July 2020

THE EFFECTIVENESS OF POINT-OF-VIEW-VIDEO MODELING ON IMPROVING SOCIAL AND COMMUNICATION SKILLS

Beyza Alpaydin

THE EFFECTIVENESS OF POINT-OF-VIEW VIDEO MODELING ON IMPROVING SOCIAL AND COMMUNICATION SKILLS

A Dissertation Presented

by

BEYZA ALPAYDIN

Submitted to the Graduate School of the

University of Massachusetts Amherst in partial fulfillment

of the requirements for the degree of

DOCTOR OF PHILOPHY

May 2020

College of Education

THE EFFECTIVENESS OF POINT-OF-VIEW-VIDEO MODELING ON IMPROVING SOCIAL AND COMMUNICATION SKILLS

A Dissertation Presented

By

BEYZA ALPAYDIN

Approved as the style and content by:

_____

Michael P. Krezmien, Chair

_____

Alexandra Lauterbach, Member

_____

Walter Denny, Member

_____

Jennifer Randall
Associate Dean of Academic Affairs
College of Education

DEDICATION

This thesis is dedicated to mom, dad, and my brothers. I cannot imagine how life looks like without you.

ACKNOWLEDGMENTS

First and foremost, I would like to express my sincere gratitude to my advisor Prof. Michael Krezmien for the continues support of my Ph.D. study for your expertise, assistance, guidance, and patience throughout the process of writing this thesis. Without your help, this dissertation would not have been possible.

Besides my advisor, I would like to thank the rest of my committee members Asst. Prof. Alexandra Lauterbach and Prof. Walter Denny for their encouragement, insightful comments, and suggestions. I also would like to thank Jennifer McIntire for accepting being my supervisor and supporting me every step of this process.

I am incredibly grateful for my mom, dad, and my brothers, for their endless support, encouragement, and love. All of you have inspired me. Without this support and encouragement, I would not have made my dreams come true.

Finally, I would like to thank all my friends who supported me, loved me and helped me this journey. Canan, Ece and Buket were with me whenever I needed. You are always more like a sister to me than a friend. I will always feel very lucky to be a part of my life.

ABSTRACT

THE EFFECTIVENESS OF POINT-OF-VIEW-VIDEO MODELING ON IMPROVING SOCIAL AND COMMUNICATION SKILLS

MAY 2020

BEYZA ALPAYDIN, B.A., ANKARA UNIVERSITY

M.ED., UNIVERSITY OF PITTSBURGH

PH.D., UNIVERSITY OF MASSACHUSETTS AMHERST

Directed by: Professor Michael P. Krezmien

Autism spectrum disorder (ASD) is a complex neurobiological disorder with symptoms that affect individuals' social interaction capabilities, their verbal and nonverbal communications, and the repertoires of activities and interest. These deficits in social and communication skills directly or indirectly influence the individual with ASDs' lives. Therefore, many interventions have been developed to increase social and communication skills for individuals with ASD. Video modeling (VM) is one of the effective interventions in teaching social communication skills for children with ASD. There are multiple variations of VM interventions. One of the forms of VM intervention is point-of-view video modeling (POVVM) that has been potential to address the deficits of social communication skills and improve these skills for children with ASD. In this intervention, videos are filmed from the perspectives of the person who is the target of the intervention. The camera angle is presented with activity, skill, or context. The POVVM directly presents relevant stimuli and eliminates irrelevant stimuli of the target behavior. Thus, the POVVM intervention has provided a clear frame of imitating the behavior. The current study investigated the effectiveness of point-of-view video modeling on improving social initiation skills for young children with ASD. Three preschool-age children with ASD were implemented

multiple-baseline across participants design to improve social initiation skills using point-of-view video modeling intervention. Specifically, the participants were taught greetings and engaging play activity behaviors using POVVM intervention. All participants improved their greetings and engaging play activity behaviors. The result of the study showed that POVVM is an effective intervention for improving social initiation skills. Consideration for interpretation and recommendations for future research are discussed.

Keywords: *autism spectrum disorder (ASD), in-vivo modeling, video modeling, point-of-view video modeling (POVVM), video-self modeling (VSM), single-case design (SCD), social communication, social initiation*

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

Statement of the Problem

Autism spectrum disorder (ASD) is a complex neurobiological disorder with symptoms that affect individuals' social interaction capabilities, their verbal and nonverbal communications, and the repertoires of activities and interest (Bauminger-Zviely et al., 2013). Ganz and collogues (2008) indicated that children with ASD exhibit a lack of social interaction and a lack of language and communication skills. Additionally, they are unable to make eye contact and rarely respond to family members (Ganz et al., 2008).

According to DSM-V (APA, 2013), the impairments of social communication is one of the core symptoms of ASD that involve a lack of social imitation skills such as specific actions with objects or shared attention. Another social impairment is a lack of joint attention skills (such as maintaining gaze or appropriate gestures). Other social impairments include (1) a lack of social attention; (2) failure to attend social stimuli; (3) a lack of facial recognition - such as not recognizing a mothers' faces; and (4) lack of functional and symbolic play - such as not playing with toys symbolically. Also, children with ASD often have significantly delayed verbal and non-verbal communication development (Klinger et al., 2014).

The National Institute of Deafness and Other Communication Disorders (2010) reported that 25% of individuals with ASD were not able to use speech as their communication mode. This deficit continued during the life span (Boesch et al., 2013). Additionally, this communication deficit can cause undesired behaviors in individuals with ASD. Iwata and colleagues (1994) indicated that, according to their functional analysis results, 60 % of 152 individuals exhibited self-injury behaviors, which served as an escape or a means of getting

attention. Because individuals with developmental disabilities struggle to communicate, they sometimes may engage in challenging behaviors (Luiselli, 2006). For instance, they might want to interact with another person (attention), or they might want to terminate the situation (escape) (Luiselli, 2006).

White and colleagues (2006) pointed out that deficits in social skills can directly or indirectly affect the lives of individuals with ASD. For example, according to Bauminger and Kasari (2000), individuals with ASD felt more loneliness than their typically developing peers because of poor social support; thus, they need more social interaction with peers (White et al. 2000). Also, White and colleagues (2006) added that social skills deficits not only influenced academic achievement for individuals with ASD but also increased the risk of peer rejection and social isolation. For this reason, individuals with autism must improve communication skills both to communicate and to develop appropriate social skills (Hardan et al., 2015).

Characteristics of Children with ASD

Children and adults with autism have some deficits, delays, or atypical characteristics in frequency, type, and quality of social interactions and social relationships with other individuals (McConnell, 2002). This characteristic feature is central to the primary issue of the original description of autism, which was Kanner's (1943) description. It has been one of the core diagnoses all of the classification system (McConnell, 2002). A diagnosis of autism is based on three areas: difficulties in reciprocal social interaction, difficulties in communication, and the presence of restricted and repetitive behaviors or interests (Lord & Richler, 2006). According to the DSM-IV and International Classification of Diseases, these behaviors in that area related to autism have been observed before age 3 (Lord & Richler, 2006).

The DSM-V (APA, 2013) organized the autism characteristic features into two main categories: social communication and the presence of restricted and repetitive behaviors (Klinger et al., 2014). Deficits in social communication were assessed in multiple contexts, such as deficits in social-emotional reciprocity. Masi et al. (2017) indicated that the context of social-emotional reciprocity includes (1) the abnormal social approach, (2) deficits of back-and-forth conversation, (3) reduced the sharing of interest, (4) emotions or affect, and (5) deficits in initiating and responding to social interactions. For example, children with ASD have difficulties initiating communication, responding to communication, and continuing communication with other individuals (Ozen, 2015).

The other context of social communication deficit is nonverbal communicative behaviors (such as managing integrated verbal and nonverbal communication, such as establishing eye contact, understanding facial expression, and body language) or deficits understanding and using gestures (Klinger et al., 2014). Rapp and colleagues (2018) indicated that lack of eye contact is a core behavioral feature for autism spectrum disorder (ASD). This characteristic feature is so distinct and recognizable in children between the ages of 2- and 6-months age children who are ultimately diagnosed with autism spectrum disorders.

The last category of social communication deficit is related to developing, maintaining, and understanding relationships in a social context. According to the American Psychology Association (APA) (2013), individuals with autism have difficulties in sharing imaginative play or in making friends. They display an absence of interest in peers (Okamoto et al., 2016). For example, children with autism had significant social deficits in discrete social skills such as social initiations and peer imitations, as well as more complex sequenced social skills, such as pretend play scenarios (Kourassanis et al., 2015).

According to APA (2013), the second main category of the characteristic features of autism is restricted and repetitive behaviors, interests, and activities. According to the DSM V (2013), one of the four categories covers stereotyped or repetitive motor movements, is the use of objects or speech, such as putting in order toys, flipping objects, or echolalia (Rudy, 2019). DSM V indicated that the second category is an insistence on sameness. In this category, individuals with ASD are not flexible about their routines or ritualized patterns of verbal and nonverbal behaviors, such as feeling extreme stress as a result of small changes (APA, 2013). According to APA (2013), individuals with ASD have difficulties with transitions (APA, 2013), such as insisting on eating the same meal every single day. The third category is the abnormal focus of interest, including a strong attachment to unusual objects. Individuals may have a perseverative interest (APA, 2013), such as collecting bulbs. DSM V stated that the last category is a hyperactive response to sensory aspects of the environment. Specific sounds, textures, or visual stimuli such as light or movement and excessive smelling or touching of objects are some examples of this category (APA, 2013).

Social Skills Intervention for Individuals with Autism

According to Boesch and colleagues (2013), the preferred interventions for individuals with ASD mostly (a) target speech and social skills measured by eye contact, (b) number of spoken words, (c) appropriate motor movements, (d) number of interactions, (e) appropriate facial affects, and (f) appropriate content of speech, among other considerations. Therefore, many researchers have developed treatments and interventions to improve these skills for individuals with ASD.

Almost all interventions for individuals with ASD are based on applied behavior analysis (ABA) principles. Early implementation to improve communication skills for individuals with

autism using ABA practices is the verbal behavior, which was the most socially significant human behavior. Language acquisition, social interaction, academics, intelligence, understanding, thinking, and problem-solving are all related to verbal behavior (Sundberg, 2007). In particular, verbal behavior focuses on the meaning of words and their functions. B.F. Skinner created the term "verbal behavior" to describe for individuals with language delay. Individuals firstly learn the function of the words. For instance, if the individuals learn the word "water," they should learn the function of the water. Therefore, verbal behavior is an effective intervention to improve language skills for individuals with ASD and other disabilities. This intervention works for some children but not for all children who had severely limited or non-verbal communication skills.

The other early intervention to improve communication skills was discrete trial training (DTT), which was based on ABA principles. In DTT, an implementer controls all aspects of interventions and uses prompting, fading, reinforcement, and shaping procedures. Although DTT is a very structured procedure, the researchers prefer it because the intervention is very efficient in teaching a very large number of skills, such as the development of speech to children who are completely mute. Additionally, children with autism could improve their skills related to the most critical aspects of language, such as syntax, semantics, and pragmatics (Roger, 2006).

When individuals with ASD do not use verbal communication methods to express their demands and needs, the researchers use other methods to teach them social and communication skills. For these individuals, augmentative and alternative communication (AAC) methods have been used. Thus, individuals with ASD learn to express their demands and wants, and do not need to exhibit challenging behaviors to express themselves. The most preferred AAC

interventions are picture exchange communication system (PECS), voice output, and video modeling (O'Reily et al., 2006).

PECS was developed for children with autism and children with social communication deficits. It is used to teach individuals using prompting, modeling, and shaping a picture system. PECS is the most popular among the AAC strategies because it is not a sign language, so it does not include complex motor movements. Additionally, the system is a cheap and portable. In addition, communication partner does not need complex training to understand what an individual is trying to communicate because the icons on the PECS show both pictures and written descriptions (O'Reily et al., 2006).

Voice output communication aids (VOCA) are used to teach individuals with disabilities to communicate with others. Using VOCAs, the individual presses or switches the button (depending on the device), which activates the recording or synthesizing of a statement of a need or want. The benefit of VOCA is that messages of varying length can be programmed, thereby improving understanding for listeners who may not be familiar with this technology (O'Reily et al., 2006).

More recently, video modeling (VM) strategies have been tried with individuals with social-communication deficits. This approach uses a variety of settings and can be implemented with various populations to teach many types of behaviors, including social interactions, communications, community skills, and motor skills. The videotapes approach includes adult models, and peers support models to teach new skills or improve the use of already acquired skills. This strategy is based on observational learning, so "adults" and "peers" refer to role models on the videotapes. The idea of creating access to target behaviors using at any location

and almost any moment provides a new perspective on the use of modeled behaviors for teaching purposes (Darden-Brunson et al., 2008).

According to Cihak and colleagues (2012), for the success of this communication intervention, the critical factor is the natural environment because it provides opportunities for generalization and maintenance of the skills. Video Modeling (VM) uses a video clip that displays a demonstration of the model engaging the desired behavior in natural settings. They also added that the VM provides positive examples to demonstrate new skills, so professionals have preferred this model when teaching communication, social, and adaptive skills (Cihak et al., 2012).

Video-Based Modeling Intervention

VM is an evidence-based practice for teaching a variety of skills, such as social and communication behaviors for children with ASD. It involves showing a target student a video display of another individual performing a specific behavior related to the same behavior that the child is being taught (Plavnick et al., 2015). According to Plavnick and colleagues (2015), the VM was based on the early work of Miller and Dollard (1941) in observational learning and, on Albert Bandura's later (1977) theory of social learning. During the 1960s, Bandura presented the concept of the observational learning model according to which young children reacted more aggressive behavior toward a toy after watching a same-age model demonstrated aggressive behavior toward the same toy (Sherer et al., 2001). After technological development, researchers used his studies to develop modeling to include the use of video to teach the variety of skills. These skills were followed as included motor behaviors such as swimming, and social behaviors, such as conversation in addition to decrease undesired behaviors or states of mind, such as anxiety (Sherer et al., 2001). Also, according to Shane and colleagues (2012), VM interventions

are well suited to five instruction categories: language concepts, social pragmatics, activities of daily living skills, life skills, and behavior management.

Observational learning theory encompasses two basic concepts: modeling and imitating. Modeling demonstrates the desired behaviors, and imitating reproduces these behaviors (Alzyoudi & Almuhiri, 2014). According to Wilson (2013), video models are a typical picture model exhibiting positive examples of the desired behavior. Wilson added that the video model is individualized accordingly, a child's needs and preferences. Thus, VM provides a targeted learning opportunity for a child that is much more individualized and targeted than merely watching a video or television program.

The VM intervention is one of the preferred teaching methods for an individual with autism among many teachers, parents, and other professionals because watching television is a highly reinforcing activity for children with autism (Banda et al., 2007; Maione & Miranda, 2006; Sherer et al., 2001). Additionally, the VM intervention allows a visual learning opportunity for them (Banda et al., 2007). Also, there are some advantages to the VM intervention. First, VM intervention is not an aversive intervention for individuals with ASD, and thus, many educators and parents prefer these teaching methods (Banda et al., 2007). Second, the VM intervention can be implemented in a variety of settings such as homes, specialized schools or clinics, after-school programs, regular classrooms, and community settings (Maione & Miranda, 2006). Third, the VM intervention is acceptable and cost-efficient for parents and teachers because recorded videotapes/DVDs can be reused (Banda et al., 2007). Fourth, video techniques may be more useful for children who have limited ability to comprehended verbal descriptions and whose visual processing abilities are relatively intact compared to their

auditioning processing skills (Maione & Miranda, 2006). Fifth, the VM intervention increase the independence of children with ASD.

Banda and colleagues (2007) pointed out that VM intervention enhances the social and communication skills of children with ASD. Additionally, many researchers found that VM intervention enhances and facilitates the generalization of social and communication skills. Maione and Miranda (2006) argued that many types of video-based interventions had been targeted at the primary social skills of a fundamental, imitative nature. These skills including greetings, verbal statements, gestures, facial expressions and initiations, requesting desired items or activities, responding in a scripted manner to specific questions and then asking the same questions back in role format, and engaging in scripted conversation.

According to Banda and colleagues (2007), a typical VM intervention consisted of eleven steps. The first step is to identify and select the target behavior that is observable and measurable. The second step is to obtain the necessary permission. The third step is to interview parents and /or teachers and observe the child. The fourth step is to select and train models who demonstrate the target behavior in video clips. The fifth step is to prepare the equipment and setting. The sixth step is to record the target behavior (s). The seventh step is to edit the video to regulate the video clip's time, duration, sounds, and so on. The eight-step is to collect baseline data. The ninth step is to show the video clip involving target behavior. The tenth step is to collect intervention data and graph data to promote the maintenance and generalization of the skills.

There are many ways to implement the VM intervention and, researchers have used adults, peers, or siblings as models for increasing, decreasing, or teaching a diverse set of behaviors (Darden-Brunson et al., 2008). According to the literature, the VM intervention has

been successfully implemented when adults serve as a model for teaching adolescents and young adults daily-living or community skills such as washing dishes/using the dishwasher and withdrawing money from the ATM (Darden-Brunson et al., 2008). Adult models have also been used for preschool-age and school-age children to teach some behaviors such as playing with objects, pretend play skills, grocery shopping, and perspective-taking skills (Darden-Brunson et al., 2008). Peer models have been used for teaching social language skills such as conversation, community skills, social initiation skills, and reciprocal play skills (Darden-Brunson et al., 2008). Siblings models may be preferable for children with autism because siblings may have opportunities to attempt to engage their brother or sister in conversation, play with them as a partner, and teach them play-related statements or pretend play skills. According to Darden-Brunson and colleagues (2008), there are several potential benefits to use siblings as video models, including availability, parental supports, and increased the probability of generalization in home settings.

There are multiple variations of VM interventions, such as traditional video modeling (VM), video-self modeling (VSM), or point-of-view VM (POVVM) (Wilson, 2013). In traditional VM, researchers use adults, siblings, or peers as models in video clips for teaching preferred or target behaviors to the children (Lee, 2015). In the VSM intervention, the individual imitates the target behaviors by observing himself or herself perform a behavior successfully (Bellini et al., 2007). Buggey and colleagues (2011) argued that Bandura's (2001) research supported VSM intervention to promote self-efficacy because it provides the viewer with visual evidence that s/he can accomplish the task. The POVVM or first-person perspective intervention (Lee, 2015) uses videos that are filmed from the perspectives of the person who is the target of

the intervention. It is a novel approach (Moore & Anderson, 2011). In traditional VM and VSM intervention, the viewers watch the entire person as a model.

On the other hand, in the POVVM intervention, the viewers do not watch the entire person as a model (Hine & Wolery, 2006). In this intervention, the viewers watch the target behavior or activity. The POVVM is an effective intervention for reducing problem behavior, increasing play actions, and teaching functional living skills (Moore & Anderson, 2011). According to Tetreault and Lerman (2010), the POVVM plus reinforcement of the specific social skills is the best combination for teaching particular social skills.

Point-of-View Video Modeling (POVVM)

The POVVM aims to reduce irrelevant stimuli in the learning environment. In this type of VM, the camera angle is used to present an activity, skill, or context. Depending on the target skill, the participant might view a specific setting or a pair of hands completing tasking (Tetreault & Lerman, 2010). Additionally, one potential advantage of POVVM is that it further restricts stimuli to those directly related to the target behaviors, and eliminates the necessity of identifying optimal characteristics of the model.

Lee (2015) argued that, based on the individual's perspective, POVVM might better support the learning of the target behaviors than any other type of VM intervention. The author also added that POVVM might facilitate clear imitation, which is one of the handicaps of individuals with ASD. Besides, POVVM recorded from the individual's perspective was more effective, both emphasizing relevant stimuli and reducing the need of the recipient of the intervention.

McCoy and Hermansen (2007) indicated that POVVM was a new model in the educational field. They added that Schreibman and colleagues published the first study of the POVVM intervention in 2000. The authors called the subjective intervention viewpoint without

the use of a model (McCoy & Hermansen, 2007). Moore and Anderson (2010) argued that using the videos in the POVVM intervention based on the perspective of the individual who is the target of the response is a novel approach. However, few studies have been published about POVVM intervention (Moore & Anderson, 2010). The existing studies focus mostly on improving daily living skills, self-help skills, and play skills. According to McCoy and Anderson (2007), the POVVM was effective for teaching play skills (such as pretend play skills), self-help skills (such as functional living skills), and priming students for transitions (such as reducing problem behaviors) for children and adults with ASD.

Although very few studies have been published in this field, the evidence in the studies supports POVVM intervention as an effective method for individuals with ASD (Lee, 2015). On the other hand, VM interventions or VSM interventions were used the most frequently for social skills intervention (Lee, 2015). Only two studies directly examined the effectiveness of POVVM in social skills: Moore and Anderson (2010), and Tetreault and Lerman (2010).

Moore and Anderson's (2010) study investigated maintaining eye contact and, initiating and maintaining scripted social interactions with others. Two preschool-age children and one elementary school-age child with autism participated in the study. The result of the study showed that the target behaviors of eye contact and scripted responses increased for participants. Similarly, Tetreault and Lerman's (2010) study investigated the effectiveness of POVVM interventions in teaching three children with autism to initiate and maintain social interactions. The result of the study showed that the POVVM was sufficient to increase and generalize eye contact among participants. However, the intervention was effective in improving social interactions for only two participants. For the third participant, the prompts were needed to demonstrate the acquisition. Mason et al. (2013) indicated that the effectiveness of the POVVM

intervention in teaching social skills was vague because of the limited research (Lee, 2015). Tetreault and Lerman (2010) pointed out that for a better understanding of the effectiveness of POVVM, future researchers should teach more complex social skills.

Purpose of the Study

Autism is a complex, neurobiological disorder that leads to significant impairments in social communication and interactions area (Bellini et al., 2007). Children with ASD have significant difficulties in social relationships. Many children with ASD resist and reject human contact and social interaction at an early age (Alzyoudi & Almuhiri, 2014). Lee (2015) stated that avoiding human contact and social interaction affects individuals' success in countless different contexts and building of relationships and friendships in the individuals' lifetime. Social skills interventions address the needs of children with ASD (Alzyoudi & Almuhiri, 2014). Therefore, many interventions have been developed to facilitate both adult-child and child-child interactions in young children with autism. These interventions included direct teaching, cooperative learning, providing cues, opportunity teaching, shaping modeling, behavioral rehearsal, peer tutoring, social stories, and video modeling (Alzyoudi & Almuhiri, 2014).

Video modeling (VM) is one of the most effective interventions for teaching social communication skills for children with ASD. In addition, the VM intervention increased child independence because this intervention was low cost and allowed for easy individualization, consistent implementation, and efficient use across professionals and settings (Wilson, 2013). Point-of-view video modeling (POVVM) discussed above is one form of VM that has the potential to address the deficits of social communication skills and improve these skills for children with ASD (Lee, 2015). Therefore, the purpose of the current study was to investigate the effectiveness of POVVM in social initiation for preschool-aged children with ASD.

Research Questions

The following research questions guided the research on the effectiveness of point-of-view-video modeling in improving social interaction skills to children with ASD:

1. Does point-of-view video modeling (POVVM) effectively teach social initiation skills to preschoolers with ASD?
2. In avoiding prompts, how does point-of-view video modeling (POVVM) provide independent attempts at social initiation skills?

Definition of Key Terminology

Autism spectrum disorder (ASD): ASD is a neurodevelopmental disorder characterized by impairments in social and communication behaviors as well as a restricted range of activities and interest (Klinger et al., 2014)

In Vivo Modeling: An observational technique in which children observe and imitate the target skill performed by an adult or peer in real time (Darden-Brunson et al., 2008)

Point-of-view video modeling (POVVM): POVVM involves recording tapes using the perspective of the person who is the target of the intervention and showing him or her the target behavior from the viewer's vantage point but without showing the entire person who is modeling the behavior (Hine & Wolery, 2006).

Single case design: Single case design or single-subject design (SSD) is a type of experimental research design. Its purpose is to establish a casual or functional relationship between dependent and independent variables (Horner et al., 2005).

Social Communication: The use of language in social context

Social initiation: An action to commence a social interaction or conversation, such as question asking (Kouo, 2016).

Social interaction: An exchange between two or more individuals such as sharing an interest.

Video Modeling (VM): A video modeling intervention typically involves an individual watching a video demonstration and then imitating the behavior of the model (Bellini et al., 2007).

Video-self modeling (VSM): The target child serves as the model and watches himself or herself performing the target behavior accurately and independently (Darden-Brunson et al., 2008)

CHAPTER II

LITERATURE REVIEW

I conducted a systematic methodological review of the research in order to understand the current state of video modeling (VM) intervention studies. The methodological review allowed me to identify the studies in evaluating methodological accuracy. A methodological review was necessary for this study because there was not a substantive body of research conducted, and the methodological quality of the studies was critical to accepting or rejecting the current findings. Additionally, the methodological review process ensured that the study I conduct aligned with the quality indicators in VM intervention studies and that professionals could accept and use the associated findings. Finally, I reviewed the results from the literature after the methodological review to help me to evaluate how much confidence I could have in several findings.

Search Procedure

For this systematic literature review, I examined the research studies published from 1990 to 2017 that examined social communication using VM interventions for children with autism spectrum disorders (ASD). I used the year 1990 as the beginning of the search because the VM intervention was created based on Bandura's social learning theory in the 1990s (Wilson, 2013). Many studies were identified through multiple electronic databases including EBSCOhost, PsychInfo, Academic Research Complete Education Resources Information Center (ERIC), Education Source, Google Scholar, and the University of Massachusetts library catalog using keywords "social," "communication," "autism," "video," and "ASD." I eliminated dissertations, book chapters, reports, video records, news articles, and conference papers. Additionally, I excluded the articles in languages other than English. My research yielded articles in 4640 peer-reviewed journals in the English language. I reviewed the titles and abstracts of studies to

determine if the studies included VM and students with autism. As a result of this process, I found a total of 136 eligible articles.

Inclusion Criteria

I used five inclusion criteria to determine which articles would be included in this methodological review. My inclusion criteria were as follows: (a) empirical research, including single-subject research, qualitative research, quantitative research, experimental research, and mixed-method research; (b) video modeling, including video-based intervention, point-of-view video modeling (POVVM), video-self modeling (VSM), video modeling (VM), and other types of interventions using with video modeling together (e.g., PECS combined with video modeling), (c) PreK, that is four-, five-, or six-year-old children (d) autism/ ASD/ at-risk group, including children with autism, Asperger syndrome, Rett syndrome, PDD-NOS, and childhood disintegrative disorder, as well as children at risk for autism, and e) social/communication skills, including social interaction, social initiation, facial expressions, social cues, imitation play skills, functional play skills, role play skills, and sharing items, activities or interest

I examined the abstracts of the studies based on the inclusion criteria. I transferred 136 articles' abstracts into a database and included a column for each indicator. I coded each abstract with 1 when met the criteria, and I coded 0 for each abstract when did not meet the criteria. Two Ph.D. students worked as independent reviewers and coded each of the abstracts according to each of the inclusion criteria. These Ph.D. students assessed whether the 136 identified abstracts met the inclusion criteria. The percentage of agreement was 100% for the inclusion of empirical study, 85% for the inclusion of VM, 96% for the inclusion of PreK, 100% for the inclusion of autism spectrum disorder (ASD), and 68% for the inclusion of social/communication skills. Then, I met with the reviewers to discuss the areas in which our assessment disagreed.

Consequently, we applied a standard of 100% agreement with all criteria. As a result of this revision, I discarded 67 studies from 136 articles because they did not meet all of the inclusion criteria.

After this revision, I examined the remaining 69 articles based on the purpose and method of the studies. In this examination, my inclusion criteria were the same previous criteria but empirical research. I used "single-case design" as a criterion instead of empirical research, and thus, I added only a single-case design study. I also added "settings" as an inclusion criterion. I excluded home setting studies. I used the same coding system. I coded 1 when the study met the inclusion criteria and coded 0 when it did not meet the inclusion criteria. One Ph.D. student, as an independent reviewer, coded each of the studies for each of the inclusion criteria. The independent reviewer identified the 69 studies as appropriate to the inclusion criteria. The percentage of agreement was 100% for the inclusion of single-subject design, 100% for the inclusion of settings, 80% for the inclusion of PreK, 100% for the inclusion of video modeling, 100% for the inclusion of ASD, and 75% for the inclusion of social/communication skills.

Similarly, after this revision, I met with the reviewer to discuss areas where we disagreed. As a result of the discussion, we applied a standard of 100% of agreements for all the criteria. At the end of the revision, ten studies met all of the inclusion criteria. I also considered ten articles' reference lists of identified studies for additional possible inclusion. I obtained one more study that met the inclusion criteria. After all these examinations, I yielded eleven articles.

Criteria for Indicators

Eleven peer-reviewed studies were included in the literature review. All studies were regarding effectiveness of video modeling intervention on the improvement social or communication skills for PreK children with ASD. When I analyzed the each of the studies in

the literature review, I found that the authors of the studies developed different types of interventions such as PECS and video modeling using with together. Two of the eleven studies were about comparing video modeling with in vivo modeling. Four of the eleven studies were regarding video-self modeling. Two studies in the literature review were about video modeling combining with another intervention. One study was about peer-video modeling. The rest of the three studies were regarding video modeling. The methodological review was conducted for each article included in the literature review.

Coding System

I modified eleven indicators using a process to examine the studies for the methodological literature review. These indicators allowed me to establish the methodological quality of the eleven research articles. These quality indicators were as follows: (1) participant, (2) context and setting, (3) research design, (4) baseline and intervention, (5) instrument, (6) dependent variable and outcome measures, (7)independent variables, (8) experimental control, (9) fidelity of implementation, (10) data analysis, and (11) social validity. Each indicator consisted of components related to the indicators that helped me to evaluate whether or not the study met the criteria for the indicators.

I developed the quality indicators based Mulcahy and colleagues' study (Mulcahy, Krezmien, & Travers, 2016). I adapted indicators from the study as well as created some indicators as appropriate to the methodological review of the study. For example, Mulcahy and colleagues (2016) study used nine indicators and I adapted all indicators in the current methodological review. In addition, I developed an instrument indicator and an independent variable indicator. Clearly, description of independent variables is one of the requirements of the single-case design (SCD). According to Horner et al. (2005), independent variables in SCD

provides not only valid interpretation of the result but also accurate replication of the procedures. Therefore, independent variables are among one of the quality indicators of the methodological review. The other quality indicator is instrument, which is important in SCD because it provides the functional relationships between results and intervention (Wang & Parrilla, 2008). Moreover, the instruments used in SCD need to be clearly described for the replicability of the procedure.

I developed descriptive components for the indicators consisting of the recommendations for quality indicators. These eleven indicators ensured the sufficient measurement of the methodological quality of the studies. For instance, in the participant indicator, I have implemented all components to the same in the original study except IQ score and achievement score. I replaced the IQ score with the diagnostic/adaptive and functional score because Mulcahy and colleagues (2016) study was evaluated according to the math improvements of individual with emotional/behavioral disorders' (EBD). However, I evaluated the social communication skills of children with ASD. Therefore, "IQ" score was not an appropriate component for the current study because for children with ASD were given a diagnostic, adaptive, or functional score rather than an IQ score. I also replaced achievement score with the language score; I focused on social and communication skills for children with ASD, so language score was explicitly more important as a component than the achievement score. Also, I evaluated the functional and adaptive score under a different component, so the achievement score was useless in the methodological review. For this reason, the final component of the participant indicator is language score. The eleven studies were evaluated according to 11 standards with 53 essential components.

Inter-Rater Reliability Agreement

The coding process involved many steps. First, I reviewed the articles and entered the descriptions in the field as appropriate the indicators. These descriptions of fields played an essential role in evaluating and coding the methodological components. Coding was entered carefully based on these descriptions of the indicators in the articles. The 53 essential components related to the indicators, and these articles were evaluated based on the components created for the methodological review. Second, after this reviewing and coding of all components of each of the eleven articles, a Ph.D. student reviewed and coded these articles as an independent reviewer. She coded and entered each article based on the description of the quality indicators. Third, the independent reviewer sent me the document for calculating the reliability of the coding. Both documents had a high agreement in terms of the reliability: 98.94% of agreement. There was only one item where disagreement occurred. Finally, the first author and the reviewer met to discuss this item. After discussing the item, they determined the correct code for achieving 100% of agreement.

Standard 1: Participant

Research studies must provide detailed and precise information about the participants (Wang and Parrilla, 2008). Clear and specific information about participants allows replication or the generalization of the research findings to a broader group of students with the same characteristics (Wang and Parrilla, 2008). Clear and thorough descriptions are especially crucial for single-case designs (SCDs) because these designs include one or a small number of participants so, this type of design requires rich participant descriptions within (Horner et al., 2005).

For my review, I used to the participant quality indicators standard developed by Mulcahy et al. (2016). The participant standard involves nine components: (a) disability or risk status is described; (b) method for determining disability or risk status is described; (c) process for selecting participants is described with replicable precision; (d) age; (e) race; (f) grade; (g) gender; (h)diagnostic/adaptive and functional score; and (i) language score. I adapted two of the components from Mulcahy et al., (2016). They used "IQ score" as one of the essential components, and I replaced that components with "diagnostic/adaptive/functional score" instead of "IQ score" because I work children with ASD in my study. The other component I adapted was "achievement score." I replaced that components with "language score" because my work is with communication and language skills.

Review of Indicator by Study

Table 1 displays the components for the Participant Indicator for each of the studies. The authors of just one of the studies (Wilson, 2013) met the criteria for all components of the Participants Indicator. Authors of four studies (Apple et al., 2005; Bellini et al., 2007; Buggey, 2012; Plavnick & Vitale) met eight out of nine components. These five studies demonstrated quite rigorous participant descriptions consistent with high-quality SCD studies (Horner et al., 2005). For example, Apple and collegues (2005) study had a quite sufficient description of the participant. The study described the participant as, "Alex, the third participant, attended the same school's integrated kindergarten. At 5 years 9 months, Alex, who had been diagnosed with Asperger syndrome, scored in the moderately high range on the PPVT-III, with a standard score of 125 and an age equivalent of 8 years 2 months. Alex received a rating of 4, or just under average, as compared to his peers. Alex's parents and teacher reported that Alex was able to engage in reciprocal conversation with adults and peers, mostly when it involved a topic of high

interest to him, particularly science. He most often spoke about items of interest to him, namely, science topics. The student interview revealed that Alex could not explain the meaning of a "compliment" or give any of his examples of complimentary statements." (Apple et al., 2005).

Authors of three of the eleven studies (Buggey et al., 2011; Cihak et al., 2012; Plavnick et al., 2015) met criteria for seven of the components. Two of those authors (Buggey et al., 2011; Plavnick et al., 2015) failed to include an adequate description of the method for determining disability or risk status. The failure to describe the process for determining disability is a critical error, as the identification process for autism is crucial for understanding the skills and challenges of the respective participants. Cihak et al., (2012) failed to describe the process for selecting participants, which significantly inhibits replication. Authors of three of the articles (Buggey et al., 2011; Cihak et al., 2012; Plavnick et al., 2015) failed to include race. Consequently, the authors left out aspects of the participant description that are important for replicating and generalizing the findings.

Authors of two of the eleven studies met the four out of nine components (Jones et al., 2014; Wert & Neisworth, 2003). Jones et al. (2014) and Wert and Neisworth (2003) indicated information about the participants such as method for determining disability or risk status, process for selecting participants, race, diagnostic/adaptive and functional score, and achievement (language) score. Simpson and Ayres (2004) study met only three of the nine components. The researchers mentioned the participants' disability or risk status, age, and gender information. Each of these three studies failed to provide adequate participant descriptions, which prevents replication but also limits our ability to interpret their findings.

Review of the Articles by Indicator Components

Table 1 also shows that all studies met disability or risk status and age components of the standard and, adequately informing the reader about disability or risk status, age, and gender of the participants. Authors of all but one of the studies (Simpson & Ayres, 2004) met the criteria for the grade component, and authors of all but three of the studies (Jones et al., 2014; Simpson & Ayres, 2004; Wert & Neisworth, 2003) met criteria for the diagnostic/adaptive and functional score component of the standard. Seventy-five percent of the studies met the diagnostic/adaptive and functional score component, which is positive because of the importance of diagnostic tests in understanding the skills and limitations of students with autism**.**

Authors of seven of the studies included an adequate description of the method for determining disability or risk status. For example, in Wilson's (2013) described disability or risk status in this manner, "She was diagnosed with autism at 4 years of age and was also diagnosed with microcephaly and metopic craniosynostosis at 5–6 months of age." Authors of seven studies including Wilson (2013), also included adequate descriptions of the process for selecting participants. Wilson (2013) created the following inclusion criteria for selecting participant: "(1) an existing diagnosis of ASD assigned by a licensed psychologist or physician; (2) school-based service provision under the category of autism; (3) vision and hearing acuity within normal or corrected-normal ranges; (4) ability to visually attend to a video for 3 min, as demonstrated during a preparticipation trial; (5) basic imitation skills, as exhibited during pre-participation assessment; and (6) enrollment in a local public preschool program." Authors of seven studies also included language scores. For instance, Wilson's (2013) described language scores as "Receptive language was a relative strength for Selena, placing her in the 25–27 months age

range across the MSEL and PLS-4. However, expressive language was an area of relative weakness, as she scored in the 10–14 months age range across the MSEL and PLS-4."

According to Wang and Parrilla (2008), selection criteria provided specific standards about what kind of characteristics the participants exhibited and that how they were selected. Similarly, the diagnosis of ability level is essential for implementing the interventions' efficacy (Wang & Parrilla, 2008). Also, the relevant information about abilities of participants with ASD (such as language abilities or index of social interaction) should be provided in detailed because children with ASD is a heterogeneous group, and the abilities of children within subgroups of ASD can be diverse. For this reason, children with ASD with different level abilities can respond differently (Wang & Parrilla, 2008). Hence, detailed information about the abilities of participants with ASD is necessary for not only replication of the procedure but also an assessment of generalizability. Smith et al. (2007) indicated that researchers were able to ensure faithfulness of ASD diagnosis by using standardized diagnostic tools such as CARS (Childhood Autism Rating Scale), ADOS (Autism Diagnostic Observation Schedule), or DSM- IV. Using one of these tools is one of the quality indicators that supports the diagnosis of psychiatrist, psychologist, or pediatrician, as it can provide the accuracy of the standardized tools' diagnosis (Wang & Parrilla, 2008). These three criteria (process for selecting participants is described with replicable precision; diagnostic/adaptive and functional score; and language score) of the quality indicators ensure that the reader understands the learning, functional, and behavioral characteristics in a manner that supports replication and acceptable findings.

Authors of just three studies included a description of race (Bellini et al., 2007; Plavnick & Vitale, 2016; Wilson, 2013). These authors provided thorough description of the participants, but their inclusion of race is crucial as the field is increasingly examining the importance of race

in the identification and prevalence of autism (Travers & Krezmien, 2018; Travers, Krezmien, & Mulcahy, 2015). Failing to include race may affect how well the reader can generalize findings. For example, Wilson's (2013) described the participant race as, "…Selena was an African female adopted by Caucasian-parents."

Table 1: Participant Indicator

Main Authors	1	2	3	4	5	6	7	8	9	MC
Apple (2005)	1	1	1	1	0	1	1	1	1	9/8
Bellini (2007)	1	1	1	1	1	1	1	1	0	9/8
Buggey (2011)	1	0	1	1	0	1	1	1	1	9/7
Buggey (2012)	1	1	1	1	0	1	1	1	1	9/8
Cihak (2012)	1	1	0	1	0	1	1	1	1	9/7
Jones (2014)	1	0	0	1	0	1	1	0	0	9/4
Plavnick (2015)	1	0	1	1	0	1	1	1	1	9/7
Plavnick (2016)	1	1	0	1	1	1	1	1	1	9/8
Simpson, (2004)	1	0	0	1	0	0	1	0	0	9/3
Wert (2003)	1	0	0	1	0	1	1	0	0	9/4
Wilson (2013)	1	1	1	1	1	1	1	1	1	9/9
Sum	11	6	6	11	3	10	11	8	7	

1= disability or risk status is described, **2=** method for determining disability or risk status is described, **3=** process for selecting participants is described with replicable precision, **4=** age, **5=** race, **6=** grade, **7=** gender, **8=** diagnostic/adaptive and functional score, **9=** achievement (language) score, and **MC=** meets criteria

Standard 2: Context and Setting

Research studies must be described the context and physical settings with a replicable procedure in order to meet the standard of a rigorous study (Horner et al., 2005; Mulcahy et al., 2016). Authors of studies must provide sufficient detail regarding the critical features of the settings to allow other researchers to identify similar settings (Mulcahy et al., 2016). Structuring the setting in a consist way can establish the functional relationship between the results and intervention more clearly (Wang and Parrilla, 2008). Therefore, the setting description is important, and it is one of the quality indicators for SCD. I used the Context and Setting Indicator standard also developed by Mulcahy et al. (2016). The context and setting standard involves only one component, which is setting description outlined with the replicable procedure.

Review of Indicator by Study

Table 2 displays the components for the Context and Settings Indicators for each of the studies. All but one (Wert & Neisworth, 2003) of the studies met the component of the Context and Settings Indicators. These eleven studies provided quite rigorously the context and setting descriptions needed for high-quality SCD studies (Horner et al., 2005). For example, Cihak et al. (2012) study described the intervention settings as, "The study occurred in an elementary school in a small public-school system in the southeastern United States. More than 650 students, preschool through fourth grade, were enrolled and 50 faculty and staff members were employed at the school. The school was structured in an open pod system, with four to five classrooms in each pod. Participants in this study enrolled in a special education developmental preschool classroom with a total of 8 children One certified special education teacher, one paraprofessional, one nurse, and one intern were assigned to this classroom. Data also were collected within three inclusive preschool classrooms during the time. Amy and Ben were in the same classroom, Carl was in a second classroom, and Doug was in a third classroom. Each classroom was assigned one certified teacher and one paraprofessional with class sizes ranging from 15 to 18 students." According to Horner et al. (2005), the context and outcomes were clearly described so, the study included all possible benefits under all conditions such as where the intervention should be used.

Review of the Articles by Indicator Component

Table 2 also shows that all studies, but one met the component of the setting description described with the replicable procedure. It was positive to see that 92% of the studies met the component of the Context and Setting Indicator, the replicable importance of the procedure for the setting in single-case design (SCD) allows demonstration of efficacy in the other typical

setting. Authors of one study (Wert & Neisworth, 2003) did not meet the criteria of the Context and Setting Indicator. In the Wert and Neisworth (2003) study, the authors mentioned that the data was collected in the school playground. However, they did not provide specific information about the school setting such as school location, staff, or the participants' peers. A clear and detailed description of the setting is also essential for generalization of the studies' findings. Baer et al. (1968) indicated that the learning behavior could not be generalized automatically, so researchers must implement another procedure for the generalization of the learning behavior. Baer and colleagues (1968) pointed out that for changing behavior, effective intervention in one setting could be repeatedly implemented in other settings. Hence, the description of the setting is important to provide conditions similar to those in the other settings of the generalization. If the setting descriptions fail to provide a replicable procedure, they may affect the implementation of the generalization for the findings

Table 2: Context and Setting Indicator

Main Author	1	MC
Apple (2005)	1	1/1
Bellini (2007)	1	1/1
Buggey (2011)	1	1/1
Buggey (2012)	1	1/1
Cihak (2012)	1	1/1
Jones (2014)	1	1/1
Plavnick (2015)	1	1/1
Plavnick (2016)	1	1/1
Simpson, (2004)	1	1/1
Wert (2003)	0	1/0
Wilson (2013)	1	1/1
Sum	10	

1= The setting description is described with replicable precision, **MC=** Meeting the criteria

Standard 3: Research Design

Research design provides a functional relationship between the intervention and the outcomes (Wang and Parrilla, 2008). Researchers must describe the research design clearly and

in detailed in order to meet the requirements in SCD. Research design also must allow the replication of the experimental effect. Studies have indicated that in SCD, replication of the experimental effects could occur within the studies (Nock, Mitchel, & Photos, 2007, pp. 341). Also, research design demonstrates how interventions are implemented in the studies and decrease the threats to internal validity (Wang & Parrilla, 2008).

For my review, I used the Research Design quality indicator standard developed by Mulcahy et al. (2016). The research design standard involves five components: a study (a)includes clearly defined casual research questions or hypotheses; (b) employs one of the single- case designs: (c) includes a small number of participants; (d) collects repeated measures over time; and (e) includes graphics and visual analysis of data.

Review of Indicator by Study

Table 3 displays the components for the Research Design Indicator for each of the studies. Authors of the eight studies met the criteria for all components of the Research Design Indicators. Authors of the four studies (Bellini et al., 2007; Buggey et al., 2011; Buggey, 2012; Wert & Neisworth, 2003) met four out of the five components. Almost, all studies met the criteria for the Research Design Indicators, and these studies demonstrate that the research design descriptions meet the high-quality standards required for SCD studies (Horner et al., 2005). For example, Simpson, Langone, and Ayres (2004) study reported using a multiple probe design across students to address to the research question: "Does CBI (computer-based intervention) effective using with video modeling offer a customizable, recyclable, engaging and efficient strategy for teachers of students with autism?" The research questions were clearly defined, and a multiple probe design across students was appropriate for addressing the research question.

Review of the Articles by Indicator Components

Table 3 shows that all studies met the requirements of SCD, included a small number of the participant, collected repeated measure over time, and included graphics and visual analysis data components of the standard. For instance, Simpson and colleagues' (2004) study indicated that they used multiple probe design across students. They explained that they used this type of design because they were assessing the effects of the computer-based video models on the target social skills. Also, the authors pointed out the collection of baseline and intervention data clearly and they scheduled for data collection time. Additionally, they showed the results in the graphics for visual analysis. All but four of the studies (Bellini et al., 2007; Buggey et al., 2011; Buggey, 2012; Wert & Neisworth, 2003) met "the study includes clearly defined casual research questions or hypotheses" component. These four studies did not have explicit research questions or hypothesizes. For example, in the Bellini, et al. (2007) study did not clearly describe the research design. They mentioned what type of multiple baseline design across participants research study they used it. Additionally, they employed repeated measures over time, reported baseline and intervention performance for each participant, and provided graphed data for visual analysis. The authors did not indicate the research hypothesis or the research questions in the study. Farrugia and colleagues (2009) indicated that researchers could focus on improving relevant research questions, hypotheses, and objectives for research studies because relevant research questions or hypotheses affected the success of the research projects, interpretation of research results, and efforts of the future publication. For this reason, failing to include clearly defined casual research questions or hypotheses may affect how well the reader could be the interpretation of the findings.

Table 3: Research Design Indicator

Main Authors	1	2	3	4	5	MC
Apple (2005)	1	1	1	1	1	5/5
Bellini (2007)	0	1	1	1	1	5/4
Buggey (2011)	0	1	1	1	1	5/4
Buggey (2012)	0	1	1	1	1	5/4
Cihak (2012)	1	1	1	1	1	5/5
Jones (2014)	1	1	1	1	1	5/5
Plavnick (2015)	1	1	1	1	1	5/5
Plavnick (2016)	1	1	1	1	1	5/5
Simpson (2004)	1	1	1	1	1	5/5
Wert (2003)	0	1	1	1	1	5/5
Wilson (2013)	1	1	1	1	1	5/5
Sum	7	11	11	11	11	

1= the study includes clearly defined casual research questions or hypotheses, **2=** employs one of the single-case designs, **3=** includes a small number of participants, **4=** collects repeated measures over time, **5=** includes graphics and visual analysis of data, and **MC=** meets the criteria

Standard 4: Description of Conditions

In SCD, researchers compare the effects of an intervention performance with a baseline condition (Horner et al., 2005). They expect that the baseline performance to change as a result of the intervention condition. Therefore, clear and detailed descriptions of the baseline condition and intervention condition are one of the requirements of SCD. Also, when researchers sufficiently describe baseline and intervention conditions, other researchers can replicate the procedure of the treatment (Horner et a., 2005). Mulcahy and colleagues' (2016) study indicated that the description of the baseline and intervention conditions must be reported with a replicable procedure to ensure methodological strictness so that order researchers can replicate the interventions with fidelity.

In my review, I used the description of the condition quality indicator standard developed by Mulcahy et al. (2016). The description of the condition standard involves five components: (a) procedure are described with replicable precision; (b) baseline conditions are clearly

described with replicable precision; (c) intervention conditions are described with replicable precision; (d) all materials are described with replicable precision; and (e) all training and qualifications associated with implementation of the intervention are described with replicable precision.

Review of the Indicator by Study and Review of the Articles by Indicator Components

Table 4 exhibits the components for the Description of the Conditions Indicator for each study. Table 4 also shows that each study met each component of the standard. All studies met the components of the Description of the Condition Quality Indicators and, demonstrated quite rigorous descriptions of the conditions consisted with high-quality SCD studies (Horner et al., 2005). In addition, all studies explicitly described treatment conditions so that they provided replication of each component of the standard (Mulcahy et al., 2016). For example, Cihak and colleagues' (2012) study reported that the study procedure consisted of a baseline and intervention condition. The authors described each phase (such as the baseline of the procedure) step-by-step and very clearly. The authors described the baseline phase as follows: "Baseline data were collected for three sessions. During baseline conditions, students were provided 10 opportunities to exchange a picture card with a teacher to initiate the request of a desired item. The interning teacher and student sat facing one another at a half-circle table or on the floor. The relevant picture, either on the table or on a Velcro strip on a notebook, was positioned directly in front of the child within easy reach. The interning teacher placed a highly desired item (snack or toy) about 3-feet away from the child and held out her hand, palm up. A wait time of 30s was provided to allow the student time to independently place a picture card in the interning teacher's outstretched hand. During this time, no verbal or physical prompts were provided by the teacher." The authors also explained the intervention procedure in a very clear and detailed

fashion. The intervention procedure consisted of the either PECS (Picture Exchange Communication System) only or VM (video modeling) plus PECS sessions. The authors described each session step-by-step in detail, as with the baseline session, ensuring the procedure was replicable

Table 4: Description of Conditions Indicator

Main Authors	1	2	3	4	5	MC
Apple (2005)	1	1	1	1	1	5/5
Bellini (2007)	1	1	1	1	1	5/5
Buggey (2011)	1	1	1	1	1	5/5
Buggey (2012)	1	1	1	1	1	5/5
Cihak (2012)	1	1	1	1	1	5/5
Jones (2014)	1	1	1	1	1	5/5
Plavnick (2015)	1	1	1	1	1	5/5
Plavnick (2016)	1	1	1	1	1	5/5
Simpson, (2004)	1	1	1	1	1	5/5
Wert (2003)	1	1	1	1	1	5/5
Wilson (2013)	1	1	1	1	1	5/5
Sum	11	11	11	11	11	

1= procedures are described with replicable precision, **2=** baseline conditions clearly described with replicable precision, **3=** intervention conditions were described with replicable precision, **4=** all materials are described with replicable precision, **5=** all training or qualifications associated with implementation of the intervention are described with replicable precision, and **MC=** meets the criteria

Standard 5: Instrument

As a generic term, instrument refers to a measurement device by researchers. According to Wendt and Miller (2012), a well-designed instrument is important because it would provide a way of sufficiently assessing the overall advantages and limitations of research. A well-designed instrument also prevents threats to internal validity regarding instrumentation (Kratochwill et al., 2010).

In my review, I used the instrument quality indicator standard developed by Horner et al. (2005) and Travers and Krezmien (2018). The instrument standard involves four components: (a) instrument source described; (b) instrument validity/reliability described; (c)instrument training described; and (d) instruments administration described.

Review of Indicator by Study

Table 5 displays the components for the Instrument Indicator for each of the studies. The authors of just one of the studies (Apple et al., 2005) met the criteria for all components of the Instrument Indicator. Authors of three other studies (Buggey et al., 2011; Jones et al., 2014; Plavnick & Vitale, 2016) met the three out of four components of the standard. These four studies applied an instrument standard in SCD studies. For example, Apple and colleagues' (2005) study reported that the instrument of the study was as appropriate to the instrument standard. The study involved two experiments, so the authors described each of the instruments for each experiment. The authors used video clips for both experiments. Therefore, they described the content of the video clips.

Authors of three of the eleven studies (Cihak et al., 2012; Simpson et al., 2004; Wilson, 2013) met criteria for two of the components. Two of those authors (Cihak et al., 2012; Simpson et al., 2004) failed to include an adequate description of the instrument validity and reliability. This failure of the component influences the instrumentational threats to the internal validity of studies such as Simpson and Ayres (2004) and Wilson's (2013) studies.

Three studies met the two out of four components of the standard. These studies were as follows: Cihak and colleagues (2012), Simpson and Ayres (2004), and Wilson (2013) failed to describe instrument training, which critical to part for the implementation of the procedure. Additionally, Cihak et al.'s (2012) study failed to describe the instrument administration, and Wilson (2013) study failed to describe the instrument source.

Authors of three of the studies (Buggey, 2012; Plavnick et al., 2015; Wert & Neisworth, 2003) met the one out of the four components of the standard. These three studies met only the first component, "instrument source described." Bellini and colleagues (2007) met none of the

components of the Instrument Standard. Each of these four studies failed to provide adequate instrument description. For this reason, the instrument process cannot be replicated in other studies.

Review of the Articles by Indicator Components

Table 5 shows that all but two (Bellini et al., 2007; Wilson, 2013) studies met the description of the instrument source component of the standard. These nine studies informed the reader adequately regarding the source of the instruments. For example, Apple and colleagues (2005) study described the video content as follows: "Video actors were chosen based on teachers' impressions of the participants' positive relationships to the peers as revealed in the pre-study questionnaires."

Authors of the six studies (Apple et al., 2005; Buggey et al., 2011; Jones et al., 2014; Plavnick et al., 2015; Plavnick & Vitale, 2016; Wilson, 2013) met the components of the description of the instrument administration. For instance, Plavnick and colleagues' (2015) study described the video administration as follows: "The videos used during the sharing condition depicted a model approaching a peer while holding an item known to be preferred by participants (e.g., toy computer) and emitting a vocal invitation for the peer to join the model. The peer agreed, and the model immediately shared the item with the peer while the two interacted with the item together." Authors of five studies (Apple et al., 2005; Buggey et al., 2011; Jones et al., 2014; Plavnick et al., 2015; Plavnick & Vitale, 2016) met the description of instrumentation training component of the standard. For example, Plavnick and Vitale's (2016) study indicated that the first author trained the therapist on the implementation of the video-based and vocal mand training procedures, which was the subject of the study's investigation. Descriptions of the

training and administration of the instrument are necessary so that the reader can understand how the instrument can be used and administered during the intervention.

Authors of just two studies (Apple et al., 2005; Wilson, 2003) included a description of the instrument validity and reliability. For instance, Wilson's (2013) study reported that the author implemented preference assessment for determination of intervention context. Similarly, Apple and colleagues' (2005) study implemented pre- and post-questionnaire and preference assessment for determining the social skills and the peers preferred by the participants preferred to play with them. These studies provided the validity and reliability of the instruments.

Table 5: Instrument Indicator

Main Authors	1	2	3	4	MC
Apple (2005)	1	1	1	1	4/4
Bellini (2007)	0	0	0	0	4/0
Buggey (2011)	1	0	1	1	4/3
Buggey (2012)	1	0	0	0	4/1
Cihak (2012)	1	0	1	0	4/2
Jones (2014)	1	0	1	1	4/3
Plavnick (2015)	1	0	0	0	4/1
Plavnick (2016)	1	0	1	1	4/3
Simpson, (2004)	1	0	0	1	4/2
Wert (2003)	1	0	0	0	4/1
Wilson (2013)	0	1	0	1	4/2
Sum	9	2	5	6	

1= instrument source described, **2=** instrument validity/reliability described, **3=** instrument training described, **4=** instrument administration described, and **MC=** meets the criteria

Standard 6: Dependent Variable and Outcomes

The dependent variable (DV) involves measurement of the target behavior that the researchers aim to change with the implementation of the independent variable (IV) (Wang and Parrila, 2008). In SCD, researchers use one or more dependent variables, and these variables mostly are observable behaviors (Horner et al., 2005). Therefore, Horner and colleagues (2005) indicated that for high-quality of the implementation SCD, the DV must be involved operational definition repeated measuring, assessment of the records for consistency, and socially

significance. Hence, researchers need to define all target behavior with minimum error, and these measured behaviors have to be connected to the socially desired results that they are chosen to represent (Wang and Parrilla, 2008).

In my review, I used the dependent variable and outcomes indicator standard developed by Mulcahy et al. (2016). The DV involves six components: (a) DV are systematically measured repeatedly over time; (b) Inter-observer agreement (IOA) is collected in each phase; (c) IOA data is collected in 20% of sessions; (d) IOA data meets the 80% standard for each DV; (e) all DVs are operationalized; and (f) each DV is measured with a procedure that generates a quantifiable index.

Review of the Indicator by Study

Table 6 exhibits the components for the Dependent Variable and Outcomes Indicator for each of the studies. All studies but one (Simpson & Ayres, 2004) met the components of the Dependent Variable and Outcomes Indicator. Simpson and Ayres (2004) studies met four out of the six components of the standard. These eleven studies demonstrated adequately dependent variable quality indicators appropriate for the high-quality standards of SCD studies (Horner et al., 2005). For example, Buggey and colleagues' (2011) study indicated the DVs as "Physical and vocal social initiations with peers in a natural environment (playground at recess) was selected as the dependent variables. Operationalizing complex human interaction is difficult at best, and this was especially true with physical initiations in this study. Field-testing a data collection form for more than a month shaped the definitions used in this study. The goal was to keep the dependent variables true to the intent of the study while also ensuring that observers could agree on what they were seeing…"

Simpson and Ayres (2004) study provided information indicating that it met four of the six components of the standard: the systematically and repeatedly measuring of the DV, collecting of the IOA data for each phase, operationalizing all DVs, and measuring with procedures that generate a quantifiable index for each DVs. The study did not provide any information about the collection of the IOA data in 20% of the sessions and meeting the IOA data in 80% of the standards. The study failed to provide adequate descriptions of the IOA procedure. The authors of the study mentioned that they collected the IOA data for each phase, but they did not provide sufficient information about the IOA procedure. Therefore, the study did establish provide the reliability of the procedure.

Review of the Articles by Indicator Components

Table 6 also shows that all studies met systematically and repeatedly measured DVs over time, collected of the IOA in each phase, operationalized all DVs, and measured with procedures that generate a quantifiable index for each DV of the components of the standard. All studies adequately informed the reader about the DVs and collection the IOA data for each phase. All but one study (Ayres & Simpson, 2004) included adequate descriptions of the measurement of the 20 % of the IOA data for the sessions and meeting of the 80% of the IOA standard. For instance, Wilson's (2013) study reported measurement of IOA data for social communication behavior for each participant: 28% of the baseline sessions, 30 % of the treatment sessions, and 50 % of the maintenance sessions were collected the IOA data with 92 % of agreement. The IOA procedure is essential for establishing the reliability of the processing the data collection. The IOA is the method for addressing the reliability and validity (Watkins & Pacheco, 2000). Failing to include the IOA procedure components may affect the intervention's reliability and validity

Table 6: Dependent Variable and Outcomes Indicator

Main Authors	1	2	3	4	5	6	MC
Apple (2005)	1	1	1	1	1	1	6./6
Bellini (2007)	1	1	1	1	1	1	6/6
Buggey (2011)	1	1	1	1	1	1	6/6
Buggey (2012)	1	1	1	1	1	1	6/6
Cihak (2012)	1	1	1	1	1	1	6./6
Jones (2014)	1	1	1	1	1	1	6/6
Plavnick (2015)	1	1	1	1	1	1	6/6
Plavnick (2016)	1	1	1	1	1	1	6/6
Simpson, (2004)	1	1	0	0	1	1	6/4
Wert (2003)	1	1	1	1	1	1	6/6
Wilson (2013)	1	1	1	1	1	1	6/6
Sum	11	11	10	10	11	11	

1= DVs are systematically measured repeatedly over time, **2=** IOA is collected for each phase**, 3=** IOA is collected 20% of sessions, **4=** IOA meets 80% of standards for each DV, **5=** All DVs are operationalized, **6=** each DV is measured with a procedure that generates a quantifiable index, and **MC=** Meeting the criteria

Standard 7: Independent Variables

In SCD, the IV is the intervention, treatment or practice under investigation (Horner et al., 2005). If the IV is operationally defined, it provides a valid interpretation of the results and accurate replication of the study according to SCD (Horner et al., 2005). Also, clear and detailed description of IV is necessary and important for replication and generalization of studies (Wang and Parrila, 2008).

For my review, I used the independent variables quality indicator standard developed by Mulcahy et al. (2016). The independent variable standard involves three components: (a) the independent variable is described with replicable precision; (b) the independent variable is systematically manipulated and under the control of the experimenter, and (c) over measurement of the fidelity of implementation for the independent variable is highly desirable.

Review of the Indicator by Study and Review of the Articles by Indicator Components

Table 7 displays the components for the Independent Variables Indicator for each of the studies. Additionally, Table 7 shows that the studies met each component of the standard. All studies met the criteria for all components of the Independent Variable Standard, meaning that all studies displayed a description of IV with according to the high-quality standards of SCD studies (Horner et al., 2005) and that the IVs of the studies are replicable. For instance, Buggey and colleagues (2011) study reported that the IV was a 2.5- to a 3.5-minute video clip of each participant socially interacting with peers. These video clips involved the participants initiating interactions of playing with others and result of initiations. The researchers explained step-by-step how they implemented the procedure of the study: "The researchers monitored the children as they viewed their videos, and all four were able to attend to the screen for the entire session, and all four exhibited behavior indicating enjoyment at watching themselves, including clapping, laughing, pointing, and bouncing."

Table 7: Independent Variables Indicator

Main Authors	1	2	3	MC
Apple (2005)	1	1	1	3/3
Bellini (2007)	1	1	1	3/3
Buggey (2011)	1	1	1	3/3
Buggey (2012)	1	1	1	3/3
Cihak (2012)	1	1	1	3/3
Jones (2014)	1	1	1	3/3
Plavnick (2015)	1	1	1	3/3
Plavnick (2016)	1	1	1	3/3
Simpson, (2004)	1	1	1	3/3
Wert (2003)	1	1	1	3/3
Wilson (2013)	1	1	1	3/3
Sum	11	11	11	

1= Independent variable is described with replicable precision, **2=** Independent variable is systematically manipulated and under the control of the experimenter, **3=** Over measurement of the fidelity of implementation for independent variable is highly desirable, and **MC=** Meeting the criteria

Standard 8: Experimental Control

The SCD provides experimental control for most threats of the internal validity in order that the experimental control allows the confirmation of a functional relationship between the IVs and the DVs (Horner et al., 2005). Mulcahy and colleagues (2016) pointed out that one of the SCD requirements is that the researchers control and manipulate IV as well as control common threats of the internal validity. They added that a successful interpretation of the findings is dependent on experimental control.

I used the "experimental control" quality indicator standard developed by Mulcahy et al. (2016). The experimental control standard involves seven components: (a) the researchers controls and manipulates the IV; (b) there is evidence that the intervention was not available in the baseline; (c) the baseline includes at least three data points; (d) the baseline data are stable for each participant or condition; (e) there are at least three data points for each phase; (f) threats to internal validity are adequately controlled; and (h) there are three demonstrated experimental effects at three different points in time.

Review of Indicator by Study

Table 8 shows the components for the Experimental Control Indicator for each of the studies. All but three studies (Buggey, 2012; Plavnick et al., 2015; Wilson, 2013) met the criteria for all components of the Experimental Control Indicators. For example, Jones and colleagues' (2014) study mentioned that the visual graph of the study had at least three data points for the baseline session and that the baseline data were stable for each participant and condition. Additionally, the study had at least three data points for each phase and the researchers controlled internal validity.

Authors of three of the eleven studies (Buggey, 2012; Plavnick et al., 2015; Wilson, 2013) met the criteria for five of the components. Two of those authors (Buggey, 2012; Plavnick et al., 2015) failed to include evidence that the intervention was not available in baseline or that researchers-controlled threats to internal validity. The failure to describe of the controlling internal validity was affected by a causal relationship between the intervention and outcomes. Therefore, the findings of the procedure may be incorrected because of misinterpretations of the results. Wilson's (2013) study failed to include that "the baseline includes at least three data points" and "the baseline data are stable for each participant and condition" components. Each of these three studies failed to provide experimental control because controlling internal validity and collecting baseline data are essential for experimental control in SCD.

Review of the Articles by Indicator Components

Table 8 displays that all studies met the controlling and manipulated IVs by the researchers. The graphs in the studies involved three data points for each phase, demonstrating experimental effects through three data points at three different times components of the standard. All but one of the studies (Wilson, 2013) met the criteria for stability baseline data consisting of the three data points. Wilson's (2013) study target skills were visual attention and social-communication skills. For visual attention, the author used bar charts, so no baseline data was provided for this skill. For social skills, the author collected baseline data, but the baseline data was not stable for each participant.

Authors of the ten studies included evidence that the intervention was not available in the baseline, and that threats to internal validity were controlled. For example, in Jones et al.'s (2014) study, the experimental control standard's components were met by the researchers. The visual graph of the study had at least three data points for the baseline session, and the baseline

data were stable for each participant and condition. Additionally, it had at least three data points for each phase. The researchers also controlled internal validity. According to Mulcahy et al. (2016), the researchers must control and manipulate the IV, conducted the requirements associated with the specific SCD, and control common threats of external validity because the successful interpretation of findings is based on the experimental control. Therefore, experimental control in the SCD is one of the requirements for high-quality research studies

Table 8: Experimental Control Indicator

Main Authors	1	2	3	4	5	6	7	MC
Apple (2005)	1	1	1	1	1	1	1	7/7
Bellini (2007)	1	1	1	1	1	1	1	7/7
Buggey (2011)	1	1	1	1	1	1	1	7/7
Buggey (2012)	1	0	1	1	1	0	1	7/5
Cihak (2012)	1	1	1	1	1	1	1	7/7
Jones (2014)	1	1	1	1	1	1	1	7/7
Plavnick (2015)	1	0	1	1	1	0	1	7/5
Plavnick (2016)	1	1	1	1	1	1	1	7/7
Simpson, (2004)	1	1	1	1	1	1	1	7/7
Wert (2003)	1	1	1	1	1	1	1	7/7
Wilson (2013)	1	1	0	0	1	1	1	7/5
Sum	11	9	10	10	11	9	11	

1= The researcher controls and manipulates the IV, **2=** Evidence that the intervention was not available in baseline
3= the baseline includes at least three data points, **4=** the baseline data are stable for each participant or condition,
5= there are at least three data points for each phase, **6=** threats to internal validity are adequately controlled
7= there are three demonstrated of experimental effects at three different points in time, **MC=** meeting the criteria

Standard 9: Fidelity Implementation

The fidelity of implementation is the degree to which an intervention is delivered as intended and is a critical aspect for successful translation for the evidence-based practice (Breitenstein et al., 2010). The fidelity of implementation assures to the researchers that the intervention is applied and documented through the continuous measurement for each practitioner, participant, and phase (Mulcahy et al., 2016). Lack of the fidelity implementation can weaken the outcomes of the study and the effectiveness of the interventions. Therefore, the

fidelity of implementation is necessary and essential for the high-quality studies in SCD (Breitenstein et al., 2010).

I used the fidelity implementation indicator standard developed by Mulcahy et al. (2016). The fidelity of the implementation standard involves four components: (a) fidelity is assessed through continues direct measurement; (b) the fidelity procedure is described; (c) the fidelity instrument is described; (d) fidelity is assessed for each interventionist, participant, and phase.

Review of the Indicator by Study

Table 9 shows the components of the Fidelity of Implementation Indicator for each study. The authors just two studies (Apple et al., 2005; Cihak et al., 2012) met the criteria for all components of the standard. Authors of four other studies (Bellini et al., 2007; Plavnick & Vitale, 2016; Simpson & Ayres, 2004; Wilson,2013) met the three out of four components. These seven studies employed a fidelity implementation procedure appropriate for the high quality of the SCD studies. For example, Cihak and colleagues' (2012) study involved in vivo intervention and video-based intervention. The authors used a checklist: for the in vivo intervention, they used 12-item-checklist; and for the video-based intervention, they used a 15-item checklist. Only two of the eleven studies met all components of the fidelity implementation.

Authors of two studies (Buggey, 2012 & Jones et al., 2014,) met two components of the standard. Two of those authors (Buggey, 2012; Jones et al., 2014) failed to include the description of the fidelity instrument. Breitenstein and colleagues (2010) indicated that the instrument of the fidelity of implementation is crucial because what it is measured is just as important as how it is measured. Therefore, the researchers provide an adequate description of the instrument of the fidelity implementation in SCD.

Authors of three studies (Buggey et al., 2011; Plavnick et al., 2015; Wert & Neisworth, 2003) met only one out of four components. Reading fidelity of implementation, authors of those studies failed to describe the instrument, the procedure, and the assessment of each phase, participant, and practitioner. Each of these three studies failed to describe an implementation of the fidelity adequately. This situation influenced weakening the outcomes and influenced the effectiveness of the intervention (Breitenstein et al., 2010).

Review of the Articles by Indicator Components

Table 9 displays the assessment of continues the direct measurement of the fidelity. All but four (Buggey et al., 2011; Jones et al., 2014; Plavnick et al., 2015, and Wert & Neisworth, 2003) studies met the requirements for description of fidelity implementation procedure. Authors of five studies (Apple et al., 2005, Bellini et al., 2007, Cihak et al., 2012; Plavnick & Vitale, 2016; Wilson, 2013) included a clear description of the instrument of fidelity implementation. Authors of four studies (Apple et al., 2005, Cihak et al., 2012, Simpson & Ayres, 2004) included assessment of the fidelity for each interventionist, participant, and phase. For example, Wilson's (2013) study reported that researchers' staff measured the fidelity of in vivo procedure during 26% of the treatment sessions in real-time observation using a pre-established checklist with 96% fidelity across participants.

According to Wang and Parrilla (2008), if researchers would examine fidelity of implementation or provided an operational definition and measurable index for both IV and DV, many studies could improve their quality. Horner et al. (2015) pointed out that in SCD, researchers must provide adequate documentation that the practice is implemented with fidelity. Therefore, the fidelity of implementation is essential for high-quality research studies using SCDs.

Table 9: Fidelity Implementation Indicator

Main Authors	1	2	3	4	MC
Apple (2005)	1	1	1	1	4/4
Bellini (2007)	1	1	1	0	4/3
Buggey (2011)	1	0	0	0	4/1
Buggey (2012)	1	1	0	0	4/2
Cihak (2012)	1	1	1	1	4/4
Jones (2014)	1	0	0	1	4/2
Plavnick (2015)	1	0	0	0	4/1
Plavnick (2016)	1	1	1	0	4/3
Simpson, (2004)	1	1	0	1	4/3
Wert (2003)	1	0	0	0	4/1
Wilson (2013)	1	1	1	0	4/4
Sum	11	7	5	4	

1= Fidelity is assessed through continues direct measurement, **2=** Fidelity procedure describe, **3=** Fidelity instrument described, **4=** Fidelity is assessing for each interventionist, participant, and phase, and **MC=** meets the criteria

Standard 10: Data Analysis

Systematic data analysis is one of the requirements for SCD (Kratochwill et al., 2010; Mulcahy et al., 2016). SCDs may use statistical analysis for interpretation of the findings (Horner et al., 2005; Mulcahy et al., 2016). However, according to the traditional SCD approach, the data are presented in graphic displays and is analyzed with a method of visual analysis (Scruggs et al., 2006). This analysis involves interpretation that considers data elements of the level change, slope change, and variability in baseline and treatment data (Horner et al., 2005; Scruggs et al., 2006).

I used the data analysis quality indicator standard developed by Mulcahy et al. (2016). This data analysis standard has five components: (a) the unit of analysis is an individual (group) whose performance creates a single score; (b) effects are reported for each DV; (c) data are reported graphically for each DV; (d) data are analyzed through visual analysis; and (e) the functional relation between IV and DV is demonstrated.

Review of the Indicator by Study and Review of the Articles by Indicator Components

Table 10 displays the components for the Data Analysis Indicator for each study. This table also shows that the studies met each component of the standard. All studies met the criteria for all components of the Data Analysis Indicator, meaning that authors of all studies included all of the quality indicator components. These are as follows: the description of the unit of analysis for the individual performance in a single score, reported effects of each DV, reported graphically for each DV, analyzed the data of the visual analysis, and demonstrated a functional relationship between IV and DV. For instance, Buggey and colleagues' (2011) study explained the data analysis procedure clearly and descriptively. The authors displayed the frequency of the social initiations data for each participant. They also used not only visual analysis but also statistical analysis the percentage of nonoverlapping data (PND) analysis. They reported each participant's PND scores for treatment and maintenance sessions. The PND scores represented strong treatment effects. The authors demonstrated a functional relationship between IV and DV (the VSM intervention (IV) was an effective intervention (DV) for three of four participants). Mulcahy et al. (2016) mentioned that a successful interpretation of the findings in SCD depends on systematic and appropriate data analysis. Therefore, for high-quality SCD studies, one of the requirements is systematic and appropriate data analysis (Horner et al., 2005).

Table 10: Data Analysis Indicator

Main Authors	1	2	3	4	5	MC
Apple (2005)	1	1	1	1	1	5./5
Bellini (2007)	1	1	1	1	1	5./5
Buggey (2011)	1	1	1	1	1	5./5
Buggey (2012)	1	1	1	1	1	5./5
Cihak (2012)	1	1	1	1	1	5./5
Jones (2014)	1	1	1	1	1	5./5
Plavnick (2015)	1	1	1	1	1	5./5
Plavnick (2016)	1	1	1	1	1	5./5
Simpson, (2004)	1	1	1	1	1	5./5
Wert (2003)	1	1	1	1	1	5./5
Wilson (2013)	1	1	1	1	1	5./5
Sum	11	11	11	11	11	

1= unit of analysis is an individual (group) whose performance creates a single score, **2=** effects are reported for each DV, **3=** data are reported graphically for each DV, **4=** Data are analyzed through visual analysis, **5=** Demonstrates functional relation between IV and DV, and **MC=** meeting the criteria

Standard 11: Social Validity

The SCDs are used in educational research to identify both fundamental principles of behavior and the interventions that are functionally related to changing the socially relevant outcomes (Horner et al., 2005). Therefore, SCDs must involve and address the social importance of DVs, the cost-effectiveness of the interventions, and their implementability by the typical intervention agents (Horner et al., 2005; Mulcahy et al., 2016).

I used the social validity quality indicator standard developed by Mulcahy et al. (2016). The social validity standard involves two components: (a) DV is socially important, and (b) the magnitude of change in the DV is socially essential.

Review of the Indicator by Study

Table 11 displays the components for the Social Validity Indicator for each study. The authors of six studies (Bellini et al., 2007; Buggey et al., 2011; Buggey, 2012; Cihak et al., 2012; Plavnick & Vitale, 2016; Wilson, 2013) met the criteria for all components of the Social Validity

Indicator. These six studies employed the implementation of the social validity as appropriate for high-quality SCD studies (Horner et al., 2005). For instance, Plavnick and Vitale's (2016) study indicated that the authors used Usage Rating Profile-Intervention (URP-I) for measuring satisfaction with the video modeling procedure. The URP-I included four factors related to social validity, acceptability, knowledge, feasibility, and integrity. The authors implemented this rating scale through the therapist and program supervisor.

Authors of five (Apple et al., 2005; Jones et al., 2014; Plavnick et al., 2015; Simpson & Ayres; 2004; Wert & Neisworth; 2003) studies failed to meet the criteria of the Social Validity standard. These five studies did not have any description of social validity. Social validity provides an ongoing evaluation regarding whether or not the treatment goals, procedure, and outcomes are acceptable, useful and socially relevant (Foster & Mash 1999). Failure to meet the social validity criteria may affect the research procedure and outcomes (Horner et al., 2005).

Review of the Articles by Indicator Components

Table 11 also shows that none of the studies met the each of the components. Authors of the six (Bellini et al., 2007; Buggey et al., 2011; Buggey, 2012; Cihak et al., 2012; Plavnick & Vitale, 2016; Wilson, 2013) studies included the description of the social importance of the DVs, and the socially importance of the magnitude of change in DVs. In other words, the remaining five studies (Apple et al., 2005; Jones et al., 2014; Plavnick et al., 2015; Simpson & Ayres; 2004; Wert & Neisworth; 2003) did not have any social validity procedure. Hence, they did not meet any components of the Social Validity Indicator.

Authors of those six studies had a social validity procedure and met the criteria for all the components in the indicator standard. These authors demonstrated the social validation and acceptability of their intervention procedure and outcomes. For example, Bellini and

colleagues'(2007) study investigated the effectiveness of VSM on social, communication and behavioral functioning in children with ASD. Results indicated that the participants displayed increased spontaneous requests and increased use of expressive language.

Table 11: Social Validity Indicator

Main Authors	1	2	MC
Apple (2005)	0	0	2/0
Bellini (2007)	1	1	2/2
Buggey (2011)	1	1	2/2
Buggey (2012)	1	1	2/2
Cihak (2012)	1	1	2/2
Jones (2014)	0	0	2/0
Plavnick (2015)	0	0	2/0
Plavnick (2016)	1	1	2/2
Simpson, (2004)	0	0	2/0
Wert (2003)	0	0	2/0
Wilson (2013)	1	1	2/2
Sum	6	6	

1= DV is socially important, **2=** magnitude of change in the DV is socially important, and **MC=** meets the criteria

Summary of the Findings of All Indicators

Table 12 displays the number of components for each indicator that was met by each author as well as the total number of articles that met the criteria for each indicator. None of the eleven studies met the criteria for all indicators.

Authors of two studies (Apple et al., 2005; Cihak et al., 2012) met the criteria for nine out of the eleven quality indicators. Authors of two studies (Plavnick & Vitale; 2016; Wilson 2013) met the requirements for eight out of eleven quality indicators. Authors of these three studies (Apple et al., 2005; Cihak et al., 2012; Plavnick & Vitale, 2016) did not meet the participant indicators. Cihak et al.'s (2012), and Plavnick and Vitale's (2016) study did not meet the criteria for the description of the participant selection procedure. Authors of two studies (Apple et al., 2005; Cihak et al., 2012) failed to meet the description of the participants' race.

The authors of those three studies (Cihak et al., 2012; Plavnick & Vitale; 2016; Wilson, 2013) failed to meet the Instrument Indicator. Cihak and colleagues'(2012) and Plavnick and Vitale (2016) did not include the description of the instrument validity/reliability. Additionally, Cihak and colleagues (2012) did not include the description of the instrument administration. Wilson (2013) failed to include the descriptions of instrument source and instrument training. These studies (Plavnick & Vitale, 2016; Wilson, 2013) failed to meet the Fidelity Implementation Indicator. All three studies failed to meet the criteria for assessing the fidelity of each interventionist, participant, and phase. All these studies met the criteria for the descriptions of the fidelity procedure, instrument, and evaluation of the fidelity through the continues measurement. These three studies had the fidelity of the implementation procedures. Assessing the fidelity for each interventionist, participant, and phase was unnecessary in these cases.

Wilson's (2013) study failed to meet the criteria of the Experimental Control Indicator. The study failed to meet the criteria for the description of the baseline consisting of three data points and stability baseline data. Wilson's (2013) study had two target skills, which they improved: visual attention and social-communication skills. For the visual skills, Wilson provided the data on a bar chart; for social communication skills, the baseline data was not stable. However, the study met the criteria for the rest of the other components.

Authors of three studies (Bellini et al., 2007; Buggey et al., 2011; Jones et al., 2014) met the criteria for seven out of the eleven quality indicators. Bellini and colleagues (2007), Buggey and colleagues (2011) and Jones and colleagues (2014) studies failed to meet the Participant Indicator, Instrument Indicator, and Fidelity Indicator. Authors of these two studies (Buggey et al., 2011; Jones et al., 2014) did not meet the criteria for the description of the participants' race and determination of disability or risk status. Bellini and colleagues' (2007) and Jones and

colleagues' (2014) studies did not include the participant language score. Additionally, Jones and colleagues' (2014) study failed to meet the description of participant selection criteria and diagnostic/functional/adaptive scores in the Participant Indicator. Therefore, Jones and colleagues' (2014) study met the fewest components of the indicators.

Authors of those two studies (Buggey et al., 2011; Jones et al., 2014) failed to meet the criteria for the description of the instrument validity/reliability. Bellini et al.'s (2007) study did not include any description of the instrument. Buggey and colleagues' (2011) and Jones and colleagues' (2014) studies failed to meet the criterion of the description of the fidelity procedure and the instrument for the Fidelity Implementation Indicator. These two components are essential to the implementation of the fidelity procedure. However, Bellini et al.'s (2007) study only failed to meet the criteria for assessing the fidelity procedure for each interventionist, participant, and phase. Therefore, the authors of the study (Bellini et al., 2007) met more of the criteria for Fidelity Implementation Indicator than did Buggey et al. (2011) and Jones et al. (2014). Authors of two studies (Bellini et al., 2007; Buggey et al., 2011) failed to meet the Research Design Indicator. These studies did not include clear definitions of the casual research questions or hypotheses. They did meet the rest of the components of the quality indicators. Jones et al.'s (2014) study did not have any procedure for addressing social validity. Therefore, the study failed to meet the Social Validity Indicator. Similarly, Apple et al.'s (2005) study failed to meet the criteria of the Social Validity Indicator. The study did not include any social validity procedures.

Authors of three studies (Buggey, 2012; Plavnick et al., 2015; Simpson & Ayres, 2004) met the six out of the eleven quality indicators. These three studies failed to meet the Participant, Instrument, Experimental Control, and Fidelity Implementation Indicators. Buggey's (2012),

Plavnick et al.'s (2015) and Simpson and Ayres's (2004) studies did not include the description of the participant's race. Also, Plavnick et al. (2015) and Simpson and Ayres (2004) failed to include the description of the method for determining participants disability or risk status. In addition, Simpson and Ayres's (2004) study failed to meet the requirements for descriptions of the participant selection criteria, grade, diagnostic/functional/adaptive score and language score. This study met only three out of nine components of the Participant Indicator. Therefore, this study did not provide the participant information as appropriate for high-quality SCD studies.

Authors of three studies (Buggey, 2012; Plavnick et al., 2015; Simpson & Ayres, 2004) failed to meet the criteria of Instrument Indicator for the description of validity/reliability and instrument training. Also, Buggey's (2012) and Plavnick et al.'s (2015) studies did not involve the description of instrument administration. Authors of these two studies (Buggey, 2012; Plavnick et al., 2015) met only one component of the criteria. Therefore, these studies did not provide instrument information as appropriate for high-quality SCD studies. Buggey (2012), Plavnick et al. (2015), and Simpson and Ayres (2004) failed to meet the Fidelity Implementation Indicator criteria. These studies did not include a description of the fidelity instrument. In addition, authors of two studies (Buggey, 2012; Plavnick et al., 2015) failed to meet the criterion of assessing the fidelity for each interventionist, participant, and phase. Buggey (2012) and Plavnick and Vitale (2016) failed to meet the Experimental Control Indicator. They did not describe the evidence that the intervention was not available in baseline or control of the threat to internal validity. Authors of two studies (Plavnick et al., 2015; Simpson & Ayres, 2004) failed to meet the Social Validity Indicator. These two studies did not have any procedure for establishing social validity. Buggey's (2012) study failed to meet the criteria of Research Design Indicator. This study did not include a clear definition of the casual research questions and hypotheses but

did meet the rest of the other components of the indicators. Therefore, the study achieved some criteria of the Research Design Indicator. Simpson and Ayres' (2004) study failed to meet the Dependent Variable and Outcomes Indicator. The study did not include information about collection of the IOA data of 20% of sessions and 80% of the standards for each DVs. However, the authors of the study collected IOA data for each phase. Moreover, the study met the criteria for the rest of the components of the indicator.

Wert and Neisworth's (2003) study only met the five out of the eleven indicators. The study failed to meet the criteria of the participant, content and setting, research design, instrument, the fidelity of implementation, and social validity indicators. The study did not include any information about intervention settings or social validity. Additionally, the authors of the study only met the fidelity of implementation criterion for the description of the assessment of fidelity through the continuous direct measurement. However, it did not meet the rest of the other components, such as description of the fidelity procedure and of the fidelity instrument. The study met the criteria for only four out of nine components of the participant indicator thus, the study is one of studies meeting the fewest components of the participant indicator. Additionally, Wert and Neisworth's (2003) study failed to meet the criterion of the research design indicator for the description of the casual research question or hypothesis. However, it reached the criteria for the rest of the components. The study only met the instrument indicator criterion for the description of the instrument source. Therefore, the study failed to meet the high-quality standards of SCD.

Table 12: Summary of the Findings All Quality Indicators

Authors	1	2	3	4	5	6	7	8	9	10	11	# of ind, met
Apple (2005)	9/8	1/1	5/5	5/5	4/4	6/6	3/3	7/7	4/4	5/5	2/0	9
Bellini (2007)	9/6	1/1	5/4	5/5	4/0	6/6	3/3	7/7	4/3	5/5	2/2	7
Buggey (2011)	9/7	1/1	5/4	5/5	4/3	6/6	3/3	7/7	4/1	5/5	2/2	7
Buggey (2012)	9/8	1/1	5/4	5/5	4/1	6/6	3/3	7/5	4/2	5/5	2/2	6
Cihak (2012)	9/7	1/1	5/5	5/5	4/2	6/6	3/3	7/7	4/4	5/5	2/2	9
Jones (2014)	9/4	1/1	5/5	5/5	4/3	6/6	3/3	7/7	4/2	5/5	2/0	7
Plavnick (2015)	9/7	1/1	5/5	5/5	4/1	6/6	3/3	7/5	4/1	5/5	2/0	6
Plavnick (2016)	9/7	1/1	5/5	5/5	4/3	6/6	3/3	7/7	4/3	5/5	2/2	8
Simpson, (2004)	9/3	1/1	5/5	5/5	4/1	6/4	3/3	7/7	4/3	5/5	2/0	6
Wert (2003)	9/4	1/0	5/4	5/5	4/2	6/6	3/3	7/7	4/1	5/5	2/0	5
Wilson (2013)	9/9	1/1	5/5	5/5	4/0	6/6	3/3	7/5	4/3	5/5	2/2	8
Number of indicators meets	1	10	7	11	1	10	11	8	2	11	6	

Note: Indicators are numbered as following: 1= participants, 2= context and setting, 3= research design, 4= baseline and intervention, 5= instrument indicators, 6= dependent variable and outcomes, 7= independent variable, 8= experimental control, 9= fidelity implementation, 10= data analysis, 11= social validity

Findings

I also analyzed the results and discussion sections from the eleven studies to identify the key findings across the articles. I used a modified form of content analysis to interpret the outcomes. I used original copies of the key conclusions of each article. I organized the analysis in an Excel spreadsheet, and I pasted each original text of the key finding into a cell in a single column in the Excel spreadsheet. I then reduced the results into condensed meaning units containing a more general description. For instance, if a study stated that the participants with ASD demonstrated more spontaneous requesting with the video modeling intervention rather than with the in vivo intervention, the condensed meaning would be that the video modeling intervention is more effective than the in vivo intervention for all children with ASD for learning spontaneous requesting.

I then reduced the condensed meaning units into categories. For example, when condensed meaning was that all students increased independent initiations and reached the

criteria more quickly in VM in conjunction with PECS than in the PECS only session, the category was PECS using with VM is more effective than the using PECS itself. I then reduced the categories into five themes: Social Communication, In Vivo Modeling vs. Video Modeling, Spontaneous Requesting, Social Initiation, and Generalization.

Social Communication

Authors of three studies found that video modeling interventions improved the social communication skills of children with autism (Apple et al., 2005; Jones et al., 2014; & Wilson, 2013). Different types of video modeling were used for social communication skills among the participants. For example, Jones et al. (2014) showed that video modeling improved social responses skills for the children with autism. The authors focused on enhancing the generalization of the social response skills among young children with ASD. They used the adults as recipients of the social interaction and assessed the performance of the generalization to adults and peers who had no training of the intervention. The participants' generalization of the social interaction performance with adults was better than with the peer's performance. However, the participants' performance with a peer was better than their performance with an adult when the participants have displayed a video clip about a peer-engaging social behavior to another peer that provided social reinforcement for the social response. Therefore, video modeling intervention was more useful to promote generalization to the peers.

The interpretation of the findings related to communication must be based on the rigor of the studies. In general, the authors of the three studies were rigorous, meeting a majority of the indicators. Wilson (2013) met eight of the eleven indicators. Jones et al. (2014) met seven of the eleven indicators, and Apple et al. (2005) met nine of eleven indicators. Jones et al. (2014) and Wilson (2013) failed to meet to instrument indicator and the fidelity indicator. Wilson (2013) did

not meet the experimental control indicator, and Jones (2014) did not meet the participant and social validity indicators. Apple et al. (2005) met fewer of the criteria. However, the studies were generally rigorous, and across the studies we should have substantial confidence that video modeling does improve social communication.

In Vivo Modeling vs. Video Modeling

Researchers and educators mostly use observational learning for children with autism. Video modeling and in vivo modeling are two types of observational learning methods. In vivo or live modeling is one of the observational techniques in which children imitates the adults' or peers' target skills performance in real time. On the other hand, video modeling involves watching an adult or peer engaging in target behaviors on a video (Darden-Brunson, et al., 2008). In vivo modeling and video modeling are based on Bandura's social learning theory (Wilson, 2013). Video modeling includes a videotape model, whereas in vivo modeling consists of a live model. A number of the research studies showed that video modeling and in vivo modeling were effective strategies both for teaching new skills to children with autism and for generalizing and maintaining these new skills (Charlop-Christy et al., 2000). For this reason, many studies compared the efficacy of these two methods.

Plavnick and Vitale (2016) and Wilson (2013) studies compared these two models. Plavnick and Vitale (2016) compared the effectiveness of video modeling with in vivo modeling for improving vocal manding skills. The result of the research showed that the video modeling strategy was more effective for improving vocal manding skills in children with autism. Wilson's (2013) study found that in vivo modeling was more effective for improving social communication skills of children with autism. On the other hand, Wilson (2013) found that the

video modeling strategy was a more effective method for improving visual attention skills in children with autism.

The interpretation of the findings related to the comparison of the two strategies must be based on the rigor of the studies. The authors of the two studies (Plavnick et al., 2016; Wilson, 2013) met the majority of the quality indicators. Both of the studies met eight of the eleven indicators. Plavnick and Vitale (2016) and Wilson (2013) failed to meet the criteria of the instrument indicator and the fidelity indicator, while Wilson (2013) did not meet the criteria of the experimental control indicator. The failure to meet these critical elements of SCD studies limits the interpretation of the findings. Because the studies had some serious shortcomings, we should be cautious about our confidence in the findings. Since there were only two studies with different findings, it is difficult to value either video modeling or in vivo modeling more. Therefore, future research is needed to increase our confidence.

Spontaneous Requesting

Authors of two studies (Plavnick & Vitale, 2016; Wert & Neisworth, 2003) showed that video modeling was an effective strategy for teaching spontaneous requesting skills. For example, Plavnick and Vitale (2016) found that the video modeling strategy was an effective intervention for teaching mand skills. Similarly, Wert and Neisworth (2003) showed that the video modeling intervention improved spontaneous requesting among children with autism. Plavnick and Vitale (2016) met eight of the eleven indicators, but they also met nearly all of the criteria for the three indicators not met. This suggest that we should have confidence in their findings. Wert and Neisworth (2003) met only five of the eleven indicators. Their study failed to meet the criteria including participant, context and setting, research design, instrumentation, fidelity, and social validity. Of particular concern was the authors' failure to meet three of the

four criteria for the Fidelity Indicator. Because of the methodological concerns, it is necessary to question the authors' findings. Across studies, there is sufficient rigor to have some confidence that video modeling improves spontaneously requesting, although additional rigorous research is needed to increase this confidence.

Social Initiation

Authors of six studies (Bellini et al., 2007; Buggey, 2012; Cihak et al., 2012; Plavnick et al., 2015; Buggey et al., 2011; Simpson & Ayres; 2003) used various types of video-based intervention to improve social initiation skills. For example, authors showed that the video-self modeling interventions were effective for improved social initiations (Bellini et al., 2007) and unprompted social engagement with peers (Buggey et al., 2011) among the participants. Buggey et al. (2011) investigated the effectiveness of the VSM intervention in facilitating social initiation skills on a playground among four children with autism. The results of the study were mixed. Two of the children displayed significant treatment effect, one of the children had a small observed effect, and one child had no improvement in social initiations. The findings of Bellini et al. (2007) were positive. During the VSM intervention, the participants improved unprompted social engagement skills and they maintained these skills after the intervention was withdrawn.

Buggey et al. (2011) and Bellini et al. (2007) each met seven of the eleven of the indicators. Authors of both studies failed to meet the standard for Participant, Research Design, Instrument, and Fidelity Implementation Indicators. These are critical elements necessary to demonstrate rigorous SCD. The failure of the two studies to meet these indicators coupled with the inconsistent findings of Buggey (2011) suggests that we should be somewhat skeptical of the findings. At the same time, each of the authors met most of the criteria for the Participant and Research Design Indicator, and Bellini et al. (2007) met three of the four criteria for the Fidelity

Indicator. Consequently, we can have limited confidence in the findings while understanding that future rigorous research is needed to enhance our confidence.

Plavnick et al. (2015) investigated the effectiveness of video modeling interventions in sharing toy sessions and joining play sessions to improve social initiation skills, and Buggey (2012) investigated the effectiveness of the VSM in facilitating social initiation for three young children with ASD. Neither study found that video modeling or video-self modeling interventions were effective for teaching social skills to students with autism. However, the authors of these two studies (Buggey, 2012; Plavnick et al., 2015) met just six of the eleven quality indicators. The authors of both studies failed to meet the Participant, Experimental Control, Instrument, and Fidelity Implementation Indicators. Additionally, Plavnick et al. (2015) failed to meet the Social Validity indicator, and Buggey (2012) failed to meet the Research Design Indicator. Of particular concern was that both authors failed to adequately describe the instruments or to ensure treatment fidelity. This creates an unusual circumstance, as the authors failed to meet two indicators of relative importance but also failed to demonstrate an effect of the intervention on students with autism. Consequently, we have limited confidence that video modeling does not work to improve social initiations, although that does not increase our confidence that video modeling does improve social initiation.

Many studies combined or embedded video modeling intervention and other types of interventions. For instance, Cihak et al. (2012) used a picture exchange communication system (PECS) with video modeling for improving social initiation skills. The results of the study showed that the participants improved their social initiation skills. Additionally, their performance was better in PECS plus video modeling sessions than PECS-only sessions. Similarly, Simpson et al. (2004) used a computer-based intervention with embedded video

modeling for improving unprompted social initiations. The authors used a computer program embedded with video clips of peers for improving three target skills: sharing, following teacher directions and social greetings. All participants exhibited rapid improvement in their target social skills. The authors also found that the computer program-embedded video modeling intervention improved the unprompted social skills. The video modeling strategy embedded another intervention for acquisition of the target behaviors. For example, the authors of the study's result showed that video modeling used with self-management interventions was effective for facilitating the acquisition behaviors that the participants did not have in their repertoire before (Apple et al., 2005). The interpretation of the studies' results showed that interventions are used with video-based intervention can be more effective than the interventions used alone.

Authors of both studies (Cihak et al., 2012; Simpson & Ayres, 2004) failed to meet the standards for Participant and Instrument Indicators. The failure to meet these indicators does affect the acceptance of the findings. On the other hand, Simpson and Ayres' (2004) study also failed to meet the Dependent Variable, Fidelity Implementation, and Social Validity Indicators. We should have the confidence in Cihak et al. (2012) study's findings regarding the effectiveness of PECS with video modeling on social initiation skills. Although the study failed to meet the standards of the Participant and Instrument Indicators, the study met the critical quality indicators concept for SCD. In other respects, the authors of the study (Simpson &Ayres, 2004) failed to meet five of the eleven indicators, which are critical elements necessary to demonstrate a high-quality SCD. Additionally, this study met just three of the nine criteria of the participant standard and met only just one component of the instrument standard. The study met most of the components of the Dependent Variable Indicator. Consequently, we should be somewhat skeptical of the finding and future research is needed to enhance our confidence.

Generalization

Authors of only one study (Jones et al., 2014) used video-based intervention for generalization of the target skills. Jones et al. (2014) evaluated the generalization of the social response skills with adults and peers. The authors used adults when teaching social responses skills. They used both adults and peers for generalization of the skills. The authors used video modeling for the generalization of the social response skills. The result of the study showed that video modeling could be promoted to help children with autism to engage with peers. However, Jones et al. (2014) met just seven of the indicators and met just half or fewer than half of the criteria of the Participant Indicator and the Fidelity Implementation Indicators. Consequently, the lack of a body of studies examining generalization as well as the methodological shortcoming require us to accept the findings with hesitation. Future rigorous research is needed to enhance our confidence in the generalizability of video-based modeling.

Summary of the Findings from a Methodological Perspective

The literature review reveals that there is a generally consistent body of research demonstrating that video modeling can have an impact of social communication, social initiation, and spontaneous requesting. However, this body of studies also had some major methodological flaws, which means that the findings can be accepted with caution. Another way to consider this is that we have some general agreement that video modeling is effective with students with autism, but our confidence is limited by the methodological shortcomings. It is difficult to dismiss the body of findings which were generally consistent. The review indicated that video modeling is a potentially efficacious intervention, but future research should be conducted with careful alignment to the quality indicators to ensure that the findings are robust and to ensure our

confidence in the findings. The findings from the literature review do merit future research in this area.

CHAPTER III

METHOD

The study employed a single-case multiple baseline across participants design to measure the impact of point-of-view video modeling (POVVM) on social communication behaviors of three children with autism spectrum disorder (ASD) and development delays (DD). The study was approved by the affiliate the University's Institutional Review Board.

Experimental Design

In this study, a multiple-baseline across participants design was used employed to answer the research questions. The multiple-baseline design provides benefits for researchers that are permanent due to learning effects (Cooper, Heron, and Heward, 2007). The multiple-baseline design starts with the baseline condition, then continues to introduce the intervention condition (Cooper, Heron, and Heward, 2007). Returning to the baseline condition is unnecessary to demonstrate the effects of the treatment because the treatment is applied to another person, behavior, or setting depending on the variable being manipulated (Cooper, Heron, and Heward, 2007). Changes across the condition, setting, or participant can serve to demonstrate each of the three effects needed to demonstrate control of the intervention.

In the study, social interaction behaviors evaluated using a point of view video modeling (POVVM) intervention. According to Gast and Ledford (2014), multiple-baseline or multiple probe design across participants are well-suited for educational and clinical research when three or more individuals in your charge exhibit similar behavior excesses or deficits that require attention. Therefore, the multiple-baseline design served the purpose of the current study because I was looking at the continuous measurement of POVVM intervention on improving social interactions before and during the intervention for the participants. This design provided day-to-

day data analysis and decision making (Gast & Ledford, 2014). I used three participants within this research study, each during free playtime.

Participants Description

Inclusion criteria for the participants were: (1) school-based service provision under the category of ASD/risk of autism/developmental delay; (2) vision and hearing skills within normal range; (3) ability to attend a video; (4) have verbal skills; (5) communication deficits; and (6) enrollment in a local public preschool program. The criteria were implemented by the summer school program coordinator. As a result of the criteria, three students met the criteria. Table 13 displays the participants' characteristics for each participant.

Table 13. Participants' Characteristics

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Kalvin	DD	BDI-2	3.8	LatinX	PreK	M	Sig. cog. delay	REEL-3: RL= 1 yr. 11 mnt. EL= less than 1 yr. 7 mnt,
Liam	ASD	DSM-V	3.2	White	PreK	M	ASD	VAPS: RL= 2 yr. 1 mnt. EL= 2 yr. 1 mnt.
Harper	DD	BDI-2	3.5	White	PreK	M	Low av. Cog. delay	BDI 2 Communication score= average level

1= disability or risk status is described, **2=** method for determining disability or risk status is described, **3=** age, **4=** race, **5=** grade, **6=** gender, **7=** diagnostic/adaptive and functional score, **8=** achievement (language) score, **BDI-2=** Battle Developmental Inventory 2nd edition, **DSM-V=** Diagnostic Statistical Manual, 5th edition, **REEL=** Receptive-Expressive Emergent Language Test, **RL**= receptive language, **EL=** expressive language, **VAPS=** Vineland Adaptive Behavior Scales

In this study, I used two male children (Kalvin and Harper) with cognitive developmental delay (CDD). These students were referred by the summer school program coordinator because the both students met the criteria for ASD with social communication deficits. CDD involves any disorders which affect a child's physical, cognitive, behavioral, or social development. The Centers for Diseases Control and Prevention (CDC) indicated that a development delay (DD) occurred if children reach a milestone at an age later than the average development rate. CDC

added that the DD is evaluated in five areas as follows: cognitive, social and emotional, speech and language, excellent motor skills, and gross motor skills (p.716) (Frey, 2011). Children with DD are related to other neurobiological disorders such as ASD, hyperactivity, and attention deficits, often also have social, emotional, and behavioral delays. Ozyurt and Dinseven Elikucuk (2018) stated that language delay was the first indicator to diagnose ASD or CDD. All these delays affected a child's ability to communicate and interact with others. As the consideration of the CDC descriptions and other information, these two students fit the criteria for ASD with social communication deficits.

Participants' language, communication, motor, perceptual and adaptive behavior scores were determined by standardized assessment tools including Battle Developmental Inventory-2 (BDI-2), Receptive-Expressive Emergent Language Test 3rd Edition (REEL-3), Vineland Adaptive Behavior Scales (VAPS), Goldman-Fristoe-II, Differential Ability Scales, Second Edition (DAS-II), and Infant/Toddler Sensory Profile-2 (ITSP-2).

The BDI-2 is an individual standardized assessment that was used for children aged birth to seven years, eleven months. The BDI-2 measures adaptive, personal-social, communication, cognitive, and developmental motor skills. The BDI-2 helps professionals to understand at the preschool, kindergarten, and primary school levels young children's developmental and functional skills (Hilton-Maunger, 2011).

The REEL-3 is used for identifying the language impairments of toddlers and infants or identifying other disabilities that affect language and other developmental areas. The REEL-3 involves two core subtests in which are receptive language and expressive language subtests and supplementary subtests. This test scoring calculates the based on percentile ranks and age equivalents (Bzoch et al., 2003).

VABS assesses individuals' personal and social skills from birth to adulthood. Adaptive behavior indicates the typical performance of an individual's daily activities for personal and social competence. These scales evaluate what a person does rather than what they can do (Sparrow et al., 2016).

The Goldman-Fristoe-II test measures an individual's consonant sounds articulation according to Standard American English. This test gives a wide variety of information, exemplifying the reproduction of both spontaneous and imitative sound, including a single word or speech (Goldman and Fristoe, 2000).

The DAS-II test is a comprehensive clinical assessment to evaluate individuals' cognitive abilities at a wide range of developmental levels. This test is suitable for individuals from 2: 6 to 7:11 years of age, who directly measure identifiable skills related to educational concerns (Elliot, 2007).

ITSP-2 consists of a questionnaire that is completed by an infant or toddler's primary caregivers in order to gather information about the child's sensory processing abilities. The caretaker's responses are summarized using standardized scoring procedures and then interpreted in terms of the impact that a child's sensory processing abilities (Muhlenhoupt, 2005).

All these tools were used in the participants' individualized educational plan (IEP) to describe their language, communication, motor, and sensory behavior skills level successfully.

Kalvin

Kalvin, a Latin-American male, was aged three years, eight months at the start of the study. His IEP provided information on the present levels of performance in the areas of speech, language, play, and social skills development. Kalvin was diagnosed with developmental delay

at three years of age. Administration of the BDI-2 cognitive evaluation showed that Kalvin had a significant cognitive delay.

His primary language was Spanish. Therefore, he took Speech and Language Evaluation in Spanish. According to this evaluation performed, he demonstrated delays in receptive and expressive language, as well as pragmatic communication and articulation. He spoke Spanish at home, but he could express himself in English.

Administration of the REEL-3 was that in the area of receptive language, Kalvin obtained a raw score of 19, which meant his receptive language was equivalent to 1 year 11 months age level. In the area of expressive language raw score was 47. This score was equivalent to less than one year seven months of age level. His articulation level was reported that he used single words accompanied by babbling to communicate.

Kalvin demonstrated an interest in a wide array of toys and games within the classroom, but he had difficulty following any adult direction. In addition, the transition from preferred activities to non-preferred activities was difficult for him. He expressed himself by making noises, screaming, and flapping his arms. Kalvin used not only body language and behavior for expressing some of his wants and needs but also used one-word utterances in both English and Spanish.

On the sensory processing measure, Kalvin scored in the typical range for planning and ideas, and he got the similar score for vision and body awareness. He scored in the Definite Dysfunction range for social participation, hearing, touch, and balance and motion.

Kalvin often had chosen to play alone when he was around other children. He obsessed to play with farm animals (esp. cows) and train tracks. While he was playing these toys, sometimes Kalvin displayed some problem behaviors. For example, when the cow could not fit in the

fences, he was crying, and he looked at his teacher to support him. Until the teacher or other adult offered another size of the animal, Kalvin continued to cry.

Liam

Liam, was a white-American male, was aged three years two months old at the start of the study. His IEP provided information on the present levels of performance in the areas of speech, language, play, and social skills development. Liam was diagnosed with autism spectrum disorder (ASD) at 16 months old. Also, according to the Diagnostic Statistical Manual-V (DSM-V) and history of reports, observation, and evaluation of his performance, Liam's behavioral and developmental profile exhibited that autistic disorder (DSM-V: 299.0; ICD-10: F84).

Liam's receptive language skills exceeded age-level expectations. He demonstrated excellent vocabulary comprehension and followed a variety of verbal directions. Liam spoke in complex multi-word sentences with developing grammar such as pronouns, possessives, and plurals. He used his words to make requests, comment, asked and answered questions, and protests. Liam was not yet telling the stories about his life removed from time and place. His language topics were concrete and self-selected so, he often narrated what he was seeing and doing. Administration of Vineland Adaptive Behavior Scales, Third Edition (VABS-III) (mean=100, standard deviation=15) showed that communication score was 91 that scored in the 27th percentile—for both receptive language and expressive language, age equivalent was two years, one month. VABS-III socialization score was 73 that scored in the 4^{th} percentile—for an interpersonal relationship, age equivalent was eight months; for play and leisure time, age equivalent was 11 months; for coping skills age equivalent was below two years.

Liam demonstrated reduced eye gaze and socialization with peers. He was interested in peers and adults but he had difficulty with back and forth discourse without adult support and

modeling. Liam's speech intelligibility was reduced then from their typical peers. Articulation errors, language levels as well as pragmatic differences led to this reduced intelligibility. Administration the Goldman-Fristoe-II, his score was in the average range for the production of Sounds-in-Words for his age (Raw Score-40, standard score-92nd, 34thpercentile). According to this result, phonological errors affected his intelligibility. He articulated all-age appropriate consonant sounds in isolation. Liam's articulation errors were amplified by the advanced level of his expressive language. When he was making eye contact, speaking with appropriate loudness, and directing his words to his conversation partners, he was better understood.

Liam's social skills were delayed. He had difficulties pairing eye contact with the communication partner taller than him. However, he preferred initiated a conversation with adults than peers. He was most comfortable in play space when he arrived there before there were many people. Liam responded most consistently four or five years old girls like his older sister. He consistently engaged in reciprocal play with his sister but not yet with other peers, even very familiar children. When a familiar peer approached him and started an interaction with words, Liam did not consistently respond.

Liam's cognitive skills were above the age level. Administration of the DAS-II (standard score means= 100; standard deviation= 15), the score age equivalent was three years seven months (when he took this test, he was three years old). Transition away from preferred activities, and daily living routines could be complicated, and could become distressed for Liam. Liam's perceptual and motor skills also were currently at an age-appropriate level.

Administration the Infant/Toddler Sensory Profile-2 showed his performance ranked as "Much More than Others." It meant that Liam did not process sensory input like his same-aged peers and might have difficulty interpreting the information from the environment or his body.

Unusual behaviors and disruption in social might result when a child attempts to manage the daily life with insufficient or inaccurate sensory below is a grid of Liam's score.

Liam's sense of personal space met the age level of expectations. He could resist expectations but respond well to visual schedules, oral preparations, and positive reinforcement for a job well done.

Harper

Harper was a white American male, was aged three years, five-month at the start of the study. His IEP provided information on the present levels of performance in the areas of speech, language, play, and social skills development. Harper was diagnosed with developmental delay at three years of age. Administration of Battle Developmental Inventory 2ndEdition, he had a low average of developmental delay. Harper demonstrated this developmental delay, which manifested in decreased speech intelligibility as well as motor planning deficits. Harper also presented significant anxiety around separation from his family.

Harper did not spend a lot of time direct contact with other children. He attended weekly playgroups and tolerated children near him but did not always seek them out. Other children in his space could create anxiety for him.

Harper's speech was intelligibility to the familiar listeners. On the other hand, he had difficulties in articulation and struggles when they were in words and sentences. Administration of Battle Developmental Inventory 2ndEdition, communication score was 94. The score was equivalent to the average level. Harper responded well with execrated visual cues with articulation and repeated the practice.

On the other hand, he had an excellent memory. While he had strong communicative intent, he had a difficult time being understood and sequencing sounds in the words, phrases, and sentences. His overall lucidity was weak in the context.

Harper was strong fine motor skills and he was able to manipulate small objects and colors. However, he had delayed gross motor skills. For example, physical mobility might be tough. Also, it might be challenging for him to detour around obstacles and children in a classroom. He was also sensitive to loud sounds or chaotic environments.

Harper also used his strong memory to access toys and acquired skills. He could be rigid in his approaches to new or novel tasks as well as problem-solving. Harper would often abandon tasks that were hard and asked for help quickly. He had some strong pre-academic skills such as color, shapes, counting, and some letters.

Harper ‘s biggest challenge was around anxiety related to new tasks and was not successful either time, resulting in extreme distress after which took him longer to recover than expected.

Communication Partners

All the students with or without special needs in the participants' classrooms were their communication partners. I did not give any training for the potential conversation partner. However, before beginning of the intervention, the teachers, and I talked to participants’ classmates. We said when the participants tried to communicate them, they should listen to the participants and respond to them. Additionally, during the intervention, if the communication partner did not respond when the participant asked him/her, I gave a verbal prompt to him/her for responding to the participant.

Setting

The three participants were recruited from a public elementary school's two different classrooms in the northeastern area in the US. This public elementary school serves a diverse population of students. In the regular school terms, the school population has approximately 285 PreK through 5th-grade students. The female student population is 52%, and the male student population is 48%. The school population consists of 65% of white students, 2% of black students, 18% of Hispanic students, 6% of Asian students, and 9% more than two races students. The demographic information of the students in the summer school program was similar to the regular school program. The special education coordinator in the northeastern area of the school district stated that a part of summer program students was referred by their special education teachers or a related service provider.

Mostly, receiving summer service students, who would regress if not educated year-round. She added that special education services referred not to all students in their services. They referred to the students were with more significant challenges, which educators expected to lose skills over the long summer break. Often, administrators even asked for data that point to regression or loss of skills when services were interrupted. According to the special education coordinator, when students got older, far fewer quality was for the summer services. Also, as known, early interventions were the most effective methods for students with disabilities so, a more significant percentage of students with disabilities in the early grades were placed in the summer programs.

The summer service program also involved children without disabilities. These students were determined in the summer program as a program team decision case by case. These

students also did not have any other deficits, but the summer program team decided each student based on needs, whether needed, summer program education.

During the summer program, one teacher and three paraprofessionals staffed each classroom. Each class population was twelve students, and three or four of the twelve students were with special needs. All participants received support and services. Two of the three participants received physical therapy, occupational therapy, and speech-language therapy. The other participant received occupational therapy, behavior therapy, and speech/language therapy.

The instructional format and daily routine in the summer program had some differences from the regular school term format. Both classrooms followed the same instructional format: 4 days per week, 3hours per day, and their daily schedule were similar such as outside play, circle, snack, tabletop toys/art, literacy circle. In outdoor playing, when students came to the school, they (both classroom students together) spent one hour in the playground. They played with a water table, or a small swimming pool, rode a bicycle or rode down the slide. After all the students entered their classroom, they changed their clothes. Then circle time started. In circle time, the students sat on the floor with consisting of a circle. They sang a morning song. Then, they played a copy-cat play. After that, they learned the alphabet and sang the alphabet song. Finally, they learned numbers and sang the song contained numbers. Then, it was snack time. After that teacher showed what the children did it today in the art time and, she worked with the students as a small group. When the group completed the art project, the teacher started to work with a new group. While she worked with the small group for the art project, the rest of the children played the tabletop toys. After completed the art project, the literacy circle time began. In the literacy circle, the students and the teacher sat on the carpet with consisting of as a circle. The teacher read a book. After that, it was the time for the school dismissal.

The classroom setting was a typical PreK classroom. The class was employed a center-based model with specific areas for activities such as reading, dramatic play, creating art, science, and building. In addition, the classroom had preschool sizeable tables and chairs, and a floor area where the class gathered. The classroom also had a teacher desk and a chair for the classroom teacher. The classroom had preschool size shelves for containers the toys, puzzles, and blocks.

The preschool and kindergarten classrooms were on the basement floor of the school. All classrooms shared the same playground, and each classroom had a direct entrance to the playground. The preschool and kindergarten students used playground entrances when they arrived at the school and left school. The playground had a slide and a climbing complex at the center of the play area. It also had a storage at the corner of the playground which kept for the bicycles, balls, water tables, chalks, and toys using in the playground. When the students played at the playground, the teachers presented the play items to the students. All intervention and data collection (baseline and intervention) took place in the students' classroom and playground areas. During the outside sessions, the study was implemented during the outside playing time. During the inside sessions, the intervention was implemented during the tabletop playing time.

Filming and Instructional Materials

For the video clips, two white girls aged six and seven years were used as the communication partner. These girls were not familiar with the participants. I used two settings which were very similar to the classroom and playground setting of the study. For the classroom setting, I used a public library's children-floor which was similar to a preschool classroom. I used the puzzle, blocks, and bus toys as the filming materials. For the playground settings, I used a playground which was near the preschool. This playground had a slide and swings. I did not

use the swings because at the preschool playground, there were not them. I used a slide and a ball as a filming material. The videos consisted of six video clips which were three different types of toys and two initiation sentences (“can I play with you” and “Do you want to play) in the library settings. I created four video clips which were two different toys and two initiation sentences.

Filming of the-point-of view-video modeling was used Apple iPhone XR phone’s video camera. The video was filmed at the approximate height of the eye level of the participants. It was filmed in similar environments of the potential settings with the minimized of the potential distraction. For in the classroom environment, the camera first directed towards the toy and then, the communication partner. The camera came closer to the communication partner and said, "Hi!" which was the beginning of the targeted social initiation signaling and the targeted part of the social initiation skills to be taught of the participants. The communication partner looked at the camera, smiled, and said, "Hi!" The camera said, "Can I play with you?" This sentence was another part of targeted social initiation skill. The communication partner responded, "Yes!" The camera said, "Okay" The camera focused on the toy and the communication partner’s hand and my hands. I filmed two more different toys following these steps. Also, I filmed "Do you want to play?" sentence for the video clip. For this sentence, the camera first directed toward the communication partner. The camera came closer and said, "Hi!" The communication partner looked at the camera, smiled, and said, "Hi!" The camera said, "Do you want to play?" The communication partner said, "Yes" Then, the communication partner and the camera walked to the toys and picked a toy. Then, the camera focused on the toy, the communication partner's hand and, my hand. I filmed two more different toys following these steps.

For the playground, I filmed four video clips using two different types of playground activities for two social initiation questions. For the playground environment, I followed the

same steps in the classroom video clips. Each video clip was approximately 25 seconds in length. I exhibited the video clips to the participants from Apple iPad.

I observed the children before collecting baseline data and also asked the classroom teachers for the high preference items for each participant. The classroom teachers had already implemented token economy procedures. Therefore, I implemented the token economy procedure as well. As a result of the teachers interview and my observation, Kalvin preferred farm animals. Liam and Harvey preferred dinosaurs and vehicles. All participants loved stickers. I gave a board (Appendix A) which involved five small checkboxes, for each participant. When they completed the checkboxes, they obtained their desired toys (i.e. for Kalvin, small farm animals; for Liam and Harvey, small vehicle or dinosaurs toys)

Dependent Variable

The dependent variable was the target behaviors of the sequence of social interactions. The sequence of behaviors were (a) approaching to the communication partner, (b) greeting the peer by saying "hi" or "hello", (c) waiting for the peer's response (for example the participant waits for the peer to say "Hey" or "Hi," (d) asking the peer to play by stating "Can I join you" or "Do you want to play?" (e) waiting for the peer's response, and (f) engaging in play behavior as demonstrated by sitting with the peer and playing together for one minute. If the conversation partner said, "No," the participant would ask another friend to play with him. The data for each behavior was collected and summarized for each interaction trial. The summarized data for the two trials for the session were averaged. This average was charted daily.

Independent Variable.

The independent variable was the POVVM intervention described in the procedures section. The intervention was implemented by the researcher as described in the procedures.

The participant received reinforcement for the correct response and implemented a correction procedure for an incorrect response. I used the least to most prompting strategy. The mastery criteria would be three consecutive sessions 100 % correct responding to social interactions.

Procedures

Baseline

In the baseline phase, the participant was not exposed to any intervention. This phase served as the control condition for each participant. The participant's behaviors in the intervention phases were not compared to the behaviors in the baseline condition. I conducted observations of the participants during the baseline condition. I implemented a partial interval during the baseline session. The partial interval recording is used when behaviors happen so quickly because that is hard to catch up with the behavior itself when it starts and ends (Tieghi-Benet et al., 2003). The total observation periods for each baseline session were 7 minutes. I divided the target behaviors into eight steps and I observed each step for a minute. I divided the total observation time into five same length intervals for each step of the target behavior. The length of each interval was 12 seconds.

Data for each session was collected and graphed consistent with original case design research. Gast and Ledford (2014) have indicated that a stable baseline within multiple-baseline procedures is five stable data points. The third participant (Harper) joined the study late than the other two participants. Therefore, the first participant (Kalvin) had seven stable data points instead of five.

After obtaining seven data points for Kalvin, I started to implement the intervention session. While obtaining an increased trend for Kalvin, I started the intervention procedure for Liam. When I obtained an increased trend for Liam, I began the intervention for Harper. During

baseline sessions, there were no video clips shown, no prompting, and no delivery of reinforcement.

Intervention

In the intervention, each intervention session lasted 15 minutes and occurred during free playtime and playground time. An intervention session began with the participant watching a point-of-view video on the iPad. I showed the video clip in a quiet section of the preschool classroom for free playtime in the classroom, and in a quiet place of the playground for the playground time. Appropriate video clip watching was defined as the target child attended to the video with eyes and face oriented towards the video screen. Inappropriate video clip watching was defined as the target child tried to take the iPad, not oriented on the video screen, or tried to leave the area. Before watching the video clip section, the participant chose his desired toy (a farm animal for Kalvin, a small vehicle for Liam, and a dinosaur for Harvey). After he chose the toy, I explained how to gain this toy. I gave a board (Appendix A) to the participant. He needed to watch video clips appropriately, and then I gave a sticker for this behavior. After he completed the board, the participant gained the desired toy. I explained this rule for all the participants before the beginning of the intervention procedure. All participants were familiar with this system because their teachers had already used the token economy as a reinforcement method.

After the participant watched the point-of-view video clip, I directed him to go to the playground area and said, “Let’s play. Go ask a friend to play.” The participant approached the preferred peer within three seconds after watching the video clip. Then he engaged in a verbal interaction as “Hey” within 3 seconds after approaching the peer. The peer responded to him as “Hey” to the participant. After that, the participant engaged the conversation partner as “Do you want to play or, can I play with you?” The conversation partner responded to him as “Yes, or

okay" Then, they began to play together for one minute. Then, I showed the video clip to the participant for a second time, and the same procedure was repeated. This short exposure to activity was consistent with evidence-based practices. This type of practice provided that a student with ASD could learn a skill via the most effective with little experiences with the desired activity, and high-frequency exposures to brief interventions.

When the participant did not engage in social interaction, I employed the correction procedures, as shown in Table 14. I had a correction procedure for each step of the target behaviors. Therefore, I had seven possible scenarios, and I implemented the correction procedure as appropriate as these scenarios as displayed in Table 14.

Table 14. Correction Procedures

Scenario	Measured Behavior of the Dependent Variable Performed or not	Independent /with Prompt Performance	Implemented of Correction Procedure
A	All seven steps are performed independently	+ + + + + + +	
B	1. The participant did not approach to communication partner 2. The participant did not say "Hi." 3. The participant did not wait the peer to look at his/her face 4. The participant did not engage toward the communication partner 5. The participant did not listen to communication's partner answer 6. Participant did not respond to peer 7. Participant did not join the peer	- - - - - -	Correction Procedure I Correction Procedure II Correction Procedure III Correction Procedure IV Correction Procedure V Correction Procedure VI Correction Procedure VII
C	• The participant did not say "hi"	+ - -	Correction Procedure II Correction Procedure

	• The participant did not wait the peer to look at his/her face • The participant did not engage toward the communication partner • The participant did not listen to communication's partner answer • Participant did not respond to peer • Participant did not join the peer	- - - -	III Correction Procedure IV Correction Procedure V Correction Procedure VI Correction Procedure VII
D	• The participant did not wait the peer to look at his/her face • The participant did not engage toward the communication partner • The participant did not listen to communication's partner answer • Participant did not respond to peer • Participant did not join the peer	+ + - - - - -	Correction Procedure III Correction Procedure IV Correction Procedure V Correction Procedure VI Correction Procedure VII
E	• The participant did not engage toward the communication partner • The participant did not listen to communication's partner answer • Participant did not respond to peer • Participant did not join the peer	+ + + - - - -	Correction Procedure IV Correction Procedure V Correction Procedure VI Correction Procedure VII
F	• The participant did not listen to communication's partner answer • Participant did not respond to peer • Participant did not join the peer	+ + + + – – -	Correction Procedure V Correction Procedure VI Correction Procedure VII
G		+ + +	

	• Participant did not respond to peer • Participant did not join the peer	+ + - -	Correction Procedure VI Correction Procedure VII
H	Participant did not join the peer	+ + + + + + –	Correction Procedure VII

Data were collected and charted daily. Data was collected on the following variables and these variables were as followed: (a) approaching to the communication partner; (b) greetings in the social interaction toward the communication partner, which clarify as correct if the participant says “Hello” or verbalizes any variation of greetings such as “Hi,” or “Hey;” within 3 seconds after the participant ultimately coming face to face; (c) listening the communication responded to the participant as “Hey” or “Hi;” (d) engaging the social interaction to the communication partner such as “Can I join you” or “Do you want to play;” (e) Listening to the conversation partner’s response; (f) behaving as appropriately the conversation partner’s response (If the conversation partner said, “yes,” the participant sitting with the conversation partner and playing together for one minute. If the conversation partner said, “No,” the participant would ask another friend to play with him.) I calculated how many attempts of the target behaviors, how many correct behaviors with prompt, and how many independent responses occurred during the 15 minutes of intervention session. Then, I showed these calculations of the graph as a total number of correct behaviors with prompt, and a total number of independent behaviors.

Generalization and Maintenance

For this study, both generalization and maintenance procedure had been planned. However, this intervention was implemented during the summer program, and, the program was only four weeks. Therefore, the generalization and maintenance procedures were not achieved because of time limitations.

Inter-Observer Agreement

Direct observation of behavior is the most commonly used method in behavioral research studies. Researchers must assure that their observation continues to meet the agreed-upon criteria. Therefore, they must attend an interobserver agreement (IOA) for observational measures to ensure reliable and valid measures.

Taking IOA data was the most popular method used to measure the percentage of reliability and validity in behavioral research studies (Watkins & Pacheco, 2000). For this research, I collected the interobserver agreement (IOA) on all measured variables with an independent observer. IOA was assessed using event recording (IOA= smaller count/larger count * 100) and was used to assess the agreement on correct responses across all participants and all conditions. The average of calculated IOA for baseline was 100%. The average of calculated IOA for intervention was 97%. I collected the IOA data 14% for baseline, and 13% for an intervention session across baseline and intervention session.

Treatment Integrity

Procedure reliability was provided to ensure that the procedure of point-of-view video modeling training sessions was implemented as planned. An independent observer completed a checklist of items (Appendix C) indicating the order of steps in the treatment to be followed. The independent observer-rated, whether the researcher appropriately completed each component.

The independent observer observed 14% of total observation sessions across participants and equally observed across baseline and intervention sessions. The treatment integrity was calculated by a total number of steps completed and divided by the total number of steps necessary and multiplying it by 100%. The average calculated of the fidelity of treatment for both baseline and intervention were 100% across participants.

CHAPTER IV

RESULTS

Total Target Behaviors

For each participant, the target behaviors were determined based on the baseline condition. Each student had deficits in more than one of the steps of behaviors, but not all the students had deficits in the same behaviors. The target behaviors for all students were: (1) saying "hello" to peer, (2) waiting for a response to the greeting, (3) listening to peer's response, and (4) engaging in play. Figure 1 displays the frequencies of the total target behaviors across the three participants. I found that the overall frequency of target behaviors increased from Baseline to Intervention condition for all three participants. In addition, there was an increase in independent demonstration of target behaviors across the participants. I calculated the mean frequency of target behaviors for baseline and intervention phases for each participant, and the mean frequency increased for each participant from Baseline to the Intervention Phase.

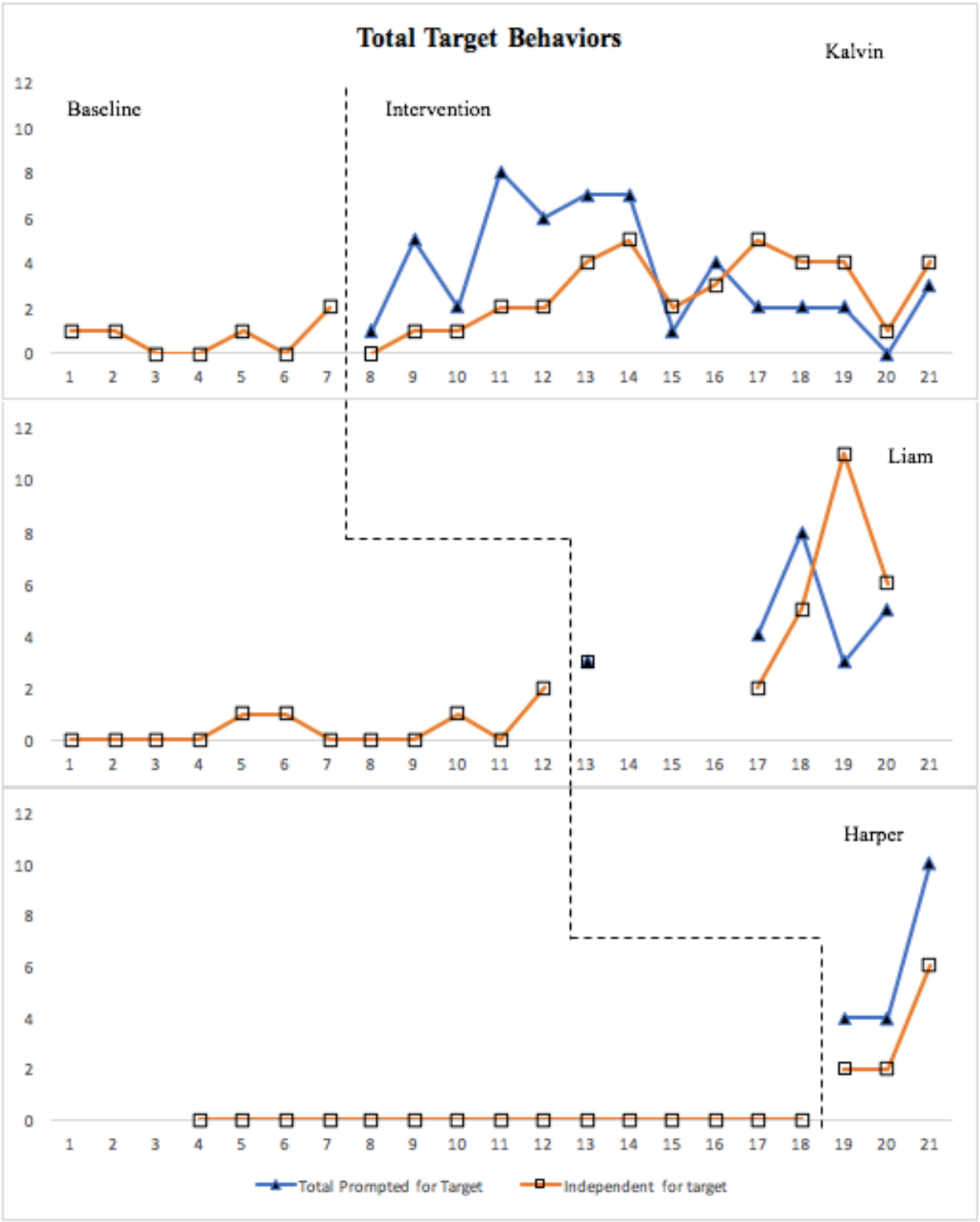


Figure 1. Total target behaviors

Kalvin

Target Behaviors

Kalvin had four target behaviors: (1) saying “hello” to peer, (2) waiting for a response to the greeting, (3) listening to peer’s response, and (4) engaging in play.

Kalvin had low levels of target behaviors during the baseline condition. He did display a total of five behaviors during the condition. In Session 1 and Session 7, he displayed, “waited for a response to play.” In Session 2 and Session 5, Kalvin exhibited, “Waits to partner for looking at his face and says ‘HI’” In Session 7, he also said, “Hi.” In general, Kalvin did tend to walk near other students engaged in play and stood near them.

The mean frequency of Kalvin's target behaviors was 0.83 behaviors per session during the baseline conditions and increased to 6.28 behaviors per session during the intervention condition. Kalvin's mean frequency of total target behaviors with prompt was 3.57, and the mean frequency of the independent demonstration of the target behavior was 2.71 per session during the intervention condition.

Prompted Behaviors

During the Intervention phase, Kalvin exhibited a prompted “Hi" behavior in the first intervention session. Kalvin required prompting within the Intervention to increase demonstrations of saying "Hi!" to the peer partner, waiting to peer partner response, asking peer partner to engage himself to the play activity, and listen to respond to the peer partner. He engaged himself in the play activity with the prompt. Kalvin engaged himself in a play activity in Session 9, 11, 12, 13, 14, 16, 19, and Session 21. During these intervention conditions, he engaged himself to the play activity one time, two, or four times. Kalvin's mean frequency of total target behaviors with prompt was 3.57 behaviors per session.

Independent Behaviors

Figure 1 shows that independent demonstration of the target behaviors increased from baseline to the intervention condition. In Sessions 13, 18, 19, 20, and Session 21, Kalvin independently said, "Hi!" one time to the peer partner one time. Also, in Sessions 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, and Session 21 Kalvin independently listened for his peer partner to response back to him one time, two times, three times, and four times, during these intervention conditions. Kalvin independently listened to his peer partner's response for engaging the play activity one time in Sessions 11, 12, 13, 14, 15, 17, and 18.

Decreased Behaviors

Figure 1 shows that the number of target behaviors decreased in Session 15 and Session 20. In session 15, Kalvin exhibited several problem behaviors. He threw toys to his peers when they played near to him, or they approached him. He only communicated with the adults appropriately. He did not follow the directions. As a result, Kalvin had limited opportunities to engage in the intervention, when given the prompt for exhibiting the desired behavior, he did not respond. When I restarted the intervention, he again displayed the problem behaviors, including hitting me and throwing an object at me. In Session 20, he failed to participate in the intervention. Kalvin refused to play with his peers. He did not follow the directions of adults. In the days that Session 15 and Session 20 were conducted, Kalvin exhibited the problem behaviors during all daily activities, and it appears that the challenging behaviors affected Kalvin's demonstration of target behaviors.

Liam

Target Behaviors

Liam had four target behaviors: (1) saying "hello" to peer, (2) waiting for a response to the greeting, (3) listening to peer's response, and (4) engaging in play.

Liam had low levels of target behaviors during the baseline condition. He did exhibit a total of five behaviors during the baseline condition. In Session 5 and Session 10, Liam displayed waits to partner response and says 'Hi' just one time during each session. He exhibited the waited for the response to play in Session 6, Session 12. Liam's sister was one of his classmates. In general, he did tend to engage his sister. However, this behavior was not the desired behavior as it interfered with Liam's social interactions with peers.

The mean frequency of Liam's target behaviors was 0.42 behaviors per session during the baseline condition and increased to 10 behaviors per session. Liam's mean frequency of total target behaviors with prompt was 4.6 behaviors per session. Overall, the mean frequency of the total independent target behaviors was 5.4 during the intervention condition.

Prompted Behaviors

During the intervention phase, he exhibited "Hi" behavior with prompt to the peers in Session 17 and Session 20 two times; in Session 18 three times, and in Session 13 and 19 only one time, respectively. Liam required prompting within the intervention to increase the demonstrating of asking peer partners to engage himself in the play activity behavior. During the intervention phase, he asked the peer as "Do you want to play" (or "Can I play with you") only one time with prompt in Session 17. Liam asked the peer to engage himself to play activity in Session 18 and Session 20 three times and in Session 13 and Session 19 two times with prompt. In Session 17, he waited to the peer for the response to say "Hi" only one time with prompt, and

there was no independent performance during this phase. He listened to the peer response for engaging play activity one time with prompt in Session 18. Liam's mean frequency of total target behaviors with prompt was 4.6 behaviors per session.

Independent Behaviors

During the Intervention condition, Liam said "Hi" to the peers independently in Sessions 13, 17, 18, and 20 one time, in Session 19 two times during the intervention phase. Figure 1 shows that independent demonstration of this behavior increased. He did display independent demonstration of the "asking the peer for engaging the play activity" only Session 18 and 19 one time and three-time, respectively.

Figure 1 shows that his independent demonstration of the "waiting to the partner's response the 'hi'" performance increased. In Session 18 and session 20 two times and Session 19, one time, he independently displayed "waiting for the peer partner's response for his greeting" behavior. Similarly, his independent demonstration of "listening to peer's response for engaging the play activity" behavior was getting increased. In Session 13, two times, Session 17 and Session 18 only one time, in Session 19 five times, and in Session 20 three times he displayed this behavior.

Challenges

One of the challenges with Liam's data was that Liam had a series of absences from school (Sessions 14, 15, and 16), and he also was absent in last (Session 21) session. Liam's absence may have negatively impacted his demonstration of desired behaviors.

Harper

Target Behaviors

Harper had four target behaviors: (1) saying "hello" to peer, (2) waiting for a response to the greeting, (3) listening to peer's response, and (4) engaging in play.

Harper did not demonstrate any desired behaviors during the baseline condition. In general, he engaged only adults (paraprofessional) in the classroom or played by himself during the baseline condition.

The mean frequency of the target behavior was zero behaviors per session during the baseline condition and increased to 9.33 behaviors per session. Overall, the mean frequency of the prompted total target behaviors was six behaviors per session. The mean frequency of the independent total target behavior performance was 3.33 behaviors per session.

Prompted Behaviors

Harper showed substantial improvement in the target behaviors compares to the baseline performance. Figure 1 showed that during the intervention phase, he did display the greeting behavior to the peer partner with prompt in Session 19 and 20, two times and Session 21 four times. Harper made neither independent nor prompted demonstration of "waiting for a response to the greeting" behavior in the first intervention session. He displayed the behavior with prompt only one time in Session 20. During the intervention phase, Harper was able to display the asking peer partners to engage himself in the play activity behavior only with the prompt. He exhibited this behavior in Session 19 two times; in Session 20 one time, and Session 21 five times. Harper did not need any prompt to display "Listening of the peer response to engage the play activity" behavior.

Independent Behaviors

Harper did display the greeting behavior to the peer partner independently in the first session of the intervention. However, he did not exhibit any demonstration of the independent performance for this behavior during the rest of the other intervention sessions. Also, Harper exhibited an independent demonstration of the listening of the peer response to engage the play activity behavior during the intervention phases. In session 19, and 20 one time, and Session 21 two times, he exhibited the behavior. Overall, his prompted total target behavior performance more significant than the independent total target performance.

Challenges

Two issues substantially affected the ability to collect data for Harper. First, the absence of Liam's sessions in 14, 15, and 16. It meant that Harper could not move to the intervention until the 19th session. Additionally, the length of the summer program was a total of 21 sessions. Therefore, Harper only participated in the intervention for three sessions.

Individual Target Behavior Analysis

I also examined the changes in individual behaviors across the participants. This was helpful to understand how the students' specific behaviors changed in response to the intervention.

Greetings Behavior

Figure 2 displays the frequencies of the saying "Hi!" to the peer partner behavior across the three participants. I found that the overall frequency of the greeting behaviors increased from Baseline to intervention condition for all three participants. Additionally, there was an increase in the independent demonstration of this behavior across the participants. I calculated mean

frequency of the greeting behavior for baseline and intervention phases for each participant, and the mean frequency increased for each participant from Baseline to the Intervention Phase.

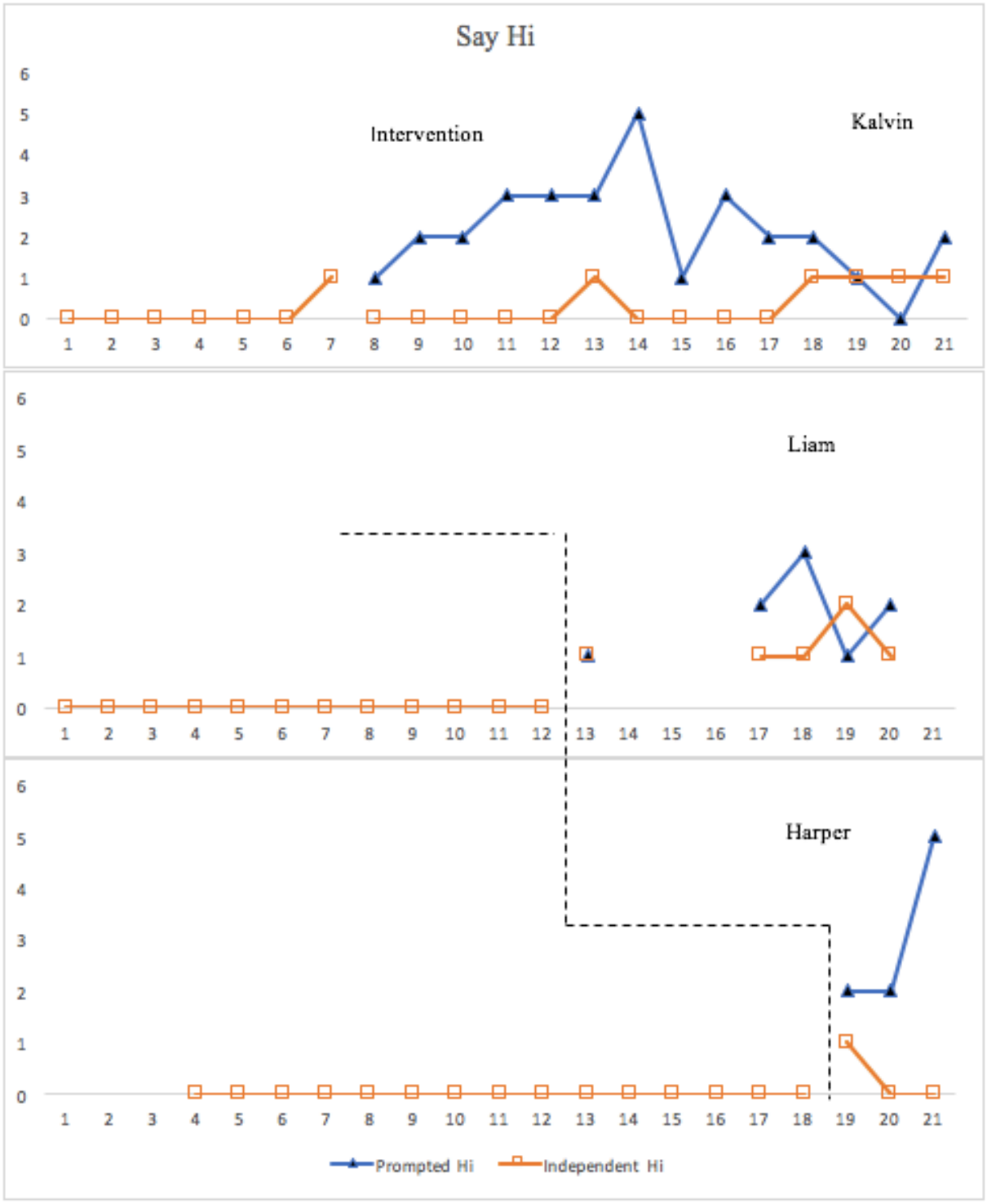


Figure 2. Say “Hi!” to the peer behavior.

Kalvin

Baseline

Kalvin had a low level of Baseline performance. He did display the greetings behavior only one time in Session 7 during the baseline conditions. In general, Kalvin tended not to start the conversation. When his friends greeted him, he looked at their faces, and rarely he responded to them.

Prompted Behavior

The mean frequency of the baseline condition was 0.14 behaviors per session and increased to 2.5 behaviors per session during the intervention condition. Kalvin showed substantial improvement in greetings behavior compares to the baseline condition. Kalvin needed to prompt for increasing the greetings behavior. During the intervention condition, he exhibited the highest performance with prompt in Session 14. Kalvin greeted his peers five times during this session.

On the other hand, he did not show any prompted performance in Session 20. Kalvin exhibited greeting behaviors with prompt in Session 11, 12, 13, and Session 16 three times; in Session 9, 10, 17, 18, and Session 21, he showed the greeting behaviors two times; and in Session 8, 15, and 19 one time. The mean frequency of greetings behavior was 2.14 behaviors per session.

Independent Behavior

During the intervention, he did display an independent demonstration of the greeting behavior one time in five different sessions. In nine intervention sessions, he did not exhibit any independent greeting behaviors. He showed the independent demonstration of the performance in Session 13, 18, 19, 20, and 21. There was a slight difference between Baseline and Intervention

performance of the greeting behaviors and, the mean frequency of the greeting behavior was 0.36 behaviors per session.

Liam

Baseline

Liam did not demonstrate any greeting behaviors during the baseline condition. In general, he followed his sister, or he followed his teacher. He tended not to start the conversation.

Prompted Behavior

The mean frequency of the baseline performance was 0 behaviors per session and increased to 3 behaviors per session during the intervention condition. Liam showed significant improvement in greeting behaviors compared to the baseline performance. He displayed prompted greetings performance three times in Session 18, which was his highest performance with prompt during the intervention condition. In Session 17 and 20, he demonstrated the greeting behaviors two times with prompt. He displayed this behavior with prompt in Session 13 and 19 only one time. Overall, the mean frequency of the prompted performance was 1.8 behaviors per session.

Independent Behavior

During the intervention condition, he demonstrated the independent performance of the greeting behaviors in each of the sessions. His highest level of performance was in Session 19. He exhibited the behavior two times independently. He displayed the greetings behaviors only one time in Session 13, 17, 18, and 20. His independent demonstration of the "greeting behaviors" performance was slightly lower than the prompted performance. The mean frequency of the independent performance was 1.2 behaviors per session.

Harper

Baseline

Harper did not demonstrate any greeting behaviors during the baseline condition. In general, he followed an adult (a paraprofessional). Harper held her hand. When she directed him to a play activity, he joined the activity with her. Otherwise, he did not join any play activity with his peers by himself. He tended to not communicate with his peers. For instance, when a peer approached him, he looked at his/her face, but he did not say anything.

Prompted Behavior

The mean frequency of the Baseline performance was zero behavior per session and increased to 3.33 behaviors per session. Harper showed substantial improvement in greeting behaviors compared to the Baseline condition. He did display the greeting behaviors in Session 19 and 20, two times and Session 21, five times. The mean frequency of the prompted performance for the greeting behavior was three behaviors per session.

Independent Behavior

During the intervention, he demonstrated that the independent performance of the greeting behavior was only in the first session. He exhibited this behavior only one time in Session 19. There was no independent demonstration of the greeting behaviors other than two of the intervention sessions. The mean frequency of the greeting behaviors was 0.33 behavior per session

Wait for the Peer to Respond Behavior

Figure 3 shows the frequencies of the "waiting the peer partner's response to the participants' greetings" behavior across the three participants. I found that the overall frequency of this behaviors increased in the intervention condition compared to the baseline condition

performance for all three participants. Additionally, there was an increase in the independent demonstration of this behavior across the participants. I calculated mean frequency of this target behavior for baseline and intervention phases for each participant. As a result of this calculation, the mean frequency of the target behavior increased for each participant in the intervention condition compared to the baseline condition.

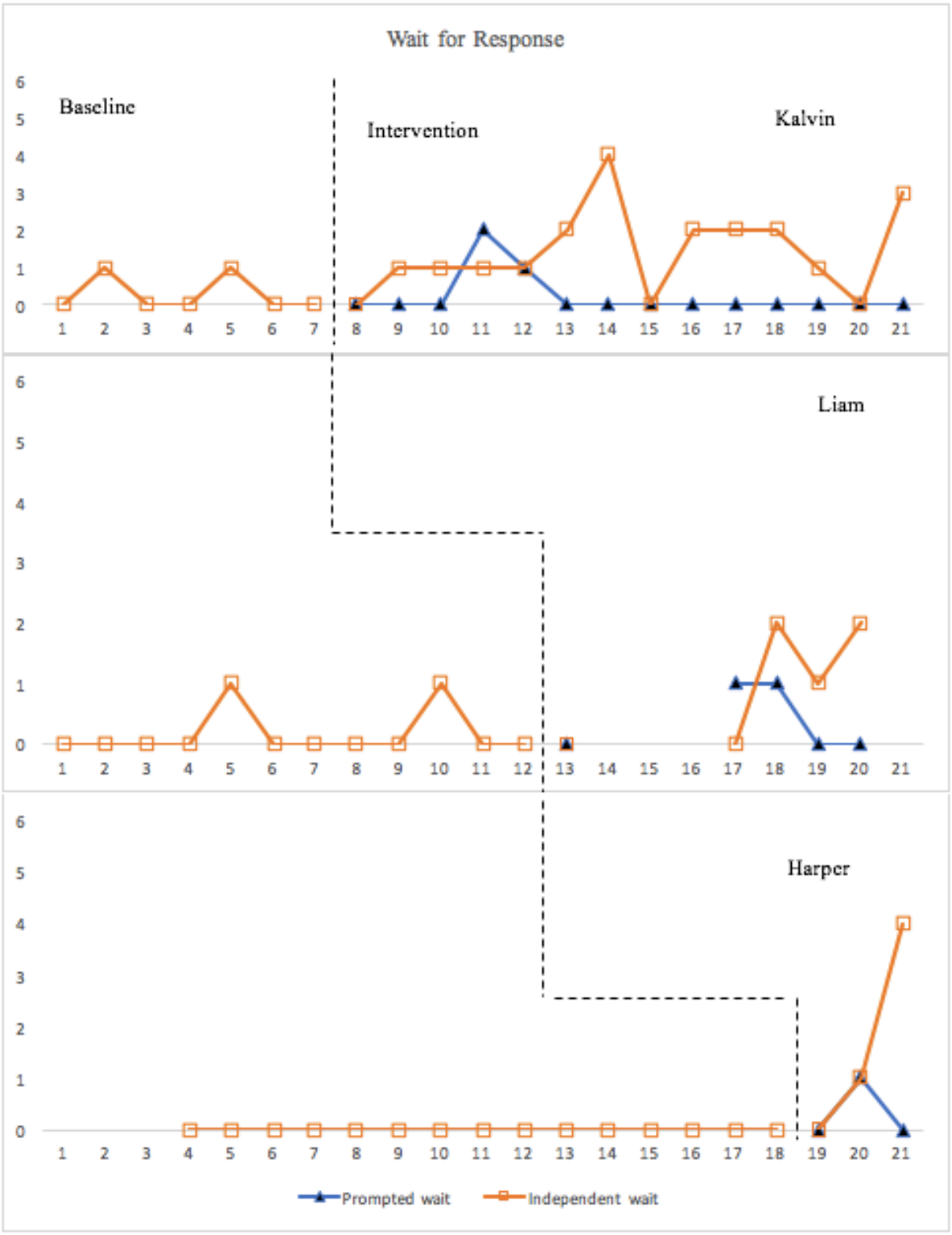


Figure 3. Wait for the peer to respond behavior.

Kalvin

Baseline

Kalvin had a low level of Baseline performance. He exhibited "waiting for the peer to respond to his greeting" behavior in Session 2 and Session 5 only one time during the baseline condition. In general, Kalvin tended not in a conversation with peers. Even though he asked for something from his peers for getting their attention, he did not listen to their response.

Prompted Behavior

The mean frequency of the baseline performance was 0.29 behaviors per session and increased to 1.64 behaviors per session. On the other hand, Kalvin's prompted target behavior performance was lower than the Baseline performance. The mean frequency of the prompted behavior performance was 0.21 behaviors per session. He did display "waiting for the peer to respond greetings" behavior in Session 11 and 12 two times and one time, respectively. There was no prompted target behavior performance for the rest of the other intervention sessions.

Independent Behavior

In the intervention sessions, Kalvin displayed independent demonstration of the target behavior twelve of the fourteen intervention sessions. He did exhibit "waiting for the peer to respond to the greeting" behavior in Session 14 four times. His performance in Session 14 was the highest performance among the intervention sessions. The second highest demonstration of the independent behavior performance was three times, in the last session (Session 21). He demonstrated independent the target behavior in Session 13, 16, 17, and Session 18 two times; in Session 9, 10, 11, 12, and Session 19 one time. Overall, the mean frequency of the independent demonstration of "waiting for the peer to respond to his greeting" behavior was 1.43 behaviors per session.

Liam

Baseline

Liam had a low level of "waiting for the peer to respond to his greeting" behavior in Baseline. He did display this target behavior in Session 5 and 10 only one time during the baseline condition. On the other hand, Liam did not display the target behavior in the rest of the other sessions during the baseline condition.

Prompted Behavior

The mean frequency of baseline performance was 0.17 behaviors per session and increased to 1.40 behaviors per session during the intervention condition. However, the prompted performance of "waiting for the peer to respond to his greeting" behavior was slightly better than the baseline performance. He did display the target behavior performance with prompt in Session 17, and Session 18 only one time. The mean frequency of prompted target behavior performance was 0.40 behaviors per session.

Independent Behavior

During the intervention, he demonstrated the independent performance of the target behavior, only three sessions. In Session 18 and Session 20, he exhibited the target behavior two times. In Session 19, he displayed the target behavior only one time. Overall, the mean frequency of the target behavior was one behavior per session.

Harper

Baseline

Harper did not demonstrate any "waiting for the peer to respond to the greeting" behavior during the baseline condition. In general, he followed an adult (a paraprofessional). Harper held her hand. When she directed a play activity, he joined the activity with her. Otherwise, he did not join any play activity with his peers by himself. He tended not to communicate with his peers. For example, when a peer approached him, he looked at his/her face, but he did not have in a conversation.

Prompted Behavior

The mean frequency of the baseline condition was zero behaviors per session and increased to two behaviors per session. Harper showed significant improvement compared to the baseline performance. He displayed the prompted performance in Session 20 only one time. In the other intervention sessions, there was no prompted performance. The mean frequency of the prompted performance was 0.33 behaviors per session

Independent Behavior

During the intervention, he demonstrated the independent performance of "waiting for the peer to respond to the greeting" behavior only in Session 20, and in Session 21 one time and four times, respectively. Overall, the mean frequency of the target behavior was 1.67 behaviors per session.

Engaging in the Play Behavior

Figure 4 displays the frequency of "engaging in play activity" behavior across the three participants. I found that the overall frequency of the "engaging to the play activity" behavior increased from baseline to the intervention condition of all three participants. Only one of three

participants had an increase in independent demonstration of target behavior across the participants. The other two of the three participants only increased in the demonstration of the target behavior with the prompt. I calculated the mean frequency of target behaviors for baseline and intervention phases for each participant, and the mean frequency of the target behavior increased for each participant from Baseline to the Intervention Phase.

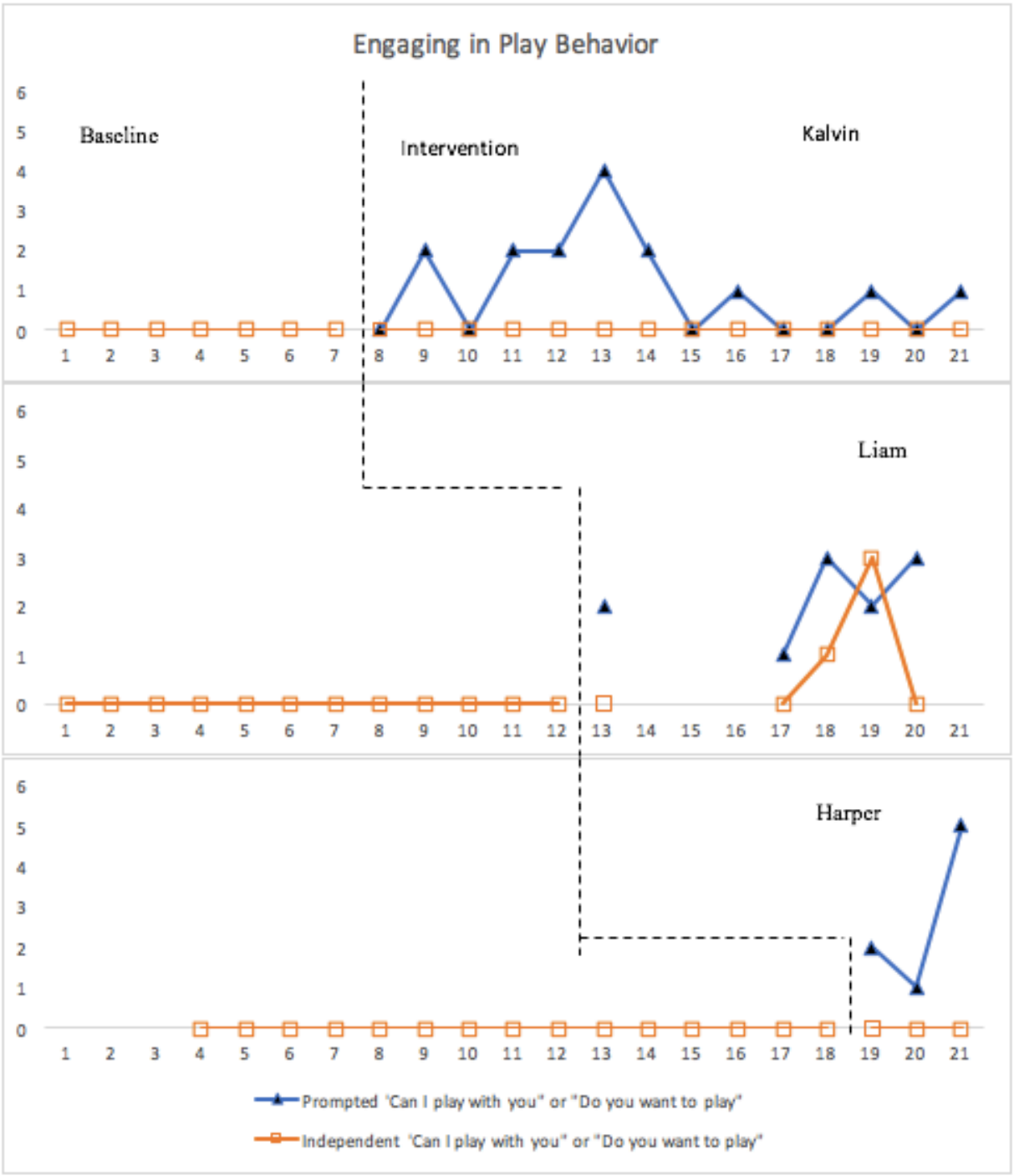


Figure 4. Engaging in Play behavior

Kalvin

Baseline

During the baseline condition, Kalvin did not demonstrate any engaging play activity behaviors. In general, when someone played his favorite toy or favorite play activity, Kalvin grabbed the toy from his friend, or involved the play without any questions. If his friend objected to grab the toy or join the play, he exhibited some problem behaviors such as crying or hitting his friend.

Prompted Behavior

The mean frequency of the baseline condition was zero behaviors per session and increased to 1.07 behaviors per session. Kalvin showed substantial improvement compared to the baseline condition. He displayed engaging the play activity behaviors with prompt four times in Session 13. In Session 9, 11, 12, and 14, Kalvin exhibited engaging play activity behavior two times. In Session 16, 19, and Session 21, he did display the target behavior only one time. Overall, the mean frequency of the prompted target behaviors was 1.07 behaviors per session because, during the intervention phase, Kalvin did not demonstrate independent of any target behavior. He needed to get a prompt for exhibiting the target behavior.

Liam

Baseline

During the baseline condition, Liam did not demonstrate any engaging play activity behaviors. In general, he played with his sister or played alone. He preferred to communicate with adults instead of his peers.

Prompted Behavior

The mean frequency of the baseline condition was zero behavior per session and increased to three behaviors per session. Liam showed significant improvement compared to the baseline condition. He did display the target behavior three times with prompt in Session 18 and 20. In Session 13 and 19, Liam exhibited engaging the play activity behaviors two times with prompt. In Session 17, he displayed the target behavior only one time. Overall, the mean frequency of the prompted performance of the target behavior was 2.2 per session.

Independent Behavior

The independent demonstration of target behaviors was slightly better than the baseline performance. The mean frequency of independent performance was 0.8 behavior per session. During the intervention condition, Liam demonstrated the independent behaviors only in Session 18 and Session 19 one time and three times, respectively.

Harper

Baseline

During the baseline condition, Harper did not demonstrate any "engaging play activity" behavior. During the free play time, he played alone, or a paraprofessional directed to him to join the play activity. In general, he stood up near to his peers but, he did not engage the play activity.

Prompted Behavior

The mean frequency of the baseline condition was zero behavior per session and increased to 2.67 behaviors per session. Harper showed significant improvement of engaging play activity behavior compared to the baseline performance. In Session 19, he displayed the target behaviors two times. In Session 20 and Session 21, he did exhibit the target behavior one time and five times, respectively.

Independent Behavior

There was no independent performance of the target behaviors during the intervention condition. Harper needed to prompt for demonstrating the target behaviors.

Listening the Peer's Response for Engaging the Play Activity

Figure 5 displays the frequencies of "listening the peer's response for engaging the play activity" behavior across the three participants. I found that the overall frequency of the target behaviors increased from Baseline to Intervention across for all three participants. Additionally, there was an increase in independent demonstration of target behaviors across the participants. I calculated the mean frequency of "listening to the peer's response for engaging the play activity" behavior for baseline and intervention phases for each participant, and the mean frequency of this target behavior increased for each participant from Baseline to the Intervention Phase.

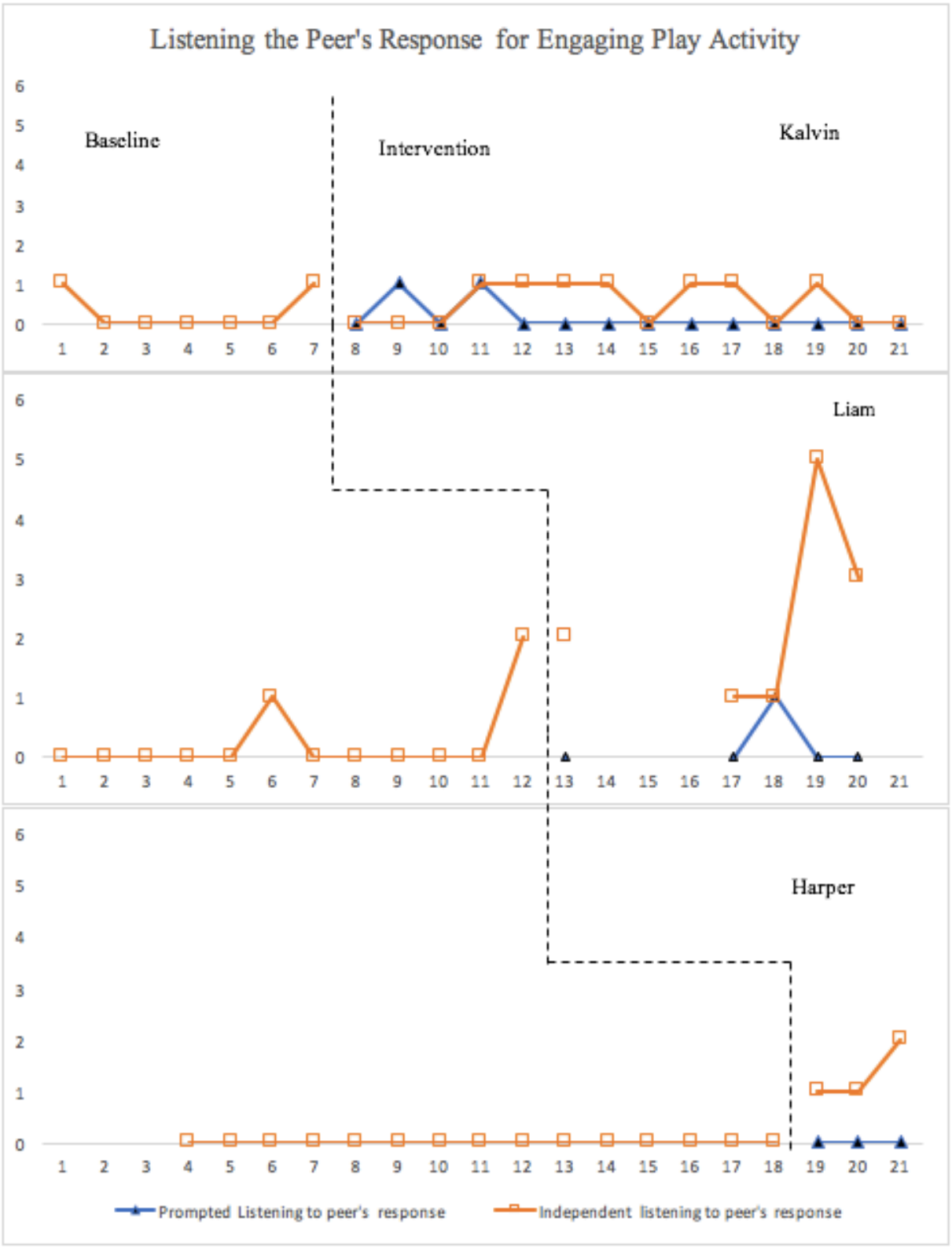


Figure 5. Listening the Peer's Response for Engaging Play Activity

Kalvin

Baseline

Kalvin had a low level of baseline performance. He exhibited the target behavior in Session 1 and Session 7 only one time. In general, he focused on playing the favorite toys or activities so, he tended to grab the toy from his peer, or got involved in the activity without asking the peer.

Prompted Behavior

Kalvin did not show any significant improvement in "listening to the peer's response to engaging the play activity" behavior. The mean frequency of the baseline condition was 0.29 behavior per session and increased to 0.64 behavior per session. During the intervention condition, he displayed listening to the peer's response for engaging the play activity behaviors in Session 8 and Session 11 with prompt. The mean frequency of the prompted target behavior performance was 0.14 per session. This mean frequency of the target behavior performance was lower than the baseline condition performance.

Independent Behavior

The independent demonstration of the target behavior was slightly better than the baseline condition performance. Kalvin demonstrated the independent performance of "listening to the peer's response to engage the play activity" behavior in Session 11, 12, 13, 14, 16, 17, and Session 19 one time. The mean frequency of the independent performance of the target behavior was 0.5 behavior per session.

Liam

Baseline

Liam had a lower level of baseline performance. He demonstrated "listening to the peer's response to engaging the play activity" behavior one time and two times, respectively in Session 6 and Session 12. In general, he tended not to communicate with his peers. When his sister played with the peers, Liam also played with them (his sister and the peers).

Prompted Behavior

The mean frequency of the baseline condition performance was 0.38 behavior per session and increased to 2.26 behaviors per session. Liam showed significant improvement in the "listening to the peer's response to engaging the play activity" behavior. On the other hand, the prompted target behavior performance was lower than the baseline condition performance. Liam did display prompted target behavior only one time. in Session 18 Overall, the mean frequency of the prompted target behavior performance was 0.20 behavior per session.

Independent Behavior

During the intervention condition, Liam demonstrated the independent performance of "listening to the peer's response to engaging the play activity" behavior in each of the intervention sessions. He did display the target behavior in Session 13 two times, in Session 17 and 18 one time, in Session 19 five times and in Session 20 three times. The mean frequency of independent target behavior performance was 2.06 behaviors per session.

Harper

Baseline

During the baseline condition, Harper did not show any demonstration of "listening to the peer's response to engaging play activity" behavior. In general, he tended not to play with his peers. When a paraprofessional directed him, Harper approached his peer. He stood up near to the peer but not to play with him/her.

Prompted Behavior

The mean frequency of the baseline condition performance was zero behavior per session and increased to the 1.33 behaviors per session. Harper showed an improvement in the target behavior compared to the baseline condition performance. On the other hand, during the intervention condition, Harper did not demonstrate any prompted performance of the "listening to the peer's response to engaging the play activity" behavior.

Independent Behavior

During the intervention condition, Harper demonstrated the independent performance of "listening to the peer's response to engaging the play activity" behavior. He displayed the target behavior in Session 19, and 20 one time, in Session 21 two times. The mean frequency of the target behavior was 1.33 behaviors per session.

CHAPTER V

DISCUSSION

As one of the forms of video modeling, point-of-view video modeling (POVVM) is an evidence-based intervention for teaching a variety of skills for individuals with autism spectrum disorders (ASD). The present study examined the effectiveness of the POVVM on improving social communication skills, including social initiation skills, for children with ASD using a single-case multiple-baseline across participant design. Three preschool-age children with ASD and developmental delays were included as participants in this study. The study utilized an intervention to teach a sequence of behaviors associated with social interactions. Through the baseline phase, I identified four target behaviors: (1) saying "hello" to peer, (2) waiting for a response to the greeting, (3) engaging in play, and (4) listening to peer's response for engaging the play.

In general, I found that POVVM is a potentially effective intervention for increasing social communication skills for all three students with ASD and developmental delays. Although this study included just three students in a summer program, it does suggest promise for the intervention. Of particular note, as discussed in the limitations section, this study was conducted in a very short time period, because of the requirements and limitations at the partner school site. The short timeline potentially revealed an interesting finding that POVVM could also impact social communication skills even during a short summer program.

Impact of the Intervention

I found that the intervention impacted the social communication behaviors of all three participants, although the impact differed across participants. One of the behaviors that substantially changed was in the "greeting to peers" behavior. Only Kalvin demonstrated a

"greeting to the peer" behavior in the baseline condition. Each of the participants demonstrated the behaviors after prompts, and two of the three participants ended the study with four consecutive sessions of at least one independent "greeting" behavior per session. This is an essential social communication skill that typically begins all other social interactions among children.

This finding was consistent with prior findings of the research using POVVM to increase the social skills for children with ASD (Kouo, 2018). Even though this study was abbreviated because of the summer schedule, all participants displayed the independent "greeting to the peer" behavior, consistent with previous findings that VM was effective in improving "greeting to the peer" behaviors (Apple et al., 2005; Kouo, 2018)

I also found that "waiting for a peer to the response" behavior improved across the participants. Waiting for a response is a critical skill for students learning social communication skills, because it demonstrates that the student understands and can participate in a two-person social interaction (Chung et al., 2007). In other words, it is a critical skill for communication, especially for students with ASD who typically struggle with reading social cues and engaging in reciprocal social communication. All three participants had low levels of waiting for a response from peers during the baseline, and each demonstration of the behavior an overall increase during the intervention phase, with multiple non-overlapping data points for each of the three participants. Although Harper joined the study later than the other two participants, his data showed increases large in magnitude in a short time. My findings indicate that POVVM is a potentially effective intervention for teaching the waiting for a response behavior, a critical communication skill between simple social skills (e.g., greeting or listening to a conversation

peer response) and more complex social skills (e.g., social initiation) (Tetreault & Lerman, 2010).

All participants had low levels of "waiting for a peer to the response" behavior. Harper did not demonstrate the independent performance of the "listening to the peer's response to engaging play activity" behavior during the baseline condition. During the intervention condition, each showed improvements in the behavior, and for Kalvin, the improvement was in both magnitude and consistency, as measured by 11of 13 sessions with a demonstrated behavior. The present study's result showed that the POVVM intervention is potentially effective for "listening to the peer's response to engaging play activity" skill. In both "waiting for the responses" behaviors (waiting for the greeting response and listening to the peer's response to join the play), all participants substantial improvement of their independent performance compared to the baseline condition.

The purpose of teaching the participants social communication skills was to increase social engagement activities, particularly play. Interactive play is one of the most important ways young children develop social skills and is a major deficit among students with ASD and developmental delays. None of the participants demonstrated engaging in play behavior during the baseline condition. During the intervention session, Kalvin and Harper displayed the engaging play activity behaviors only with prompt. Liam did demonstrate the target behavior independently. However, he still required to prompt for displaying "engaging the play activity" behavior during the intervention. One reason that I didn't observe increased play behavior because the short duration of the intervention wasn't sufficient to develop this skill, which did not appear to be in any of the participants' behavior repertoires.

I found that, in general, social initiations improved, but often with prompt. Considering none of the participants had social initiation skills in their behavior repertoires before, that is perhaps understandable. Social initiation, in other words, verbal social communication behavior, is one of the complex social behaviors for children with ASD (Nikopoulos & Nikopoulo-Symyri, 2008). For this reason, the participants' independent performance of the social initiation skills might be lower than the other target skills such as greetings or listening to the conversation partners' responses. According to Cihak et al. (2012), video modeling (VM) intervention was an effective intervention for teaching new skills and improving communication skills. Similarly, the present study findings indicated that one of the forms of video modeling (VM), POVVM is an effective intervention for teaching new social communication skills for children with ASD.

A considerable body of literature has limited but also has been effective on social initiation skills of children with ASD and increase the social interaction between the children with ASD and their peers. The results of the present study have supported the previous studies' results about the effectiveness of the POVVM on improving social skills for children with ASD. Apple et al. (2005) study pointed out that VM was an effective procedure possibly contributing to the rapid behavior change exhibited by participants, who had not been exhibited behavior before. Similarly, the present study result showed that the POVVM is possibly contributing to the rapid improvement of the social communication behavior for the children with ASD, especially those who have not been exhibited the behavior before.

I used the female children as a conversation partner in the video clips. Although many studies using VM intervention suggested that the model in the video clips should be similar for the observer as possible (Plavnick et al., 2015). However, in the current study, this situation was not a necessary component for the effectiveness of the POVVM intervention. According to

Alzyoudi et al. (2015), children with ASD often have difficulty attending more than one stimulus at a time. Also, when they focus on wrong or irrelevant stimuli, the acquisition of the target behavior may be delayed. The POVVM helps to focus on the only significant stimulus, in other words, the desired behavior, for the participants because the POVVM provides that the children can make a direct connection between the first-person perspective of the video model (Kouo, 2018).

In the current study, it is possible that participants' characteristics, such as verbal or non-verbal skills and responsiveness of the visual stimuli, may have affected the effectiveness of the POVVM intervention. Sancho et al. (2010) and Tereshko et al. (2010) stated that participants' attention for a video or television might be prerequisite skills for children with ASD (Kouo, 2018). According to Alzyoudi et al. (2015), watching a video was an enjoyable activity, and increased learner's motivation and their attention. Moreover, Wilson's (2013) study result showed that video modeling was an effective intervention for improving visual attention.

On the other hand, sometimes, younger children with ASD do not respond to video modeling. For example, Buggey's (2012) study pointed out that the participants who were diagnosed with ASD in the study did not have any behavior changes after implementing the video-self modeling (VSM)- that is, one of the forms of video modeling. The author indicated that there was a direct relationship between children's age and VSM intervention efficacy. Also, the VM intervention is based on visual processing strengths of children with autism rather than based on the traditional teaching methods that were less useful in children with autism (Alzyoudi et al., 2015). Consideration of the body of the literature review and the present study findings, responsiveness of the visual stimuli is one of the prerequisite skills for all the forms of VM interventions.

In the current study, the classroom and the playground were used as the setting of the intervention. Both settings were the participants' natural environment. Cihak et al. (2012) stated that the natural environment was the key to the success of the demonstration, maintenance, and generalizability of the skills. Therefore, implementing the intervention for children, in the natural environment is vital for the efficacy of the intervention. Also, many social skills interventions' failure is that these interventions were implemented in an isolated environment (Bellini et al., 2007).

Similarly, Plavnick et al. (2015) indicated that if the target response did not relate the reinforcers in the natural environment, motivation to continue engaging the response might be decreased. Additionally, when the intervention implemented in the participants' natural environment, target social skills showed rapid improvement (Simpson and Ayres, 2004). The findings of the present study showed that the implementation of the intervention is one of the critical elements to success the demonstration and rapid improvement of social communication skills for children with ASD.

Limitations of the Study

The present study showed that the point-of-view video modeling (POVVM) was a potentially effective intervention for improving social initiation skills. On the other hand, the study had several significant limitations. The first limitation was associated with the length of the intervention. The study was implemented during the a-four-week summer program that was four days per week and 3 hours per day. As with most of the school-based interventions, the current study was conducted under the time constraints of a typical school day and calendar (Cihak et al., 2012).

The time restriction affected the capacity to complete this study. Originally, I intended to implement the study over three months in an academic year. However, still changes in school personnel and their decision making, I had to change the district in order to complete the study. As a result, the study was unable to be run for a longer time, which may not have resulted in more increases in target behaviors.

Second, because of the length of the study, I was unable to implement maintenance and generalization sessions. Radley et al. (2014) indicated that many numbers of social skills studies did not result in increased the ability to social competence, which meant to utilize fundamental and specific social skills in the appropriate context so, social skills intervention was the failure to promote generalized effect. The authors added that if the social skills training promoted the social competence, the social skills training would explicit methodological programming for generalization to occur within social skills training (Radley et al., 2014). Furthermore, when an intervention appears to be effective during its implementation, the determination of the success of the intervention is the maintenance of the treatment effects after treatment is suspended (Mace and Nevin, 2017). The absence of maintenance and generalization phases are limitation.

Third, because of the absences and short time, I only had data for three intervention sessions for Harper. However, Harper showed a demonstrated increase in target behaviors in those sessions. Nonetheless, the lack of more intervention sessions is another limitation.

Another limitation of the study was the attendance (and subsequent absences) of the participants. Harper joined the study later than the other two participants. Therefore, I started the intervention session for the first participant, Kalvin, later than I planned. Also, Liam had a series of absences, which were Sessions 14, 15, 16, and Session 21, during the intervention sessions.

Liam's absence may have negatively impacted his demonstration of desired behaviors. Moreover, Harper could not move to the intervention until the 19th session.

Cooper, Heron, and Heward (2007) recommended that authors of behavioral research method in their current practice and recommendations that IOA was obtained for a minimum of 20% of total observation sessions in a study, and preferably between 25% and 33% of total observation sessions (p.119). Because of the time of the study, it was difficult for the researcher's second observer to attend the minimum required the number of sessions. In the current study, IOA data was observed only 14% of total observation sessions for baseline, and 13% of total observation sessions for intervention sessions. The study did not meet the minimum requirement of the IOA data observation period. This situation was a limitation of the study.

In the current study, during the summer program, all the children in the program shared the same playground at the same time. It meant that among 12 to 36 children could be in the playground. While this situation increased opportunities to interact with peers (Buggey et al., 2011), it was not always possible to control for teacher behaviors during the interventions. Sometimes, teachers unwittingly intervened with the behaviors which occurred between the participants and the peer when they exhibited problem behaviors, especially hitting or throwing something to each other. This situation may have affected the participants' responses to the intervention. Bellini et al. (2007) stated that the introduction of the intervention might affect teacher behavior in a way that made them more attentive to social behavior, leading to increase prompting and reinforcement of social engagement. However, I did not observe any teachers prompting or reinforcing the target behaviors during the implementation of the procedure.

In the current study, I used only male participants in the same school. They attended the same school and were similar socioeconomic backgrounds. According to Cihak et al. (2012),

these shared characteristics could not be generalized to all preschoolers with disabilities or other age groups. This is not a limitation for single-case design research but rather is sometimes viewed as a limitation by researchers not familiar with the single-case design. Consequently, it is important to note this.

Implication for Practitioners and Future Research

This study resulted in several implications for research and practice. I found that POVVM is potentially effective for increasing social communication skills and social initiation skills for young children with ASD and developmental delays. Additionally, an unexpected finding was the potential effectiveness of POVVM in short summer programs, which are limited in their duration. The data also suggest that POVVM is feasible for the school setting.

Because of the limitations of this study, I intend to conduct additional research on POVVM during the school year. This will allow me to test the impact of the intervention over time to increase and maintain social communication skills. That research will ensure that I will include both maintenance and generalization components as initially designed and consistent with some other studies (Bellini et al., 2007).

I used play-ground and free play areas in the regular classroom as a study setting, and I collected the data of the desired behavior only in the free playtime. Future research should implement the study in the different settings in the school, such as the art station in the classroom, circle time, reading time, and at different times of the day. This type of additional research can advance our understanding of the ability of POVVM to support student social skills communication in different settings, both social and academic.

In general, many of the interventions have been planned at least one school semester. Because of the restrictions of the school partner placements, I adapted the current study

intervention for a four-week summer program. The results of the study showed that the participants improved their target behaviors even in this short duration. The findings showed that the intervention provides to get the result in a short time. Future research should investigate this finding further. Often, researchers do not implement intensive interventions with students with ASD because the interventions typically require substantial time to result in a behavior change. However, this study suggests that research could be conducted in short term placements, including summer programs. This type of research could advance the field by utilizing the time that children with ASD often lack access to evidence-based or scientifically supported interventions.

POVVM represents a potentially effective intervention for teachers. Teachers can use POVVM to teach social and communication skills for children with ASD. This study showed that POVVM interventions could be implemented in inclusive classes without disrupting training programs. Importantly, POVVM appears to be effective from this study even for short-term programs such as a four-week summer program. This is an important contribution to the field that should be explored by researchers and practitioners.

The findings also indicate that a relatively straight forward intervention can be implemented in a relatively unstructured summer program. Practitioners could utilize volunteers or paraprofessionals to implement similar POVVM interventions in their classrooms, schools, and summer programs. It appears that POVVM has enough demonstrated impact to be implemented by practitioners. However, it would be useful if the researchers shared their POVVM videos as exemplars that could be used by practitioners.

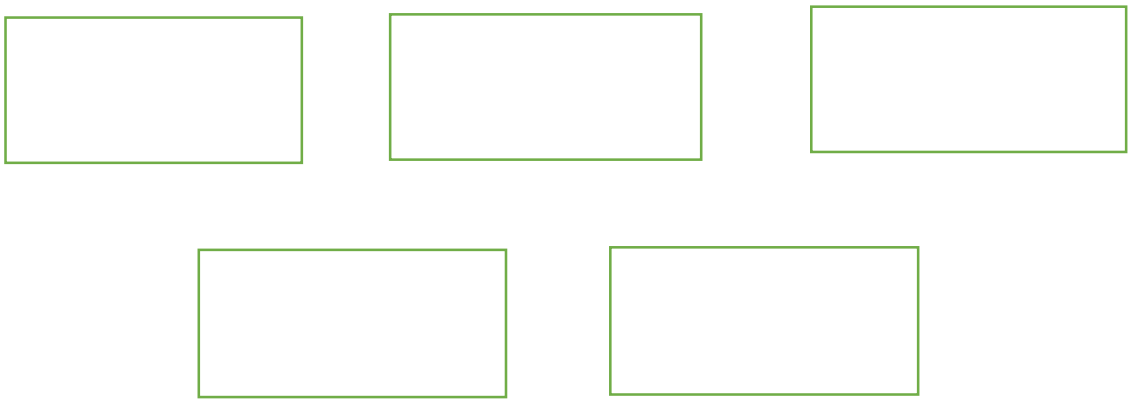
Conclusion

The findings of the study showed that POVVM was a potentially effective intervention for improving social communication skills, and it shows that this intervention may address social communication and interaction issues consistent with a prior study (Kouo, 2018). Furthermore, I found that the POVVM could change student behavior even in a short-term program such as a summer enrichment program. Despite the limitation of this study, it does add to the knowledge base that finds that more research should be conducted on POVVM to inform practice. Such a body of work could fundamentally change the social behaviors of students with ASD and developmental delays and advance their short-term and long-term school and social experiences.

APPENDIX A

REWARD BOARD

_____'s Board



APPENDIX B

CORRECTION PROCEDURES

Correction Procedure 1:

- After watching the video clip, I will give verbal direction "Go ask a friend to play" and wait 5 seconds. If he does not approach anybody, I will say a specific peer's name "Go ask XX to play"
- I will wait 5 sec. If he responds correctly, I will pass the next step. If he does not approach to the peer X, I will exhibit the video clip to him which shows "approaching towards the peer" part
- I will wait 5 sec. If he responds correctly, I will pass the next step. If he does not approach to the peer XX, I will point out the peer and say "Go ask XX to play"
- I will wait 5 sec. If he responds correctly, I will pass the next step. If he does not approach to the peer, I will touch his shoulder gently and direct him towards the peer, and say "Go ask XX to play"
- I will wait 5 sec. If he responds correctly, I will pass the next step. If he does not approach to the peer. I will return the watching the video clip section

Correction Procedure 2

- After approaching to the peer, the participant needs to say "Hi!" to the peer. I will wait for 5 seconds. If he does not say "hi" to the peer, I will say, "Say, 'hi' to XX."
- I will wait 5 sec. If he responds correctly, I will pass the next step. If he does not say "hi," to the peer, I will exhibit the video clip which shows "saying "hi" to the peer" part
- I will wait 5 sec. If he responds correctly, I will pass the next step. If not, I will return the watching the video clip section

Correction Procedure 3

- After saying "hi" to the per, the participant needs to wait the peer looking his face and saying "hi" to him. I will wait 5 seconds. If he waits to the peer's response (looking his face and saying "hi"), I will pass the next step. If not, I will say, "wait for your friend's response."
- I will wait for 5 seconds. If he responds correctly, I will pass the next step. If he does not wait for the peer's response, I will exhibit the video clip part, which is related to the "waiting for the peer's response" part.
- I will wait 5 sec. If he responds correctly, I will pass the next step. If he does not wait for the peer's response, I will return the video watching section.

Correction Procedure 4

- After waiting for the peer's response, the participant needs to engage the peer, and he needs to say, "can I play with you?" I will wait 5 sec. If he responds correctly, I will pass the next step. If he does not say anything, I will say, "Ask your friend?"
- I will wait 5 sec. If he responds correctly, I will pass the next step. If he does not say anything, I will show a video clip which is related to the "engage in the peer's play activity" part.
- I will wait 5 sec. If he responds correctly, I will pass the next step. If he does not say anything, I will say, "Say, 'Can I play with you?'" (or "do you want to play with me?")
- I will wait 5 sec. If he responds correctly, I will pass the next step. If not, I will return the watching the video clip section.

Correction Procedure 5

- After asking the peer, the participant needs to wait for the peer answer. I will wait for 5 seconds. If he listens to the peer response, I will pass the next step. If he does not listen to his peer, I will say, “Listen your friend” Then, I establish eye contact and ask, “what did s/he say?”
- I will wait 5 sec. If he responds correctly, I will pass the next step. If he does not say anything, I will show the video clip, which is related to listening to the peer response part.
- I will wait 5 sec. If he responds correctly, I will pass the next step. If he does not say anything, I will remind the peer’s response, for instance, “he/she said, yes.”
- I will wait 5 sec. If he responds correctly, I will pass the next step. If not, I will return the watching the video clip section

Correction Procedure 6

- After listening to the peer response, he needs to respond to the peer. If his peer says, "yes," he sits near the peer. However, if his peer says, "no I want to play alone" he needs to say "Okay!”
- I will wait for five seconds. If the participant responds to his peer's response correctly, I will pass the next step. If the participant does not respond to the peer, I will say, "wait! What do you need to say?"
- I will wait 5 sec. If he responds correctly, I will pass the next step. If not, I will remind the peer's response, such as "your friend said 'no' so, what do you need to say"
- I will wait for 5 seconds. If the participant responds correctly, I will pass the next step. If not, I will say, "Say, 'okay!’"

- I will wait 5 sec. If he responds correctly, I will pass the next step. If not, I will return the watching the video clip section.

Correction Procedure 7:

- After the participant responds to the peer's response. The participant needs to join the peer, or he approaches another peer for playing together as appropriate the peer's response. If the participant joins the peer for playing together in 5 sec. (or approaches another friend)" I will give social reinforcement such as "Good listening." If the participant does not respond, I will show the video clip, which is related to the "play with together" part.
- I will wait for five seconds. If the participant responds correctly, I will give social reinforcement such as "Good listening" or "Good job," If the participant does not respond, I will say "what did your friend say?"
- I will wait for five seconds. If the participant responds correctly, I will give social reinforcement such as "Good listening" or "Good job" If the participant does not respond, I will remind the peer's response to him such as "your friend wants to play with you (or your friend wants to play alone)"
- I will wait for five seconds. If the participant starts to play with his/her peer (or approaches another friend), I will give social reinforcement. However, if the participant does not respond, I will say "you can join your friend (or let's ask another friend)"
- I will wait for five seconds. If the participant joins his/her peer (or approaches another friend), I will give social reinforcement. However, If the participant does not respond, I will return the video clip section.

APPENDIX C

INTERVENTION FIDELITY CHECKLIST

Instruction: *The Intervention Checklist includes each step in the process of implementing the point-of-view video modeling procedure. Please complete all of the requested information including researcher, setting, learner, and observe date. This item is scored based on observation the target skill. Within the table record a yes, no, partial and N/A (not applicable). The observer can explain any "partial" recording in the notes section.*

Researcher: _____ **Learner:_____** **Setting:_____**
Objective:_____ **Observer:_____** **Observe date:__/__/___**

	Yes	No	Partial	N/A	Notes
1. Is the goal appropriate for the child?					
2. Is the accuracy criteria appropriate for the behavior?					
3. Does the material prepare before the session?					
4. Does the instructor obtain the learner's attention?					
5. Does the instructor provide the stimulus or instruction?					
6. Does the instructor deliver reinforcement when respond appropriately?					
7. Does the instructor deliver the prompt when respond inappropriately?					
8. Does the learner obtain reinforcement and prompt with zero delay?					
9. Does the instructor follow the prompt hierarchy?					
10. Does the instructor give "five seconds" between response and prompt?					
11. Does the instructor only record an independent response as the correct response?					
12. Does the instructor record a response with prompting as the response with prompt?					

13. Does the instructor record as an incorrect response because the learner did not respond correctly with the prompt?					
Score	__/12	__/12	__/12	__/12	

BIBLIOGRAPHY

Alzyoudi, M., Sartawi, A., A. & Almuhiri, A. (2014). The impact of video modeling on improving social skills in children with autism. *British Journal of Special Education,* 42(1), 53-68.

American Psychiatric Association (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing

Apple, A., L. Billingsley, F., & Schwartz, I., S. (2005). Effects on video modeling alone and with self-management on compliment-giving behaviors of children with high-functioning ASD. *Journal of Positive Behavior Interventions,* 7(1), 33-46.

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

Banda, D., R., Matuszny, R., M., & Turkan S. (2007). Video modeling strategies to enhance appropriate behaviors in children with autism spectrum disorders. *Teaching Exceptional Children,* 39(6), 47-52.

Bauminger-Zviely, N., Eden, S., Zancanaro, M., & Gal., E. (2013). Increasing social engagement in children with high-functioning autism spectrum disorders using collaborative technologies in the school environment. *Autism: The International Journal of Research and Practice,* 17(3), 317-319.

Bellini, S., Akullian, J., & Hopf, A. (2007). Increasing social engagement in young children with autism spectrum disorders using video self-modeling. *School Psychology Review,* 36(1), 80-90.

Boesch, M., C., Wendt, O., Subramanian, A., & Hsu, N. (2013). Comparative efficacy of the picture exchange communication system (PECS) versus a speech generating device: effect on social communicative skills and speech development. *Augmentative and Alternative Communication,* 29(3), 197-209.

Breitenstein, S., M., Gross, D., Garvey, C., Hill., C., Fogg, L., & Lesnick, B. (2010). Implementation fidelity in community-based intervention. *Journal of Research and Nursing Health,* 33(2), 164-173.

Buggey, T. (2012). Effectiveness of video self-modeling to promote social initiations by 3-year-olds with autism spectrum disorders. *Focusing on Autism and Other Developmental Disabilities,* 27(2), 102-110.

Buggey, T., Hoomes, G., Sherberger, M., & Williams, S. (2011). Facilitating social initiations of preschoolers with autism spectrum disorders using video self-modeling. *Focus on Autism and Other Developmental Disabilities,* 26(1), 25-36.

Bzoch, K., R., League, R., & Brown, V. (2003). Receptive expressive emergent language test examiners manual. Austin, TX: Pro-ed

Charlop-Christy, M., Le, L., & Freeman, K., E. (2000). A comparison of video modeling with in vivo modeling for teaching children with autism. *Journal of Autism and Developmental Disorders,* 30(6), 537-552.

Chung, K., Reavis, S., Masconi, M., Drewry J., Matthews, T., & Tasse, M., J. (2007). Peer-mediated social skills training program for young children with high-functioning autism. *Research in Developmental Disabilities,* 28, 423-436

.

Cihak, D., F., Smith, C., C., Cornett, A., & Colemann, M., B. (2012). The use of video modeling with the picture exchange communication system to increase independent communicative initiations in preschoolers with autism and developmental delay. *Focus on Autism and Other Developmental Disabilities,* 27(1), 3-11

Cooper, J., O., Heron, T., E., & Heward, W., L. (2007). Applied behavior analysis. Upper Saddle River, NJ: Pearson/Merrill -Prentice Hall

Darden-Brunson, F., Green, A., & Goldstein, H. (2008). Video-Based Instruction for Children with Autism. In Luiselli, J., K., Russo, D., C., Christian, W., P., & Wilczynski, S., M., (eds.) *Effective Practices for Children with Autism: Educational and Behavioral Support Interventions that Works,* (pp. 241-268). New York, NY: Oxford University Press

Elliot, C., D. (2007). Differential ability scales, second edition. Retrieved from https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Cognition-%26-Neuro/Comprehensive-Ability/Differential-Ability-Scales-II/p/100000468.html

Farrugia, P., Petrisor, P., A., Farrokhyar, F., & Bhandari, M. (2009). Research questions, hypothesis and objectives. *Continuing Medical Education.* 53(4), 278-281.

Foster, S., L. & Mash, E., J. (1999). Assessing social validity in clinical treatment research issues and procedures. *Journal of Consulting and Clinical Psychology,* 67(3), 308-319.

Frey, R., J. (2011). The gale encyclopedia of children's health: infancy through adolescence. Philadelphia, PL: Gale Cengage Company

Ganz, J., B., Kaylor, M., Bourgeous, B., & Hadden, K. (2008). The impact of social scripts and visual cues on verbal communication in three children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities,* 23(2), 79-94.

Gast, D., L., & Ledford, J., R. (2014). Single case design: application in special education and behavioral sciences. [Kindle DX version]. Retrieved from Amazon.com

Goldman, R., & Fristoe, M. (2000). Goldman Fristoe II, test of articulation. Circle Pines, MN: American Guidance Service Inc.

Hardan, A., Y., Gengaux, G., V., Berquist, K., L., Libove, R., A., Ardel, C., M., Philips, J., Frazier, T., W., & Minjarez, M., B. (2015). A randomized controlled trial of pivotal response treatment group for parents of children with autism. *Journal of Child Psychology and Psychiatry,* 56(8), 884-892.

Hilton-Mounger, A. (2011). Battelle Developmental Inventory: 2nd Edition. In Goldstein, S., & Naglieri, J., A. (Eds.) *Encyclopedia of a Child Behavior and Development.* Springer, Boston, MA.

Hine, J., F., & Wolery, M. (2006). Using point-of-view modeling to teach play to preschoolers with autism. *Topics in Early Childhood Special Education,* 26 (2), 83-93.

Horner, R., H., Carr, E., G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children.* 71(2), 165-179.

Jones, J., Lerman., D., C., & Lechago, S. (2014). Assessing stimulus control and promoting generalization via video modeling when teaching social responses to children with autism. *Journal of Applied Behavior Analysis,* 47, 37-50.

Klinger, L., G., Dawson, G., Barnes, K., & Krisler, M. (2014). Autism spectrum disorders. In Mash, E., J., & Barkley, R., A. (Ed). *Child Psychopathology* (pp. 531-572). New York, NY: The Guilford Press

Kouo, J., H., L. (2016). The effectiveness of point-of-view video modeling in teaching social initiation skills to children with autism spectrum disorder. (doctoral dissertation). Retrieved from: http://gateway.proquest.com.silk.library.umass.edu/openurl?res_dat=xri%3Apqm&author=Kouo&date=2017&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Adissertation&title=%22The+effectiveness+of+point-of-view+video+modeling+in+teaching+social+initiation+skills+to+children+with+autism+spectrum+disorders.%22&url_ver=Z39.88-2004&genre=dissertation

Kourassanis, J., Jones, E., A., & Fienup, D., M. (2015). Peer-video modeling: Teaching chained social game behaviors to children with ASD. *Journal of Developmental Psychology and Disabilities,* 27, 25, 36.

Kratochwill, T. R., Hitchcock, J., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M & Shadish, W. R. (2010). Single case designs technical documentation. Retrieved from What Works Clearinghouse website: http://ies.ed.gov/ncee/wwc/pdf/wwc_scd.pdf.

Lee, J., N. (2015). The effectiveness of point-of-view video modeling as a social skills intervention for children with autism spectrum disorders. *Review Journal of Autism Developmental Disorders,* 2, 414-428.

Lord, C., & Richler, J. (2006). Early diagnosis of children with autism spectrum disorders. In Charman, T., & Stone, W. (Ed). *Social and communication development in autism spectrum disorders,* (pp. 35-60). New York, NY: The Guilford Press

Luiselli, J., K., (2006). Communication, and social skills intervention. In O'Reilly, M., F., Cannella, H., I., Sigafoos, J., & Lancioni, G. (Ed). *Antecedent, assessment, and intervention* (pp. 187-192). Baltimore, MD: Paul H. Brookers.

Mace, F., C., & Nevin, C., A. (2017). Maintenance, generalization and treatment relapse: A behavioral momentum analysis. *Educational Treatment of Children,* 40 (1), 27-42.

Maione, L., & Miranda P. (2006). Effects of video modeling and video feedback on peer-directed social language skills of a child with autism. *Journal of Positive Behavior Intervention,* 8(2), 106-118.

Masi, A., DeMayo, M., M., Glozier, N, & Guastella, A., J. (2017). An overview of autism spectrum disorder, heterogeneity, and treatment options. *Neuroscience Bulletin,* 33(2), 183-193.

McConnell, S., R. (2002). Interventions to facilitate social interaction for young children with autism: Review of available research and recommendation for educational intervention and future research. *Journal of Autism and Developmental Disorders,* 32(5), 351-372.

McCoy, K., & Hermansen, E. (2007). Video modeling for individuals with autism: A review of model types and effects. *Education and Treatment of Children,* 30(4), 183-213

Moore, D., W., & Anderson, A. (2011). Point-of-view video-mediated procedure is effective for teaching children with autism to maintain scripted social interactions with others. *Evidence-Based Communication Assessment and Intervention,* 4(4), 205-210.

Muhlenhoupt, M. (2005). Using the infant/toddler sensory profile in early intervention services. Philadelphia, PA: Child and Family Study Research Program.

Mulcahy, C., A., Krezmien, M., P., & Travers, J. (2016). Improving mathematic performance among secondary students with EBD: A methodological review. *Remedial and Special Education.* 37(2), 113-128.

Nikopoulos, C., K. & Nikopoulo-Smyrni, (2008). Teaching complex social skills to children with autism; advances of video modeling. *Journal of Early Intensive Behavior Intervention,* 5(2), 30-43.

Okamoto, Y., Ishitobi, M., Wada, Y., & Kosaka, H. (2016). The potential of nasal oxytocin administration for remediation of autism spectrum disorders. *CNS & Neurological Disorders- Drug Targets,* 15, 564-577.

Ozen, A. (2015). Effectiveness of siblings-delivered iPad game activities in teaching social interaction skills to children with autism spectrum disorders. *Educational Sciences: Theory & Practice,* 15(5), 1287-1303.

Ozyurt, G., & Dinseven, Elikucuk, C. (2018). Comparison of language features, autism spectrum symptoms in children diagnosed with autism spectrum disorder, developmental language delay and heathy control. *Archives of Neuropsychiatry,* 55(3), 205-210.

Plavnick, J., B., MacFarland, M., C., & Ferreri, S., J. (2015). Variability in the effectiveness of a video modeling intervention package for children with autism. *Journal of Positive Behavior Interventions,* 17(2), 105-115.

Plavnick, J., B., & Vitale, F., A. (2016). A comparison of vocal mand training strategies for children with autism spectrum disorders. *Journal of Positive Behavior Intervention,* 18(1), 52-62.

Radley, K., C., O'Handley, R., D., Ness, E., J., Ford, W., B., Battaglia, A., A., McHugh, M., B., & McLemore, C., E. (2014). Promoting social skills use and generalization in children with autism spectrum disorder. *Research in Autism Spectrum Disorder.,* 8, 669-680.

Rapp, J., T., Cook, J., L., Nuta, R., Balagot, C., Crauchman, K., Jenkins, C., Karim, S., & Watters-Wybrow, C. (2018). Further evaluation of a practitioner model for increasing eye contact in children with autism. *Behavior Modification,* 00 (0), 1-24.

Roger, S., J. (2006). Evidence-Based Intervention for Language Development in Young Children with Autism, in Charman T. & Stone, W. (eds.) *Social & Communication Development in Autism Spectrum Disorders: Early Intervention, Diagnosis, & Intervention,* (pp. 143-179). New York, NY: Guilford Press.

Rudy, L., J. (2019). An overview of repetitive behaviors in autism. Retrieved from Very Well Health website: https://www.verywellhealth.com/repetitive-behaviors-in-autism-260582

Scruggs, T., E., Mastropieri, M., A., & Regan, K., S. (2006). Statistical Analysis for Single Subject Research Designs, in Scruggs, T., E., & Mastropieri, M., A. (ed.) *Applications of Research Methodology (Advances in Learning and Behavioral Disabilities, Volume 19)* Emerald Group Publishing Limited, pp.33-53

Shane, H., C., Laubscher, E., H., Schlasser, R., W., Flynn, S., Sorce, J., F., & Abramason, J. (2012). Applying technology to visually support language and communication in individuals with autism spectrum disorder. *Journal of Autism and Developmental Disorders,* 42(6), 1228-1235.

Sherer, M., Pierce, K., L., Paredes, S., Kisacky, K., L., Ingersoll, & Schreibman, L. (2001). Enhancing conversation skills in children with autism via video technology "which is better 'self' or 'other' as model? *Behavior Modification,* 25(1), 140-158.

Simpson, A., Langone, J., & Ayres, K., M. (2004). Embedded video and computer-based instruction to improve social skills for students with autism. *Education and Training in Developmental Disabilities,* 39(3), 240-252.

Sparrow, S., S., Cicchetti, D., V., & Saulnier, C., S. (2016). Vineland Adaptive Behavior Scales, Third Edition. Retrieved from https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Behavior/Adaptive/Vineland-Adaptive-Behavior-Scales-%7C-Third-Edition/p/100001622.html

Sundberg, M. L. (2007). Verbal behavior. In J. O. Cooper, T. E. Heron, & W. L. Heward, *Applied behavior analysis* (2nd ed.) (pp. 526-547). Upper Saddle River, NJ: Merrill/Prentice Hall.

Tetreault, A., S. & Lerman, D., C. (2010). Teaching social skills to children with autism using point-of-view video modeling. *Education and Treatment of Children,* 33(3), 395-419

Tieghi-Benet, M., C., Miller, K., Reiners, J., Robinett, B., E. Freeman, R., L., Smith, C., L., Baer, D., & Palmer, A. (2003). Encouraging Student Progress, Student/team book. Lawrence, KS: University of Kansas

Travers, J., C., & Krezmien, M., P. (2018). Racial disparities in autism identification in the United States during 2014. *Council for Exceptional Children,* 84(4), 403-419.

Travers, J., C., Krezmien, M., P., Mulcahy, C., & Tincani M. (2015). Racial disparity in administrative autism identification across the United States during the 2000 and 2007. *The Journal of Special Education,* 48(3), 155-166.

Wang, S.-Y., & Parrilla, R. (2008). Quality indicators for single-case research for social skills interventions for children with autism spectrum disorder. *Developmental Disabilities Bulletin,* 36(1), 81-105

Watkins, M., W., & Pacheco, M. (2000). Inter-observer agreement in behavioral research: Importance and calculation. *Journal of Behavioral Education,* 10 (4), 205-212.

Wendel, E., Cawthon, S., Ge, J., & Beretvas, S. (2015). Alignment of single-case design (SCD) research with individuals who are deaf or hard of hearing with the what works clearinghouse standards for SCD research. *Journal of Deaf Studies and Deaf Education,* 20(2), 103-114

Wendt, O., & Miller, B. (2012). Quality appraisal of single-subject experimental design: An overview and compression of different appraisal tools. *Education and Treatment of Children,* 35(2), 235-268.

Wert, B., Y & Neisworth, J., T. (2003). Effects of video-self modeling on spontaneous requesting in children with autism. *Journal of Positive Behavior Intervention,* 5(1), 30-34

White, S., W., Keonig, K., & Scahill, L. (2006). Social skills development in children with autism spectrum disorders: A review of the intervention research. *Journal of Autism and Developmental Disorder,* 37, 1858-1868.

Wilson, K., P. (2013). Incorporating video modeling into a school-based intervention for students with autism spectrum disorders. *Language, Speech, and Hearing-Service in School,* 44, 105-117

Wilson, K., P. (2013). Teaching social-communication skills to preschoolers with autism: Efficacy of video versus in vivo modeling in the classroom. *Journal of Developmental Disorder.* 43, 1819- 1831.