring VMO-PIPRT.

The effectiveness of the two treatments in the intervention setting, the child-initiated learning centers in the inclusive classroom, was variable across the five participants. Analysis of the data indicated the combination of the VMO-PIPRT treatment was more effective for one participant (participant one) in the inclusive preschool classroom, and minimally effective for

participant five. Analysis of the data indicated VMO alone was more effective at increasing social play actions (i.e., reciprocal interactions) for participant three, and minimally effective for participant five. Since only two of the five participants had more substantial positive effects of the treatments, one with the combination of VMO-PIPRT being more effective and the other participant being more responsive to VMO alone, it cannot be determined that either was a more effective treatment on increasing positive social interactions for young children with DD in inclusive settings.

Examining the percentage of positive social interactions (i.e., reciprocal initiations and responses), two of the participants demonstrated favorable results during some of the sessions, though none of the participants indicated a very effective or effective intervention per PND analysis (Scruggs & Mastropieri, 1998). Participant one had PND of VMO-PIPRT to baseline of 60%, or deemed questionable (Scruggs & Mastropieri, 1998); yet when examining VMO-PIPRT to VMO alone, PND was calculated to be 0%, or not an effective treatment. During phases two and three, participant one was excited to watch the videos and also play with the researcher and/or peers, suggesting some positive social validity in support of the treatments. In examining phase two treatment data, there may have been multi-treatment interference for participant one.

When looking specifically at participant one's initiations in the classroom, calculated PND was 80% VMO-PIPRT, indicating an effective treatment. However, there was one day where data for VMO alone was higher, resulting in 0% PND for VMO-PIPRT compared to VMO alone. Due to time and consent limitations (i.e., parents signed consent for baseline to be a maximum of five sessions), the baseline phase could not have been extended further for any of the participants (i.e., parents signed consent for their child to be in baseline for up to but no more

than five days). Also, it is possible that if the intervention could have been extended it would have stabilized with the possibility of an increased percentage for PND.

The effect for participant two was not evident, although data indicate that the participant engaged in the target behavior at low levels of the VMO-PIPRT treatment compared to zero occurrences of the social play actions during phase one baseline. This demonstrates the behavior may not have been within her behavioral skill set prior to administration of the treatment. The participant was able to display the target behavior when prompted or provided support, but was not able to spontaneously exhibit the target behavior consistently. Participant two was not responsive to either treatment and therefore VMO-PIPRT+R (i.e., the addition of the researcher and peer during treatment) as PND of VMO-PIPRT to VMO and also VMO-PIPRT to baseline were both 20%, or not effective (Scruggs & Mastropieri, 1998). Though she did not perform the target behavior consistently in baseline, she did engage in the behavior post-treatment in the classroom and on the playground, indicating the behavior was then a learned skill added to her behavioral skill set under intervention conditions.

Participant three demonstrated increased levels of social play actions between the VMO alone treatment and phase one baseline; however, his PND indicated questionable results (Scruggs & Mastropieri, 1998). Although his median scores increased from phase one baseline, phase two baseline results also increased, indicating the possibility of multi-treatment interference. During session eight in phase two baseline, participant four, a peer, and a student worker were engaging in an activity together, resulting in prompting and support towards positive interactions. Prompting, modeling, and interactions naturally occur between teacher-to student and student-to-student interactions in early childhood classrooms. Although it can shift results for participants, instruction cannot be altered simply because research is taking place.

Without the inclusion of session eight results, results would have been different for all calculations, including PND. Post-study, participant three would approach the researcher and ask to watch the videos and play with toys. Although not official, this may suggest support for using VMO and PIPRT as acceptable treatments (Horner et al., 2005).

PND for participant three VMO alone to baseline was 60%, questionable effectiveness, and VMO alone to VMO-PIPRT was 40%, also ineffective. It is possible that if the intervention could have been extended stabilization would have been present and possibility of increased percentage for PND would have increased. It was evident in by observation and speaking with participant three that he enjoyed being in the company of adults; he wasn't as interested in playing with peers. When his parents were asked about his behavior with peers his age, they also noted he enjoyed being with his parents more and was content playing alone.

Through visual analysis of classroom data collected for participant four, there were minimally accelerating trends for both treatments; however, results were insignificant. On day three of phase one baseline, the participant and a peer were prompted to interact on multiple occurrences by the teacher. During phase one baseline there were 10% of intervals with positive social interactions. Participant four was new to the school. There were approximately two weeks in between her first day of school and the first day of baseline (i.e., session one). Participant four in the classroom was typically seen playing in a handful of structured learning centers playing by herself (e.g., water table, dramatic play). After the classroom teacher observed administration of the treatment one day, the classroom teacher expressed how participant four's expressive vocabulary soared and was higher than typically observed in the classroom. Although there may not have been an apparent effective or best treatment, the

treatments may have had a positive impact on other foundational play skills, such as communication and expressive language.

Visual inspection of participant five's reciprocal interaction results indicate that the effects of the two treatments were not evident. This participant engaged in the target behavior at low levels during VMO-PIPRT treatment compared to zero levels during phase one baseline or VMO alone. Additionally, examining the initiations data, it appears the participant initiated positive social interactions on multiple occasions in phase one baseline and in phase two comparison treatments but the initiations were not responded to by peers. This suggests that the initiation behavior may have been part of his behavioral skill set prior to and under treatment conditions, but overall he demonstrated difficulty responding to peers' initiations. These data may also mean that after several attempts to engage peers in play with no response, the participant could have chosen to move on to play independently.

During phase one baseline, it was a challenge to get participant five to transition to the treatment room. During the first two days of treatment, a preferred activity was paired with the treatment. For example, the researcher and participant complete three pieces of a puzzle, watched the video for one minutes, completed three more pieces of the puzzle, and then watched the remainder of the video. Once the participant was familiar with the routine, he transitioned effortlessly. The transitions became effortless during the last few days of phase two. Throughout phase three best-treatment he would independently transition and sometimes run to the treatment room upon seeing the researcher walk into his classroom.

Research Question Two

Will the positive effects of the best treatment generalize to the playground setting? I predicted the effects of VMO-PIPRT would generalize to the playground setting.

Examining the percentage of positive social interactions on the playground, participant one demonstrated favorable results during some of the generalization sessions, though none of the participants indicated a very effective or effective intervention per PND analysis (Scruggs & Mastropieri, 1998). The best treatment for participant three was VMO alone. Contradictory to the results, visual analysis indicated VMO-PIPRT to be more effective at generalizing to the playground setting, with the PND for VMO-PIPRT compared to VMO alone equaling 60%. The PND scores for participants one and three for comparison of VMO alone to VMO-PIPRT using initiations on the playground decreased (Scruggs & Mastropieri, 1998).

Participant one on the playground had inconsistent results during phase one baseline. However, due to time and parental consent limitations (i.e., maximum of five days baseline), phase two began and the researcher randomized the first treatment implemented for the participant. During session four in phase one baseline, the participant played with one peer who was not trained to be a peer participant (i.e., 23.33% of intervals) and to the researcher's knowledge that peer did not engage with the participant for the remainder of the study. Their interactions were valid, although inconsistent to the other behaviors observed. They altered visual analysis and PND results. VMO-PIPRT compared to VMO alone indicated PND = 60%. During best-treatment there continued to be a slight level change compared to phase one baseline.

The generalized effect for participant two was not apparent on the playground. Data indicate that the participant engaged in the target behavior at a low level during sessions two (i.e., phase one baseline) and sessions seven (i.e., first day of VMO-PIPRT). It appears the behavioral skills were in her repertoire. Results did not appear to be dramatically different before or after the one-week break due. Compared to measurement of the social play actions,

initiations were higher for participant two on the playground. Initiations peaked with two initiations (i.e., 6.67% of intervals). There were three days where there were one or more initiations for VMO-PIPRT and two days for VMO alone. This suggests participant two was displaying some of the desired behaviors, but she was not being responded to by peers. Approximately six weeks after the last day of the best-treatment phase for participant two, the researcher stopped by the preschool. During the visit the researcher crouched down to say "hello" to the participant at her eye level. The participant responded back saying, "I want to watch movie." Knowing that the participant did not spontaneously communicate often, this was a surprise. It also was an indication that the treatments may have had a lasting positive impact on the participant consistent with an increase in positive social interaction.

Participant three did not show significant generalizing of the target skills to the playground. Phase one baseline results were minimal but varied. Although VMO alone appeared to be more effective in the classroom, on the days in which VMO-PIPRT were administered there were higher levels of social play actions on the playground, with the PND = 60% for both VMO-PIPRT compared to baseline and VMO alone. Due to time constraints and parental consent (i.e., parents signed consent for their son/daughter to be in baseline for no more than five days), phases two and three were limited in number of sessions.

Examining initiations data, phase one baseline and phase two VMO alone were slightly greater (e.g., Phase one $M = 4.67$ in initiations versus $M = 1.33$); however, percentages of intervals decreased where there were positive initiations during phase two VMO-PIPRT, as compared to reciprocal interactions, suggesting the participant wasn't initiating as often as he was responding. It was noted by the researcher and teachers when the large, red playing ball was on the playground (i.e., two feet tall) participant three became engrossed playing with the ball.

This was a frequent occurrence. It was difficult to engage him in a conversation and due to the size of the ball it was challenging to share or toss the ball.

Results for participant four on the playground indicate that skills did not generalize from classroom training to playground for either of treatments. Examining the day-to-day data, there were typically one or two peer initiations where the participant did not respond. One two days during phase two (i.e., one of each treatment), there was one peer initiation and one participant initiation a few minutes apart that were not responded to by either party. When comparing reciprocal interactions versus initiations data, there were three different session days with varying data (i.e., session three, session 10, session 20). These sessions had higher percentages for reciprocal interactions, indicating the participant rarely initiated interactions.

Participant five had slightly higher levels of initiations than reciprocal interactions on the playground but there was little to no evidence for generalization. In phase one baseline there were minimal occasions where a peer initiated and the participant responded. During session three baseline the teacher prompted both students on several occasions to ask for the ball back from the other. There were considerably more occurrences of social play actions and also more occurrences of initiations made by the participant because of teacher prompting and playing ball with a peer. These are naturally occurring interactions that transpire in early childhood classrooms. Moreover, these events made an impact on all data, including PND, visual analyses, mean, median, and range. There were also more initiations during two VMO-PIPRT treatment days (sessions seven and 10) and one VMO alone day (session six) that were not responded to. Participant five was observed fixating on specific materials that could only be played alone (i.e., bouncing ball to self while crouching down).

Relation to the Literature

There were components of this study that were included in the implementation of the treatments that aligned more closely with some studies than with others. In order to be consistent across all participants, toys were selected on preferred activities within age appropriate levels similar to items found in classrooms and/or homes (Plavnick, McFarland, & Ferrari, 2015). Individualized preference assessments were not conducted prior to the start of the study so there was no information whether the three toy sets were selected as high-preference items (Liber, Frea, & Symon, 2007). Although teaching participants verbal and motor movements has been found to be effective in increasing play skills for young children with autism (Paterson & Arco, 2007), teaching ten of each both sets of skills may have been an overwhelming amount of content for the peers, participants, and within each VMO video to feature.

The selected materials were age and developmentally appropriate (Ingersoll & Schreibman, 2006; Palechka & MacDonald, 2010; Plavnick, McFarland, & Ferrari, 2015). However, by having a higher number and a variety of items of interest in each toy set, the students may not have been motivated to interact with one another. There were similar scenarios in the classrooms. Due to the programs' developmentally appropriate approach, there were generally two or more of each object in the classroom. This made it more challenging to embed interactive learning opportunities in the classrooms where post-treatment data were collected. In other words, participants may have avoided interacting with peers simply because they were able to gain access to high-preference items in the classroom.

More research needs to be done examining children ages three to five years old and children who are lower functioning with expressive vocabulary and play skills. Literature

suggests VMO and PIPRT to be effective with children who fall under the early childhood umbrella per NAEYC (birth to eight years old); however, the literature mainly includes children ages five to eight years old and up (e.g., Maione & Mirenda, 2006; Paterson & Arco, 2007; Plavnick, McFarland, & Ferrari, 2015).

Procedural Factors

The original intent of the procedures used in this study was to have the classroom teacher implement the treatments; however, due to teacher to student ratios and scheduling, this was not possible. Chapter Three also outlined how the treatments were to be administered in the classroom in a space away from distractions. One of the teachers voiced concerns about bringing in the toy set materials that may have fit more appropriately in one learning center (i.e., bringing in trains, found in the blocks center, into the library center). This could have been confusing for the participants. Therefore, the treatments were administered in the center storage room located between two classrooms. The room was smaller in size and had half-doors that were left open during administration of the treatments. Teachers and student workers stored their jackets, backpacks and classroom materials in this space. The space was sometimes found in disarray and the researcher/research assistants gently rearranged materials to allow for more open space to administer the treatments.

Limitations

Data Collection

One limitation to the study was the quality of videos. Each treatment session, classroom, and playground sessions were recorded for later viewing and scoring. Background noise in the classroom and on the playground limited the voice projection of interactions, possibly interfering with observers being able to hear whether a vocal positive social interaction or initiation had

occurred. Additionally, participants were free to move about the classroom and playground requiring quick movements of the researchers to be close enough to hear their interactions but far away enough not to interfere with interactions and ongoing play.

A partial-interval recording form was used to capture the positive social play actions occurring in the classroom and on the playground. The form did not capture the absolute frequency of interactions. Since many of the participants engaged in social play actions at low levels, having a more explicit data collection system would have been helpful to truly capture the nature and occurrence of interactions. A shorter interval or frequency may have been a better choice for measurement. Another option could have been individualizing the target behaviors for each participant since their skills varied (Wilson, 2013).

The social play actions (Garrison-Harrell et al., 1997), may have been too advanced to capture what was actually occurring post-treatment. The definition included but was not limited to engaging with peers, playing or sharing toys, communicating, or engaging in one of the stages of play. Specifically, an "initiation" was defined as an attempt to involve a peer in a mutual activity and included a vocalization noticeably stated for a peer (Garrison-Harrell et al., 1997). Social play actions, the DV, could be adjusted to meet more developmentally appropriate needs of participants in the future, such as foundational skills needed to master more advanced play skills (e.g., Ingersoll & Schreibman, 2006).

Participant Selection

Participants had to have met the selection criteria and be recommended by the preschool staff in order to be considered for participation. Although all participants met the criteria for the study, participants two, four and five may not have been good candidates for the study. Participants four and five demonstrated the required skills needed, but they did not consistently

demonstrate the skills without prompting, support or modeling. Participants two and four began ABA therapy in the middle of the study. The addition of ABA to their daily schedules changed their school attendance hours. As stated by participant two's classroom teacher, the addition of ABA in the morning before school made her days long and she often came to school tired. Had the information about beginning ABA therapy been known in advance, the start of the study could have been adjusted so there was an adjustment period limiting the negative effect of what is possibly a confounding factor.

Participants four and five were consistently observed choosing solitary activities in the classroom and on the playground, showing little interest in engaging with others. Their lack of interest in others could have limited the effectiveness of both treatments. In addition participant four was new to the school and was, therefore, less familiar with other students. There were approximately two weeks in between her first day of school and the first day of baseline (i.e., session one). Parents indicated she had not previously received special education services in her previous state. The programs were NAEYC accredited and followed Early Childhood Environment Rating Scale, Third Edition (ECERS-III) guidelines. Students had many opportunities to make choices during the day and they rarely had to engage in non-preferred activities. Since minimal demands were placed on students throughout the school day, participant four had difficulty engaging with materials that were non-preferred. These materials changed daily (e.g., some days she wanted to play with the train toy set). These could have been factors that affected treatment effectiveness.

There was a designated area where the treatments were administered and as far away from distractions as possible. Data were collected on whether participants watched a percentage of the videos (i.e., eyes focused on the video, within 2 feet of the iPad), but data were not

collected on whether participants were paying attention to the video model (e.g., Wilson, 2013), or the peer participant after viewing the video. For example, participant five was often seen watching the ceiling fan during administration of the treatment versus playing with the peer or researcher. For all participants, knowing more diagnostic information and their progress in their programs would have further supported their selection for the study. Other information in addition to meeting selection criteria and staff recommendations would have further supported their participation (e.g., scores on Autism rating scales, number of expressive vocabulary words).

Participant Attendance and Schedules

Although typical of early childhood research, all five participants were absent for two or more days throughout the course of the study. Participant two had several absences from school over the course of the study due to being ill and adjusting to schedule changes. Because she began attending ABA therapy in the middle of the study her schedule changed from full- to half-day. She was likely more tired when she arrived at school in the afternoon and was often seen trying to sit on a teacher's lap or snuggle into their arm. On a few occasions she fell asleep in the classroom at times other than designated rest time. Participant four was sick and absent from school during each of the three phases. Participant five continued attending ABA therapy three times per week once the study started, making some of his attendance full- and others half-days. He was also ill for a few days on two separate occasions throughout the 20 days of the study. In addition to scheduling administration of the treatments based on student availability, the researcher had to maneuver within each classroom's schedule (e.g., field trips). For example, some participants were present for only one of the playground sessions each day (e.g., 9:00 am).

Multi-Treatment Interference

Because of scheduling obstacles, the times between administration of the treatment,

baseline, and playground data were decreased from one hour to 30 minutes. Wolery et al. (2014) suggested one hour or more in between data collection sessions. However, balancing participant schedules, classroom schedules, delivery of special education and related services, and illness made one hour difficult to achieve, necessitating the adjustment down to 30 minutes in between recording sessions. Shortening the time in between data recording sessions increased the possibility of multi-treatment interference. This also may have contributed to the difficulty in determining the most effective treatment.

Diffusion of Treatment

Participants one and four were in the same four-year-old classroom. Participants three and five were in the same three-year-old classroom. Although only one participant per classroom was participating in the study at a time, there may have been some diffusion of treatment.

Peer Participant Variability

Peer participants were recommended to the study by their teachers and the center director based on the selection criteria described earlier. As expected among preschool-aged children, there was variability in their performances during administration of the VMO-PIPRT treatment. There was also variability in their performance or willingness to use the various PIPRT strategies based on the day, how they were feeling, materials used, or other reasons provided by the preschool aged-children. For example, one peer only wanted to participate when the train materials were used, and another only when it was dramatic play and he could play with the baby doll. The levels of expressive vocabulary, maturity, and persistence varied dramatically. Examples include one peer repeatedly trying to present, initiate and share toys during PIPRT, another peer participant forgetting to provide positive reinforcement when a participant traded

toys (e.g., forgot to say "thank you!"), or another peer who tried to interact but was difficult to understand. Although all peer participants were same-aged peers, two of the four year old peers appeared to be the most talkative and persistent throughout the duration of the study. These are all factors that may have influenced the post-treatment results in the study.

The video model actors were the same as those selected to participant as peers in the study. There was a mix of gender, race, age, expressive vocabulary, interests, and play skill abilities. Bellini and Akullian (2007) suggest video model actors should be as similar to the participants as possible, yet that was not possible due to the enrollment rosters. However, Plavnick, McFarland, and Ferrari (2015) used video models of the opposite sex and their results did not appear to be impacted.

Practical Implications

A key takeaway from this study is that every child is an individual and interventions are not likely to have the same impact across children. The intensity and frequency of interventions need to not only be individualized, but teachers need to utilize ongoing data collection strategies sensitive to individual differences. Appropriate data needs to be collected and analyzed in order to determine if an intervention is being effective or needs to be adapted to best meet the needs of the student. Since the study did not explicitly favor one treatment over the other, there is still value in using technology and peers to teach pro-social skills. In inclusive environments students with DD can practice these skills with typical peers and generalize them to other naturalistic settings. Students without disabilities can be trained to implement strategies and be more responsive peers when provided adequate support, modeling, and ongoing feedback. Also, parents and teachers reported the participants benefitted and the treatments were effective.

Suggestions for Future Research

Research that supports using PIPRT for young children is still limited. Additionally, research on the most effective type of video modeling (e.g., other, self, peer) varies based on individualized needs of participants, age, target behaviors, and so forth. More research is needed to discuss the benefits of both interventions or alternatives to the treatments administered in this study, such as video self-modeling (Mason, Davis, Ayres, Davis, & Mason, 2016), the combination of interventions as a package compared to single treatments, and which treatment is more effective. While results were not as powerful in demonstrating either treatment being effective or more effective than the other, inconsistency surrounding these data are paradoxically consistent with other research (Charlop-Christy et al., 2000; Gena et al., 2005, Wilson, 2003), stating that VMO is just as effective or more effective than in-vivo modeling. This also brings up for discussion whether the benefits of the combined treatments outweigh treatments being implemented individually.

Similar treatments could be administered to see the relative effects on other target behaviors that are developmentally appropriate for the participants, such as examining eye gaze or proximity. Based on the play skills of the participants in the study, there may be positive changes towards increasing or focusing eye gaze, moving within proximity during types of play. Other studies could examine the types of play occurring post-treatment(s) related to Parten's (1932) stages of play. Additionally, further behaviors of typical and trained peers could be examined focused on the why, when and how they choose to interact with others.

Summary

The first purpose of this study was to examine the relative effects of Video Modeling Other and Peer-Implemented Pivotal Response Training (VMO-PIPRT) when compared to

Video Modeling Other alone (VMO) at increasing the number of positive social interactions in young children with DD in an inclusive setting. Secondly, the study investigated whether the positive effects of the best treatment generalized to the playground setting. Results suggest that VMO-PIPRT was more effective for participant one, and minimally effective for participant four. VMO alone was more effective for participant two, and minimally effective for participant five. There was no significant effect for participant two. The results were not significant for any of the participants and experimental control was challenging to establish due to possible multi-treatment interference. Motivation and other confounding variables may have been a factor in the effectiveness of the treatments for all participants. Additional studies on the effectiveness of social skills interventions are needed for students with DD that focus on forming relationships, achieving academic success, and achieving an overall positive well-being (Buysse, Goldman, West, & Hollingsworth, 2008; Costin & Jones, 1992; Kasari, Rotheram-Fuller, Locke, & Gulsrud, 2012; Klein, 2002).

APPENDIX A

Parent of Research Participant Informed Consent Form

RESEARCH PARTICIPANT PARENT PERMISSION FORM
Department of Educational & Clinical Studies

TITLE OF STUDY: A Comparison of the Effects of Video Modeling Other alone and Video Modeling combined with Peer Implemented Pivotal Response Training (VMO or VMO-PIPRT) on Positive Social Interactions Performed By Young Children With Developmental Disabilities

INVESTIGATOR(S): Dr. John Filler and Maryssa Kucskar

CONTACT PHONE NUMBER: 702-895-3328

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 skills interventions: video modeling other alone (VMO) and a combination of video modeling and peer implemented pivotal response training and (VMO-PIPRT). Both interventions have been demonstrated to be effective in various research studies. This study will attempt to identify which one is better at increasing the number of positive social interactions exhibited by young children with developmental disabilities (e.g., hi, thank you, let's play). In the VMO alone intervention, students will work with a researcher in order to learn how to initiate and respond to peers as demonstrated in the video. In the VMO-PIPRT intervention, a typical peer will take the place of the researcher and use different strategies (e.g., giving choices, taking turns, encouraging conversation) to work with students with disabilities.

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, autism, or a developmental delay.

Procedures

If you allow your child to volunteer to participate in this study, your child will be asked to do the following while under the supervision of school staff: (a) participate in the intervention (VMO or VMO-PIPRT) for up to 30 minutes a school day for up to 5 weeks; (b) be video recorded for up to 15 minutes while the intervention is being delivered (30-second intervals); and (c) be video recorded for up to 30 minutes of regular time following delivery of the intervention. At the beginning of the study, the Social-Emotional Assessment/Evaluation Measure (SEAM; Squires,

Bricker, Waddell, Funk, Clifford, & Hoselton, 2014) will be administered to both the parents and your child's classroom teacher. The SEAM is an assessment scale that provides information on a child's social-emotional strengths and areas of need. Information collected from the SEAM will be used to describe your child's social behaviors typically observed in school and at home. With the exception of the time spent receiving the VMO or VMO-PIPRT, your child will continue to participate in regularly scheduled school activities. With your permission, your child's Individualized Education Plan (IEP) and/or Individualized Family Service Plan (IFSP) will be reviewed under the supervision of your child's teacher in order to further support your child's participation in the study. In addition to providing consent for your child, you will be asked to complete a 10-item questionnaire at the conclusion of this study related to the purpose, the procedures, and the results 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 (VMO or VMO-PIPRT) is better at increasing the number of positive social initiations exhibited 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 the study. Since the maximum number of participants will be 18 (4 teachers, 4 students with disabilities, and 10 student peers), there is a possibility that individuals may be able to link your child's participation to this study. In order to minimize this risk, when results are presented, they will be presented in aggregate and/or with the use of 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 child, student, or peer.

Another possible risk is related to video recording. The purposes of which are to ensure that the instructional strategies are implemented in a highly structured fashion and to record your child's 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. Your child *will not* be compensated for their time.

Contact Information
If you or your child has 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. You or your child is encouraged to ask questions about this study at the beginning or any time during the research study. If your child does not to participate in the study, he or she will continue to receive regularly scheduled instruction. Furthermore, lack of participation will not impact the quality of instruction or evaluations that your child is scheduled to receive.

Confidentiality
All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link your child to this study. All 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.

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	Child's Name (Please print)
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 B

Parent of Peer Participant Informed Consent Form

PEER PARTICIPANT PARENT PERMISSION FORM

Department of Educational & Clinical Studies

TITLE OF STUDY: A Comparison of the Effects of Video Modeling alone and Video Modeling combined with Peer Implemented Pivotal Response Training (VMO or VMO-PIPRT) on Positive Social Interactions Performed By Young Children With Developmental Disabilities

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CONTACT PHONE NUMBER: 702-895-3328

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 skills interventions: video modeling other alone (VMO) and a combination of video modeling and peer implemented pivotal response training and (VMO-PIPRT). Both interventions have been demonstrated to be effective in various research studies. This study will attempt to identify which one is better at increasing the number of positive social interactions exhibited by young children with developmental disabilities (e.g., hi, thank you, let's play). Your child will aide in delivering the VMO-PIPRT intervention to students with disabilities. Your child will be taught different strategies (e.g., giving choices, taking turns, encouraging conversation) in order to model and teach children with disabilities to initiate and respond to peers in the classroom.

Participants

Your child is being asked to participate in the study because he or she is enrolled in the UNLV CSUN Preschool.

Procedures

If you allow your child to volunteer to participate in this study, your child will be asked to do the following while under the supervision of school staff: (a) participate in up to 12 training sessions which will last no longer than 30 minutes a day for 10 days; (b) participate in the VMO-PIPRT intervention up to 30 minutes a school day for up to 10 weeks by delivering the intervention to a child with a disability (with supervision and assistance from the student researcher); and (c) be

video recorded for up to 45 minutes during regular class time. 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.

With the exception of the time spent participating in the delivery of the VMO-PIPRT instruction your child will continue to participate in regularly scheduled school activities.
In addition to providing consent for your child, you will be asked to complete an 8-item questionnaire at the conclusion of this study related to the purpose, the procedures, and the results 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 (VMO or VMO-PIPRT) is better at increasing the number of positive social interactions exhibited by preschool aged children with disabilities.

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 the study. Since the maximum number of participants will be 18 (4 teachers, 4 students with disabilities, and 10 student peers), there is a possibility that individuals may be able to link your child's participation to this study. In order to minimize this risk when results are presented, they will be presented in aggregate and/or with the use of appropriate de-identifiers as listed below:

f. Research participants will be referred to as Participant One, Participant Two, Participant Three, etc.
g. Peer participants will be referred to as Peer Participant One, Peer Participant Two, Peer Participant Three, etc.
h. Teacher participants will be referred to as Teacher Participant One, Teacher Participant Two, Teacher Participant Three, etc.
i. Parent participants will be referred to as Parent Participant One, Parent Participant Two, Parent Participant Three, etc.
j. Non-participating students will be referred to as child, student, or peer.

Another possible risk is related to video recording. The purposes of which are to ensure that the instructional strategies are implemented in a highly structured fashion and to record behavioral responses of the children. 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. Your child *will not* be compensated for their time.

Contact Information

If you or your child has 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. You or your child is encouraged to ask questions about this study at the beginning or any time during the research study. If your child does not to participate in the study, he or she will continue to receive regularly scheduled instruction. Furthermore, lack of participation will not impact the quality of instruction or evaluations that your child is scheduled to receive.

Confidentiality

All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link your child to this study. All 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.

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	Child's Name (Please print)
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 C

Peer Participant Youth Assent Form

PEER PARTICIPANT YOUTH ASSENT FORM
Department of Educational & Clinical Studies

A Comparison of the Effects of Video Modeling with Video Modeling combined with Peer Implemented Pivotal Response Training (VMO or VMO-PIPRT) on Positive Social Interactions Performed By Young Children With Developmental Disabilities

1. Hello! My name is Maryssa Kucskar.

2. I am asking you to join my study because your teacher(s) said you followed directions and played with friends at school. I think you could help us teach your friends to play with you and other friends at school.

3. We will teach you how to teach your classmate(s) things like giving choices when playing, taking turns, and saying nice words to your friends (e.g., "good job").

4. There will be 12 training sessions. Each training session will be 30 minutes long. After you have been trained, we will begin the study. In the study, you will watch a short video and play with some toys with a friend from class.

5. You will be video taped while you are playing 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.

6. There may not be any direct benefits to joining our study.

7. 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.

8. 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. If you want to stop, you can say something like, "I don't want to do this anymore", "No more," or "All done." You can say you don't want to participate in the study at any point in time.

9. 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 702-895-3328, call the

UNLV Office of Research Integrity – Human Subjects at 702-895-2794, or call toll free at 877-895-2794.

10. Circle the smiley face if you agree to be in this study. Circle the sad face if 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

Circle the smiley face if you agree to be video recorded:

Smiley Face

Circle the sad face if you do not want to be video recorded:

Sad Face

Child's Name

Date

APPENDIX D

Research Participant Youth Assent Form

RESEARCH PARTICIPANT YOUTH ASSENT FORM
Department of Educational & Clinical Studies

A Comparison of the Effects of Video Modeling with Video Modeling combined with Peer Implemented Pivotal Response Training (VMO or VMO-PIPRT) on Positive Social Interactions Performed By Young Children With Developmental Disabilities

1. Hello! My name is Maryssa Kucskar.

2. Your teacher(s) said you could be a good fit to participate in this research study because you may need some help in learning how to say hi, share toys, and play with friends at school. We are asking you to take part in a research study because we are trying to learn more about teaching you to say hi, share toys, and play with friends.

3. If you agree to be in this study, your classmates, me, and one of my friends will teach you how to say hi, share, and play with toys.

4. There will be two interventions. In the first intervention, you will be with a researcher/adult where we watch a short video and play with toys. In the second intervention, you will watch a short video with a researcher/adult but then play with a friend from your class.

5. You will be video taped while you are playing 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.

6. There may not be any direct benefits to joining our study.

7. 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.

8. 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. If you want to stop, you can say something like, "I don't want to do this anymore", "No more," or "All done." You can say you don't want to participate in the study at any point in time.

9. 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 702-895-3328, call the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, or call toll free at 877-895-2794.

10. Circle the smiley face if you agree to be in this study. Circle the sad face if 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

Circle the smiley face if you agree to be video recorded:

Smiley Face

Circle the sad face if you do not want to be video recorded:

Sad Face

Child's Name

Date

APPENDIX E

Teacher Participant Informed Consent Form

TEACHER INFORMED CONSENT

Department of Educational & Clinical Studies

TITLE OF STUDY: A Comparison of the Effects of Video Modeling Other alone with Video Modeling combined with Peer Implemented Pivotal Response Training (VMO or VMO-PIPRT) on Positive Social Interactions Performed By Young Children With Developmental Disabilities

INVESTIGATOR(S): Dr. John Filler and Maryssa Kucskar

CONTACT PHONE NUMBER: 702-895-3328

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 skills interventions: video modeling other alone (VMO) and a combination of video modeling and peer implemented pivotal response training and (VMO-PIPRT), in order to determine which is better at increasing the number of positive social interactions exhibited by young children with developmental disabilities. VMO is an intervention that uses video to teach children to perform specific target behaviors. At the end of the video, the target child is provided the opportunity to imitate the actions of the peers from the videos. PIPRT is an intervention that uses typical peers to teach other children to perform specific behaviors and the target child is provided the opportunity to imitate the actions from the trained peers. The two interventions will alternate: (a) VMO alone and (b) a combination of VMO and PIPRT together. Both interventions have been demonstrated to be effective in various research studies. This study will attempt to identify which one is better at teaching children with disabilities how to initiate and respond to peers.

Participants

You are asked to participate in this because you have met the qualifications to serve as a staff member of the UNLV CSUN Preschool and you teach or support 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 minimally assist the researcher in implementing the intervention (e.g., train peer participants, setting up the area, transition students

to intervention area), and will not directly implement the intervention with peers or research participants on a daily basis. The researcher will primarily be implementing the intervention. Specifically, you will be asked to:
(a) assist the student investigator with the scheduling of meetings to obtain parent consent/youth assent and being present while those meetings occur.
(b) participate in up to 12 training sessions, which will last no longer than 40 minutes a day and will be conducted at times convenient to, and approved by, both you and the Director of the UNLV/CSUN Preschool;
(c) complete the Social-Emotional Assessment/Evaluation Measure (SEAM; Squires, Bricker, Waddell, Funk, Clifford, & Hoselton, 2014). Information collected from the SEAM will be used to describe the child's social behaviors typically observed in school and at home; and
(d) be video recorded for up to 45 minutes (per student; approximately 15 minutes after the delivery of the intervention, 15 minutes during a time of day other than immediately after the intervention, and 15 minutes on the playground).

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. With the exception of the time spent receiving the VMO or VMO-PIPRT specialized instruction (estimated to be 15 minutes per school day for up to 5 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 to participating in this study. However, we hope to learn which intervention (VMO or VMO-PIPRT) is better at increasing the number of positive social initiations exhibited 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 the study. Since the maximum number of participants will be 18 (4 teachers, 4 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 appropriate de-identifiers as listed below:

k. Research participants will be referred to as Participant One, Participant Two, Participant Three, etc.
l. Peer participants will be referred to as Peer Participant One, Peer Participant Two, Peer Participant Three, etc.
m. Teacher participants will be referred to as Teacher Participant One, Teacher Participant Two, Teacher Participant Three, etc.

n. Parent participants will be referred to as Parent Participant One, Parent Participant Two, Parent Participant Three, etc.
o. Non-participating students will be referred to as child, student, or peer.

Another possible risk is related to video recording. Videos will be recorded during each session with the purpose to ensure that the instructional strategies of each intervention are being 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 the video.

Cost /Compensation

There *will not* be financial cost to you to participate in this study. Individuals will be expected to: (a) participate in up to twelve training sessions which will last no longer than 40 minutes a day; (b) participate in additional refresher training sessions (as needed); (c) participate in the delivery of the interventions (VMO or VMO-PIPRT) up to 15 minutes a school day for up to 5 weeks (per student); and (d) be video recorded for up to 15 minutes (per student) while the intervention is delivered; and (e) be video recorded for up to 45 minutes of regular time (per student) following delivery of the intervention. You *will not* be compensated for their 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 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.

Contact Information

If you or your child has any questions or concerns about the study, you may contact Dr. John Filler at **702-895-3328.** 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 participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw without prejudice to your relations with UNLV at any time. Withdrawal from this study mans that you will no longer actively participate in any part of the delivery of the intervention sessions (VMO or VMO-PIPRT). 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.

If you withdraw at any point during the study, research and peer participant(s) may or may not choose to continue on with the intervention. If the research and peer participant(s) continue with the study, another teacher will be asked to continue the intervention. If a research participant

does not want to continue the study, the intervention and data collection for that student will stop immediately. If only a peer participant does not want to continue with the study, another peer will be asked to continue on with the training/intervention. The data collection will continue and the revision will be noted. If having an additional peer assist in the intervention is not feasible, data collection will stop immediately. Parent(s) of the given participant(s) will be notified if the intervention is stopped.

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 Participant Date

_____

Participant Name (Please Print)

Audio/Video Taping:

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:

- Social play skills: Social play skills can be defined as involving social interactions with one or more individuals over a given period of time, such as initiating, maintaining, and engaging in one of the phases of play (Yang, Wolfberg, Wu, & Hwu, 2003).
- Social interactions: defined by a behavior that includes a single or group of initiations followed by responses (Haring & Breen, 1992). The social interactions must be a *positive social interaction*. The interaction must be based on a child's individual communication and there has to be a positive social initiation followed by a positive social response.
- Positive social initiation: A social initiation is defined as an attempt to involve a peer in a mutual activity and includes a vocalization noticeably directed to a peer that attempted to elicit a social response (Garrison-Harrell, Kamps, & Kravits, 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 Sam"), commenting on an item that is related to a current activity ("I like your drawing"), requesting ("Can I play with the train?"), and offering a toy to a friend to play (holding up a toy within proximity of another student).
- Positive social response: This is defined by a child responding to a peer's initiation (Garrison-Harrell, Kamps, & Kravits, 1997). For example, a child saying "yes" or agreeing when a peer asks him/her to play, a child responding with "thank you" to a compliment, saying a greeting back, etc.

Directions:

- Circle "SI" under the appropriate 30-second time interval if the participant performed a positive social initiation towards a same-aged peer (*subject initiation).*
- Circle "PI" under the appropriate 30-second time interval if a same-aged peer performed a positive social initiation towards the participant (*peer initiation).*
- Circle "SR" under the appropriate 30-second time interval if the participant responded to a positive social initiation from a same-aged peer (*subject response).*
- Circle "PR" under the appropriate 30-second time interval if a same-aged peer responded to a positive social initiation from the participant (*peer response).*

Note:

- The positive social play skills may or may not be reciprocated by same-aged peers. If the participant initiates and a same-aged peer does not respond, please circle "SI" under the appropriate 30-second time interval (*subject initiation)*.
- If a same-aged peer initiates but a participant does *not* respond, nothing needs to be circled and/or indicated on the form.

Do not circle a role if:

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

Participant: _____ Setting: _____ Date: _____

Directions: Circle the appropriate role if the participant was involved in a positive social interaction within the allotted 30-second time interval. Refer to the key at the bottom of the page for any questions about abbreviations. The rater must circle *at least one* abbreviation during every 30-second interval.

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

Key:

SI = subject initiated interaction
PR = peer responded to initiation
PI = peer initiated interaction
SR = subject responded to initiation
N/R = no response during the interval

Adapted from Cooper, Heron & Howard (2007)

APPENDIX G

Video Modeling Other
VMO Implementation Fidelity Measure

Directions: Answer questions 1-19 below based on recorded videos of the delivered treatment.

- Circle "Y" if the step was performed accurately.
- Circle "N" if the opportunity to perform that step was present 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 invite the research participant (RP) to join the intervention prior to the delivery of the intervention?	Y	N	N/A
2. Did the researcher and the RP sit/stand in an adjacent area with the iPad (i.e., table, floor) and were they sitting away from distractions (i.e., entrance way, peers) to begin the intervention?	Y	N	N/A
3. Did the researcher say, "We are going to watch a video and play with some toys today. Please pick a video!" (or something similar)?	Y	N	N/A
4. Was the RP presented with two or three visuals of the toy sets?	Y	N	N/A
5. Was the RP within 2 feet of the iPad (sitting/standing) when the video was playing?	Y	N	N/A
6. Was the researcher within 2 feet of the iPad (sitting/standing) when the video was playing?	Y	N	N/A
7. Did the pair watch 1/3 or more of the video? (e.g., stay in the designated area, not play with other toys)	Y	N	N/A
8. At the conclusion of the video, did the researcher say, "Come play with me and the *toys*!" (i.e., corresponding to the toy play set)?" (or something similar)	Y	N	N/A

9. Did the researcher and the RP transition to the toy play area?	Y	N	N/A
10. Did the researcher and RP stay in the area with the toy set for 4 to 6 minutes?	Y	N	N/A
11. Did the researcher provide 3 prompts or less during the toy play session?	Y	N	N/A
12. Was the featured toy out in the designated area available for the participant and TP to pay with?	Y	N	N/A
13. After playing, did the researcher pull out the iPad for the pair to watch the same video a second time and say, “We are going to watch the video one more time” (or something similar)?	Y	N	N/A
14. Was the RP within 2 feet of the iPad (sitting/standing) when the video was playing?	Y	N	N/A
15. Was the RP within 2 feet of the iPad (sitting/standing) when the video was playing?	Y	N	N/A
16. Did the pair watch the full video for 1/3 or more of the time? (e.g., stay in the designated area, not play with other toys)	Y	N	N/A
17. Once the second viewing of the video was complete, did the researcher say, “Go play with your friends!” (or something similar)?	Y	N	N/A
18. Did the researcher provide minimal assistance when necessary?	Y	N	N/A
19. Did the entire session last less than 15 minutes?	Y	N	N/A

Adapted from Van Norman (2005)

APPENDIX H

Video Modeling Other and Peer Implemented Pivotal Response Training
VMO-PIPRT Implementation Fidelity Measure

Directions: Answer questions 1-19 below based on recorded videos of the delivered treatment.

- Circle "Y" if the step was performed accurately.
- Circle "N" if the opportunity to perform that step was present 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 invite the typical peer (TP) to join the intervention prior to the delivery of the intervention?	Y	N	N/A
2. Did the teacher and/or researcher remind the TP of the PIPRT strategies learned from training (e.g., review if needed)?	Y	N	N/A
3. Did the teacher invite the research participant (RP) to join the intervention prior to the delivery of the intervention?	Y	N	N/A
4. Did the RP and the researcher sit/stand in an adjacent area with the iPad (i.e., table, floor) and were they sitting away from distractions (i.e., entrance way, peers) to begin the intervention?	Y	N	N/A
5. Did the researcher say, "You are going to watch a video with me and then play with some toys today with someone from school. Please pick a video!"	Y	N	N/A
6. Was the RP presented with two or three visuals of the toy sets to play with?	Y	N	N/A
7. Was the RP within 2 feet of the iPad (sitting/standing) when the video was playing?	Y	N	N/A
8. Was the researcher within 2 feet of the iPad (sitting/standing) when the video was playing?	Y	N	N/A

9. Did the pair watch the full video for 1/3 or more of the time? (e.g., stay in the designated area, not play with other toys)	Y	N	N/A
10. Once the video was completed, did the researcher say, "Go play with the *toys*!" (i.e., corresponding to the toy play set)?	Y	N	N/A
11. Did the RP and researcher transition to the designated toy play area to allow the RP and TP to play with the toys?	Y	N	N/A
12. Was the featured toy out in the designated area available for the RP and TP to pay with?	Y	N	N/A
13. Did the RP and TP stay in the designated toy play area for approximately 7-8 minutes?	Y	N	N/A
14. Does the TP implement some or all of the PIPRT strategies?	Y	N	N/A
15. Once play session (PIPRT strategies) was complete, did the researcher say, "Go play with your friends!" (or something similar)	Y	N	N/A
16. If needed, does the researcher provide 3 or less prompts to the TP to implement the PIPRT strategies (with 1 minute in between each prompt)?	Y	N	N/A
17. Did the entire session last less than 15 minutes?	Y	N	N/A
18. Did the researcher provide minimal assistance when necessary?	Y	N	N/A
19. Did the researcher supervise the intervention?	Y	N	N/A

Adapted from Van Norman (2005)

APPENDIX I

Social Validity Measure for Classroom Teachers

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 having the student's number of social interactions increase is a valid and appropriate goal.						
2. Video modeling was effective at increasing the number of social interactions of the target student.						
3. The combination of the video modeling and peer implemented pivotal response training intervention was effective at increasing the number of social interactions of the target student.						
4. The other peers involved in the intervention benefitted from the use of video modeling.						
5. The other peers involved in the intervention benefitted from video modeling and peer implemented pivotal response training						
6. Other children **not involved** in the intervention benefitted from video modeling.						
7. Other children **not involved** in the intervention benefitted from video modeling and peer implemented pivotal response training.						
8. Video modeling is something I could do in my classroom.						
9. Video modeling and peer implemented pivotal response training is something I could do in my classroom.						

10. Video modeling is something I could do on the playground.						

11. Video modeling and peer implemented pivotal response training is something I could do on the playground.						
12. I would like to learn more about video modeling so I could use it in the future with my students.						
13. I would like to learn more about the procedures for video modeling and peer implemented pivotal response training so I could use it in the future with my students.						
14. I would use video modeling with a new group of students.						
15. I would use video modeling and peer implemented pivotal response training with a new group of students.						
16. Overall, the use of video modeling was appropriate for a preschool setting.						
17. Overall, the use of a combination of video modeling and peer implemented pivotal response training 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

Social Validity Measure for Parents of Research Participants

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 having your child's number of social interactions increase is a valid and appropriate goal.						
2. Video modeling other was effective at increasing the number of social interactions of your child.						
3. The combination of the video modeling and peer implemented pivotal response training intervention was effective at increasing the number of social interactions of your child.						
4. Video modeling is something I could do at home or in the community.						
5. Video modeling and peer implemented pivotal response training is something I could do at home or in the community.						
6. I would like to learn more about video modeling so I could use it in the future with my child.						
7. I would like to learn more about the procedures for video modeling and peer implemented pivotal response training so I could use it in the future with my child.						
8. Overall, the use of video modeling was appropriate for a						

preschool setting.						

9. Overall, the use of a combination of video modeling and peer implemented pivotal response training was appropriate for a preschool setting.						
10. 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 K

Social Validity Measure for Parents of Peer Participants

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 having the student's number of social interactions increase is a valid and appropriate goal.						
2. The combination of the video modeling and peer implemented pivotal response training intervention was effective at increasing the number of social interactions of the target student.						
3. My child benefitted from helping other students use video modeling to increase social interactions.						
4. I would like to learn more about the procedures for video modeling so my child could help others with it in the future.						
5. I would like to learn more about the procedures for video modeling and peer implemented pivotal response training so my child could help others with them in the future.						
6. Overall, the use of video modeling was appropriate for a preschool setting.						
7. Overall, the use of a combination of video modeling and peer implemented pivotal response training was appropriate for a preschool setting.						

8. 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 L

Peer Implemented Pivotal Response Treatment Strategies

Strategy 1: Orient Attention: Paying Attention

Strategy 2: Use Developmentally Appropriate Language: Easy Sentences

Strategy 3: Enhance Motivation by Offering Choices: Give Choices

Strategy 4: Modeling Appropriate and Complex Play Skills: Show Good Playing

Strategy 5: Encouraging Conversation Ask Your Friend to Talk

Strategy 6: Teaching Turn Taking: Take Turns

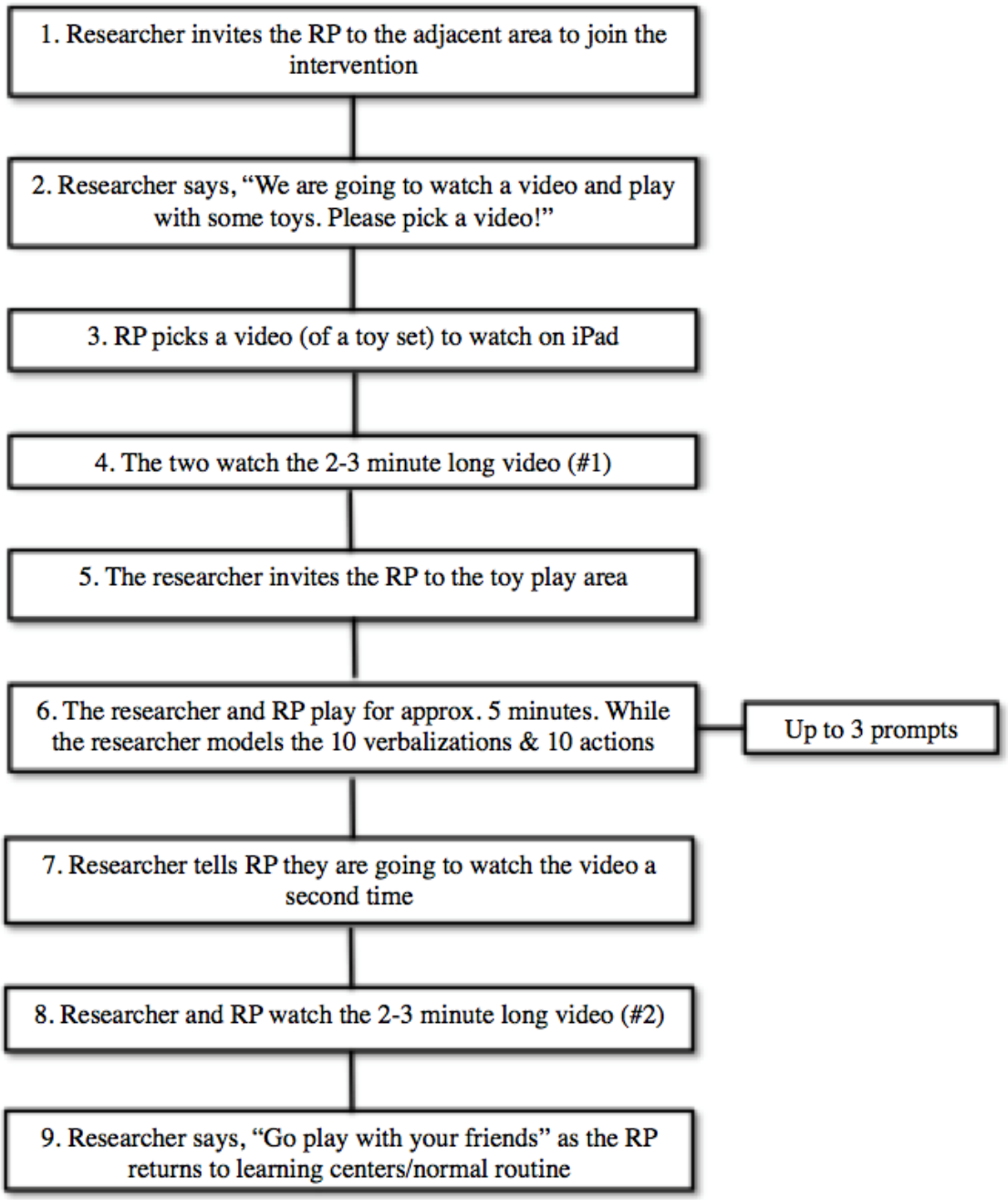
Strategy 7: Reinforcing Appropriate Social Behavior: Good, Nice Try

Strategy 8: Increasing Observational Learning: Tell What You Are Doing

Information from Pierce and Schreibman (2007)

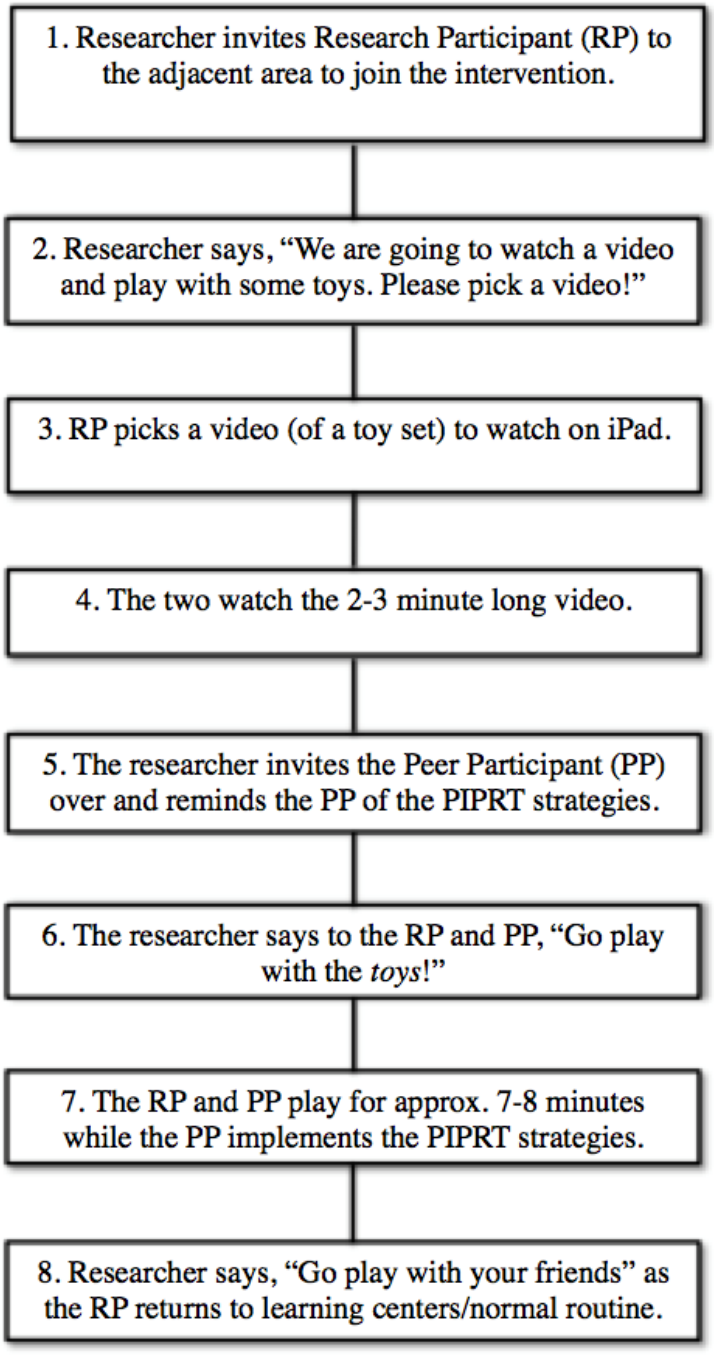
APPENDIX M

Task Analysis of Video Modeling Other (VMO) Performance of Behavior



APPENDIX N

Task Analysis of Video Modeling Other and Peer Implemented Pivotal Response Training (VMO-PIPRT) Performance of Behavior



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