ABSTRACT

Title of Dissertation:	THE EFFECTIVENESS OF POINT-OF-VIEW VIDEO MODELING IN TEACHING SOCIAL INITIATION SKILLS TO CHILDREN WITH AUTISM SPECTRUM DISORDERS
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Deficits in social communication and interaction have been identified as distinguishing impairments for individuals with an autism spectrum disorder (ASD). As a pivotal skill, the successful development of social communication and interaction in individuals with ASD is a lifelong objective. Point-of-view video modeling has the potential to address these deficits. This type of video involves filming the completion of a targeted skill or behavior from a first-person perspective. By presenting only what a person might see from his or her viewpoint, it has been identified to be more effective in limiting irrelevant stimuli by providing a clear frame of reference to facilitate imitation. The current study investigated the use of point-of-view video modeling in teaching social initiations (e.g., greetings). Using a multiple baseline across participants design, five kindergarten participants were

taught social initiations using point-of-view video modeling and video priming. Immediately before and after viewing the entire point-of-view video model, the participants were evaluated on their social initiations with a trained, typically developing peer serving as a communication partner. Specifically, the social initiations involved participants' abilities to shift their attention toward the peer who entered the classroom, maintain attention toward the peer, and engage in an appropriate social initiation (e.g., hi, hello). Both generalization and maintenance were tested. Overall, the data suggest point-of-view video modeling is an effective intervention for increasing social initiations in young students with ASD. However, retraining was necessary for acquisition of skills in the classroom environment. Generalization in novel environments and with a novel communication partner, and generalization to other social initiation skills was limited. Additionally, maintenance of gained social initiation skills only occurred in the intervention room. Despite the limitations of the study and variable results, there are a number of implications moving forward for both practitioners and future researchers examining point-of-view modeling and its potential impact on the social initiation skills of individuals with ASD.

THE EFFECTIVENESS OF POINT-OF-VIEW VIDEO MODELING IN TEACHING SOCIAL INITIATION SKILLS TO CHILDREN WITH AUTISM SPECTRUM DISORDERS

by

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Dedication

The unfaltering support of numerous, knowledgeable, and beloved individuals have guided me to this monumental point in my life. Mom and Dad, you never gave me any idea that I could not do whatever I wanted to do and be whomever I wanted to be. You are my twin pillars without whom I could not stand. Both of you have been unflagging in your efforts to encourage, love, and support me, and never hesitate to celebrate every single milestone. Eric, you have come to the rescue countless times to save my computer from the deathly grips of the blue screen and other malicious viruses. Theodore, you are my ultimate inspiration. You have guided me through these incredible years with your love, kindness, knowledge, and patience. I am so very blessed to have you in my life.

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Chapter 1: Statement of the Problem

Children without disabilities naturally develop critical social skills in the context of interactions with peers and through observation and imitation of others (Pierce-Jordan & Lifter, 2005). According to Walker (1983), social skills are "a set of competencies that: a) allow an individual to initiate and maintain positive social relationships, b) contribute to peer acceptance and to a satisfactory school adjustment, and c) allow an individual to cope effectively with the larger social environment" (p. 27). Successfully navigating numerous social situations necessitates an awareness of the individual's own emotions and the emotions of others, and an ability to make decisions based on the social context in order to enable the individual to establish positive relationships with other people (Zins, Weissbert, Wang, & Walberg, 2004). Children without disabilities learn to adjust their social communication based on the social context or environment and its prescribed rules by understanding both verbal and nonverbal feedback from other children and adults (Haney, 2013). The setting (e.g., the classroom, the playground, the home) and the communication partners involved (e.g., teachers, classmates, parents, siblings) dictate the formality of speech and the vocabulary used in that conversational exchange (Winner, 2002).

The classroom is one of countless social contexts where individuals develop and practice social skills. Before beginning conversational exchanges, at the preschool age (i.e., three to five years of age) children show affection, concern, and a wide range of emotions. Social reciprocity, which may involve simply exchanging sounds or smiles with another individual, is one of the earliest stages and basis for social interactions (Laursen & Hartup, 2002). In addition, the ability to imitate adults

and peers, engage in pretend play and cooperative play with peers, and demonstrate a desire to please friends are additional instances of interaction amongst young children (Division of Birth Defects, 2014).

Social skills are imperative in daily interaction, but also greatly impact a child's success in a number of facets for the entirety of that individual's lifespan. Some of life's complexities that demand social skills are academic achievement, building lasting friendships and relationships, resolving conflicts, and how individuals navigate dynamic environments, such as their place of employment, their community, or their home environment (McKown, Gumbiner, Russo, & Lipton, 2009).

Characteristics of Individuals with Autism Spectrum Disorder

For the rapidly growing and heterogeneous population of individuals with Autism Spectrum Disorder (ASD), social skills are distinguishing deficits (McConnell, 2002). Individuals with ASD exhibit deficits in social skills acquisition and in performing or applying learned social skills to applicable social contexts and situations (Bellini, 2006). According to the fifth edition of the Diagnostic and Statistical Manual (DSM-V), social communication and interaction deficits include three symptoms: (a) deficits in social-emotional reciprocity, (b) deficits in nonverbal communicative behaviors used for social interaction, and (c) deficits in developing and maintaining relationships (American Psychiatric Association, 2013). Among these core deficits in social communication and interaction, Barton, Lawrence, and Deurloo (2012) identify the ability to attend to relevant cues, to imitate, to understand

language, and to participate in functional pretend play to be other fundamental goals for young children with ASD that are also related to social skills.

Individuals with ASD are often observed displaying minimal interest in engaging in social reciprocity with peers or adults, and present a preference for social isolation or detachment (Dawson et al., 2004). The earliest signals for delayed social development in young children with ASD are a lack of joint attention (JA) and expressions of positive affect, such as smiling or laughter. Children participating in JA shift their gaze from an object and make eye contact with a communication partner and use gestures such as pointing to engage with another individual (Krstovska-Guerrero & Jones, 2013). According to Mundy, Kasari, and Sigman (1992), individuals who fail to engage in JA also fail to display affective responding, which draws the attention of other adults and peers and is pivotal in increasing opportunities for social interaction.

Theory of Mind (ToM), an ability to identify another's perspective or *read* his or her mind in order to empathize and understand another individual's knowledge and beliefs, is also associated with the social skill deficits of this population (Baron-Cohen, Leslie, & Frith, 1985, p. 38). For preschool children, ToM plays an important role in the success of engaging in and sustaining play with peers. Deficits in ToM exhibited by individuals with ASD are thus associated with significant delays in social development (Myszak, 2010). The inability to empathize and deduce the emotional state of others by understanding nonverbal communication cues, such as facial expressions, eye gaze, body language, and gestures, severely impact the social skills of individuals with ASD.

Individuals with ASD who are motivated and interested in engaging with other adults or peers, may struggle with a range of anxieties and difficulties in social contexts and situations. Children with ASD may not be able to successfully gain the attention of a peer and initiate a conversation. Others may find maintaining a conversation difficult and understanding the nuances of social situations with differing peer groups to be challenging (Haney, 2013).

Social skills deficits persist for individuals with ASD as they develop and may be further hindered by circumscribed interests or an abnormal fixation on a specific subject or object that relates to rigidity in behaviors (Jones & Klin, 2013; Sasson, Turner-Brown, Holtzclaw, Lam, & Bodfish, 2008). Some individuals with ASD may be consumed with information on specific topics, such as trains or dinosaurs, and thus commandeer a social interaction and ignore social-emotion reciprocity (i.e., the give and take in a conversation). Individuals with ASD may not be able to recognize social cues that relate to the emotions of a communication partner and may not initiate or respond to such cues in order to show care or concern (Haney, 2013). A restricted fascination with specific toys or objects is also associated with repetitive or ritualistic manipulation of toys, such as spinning or arranging toys, instead of playing with toys for their intended use (Lydon, Healy, & Leader, 2011). Such behaviors often preoccupy individuals with ASD and therefore limit the opportunities for social interaction with peers.

Importance of Social Skills Interventions

The successful development of social communication and interaction in individuals with ASD is a lifelong objective, and the acquisition of such skills can

have a lasting impact on other critical areas of need that are defining characteristics of this population. Social skills are associated with cognitive, physical, and emotional development (Fragale, 2014). As a pivotal skill, targeting social skills produces broad improvements in other areas, such as pro-social behavior, appropriate communication with both peers and adults, and cooperative and functional play (Jung & Sainato, 2013). Through social skills instruction, individuals with ASD may be taught to appropriately communicate and initiate interactions, rather than just responding to others, participate in turn-taking, make requests, and ask questions instead of resorting to more interfering behaviors, such as tantrums and aggressions (Egel, Holman, & Barthold, 2012; Reichow & Volkmar, 2010; White, Keonig, & Scahill, 2007). Social skills instruction therefore would lead to increased acceptance from typically developing peers, and more inclusion in less restrictive environments, which will broaden the opportunities from which an individual with ASD may practice social interaction and communication and build meaningful friendships with peers (Jordan, 2003).

Social Skills Interventions for Individuals with ASD

Given the importance of developing social skills for individuals with ASD, the amount of research on interventions targeting such skills has increased exponentially. Numerous interventions targeting social skills have been examined, however, only a small number have been identified which meet evidence-based criteria. The National Professional Development Center on Autism Spectrum Disorders (NPDC) is considered an authoritative source on evidence-based practices and autism. According to the NPDC (2014), peer-mediated instruction and intervention (PMII), prompting,

reinforcement, self-management, social narratives, social skills groups, and video modeling (VM) are effective practices that may aid in the gaining of social skills. PMII consists of training peers without disabilities to be responsive communication partners by increasing opportunities for individuals with ASD to socialize. Used in combination with other evidence-based practices, prompting procedures are a method to assist individuals with ASD with learning and performing behaviors and skills. Reinforcement serves as a method to increase the probability of the future performance of the behavior or skill by the individual. Self-management targets the ability of the individual with ASD to autonomously regulate his or her behaviors in multiple contexts. Social narratives are individualized and brief descriptions of a social situation to prepare an individual, and emphasize important cues and appropriate responses. Social skills groups are an opportunity for a small group of individuals with ASD to learn and practice appropriate social skills with the guidance of an adult facilitator. Lastly, VM is an instructional approach using recorded videos. VM commonly includes a desired skill or replacement behavior presented to students in a video format. Students are provided with opportunities to observe the video repeatedly and then participate in sessions which allow the student to imitate and practice the skill or behavior shown in the VM (Hine & Wolery, 2006).

Despite the social skills interventions available for individuals with ASD, more research on interventions focusing on social skills is warranted (Jung & Sainato, 2013; White, Keonig, & Scahill, 2007). The aforementioned evidence-based interventions addressing social skills for this population do not fully remedy the social skills deficits representative of this population. In a comprehensive review of

the intervention research on social development that spanned from 1985 to 2006, White, Keonig, and Scahill (2007) concluded there was still much to research in regards to effective intervention approaches. The authors also emphasized a need to conduct replication and elaborative studies, and more methodolgically rigrous studies.

Video Modeling as a Means to Develop Social Skills in Individuals with ASD

Among the evidence-based interventions necessitating further research is VM. In a literature review, Fragale (2014) found VM to be an effective intervention for improving play-related skills, such as solitary play and social play, of children with ASD. Based on the results of three separate meta-analyses, Bellini and Akullian (2007), Wang and Spillane (2009), and Reichow and Volkmar (2010) found VM is an evidence-based practice for individuals with ASD, which aligns with the NPDC. Specifically, Wang and Spillane found VM to be highly effective for this population. In addition, Scheflen, Freeman, and Paparella (2012) found VM to be more effective than in vivo modeling (where live models perform the target behavior).

There are a number of types or methods in which VMs may be presented to individuals with ASD. One type may include *adults as the model*, where an educator, staff member, or parent models the preferred behavior or targeted skill. Another type of VM is *peers as a model*, which includes a peer who may be the same age and gender, such as classmates or siblings modeling the behavior or skill in focus. A video of the actual recipient of the instruction engaging in the preferred behavior or skill is known as *video self-modeling (VSM)*. *Point-of-view video models* or first-person perspective video modeling is a video of what the recipient of the instruction would actually see if he or she were engaging in the behavior or skill (Shukla-Mehta,

Miller, & Callahan, 2012). This form of VM may include hands demonstrating the skill and using the relevant materials or other individuals connected to performing the skill or behavior (McCoy & Hermansen, 2007).

VM may be used in isolation or as part of an instructional package and may be accompanied with additional instruction, prompting, and reinforcement (Wilson, 2013). VM may be presented in two common ways, which are both effective for individuals with ASD (Mason, Davis, Boles, & Goodwyn, 2013; Sancho, Sidener, & Reeve, 2010). *Video priming* occurs when the individual is presented with the entire video prior to imitating and practicing the desired skill or behavior. *Video prompting* involves segmenting the video into a task analysis to scaffold the learning of a targeted skill or behavior (Mason et al., 2013).

Employment of VM as an instructional tool by educators has become more frequent due to increased access to technology and its cost effectiveness. Instructors may record a number of VMs in a variety of naturalistic settings that are applicable to the individual student (Scheflen et al., 2012). The VM may be used for more than one student or may be edited to better individualize the product by adding preferred music or video clips to encourage the student to attend to the videos (Hine & Wolery, 2006).

The use of VM takes into account the preference for visual stimuli typically shown by individuals with ASD. It is also known that this population does not commonly engage in incidental learning, therefore, VM is an approach that directly teaches the skill or behavior to be imitated and to be applied in the naturalistic setting (Hine & Wolery, 2006; McCoy & Hermansen, 2007). In addition, individuals with ASD frequently struggle with attending to important and relevant cues in their

environment (Haney, 2013). Video modeling also aims to help children with ASD better identify significant cues by limiting extraneous stimuli shown in the video (Barton, Lawrence, & Deurloo, 2012; Mason et al., 2013).

Additionally, Shane et al. (2012) stated the use of unwieldy, more traditional augmentative and alternative communication (AAC) devices (e.g., GoTalk®, Dynavox®) may stigmatize the individual with disabilities. These cumbersome devices may be stigmatizing because they may be intimidating to others who are unfamiliar and apprehensive about potentially using the device to communicate. The possible hesitation experienced by others may prevent them from approaching an individual with a disability, and therefore may be a barrier to opportunities for social interaction. Therefore, Shane et al. emphasized the need to use more commonplace and less stigmatizing *consumer-level hardware* (e.g., laptop computer, cellular phone, tablet) to provide instruction, specifically social skills, language, and communication, for individuals with ASD. VMs are oftentimes presented on hand-held technologies, such as tablets or cellular phones, and therefore, address the recommendations made by Shane et al. since VMs use socially acceptable technologies that are unobtrusive and do not limit the individual's opportunities to interact with peers.

Advantages of Point-of-View Video Modeling

Recognizing relevant stimuli in environments that often include both relevant and irrelevant stimuli is a general deficit for individuals with ASD. Therefore, Rayner et al. (2009) and Tetreault and Lerman (2010) have suggested that when compared to other forms of VM, point-of-view video models may be most effective in limiting the irrelevant stimuli and drawing children's attention to the relevant stimuli. By filming

a VM from the student's perspective, point-of-view video models may better support the learning of the targeted behavior than any other form of VM. Point-of-view video modeling may provide a clear frame of reference to facilitate imitation, which is another obstacle for individuals with ASD (McCoy & Hermansen, 2007). Additionally, according to Ayres and Langone (2007), video models recorded from the student's perspective are more effective not only in emphasizing the relevant stimuli that require attention, but in reducing the need for the recipient of the intervention to have ToM.

Despite the statements supporting the use of point-of-view video models as an effective intervention for individuals with ASD, VMs employing adults, peers, and VSMs are the most frequently used intervention for social skills instruction (Fragale, 2014; Mason et al., 2013). In a meta-analysis of the efficacy of point-of-view video modeling, Mason et al. (2013) identified one study (Tetreault & Lerman, 2010) examining point-of-view video modeling and social skills and suggested that the effectiveness of point-of-view video modeling in teaching social skills was inconclusive given the limited research. Nonetheless, Mason et al. indicated this form of VM was promising for individuals with ASD, which aligned with the conclusions of past meta-analysis of the efficacy of video modeling by McCoy and Hermansen (2007) and Shukla-Mehta et al. (2012).

Statement of Purpose

Social communication and interaction have been identified as a distinguishing impairment for individuals with ASD that pervasively affects the individual's success in countless contexts and the building of relationships and friendships throughout the

course of an individual's lifetime. Early targeting of social skills may be imperative to understanding and ameliorating the significant deficits in the ASD population, such as appropriate use of language and communication and engagement in pro-social behaviors. Point-of-view video modeling has the potential to address these deficits and ultimately improve social communication and interaction in individuals with ASD. Therefore, the purpose of the research is to expand upon the existing literature focusing on this form of VM as an intervention targeting the development of social communication and interaction for students with ASD. By extending the existing research, the study examined the effects of point-of-view video modeling in increasing social skills in young children with ASD.

Queries Guiding the Literature Review

The following questions guided the review of the literature and framed the questions guiding the research of the effectiveness of point-of-view video modeling in teaching social skills to children with ASD:

1. Do point-of-view video models effectively teach social communication and interaction skills to preschool children with ASD?
2. What social skills do point-of-view video models effectively teach and are the social skills being targeted *simple* functional play skills (e.g., playing with toys appropriately) or *complex* play skills (e.g., reciprocal and cooperative play)?
3. What child characteristics or prerequisites are required for point-of-view video models to be successful?

4. What is the appropriate length of a point-of-view video model for a preschool child and how frequently should the child view the video for each session?
5. In order to avoid prompt dependence, how are point-of-view video models faded to guide children towards more independent functioning?
6. Do social skills gained through the implementation of point-of-view video models generalize to different settings, people, and similar scenarios?
7. Are the social skills gained from point-of-view video models maintained after a period of time?
8. Based on the current extent of research, what questions relating to point-of-view video models and social skills remain unanswered?

Definition of Key Terminology

This section provides definitions of terms used in this study.

Video Modeling – is an instructional approach using recorded videos. A VM commonly includes a desired skill or replacement behavior presented to students in a video format. Students are provided with opportunities to observe the video repeatedly and then participate in sessions which allow the student to imitate and practice the skill or behavior shown in the VM (Hine & Wolery, 2006).

Point-of-View Video Modeling – or first-person perspective video modeling is a video of what the recipient of the instruction would actually see if he or she were engaging in the behavior or skill (Shukla-Mehta, Miller, & Callahan, 2012). This form of VM may include hands demonstrating the skill and using the

relevant materials or other individuals connected to performing the skill or behavior (McCoy & Hermansen, 2007).

Social Initiation – is an action to commence a social interaction or conversation, and for the purposes of the research it involves shifting attention toward an individual, maintaining attention toward that individual, and verbalizing "Hello" or some variation of a greeting.

Other Social Initiations (natural generalization) – for the purposes of the natural generalization probes, social initiation bids included greetings, getting attention, organizing, sharing, seeking assistance, engaging in compliments, and demonstrating affection (Odom & Strain, 1986).

Video Priming – occurs when the individual is presented with the entire video prior to imitating and practicing the desired skill or behavior (Mason et al., 2013).

Prompting – used in combination with other evidence-based practices, prompting procedures are a method to assist individuals with ASD with learning and performing behaviors and skills (NPDC, 2014).

Reinforcement – serves as a method to increase the probability of the future performance of the behavior or skill by the individual (NPDC, 2014).

Chapter 2: Review of the Literature

The development of social communication and interaction is imperative for individuals with ASD. The extensive influence of social skills on daily interactions, functioning, achievement, and building of relationships and friendships further signifies how pivotal it is to investigate research regarding social skills interventions for this growing population. Therefore the identification of effective social skills interventions is necessary. The deeper investigation of an intervention that has been identified as an evidence-based practice, such as video modeling, would provide information on the full extent of this intervention in instructing individuals with ASD as it pertains to social communication and interaction.

In this chapter, a comprehensive review of the current research regarding social skills instruction through the application of point-of-view video models is provided. The purpose of the review of literature is to: (a) investigate the current research of social skills instruction through the application of point-of-view video modeling, (b) examine the empirically-based literature to inform the current study, and (c) potentially identify answers to the guiding questions outlined previously.

Literature Search Procedures and Criteria

Empirically-based literature on point-of-view video models targeting social skills was selected through electronic and ancestral searches of literature published between 2004 and 2014. The rationale for these parameters was due to the limited amount of research on point-of-view video models and social skills, and therefore the parameters were set at 10 years to better identify the existing research. The following databases were used: Education Research Complete (EBSCO), ERIC, JSTOR, MAS

Ultra School Edition, MLA International Bibliography, Primary Search, PsycINFO, and Social Science Citation Index. The keywords used to generate the electronic search included *autism*, *autistic*, *autism spectrum disorder*, *ASD*, *point-of-view video modeling, first person perspective video modeling,* and *social skills*.

Other criteria for inclusion included: (a) studies which included participants diagnosed with ASD, (b) studies that specifically addressed social skills (e.g., social communication, interaction with peer or adults); and (c) studies which examined point-of-view video modeling as the only independent variable (i.e., no additional instruction or program package). Studies that employed supplementary reinforcement (e.g., non-contingent, contingent) and prompting in addition to point-of-view video modeling were included due to their recurrent use in many video modeling intervention studies. For the purpose of the review, only articles from peer-reviewed journals were incorporated. Both the electronic search and ancestral search yielded five empirically-based research articles evaluating the effectiveness of point-of-view video modeling in teaching social skills. The periodicals in both the electronic search and ancestral search included *Education and Training in Autism and Developmental Disabilities*, *Education and Treatment of Children*, *Research in Autism Spectrum Disorders*, and *Topics in Early Childhood Special Education.*

Results and Overview of the Literature

The following five empirically-based studies investigated the effectiveness of point-of-view video modeling in instructing social skills to children with ASD. Table 1 presents an overview of these five studies.

Hine and Wolery (2006) conducted a multi probe design across two behaviors and across two participants. Two main research questions guided their study: (a) Will preschoolers with ASD readily imitate actions seen through point-of-view video modeling? and (b) Will any acquired skills generalize to the children's classroom sensory activities and across untrained materials? The study included two female participants identified with autism based on the DSM-IV. Both participants attended an inclusive, full-day preschool, but in separate classrooms that included 10 – 14 children with approximately half the class being children with disabilities. At the commencement of the study, Christine was 30 months old, and Kaci was 43 months old. Based on teacher reports both participants engaged in stereotypic behaviors during play periods and showed preferences for videos. The *Motor Imitation Scale* (Stone, Ousley, & Littleford, 1997) was administered to test the participants' abilities to imitate, and the results indicated that both participants were capable of imitating simple actions observed from adults or materials.

The materials used in the sessions were identified as sensory toys, and consisted of a gardening set (e.g., shovels, planter pots, plants) and a cooking set (e.g., utensils, bowls, plates, pots). These materials were placed in a sensory bin filled with potting soil.

Investigators collected the baseline data. In the preschool therapy room, the investigators placed the set of gardening toys into the sensory bin and verbally prompted the participant to play. During the two minute baseline probe, the investigators did not provide any additional prompting on how to use the set of toys. After the probe with the gardening toys, the materials were removed and the

Table 1.

Summary Data for Point-of-View Video Modeling

Study	Research Design	Number of Participants	Age of Participants	Type of VM	Targeted Skills	Reinforcement	Prompting
Hine & Wolery, 2006	Multi Probe Design	2 girl participants	2 – 3 years of age	Priming	Play skills – Functional Play	Yes	Yes
Sancho, Sidener, & Reeve, 2010	Adapted Alternating Treatments Design and Multiple Baseline Design	1 boy participant 1 girl participant	5 years of age	Priming and Prompting	Social skills – Social Script	Yes	Yes
Scheflen, Freeman, & Paparella, 2012	Multiple Baseline Design	4 boy participants	2 – 3 years of age	Priming	Play skills – Functional Play and Social skills – Social Script	Yes	No
Tereshko, MacDonald, & Ahearn, 2010	Multiple Baseline Design	4 boy participants	4 – 6 years of age	Priming and Prompting	Play skills – Functional Play	Yes	Yes
Tetreault & Lerman, 2010	Multiple Baseline Design	2 boy participants 1 girl participant	4 – 8 years of age	Priming	Social skills – Social Script	Yes	Yes

participant was permitted to watch a cartoon for another two minutes. The procedure for the set of gardening toys was repeated using the set of cooking toys.

Prior to each intervention session, the investigators conducted a daily treatment to identify the participant's performance without immediately seeing the video prior to imitating or practicing the targeted behaviors. The daily treatment probe mirrored the baseline procedures. The investigators reinforced the participants if they were contacting the toys and remaining at the sensory bin, and verbal praise and tangible rewards were provided for on-task behavior.

In the preschool therapy room, the intervention sessions included the participant, the first author, and an observing graduate student. The independent variable was the point-of-view video models. Prior to the video models, a two minute cartoon was shown to help the participant attend to the video. The point-of-view video models included a female voice stating, "Play with your toys!" Then the video showed a pair of adult hands appropriately manipulating one toy from either the aforementioned gardening or cooking sensory toys in the sensory bin. After modeling appropriate manipulation with each toy, the same female voice stated, "Great job playing with your toys!" Then the same cartoon played for a total of 60 seconds. Each video was no more than two minutes in length, and included three exemplars of how the participants were expected to manipulate the same set of toys.

In each intervention session, each participant viewed the two videos before beginning the practice session. During the practice session, the procedures used in baseline were repeated, however, the practice sessions were three minutes in length and the participants received prompts for standing at the bin and playing with toys.

Reinforcement was not provided by the investigators when the participants imitated the modeled behaviors from the videos.

The dependent measure in the study was the number of performed actions mirroring what was modeled in the point-of-view video models. In order to collect and code the data, the daily probe and practice session were video recorded. The first author and a trained graduate student coded any imitated actions in the video recordings. There were six possible exemplars to imitate for the gardening set and five for the cooking set.

Kaci exhibited satiation with the same materials being presented repeatedly, which the investigators stated led to decreased responding during the intervention phase. In order to address this, the investigators introduced a new material by changing the potting soil to colored rice. The authors also used a different and more specific prompt (i.e., "Do what you saw on the video.") and changed the procedures for Kaci to provide verbal praise and edibles for imitating the modeled actions from the videos.

The investigators probed the participants' ability to maintain any gained play skills by withdrawing the treatment and practice sessions and returning to baseline procedures. In order to assess generalization, probes were conducted in the participants' classroom with similar sets of gardening and cooking toys. The investigators also conducted procedural fidelity assessments and administered a social validity questionnaire. Using a 5-point Likert-type scale, 20 special education graduate students viewed and rated videotapes of the participants' performance before and after the intervention based on their "engagement, manipulation of materials,

appropriate use of materials, enjoyment of the activity, and need for help using the materials" (Hine & Wolery, 2006).

The results of the study indicated that point-of-view video modeling was effective in teaching the participants to appropriately manipulate the sets of gardening and cooking toys. Kaci successfully imitated the modeled actions using the set of gardening toys, and Christine was observed playing appropriately with both sets of toys. The alteration to the study materials, prompts, and reinforcement aided Kaci in imitating the modeled behaviors with the set of cooking toys. Hine and Wolery (2006) stated that the presentation of multiple examples of the targeted behavior through the point-of-view video models led to generalization; however, only skills gained with the set of gardening toys generalized to the classroom setting. Both participants performed with inconsistency in the maintenance probes, thus making it difficult to draw conclusions about the effectiveness of the intervention in promoting maintenance of gains. Results from the procedural fidelity assessments showed that all phases of the study were conducted with 95% accuracy. Based on the social validity questionnaires, the raters found the intervention to be socially valid in increasing engagement with the activity, manipulating the materials multiple times, appropriate use of materials, and enjoyment of the activity. The raters also found that the participants did not require as much assistance using the materials.

The results of the study are promising. However, the conclusions of the study, which used a multiple probe design across two participants and two behaviors – playing with a set of gardening toys and a set of cooking toys, may be made stronger with additional replications (Kratochwill et al., 2010). The adjustments to the study

procedures for Kaci, also weaken the overall results and highlight the potential need to provide more specific prompting and praise in order to promote skill acquisition. The authors attempted to identify prerequisites and noted that the participants exhibited basic imitation skills with adults as models prior to the study. However, further research needs to be conducted on whether this is an accurate prerequisite for point-of-view video modeling to be effective. The authors also mentioned the limited number of probes conducted in the phases of the study, and the need to collect data on other facets of social skills, such as engagement in functional play and social interactions with peers. Lastly, generalization, maintenance, and examining the impact of more cues and reinforcement continue to be areas warranting further research.

In another study, Sancho et al. (2010) used an adapted alternating treatments design and multiple baseline design to teach play skills to two children. At the time of the study, Mark was 5 years, 4 months old, and Erin was 5 years, 11 months old. Both had been diagnosed with autism by an independent agency and were selected due to their limited imaginative play and because both had the ability to attend to a television for at least two minutes.

Two play sets, a play house and a circus, which contained five characters per set were used in the point-of-view video models. Prior to beginning the intervention phase, the investigators collected baseline data by placing a play set before the child and providing the instruction, “It’s time to play.” The participant was observed for 4 minutes, and no prompts, reinforcement or further directions were provided.

In the intervention phase, the point-of-view video models presented two minute play scenarios containing 10 scripted actions with the play set and characters and 10 vocal scripts. The video models contained two adult hands using the play set and characters to model the scripted actions. In addition to filming the video from the first-person perspective, the investigators also recorded the video from an additional three different angles (i.e., in front of the set, to the right of the set, and from the left of the set).

Within the intervention phase, the participants took part in both a simultaneous video modeling procedure and a video priming procedure. With *simultaneous video modeling*, the participant viewed a video once with the play set and corresponding characters also placed in front of them. While the participant was viewing the video, the investigator would manually prompt and reinforce the play actions with the characters. The prompts were systematically faded and reinforcement was provided contingent on prompted and independent responding. A correction procedure was used for any errors by rewinding the video to the specific action and having the student imitate the action. Following the intervention session, the investigators returned to baseline procedures to collect the post-session data. With *video priming*, the participant did not have access to the play set and characters while viewing the video model. The investigator did not provide any manual prompts. Reinforcers were provided every 10 seconds contingent only on the child's attention to the video, and not to the child's imitations of the play actions or scripts. It is important to note that the edible reinforcers that were provided during the intervention sessions were placed in a clear cup near the DVD player. The participant

was permitted to only consume the reinforcers following the session. Following the intervention session, the investigators returned to baseline procedures to collect the post-session data.

Data collection was facilitated by video recordings of all sessions. The dependent measures included attending to the video or play set characters, imitation of vocal scripts, unscripted verbalizations, imitation of actions with the characters, and unscripted actions with the characters. Data were collected using a 10-second momentary time sampling procedure and frequency data. Additionally, interobserver agreement, treatment fidelity, and social validity were assessed by the investigators.

In order to probe for generalization, five additional settings were selected: the classroom, conference room, office, gymnasium stage, and a multipurpose room in each participant's home. Novel instructors and similar play sets and characters were also used. Both simultaneous video modeling and video priming procedures were used as described above in the generalization probes. One and two weeks after the study, maintenance probes were conducted for the participants.

Based on the results of their study, Sancho et al. (2010) concluded that both video modeling procedures (i.e., simultaneous video modeling and video priming) were effective in teaching and maintaining play skills for the two participating children. For Mark, both types were effective in teaching and maintaining scripted play actions. However, for Erin, simultaneous video modeling was more effective. Unfortunately, engagement in unscripted play actions and vocal scripts occurred rarely. However, simultaneous video modeling led to higher scripted verbalizations in the generalization sessions, while unscripted play actions remained low. In addition,

Sancho et al. stated that generalization did not occur for novel play sets. Results from assessments on interobserver agreement showed a total range of 97% - 100% and treatment fidelity also showed an overall range of 97% - 100%. The results of the Likert-type scale social validity assessment, which was completed by 16 teachers, identified that the educators were willing to implement simultaneous video modeling procedures and video priming procedures.

The findings of the study do not provide any further clarity on whether video priming or a form of video prompting is more efficacious. The authors also mention that the prompting and reinforcement may have impacted their data and may have potentially led to multiple treatment interference. Additionally, like the previous study by Hine and Wolery (2006), the study was rather small, including only two participants with two play sets. According to Kratochwill et al. (2010), at least three replications are necessary to strengthen the conclusions made in multiple baseline studies. However, the study did attempt to address and teach both functional play and social scripts. The authors also collected data on unscripted play actions and vocalizations, which is another step to further improving social communication and interaction in individuals with ASD. Both generalization and maintenance were assessed, which are additional factors in identifying whether point-of-view video modeling is effective for this population.

In the most recently published article on point-of-view video modeling and the teaching of play and social skills, Scheflen et al. (2012) used a multiple baseline design with four male participants. The authors believed that by creating VMs which followed the developmental sequence of play skills, individuals with ASD would be

able to acquire such skills, which would also translate to improvements in language. The authors also incorporated past research in directly teaching language through video modeling. The participants were randomly sampled from an ASD treatment program and were between two to three years of age. The authors included a detailed table presenting each participant's demographic characteristics.

Prior to beginning the intervention phase, the authors collected baseline data by observing the participants during a 15-minute free play session in the classroom and a therapy room. Both settings included different types of toys. The authors' aim was to determine the participants' play levels in different settings.

The authors created video models demonstrating sequences of play that corresponded with each level of play according to the developmental sequence established by Kasari, Freeman, and Paparella (2006). The levels of play include:

1. Indiscriminate Actions: all toys are treated as identical
2. Discriminate Actions: shows understanding of different physical characteristics of toys (e.g., squeezes stuffed animal)
3. Takes Apart Combinations: takes apart components of a whole object (e.g., puzzle)
4. Presentation Combinations: puts back together the components of the object
5. General Combinations: uses multiple unrelated objects to construct a new configuration
6. Pretend Self: engages in pretend play with toys (e.g., drink from toy cup)
7. Specific Combinations – Physical Attributes: uses objects or toys based on physical construction (e.g., stacking cups)

8. Child as Agent: extends actions to another toy (e.g., doll)
9. Specific Combinations – Conventional Attributes: understands conventional uses of objects and toys and extends this to self
10. Single Scheme Sequences: understands conventional uses of objects and toys and extends this to self and other toys
11. Substitutions with Object: substitutes an object for another (e.g., bowl as hat)
12. Substitutions without Object: pretends to substitute an object for another
13. Doll as Agent: moves objects and toys as if capable of movement
14. Multischeme Sequences: elaborates on extending actions to other toys
15. Sociodramatic Play: takes on familiar roles during play
16. Thematic Fantasy Play: takes on fantasy roles during play

The point-of-view video models contained adult hands manipulating different toys or sets of toys, which were also accompanied with scripted language. The intervention sessions took place in the speech therapy room twice a week for 15 minutes. According to their observed play level during baseline, participants watched the video model of a play skill of the next level of play on the developmental play sequence. Participants watched videos targeting one play skill representing the corresponding level of play with three separate toy models two times each. Each toy model was approximately 30 seconds in length. After watching one video using the first of three toy models twice, the participant was given the same toys for two minutes to imitate what was modeled. During this time, the investigator provided the instruction, "Time to play!" No other prompts or reinforcement were provided, however participants were reinforced contingent on imitation of play actions. This

procedure was repeated until all three toy model videos were shown and the participant was able to practice with the toys for two minutes. Mastery was determined after the participant was observed engaging in that specific level of play with three differing toys not seen in the video models in the therapy room and in the classroom.

The dependent variables in the study included engagement in play actions according to the student's level and vocalizations that related to the play actions. Both maintenance and generalization were assessed, in addition to procedural fidelity and social validity.

Based on the results of the study by Scheflen et al. (2012), the video modeling procedures were effective in teaching functional play with toys and developing language during play. The study had a notable strength, which was the inclusion of detailed demographic and assessment information, which may provide some information on prerequisite skills for point-of-view video modeling to be effective. However, the size of the study was small, and is a limitation of this study. In addition, the authors acknowledged that the participants received intensive speech therapy during the time of the study, which may influence the interpretation of the results and the conclusions about the impact of point-of-view video modeling.

Tereshko, MacDonald, and Ahearn (2010) conducted a multiple baseline design to investigate the impact of point-of-view video modeling on teaching functional play skills. The study included four male preschool participants diagnosed with ASD with the Autism Diagnostic Observation Scale (ADOS; Lord, Rutter, DiLavore, & Risi, 2001). The sessions took place in the school's therapy room. Pre-

assessment data were collected to determine the participants' abilities to discriminate objects, identify pictures on a computer screen, and attend to a video shown on a DVD player.

Mega Bloks® were used to construct four different toy structures consisting of eight pieces each. In the baseline phase, the investigators placed a disassembled toy structure and a picture of the completed project before the participant. After the investigator directed the participant to play, no further prompts were provided. After 2 minutes, a non-contingent reinforcer was provided and the baseline procedures were repeated for an additional two toy structure creations.

The point-of-view video model presented adult hands using the Mega Bloks® to construct three separate toy structures. The investigators zoomed into specific actions to help the participant attend to the relevant stimuli. Each full model of an entire toy structure being constructed was then segmented into a response chain. The first video chain included one step only. The second video chain include step one and step two. The third video chain included steps one through three. The video response chains were edited until all eight steps were completed and the final product had been constructed.

Participants were first presented with the full video model. Prompts were only used to redirect the participants' attention to the video. Baseline procedures were used during the practice session to collect data. Once the participant performed at a stable level with fewer than 50% of the steps completed, the participant proceeded to view the segmented videos. With the video segments, the participant watched each chain and then proceeded to the practice session which replicated the baseline procedures.

The first sessions involved completing only the first step in building the toy structure. Once the participant was able to complete the first step with 100% accuracy across two consecutive trials, the participant proceeded to the next chain until all eight steps and the toy structure was completed. Once the participant was able to follow all response chains and build the toy structure with 100% accuracy across two consecutive sessions, the video model was removed and the participant was instructed to build the toy structure with only the picture. The participant was able to proceed to the next toy structure after building the toy structure with 100% accuracy across two consecutive sessions.

A response blocking procedure was used for three participants to prevent repeated mistakes or attempts to reach for the incorrect Mega Bloks®. If the participant made a mistake in 3 out of 5 consecutive sessions on a single step, the investigator blocked the next incorrect response, but did not provide any prompting or redirection to the correct piece.

All sessions were recorded to allow for data collection. The investigators collected data on the construction of the toy structure and attention to the video model. The investigators also calculated interobserver agreement. In addition, generalization probes were conducted in the participants' classrooms once the participant had reached mastery with a toy structure. A fourth toy structure was used for this generalization probe.

Tereshko et al. (2010) indicated their study demonstrated that segmenting the point-of-view video models into forward response chains was effective for teaching functional play with the Mega Bloks®. All participants were able to build all three

toy structures and generalize those skills to the classroom setting. For two participants, the segmented videos were needed to build the first two toy structures. However, on the third, the participants were able to accurately build the structure by just viewing the full video. The authors suggested that the use of chaining led to greater imitation skills and attendance to relevant stimuli. The segmented videos also scaffolded learning and only allowed the participants to proceed to the next step upon mastering the previous, foundational steps.

The results of the study provide promising evidence that point-of-view video modeling, coupled with segmenting or forward response chaining, is effective in teaching children with ASD to imitate skills and play functionally. However, the use of a photograph to emphasize the final product may have affected the results of the study by providing added support, and may threaten internal validity through multiple treatment interference. Additionally, the use of a photograph may not be applicable to building more social play skills or pretend play with other students, since those cannot be as concretely depicted. The authors also failed to address maintenance of skills. Nonetheless, the study by Tereshko et al. (2010) provides a different perspective on how point-of-view video modeling and forward response chaining may effectively teach play skills.

In another recently published study, Tetreault and Lerman (2010) examined the impact of point-of-view video modeling in teaching three children diagnosed with autism to initiate and maintain social interactions with others by implementing a multiple baseline design across three behaviors and three participants. The participants, who were attending a private behavior analytic services center, were

diagnosed by an independent psychologist. According to the Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1988) Zhane and Janet fell within the severe range of symptomology and Randall fell within the mild-moderate range of symptomology. The Preschool Language Scale, Fourth Edition (PLS-4; Zimmerman, Steiner, & Pond, 2002) was administered to all of the participants. At the time of the study, Randall was 8 years, 2 months and his receptive and expressive language abilities were assessed to be at the age equivalent of 3 years, 4 months, and 3 years, 1 month respectively. Zhane was 5 year, 5 months and his receptive and expressive language abilities were assessed to be at the age equivalent of 2 years, 3 months, and 2 years, 9 month respectively. Janet was 4 year, 4 months and both her receptive and expressive language abilities were assessed to be at the age equivalent of 3 years, 10 months. All three participants exhibited minimal social initiations, but were able to imitate three- to four- word sentences. Prior to the study, none of the three participants had received instruction through video models.

The investigators selected three scripts or opportunities for the participants to initiate and maintain a social interaction that would be modeled using point-of-view video modeling, and each script included corresponding materials. The three scripts were entitled: "Get Attention," "Request Assistance," and "Share a Toy." The aim of the script "Get Attention," was to have the participant obtain a conversant's attention to show him or her a drawing on a dry erase board. In the "Request Assistance" script, the goal was to have participants ask for a closed box containing a bottle of bubbles. Lastly, the "Share a Toy" script asked participants to share a Mr. Potatohead® doll with a conversant and then to request it back. Each script included a

form of greeting and five concrete exchanges, which the authors defined as making eye contact and a vocalization with a conversant.

All sessions were conducted in a small room at the treatment center. In the baseline phase, each participant was placed at a table containing the toys that would later be used in the point-of-view video models. The participants were informed that a conversant would leave and then enter, and that they needed to play at the table with that individual. Every 10 seconds, the conversant would state the assigned line in the script regardless of the participant's performance.

During the intervention phase a portable DVD play was used to show the video models. The independent variable was the point-of-view video models, which began with a brief visual cue or transition into the video model. The video models were no more than three minutes in length, and as aforementioned, included the verbalized scripts of a conversation pertaining to gaining attention, seeking assistance, and sharing. In the point-of-view video models, the first author verbalized the script to be imitated by the participants and an unfamiliar graduate student was the conversant, who was also recorded in the video models. The first author was not present in the video. The recorded video also showed head movements (e.g., nodding and making eye contact with the conversant) by mimicking such movements with the equipment while recording.

Practice sessions were conducted following the viewing of a video model and contained the same materials used in the particular video model shown. Practice sessions were recorded for data collection purposes. Greetings were scored as correct if the participant vocalized an appropriate greeting. Exchanges (e.g., eye contact and

vocalization) were identified as correct if "the child said the exact sentence from the video or a sentence that differed by no more than two words (added or deleted) from the target script" (Tetreault & Lerman, 2010, p. 399). If the participant was observed making eye contact with the conversant for any amount of time during the vocalization, it was scored as correct. Practice sessions mirrored the baseline procedures. Additionally, if the participant did not imitate the exchange after 10-seconds, the trainer provided a cue for the conversant to proceed onto the next statement. This was done with the use of an index card displaying the subsequent statement, which was presented in a manner that could not be seen by the participant (Tetreault & Lerman, 2010). The authors identified the mastery criterion to be any 8 out of 10 exchanges (i.e., either eye contact or vocalizations) occurring per session across three consecutive sessions.

At the beginning of the intervention phase, the first author provided reinforcements contingent on attention to the video model. During the practice sessions, reinforcement was provided to the participant if they engaged in the scripted exchange. Only one participant, Janet, began to speak with the first author and not the graduate student serving as the conversant. The authors believed this was due to her associating the first author with the reinforcers. Therefore, the authors decided to remove the reinforcers and only provide the video models. When Janet was unable to reach mastering for the previous two phases of the intervention, the authors provided least-to-most prompting when Janet did not engage in an exchange after 10 seconds.

In order to probe for generalization, the materials initially used were replaced with similar items, such as a Playdoh®, a screw-top plastic container, or a toy bus for

the respective scripts. In both the generalization and maintenance phase, the authors returned to baseline procedures.

Tetreault and Lerman (2010) concluded that impact of point-of-view video modeling on initiating and maintaining social interactions with a conversant were unconvincing. Each participant required some level of additional support through reinforcement or prompting, or some modification to the script, thus making the results of the study difficult to interpret. The authors indicated the intervention was most successful in increasing and generalizing eye contact amongst the participants. However, for the vocal exchanges, the authors believed that they were not as concrete or easily discernable as the video movements mimicking eye contact with a conversant. Generalization was minimal for the three participants. The authors also stated the inconclusive results of their study may be in part due to the complexity of the targeted social skills, which have not been studied in the past. This emphasizes the need for further research to better understand the effectiveness of point-of-view video modeling in teaching more complex social skills.

Although the targeted skills, the procedures, and the outcomes of these studies varied, one clear theme emerged: students with ASD, to some degree, showed improvements in social skills following point-of-view video modeling. However, the research pertaining to this intervention had several weaknesses. Although typical for single-subject studies, a common weakness in the studies included small sample sizes. In addition, few studies assessed but found little evidence of generalization or maintenance of the acquired skills. Likewise, the authors of several studies pointed

out the need for future research. A more comprehensive discussion of the reviewed studies is provided in the following section.

Discussion

The purpose of this literature review was to investigate the impact of point-of-view video modeling on social skills and to find answers to the guiding questions outlined earlier, despite limited research in this area. The five articles which did address this form of VM provide inconclusive results on the effectiveness of this intervention. However, the limited research does provide a foundation for teaching social skills to students with ASD, and a number of noteworthy points may be gleaned from the review of the literature.

Guiding Queries

The existing literature collectively supports the effectiveness of point-of-view video modeling in teaching play skills and social skills to children with ASD. However, questions still remain as to the breadth of this intervention's impact on teaching the complexities of social skills to this population. Of the five studies, four targeted solitary play (Hine & Wolery, 2006; Sancho et al., 2010; Scheflen, Freeman, & Paparella, 2012; Tereshko, MacDonald, & Ahearn, 2010), and one study (Tetreault & Lerman, 2010) targeted social play (i.e. initiating and maintaining social interaction). The four studies which focused on solitary play also targeted more *simple* functional play skills (i.e., playing with gardening and cooking sets, play with character toys, building toy structures) instead of more *complex* play skills that are more reciprocal and cooperative in nature (e.g., role-playing, dress-up games with peers).

The studies by Sancho et al. (2010) and Tetreault and Lerman (2010) did include more complex play and social skills. Sancho et al. targeted both scripted play actions and vocalizations with a play set and corresponding toys. Tetreault and Lerman used social scripts to target gaining a conversant's attention, seeking help, and sharing a toy with another. However, it is still difficult to determine how effective point-of-view video modeling is in teaching more complex social skills. The studies by Sancho et al. and Tetreault and Lerman showed mixed results and overall, minimal evidence of both generalization and maintenance. It is also important to note the ability to engage in simple functional skills is necessary before graduating on to complex social skills. Sancho et al. mentioned that the two participants did not engage in imaginative play, and Tetreault and Lerman did not specifically address the participants' simple social skills. Therefore, the varied results of these studies may be due to the incomplete examination of simple social or play skills as prerequisite skills during the sampling of participants.

Through pre-assessments, observations, and parent and teacher reports authors of the studies attempted to determine the prerequisites required for a child to be ideal for point-of-view video modeling. Hine and Wolery (2006) identified whether the participants were capable of imitating simple actions observed from adults or materials. Two studies (Sancho et al., 2010; Tereshko et al., 2010) determined whether participants could attend to a video or television. Additionally, Tereshko et al. assessed the participants' abilities to discriminate objects and identify pictures on a computer screen. Tetreault and Lerman (2010) identified participants' receptive and expressive language, and another study (Scheflen et al., 2012) provided detailed

demographic and assessment data. The studies included in the review of literature used a number of different assessments to determine the appropriateness of the intervention, and it still remains unclear whether the prerequisite skills assessed in these studies had a positive or negative impact on the concluding results.

The length of a video model is important in helping an individual with ASD attend to the video and may facilitate imitation of the targeted behavior or skill. Two studies (Hine & Wolery, 2006; Sancho et al., 2010) used videos no more than two minutes in length and one study (Tetreault & Lerman, 2010) included videos no more than three minutes in length. However, two studies (Scheflen et al., 2012; Tereshko et al., 2010) did not clearly report the length of their videos. Several studies were also unclear about the number of times the participant viewed the video models in a single session. However, it was clear that repeated viewings of the video models were necessary to facilitate skill acquisition.

Prompting and reinforcement were used in all five studies. However, only two studies (Sancho et al., 2010; Tetreault & Lerman, 2010) included procedures to fade prompting and increase independent functioning. Additionally, the studies included varied results in regards to both generalization and maintenance. One study (Hine & Wolery, 2006) showed generalization with one set of toys and another study (Tetreault & Lerman, 2010) showed generalization only with making eye contact. Additionally, only one study (Sancho et al., 2010) showed positive results for maintenance.

The five studies provide preliminary research demonstrating the potential effectiveness of point-of-view video modeling. However, a number of questions remain unanswered, and future research continues to be warranted.

Proposed Study Implications

The literature provides limited research on how point-of-view video modeling may teach more complex social skills that include social communication and interaction with adults or peers. In addition, there is little research on whether learning such skills through this form of VM may lead to unscripted play behavior and communication. Future research should be conducted on the extent to which point-of-view video modeling can teach social play and how this evidence-based intervention may further develop unscripted and novel play.

The studies included in this review also address a number of prerequisites that may aid in identifying whether point-of-view video modeling is an effective intervention for an individual with ASD. One potential skill a child may need to have in his or her repertoire is the ability to attend to video shown on a computer screen, portable DVD player, or television. However, McCoy and Hermansen (2007) and Plavnick (2012) stated that it remains inconclusive as to whether there is a relationship between the ability to attend to a video and the imitation of the skill or behavior being targeted in the video model. It is also unclear what verbal skills an individual must have to imitate vocalizations from video models. Therefore, more research needs to be conducted to identify what are the optimal characteristics of an individual with ASD in order for point-of-view video modeling to be a viable intervention in teaching play and social skills. In order to facilitate this, Mason et al.

(2013) stated future research should also include more detailed diagnostic information and assessment information on each participant.

Additional research comparing the use of video priming and prompting, which was only minimally addressed by Sancho et al. (2010), remains necessary. In addition, future research must be conducted to determine the appropriate length of a video model and the frequency in which a participant should view the model before having to practice the targeted skill or behavior. The results of the literature review do not shed any conclusive light on this matter.

Several studies employed unique video editing to further facilitate skill acquisition. Sancho et al. (2010) filmed the video models from the first-person perspective and three additional angles. Tereshko et al. (2010) zoomed into relevant actions and visual stimuli to ensure participants attended to specific details of building a toy structure. Tetreault and Lerman (2010) mimicked head nodding and the making of eye contact. Two studies (Hine & Wolery, 2006; Tetreault & Lerman, 2010) used a visual cue before presenting the video model to gain the attention of the participant. It is not clear whether these differences in the video models led to positive results, therefore, further research should investigate when such edits to the video models are warranted.

All of the included studies in the literature review were coupled with both reinforcement and prompting. This consistency amongst the studies highlights the potential need to provide specific reinforcement and praise to promote skill acquisition. However, future research must provide procedures to fade reinforcement and prompting. Addressing this may also lead to further generalization and

maintenance, which are both areas that continue to require future research to better show evidence of the effectiveness of point-of-view video modeling.

Chapter 3: Methodology

Rooted in the limited research which addresses the potential effectiveness of point-of-view video modeling as a social skills intervention, the research aimed to address how effective this form of video modeling may be in teaching social initiations (i.e., greetings) to young children with ASD. Although seemingly limited in focus, social initiations are a foundational skill with long-term implications, from which a conversation and other social communication and interactions may emerge. The targeting of social initiations also addresses social-emotional reciprocity, which is specifically identified as an area of deficit in the DSM-V.

Research Questions and Hypotheses

Specifically, the following questions were addressed in the research:

1. To what extent did appropriate social initiations increase as a result of point-of-view video modeling intervention presented with video priming?
2. To what extent did procedures to fade reinforcement and prompting lead to independent performance of the appropriate social initiations?
3. To what extent did any increased social initiations generalize across novel settings and peers not included in the research study?
4. To what extent did any increased social initiations maintain two and four weeks following the conclusion of the study?

Based on the current research findings on point-of-view video modeling and social skills interventions for individuals with ASD, which were summarized in Chapter 2, the following hypotheses were examined in this study:

1. Preschool students with ASD would engage in increased social initiations following a point-of-view video modeling intervention using video priming.
2. Preschool students with ASD would engage in increased social initiations independently, without the use of reinforcement and prompting.
3. Preschool students with ASD would engage in generalized performance of social initiations across novel settings and peers not included in the research study.
4. Preschool students with ASD would engage in maintained performance of social initiations two and four weeks following the conclusion of the study.

The research questions and corresponding hypotheses were examined through the utilization of single-case research methodology. As an experimental design, single-case research aims to determine whether a functional or causal relationship exists between the independent variable and the dependent variables (Kennedy, 2005). The methodology is frequently employed in research including individuals with disabilities and commonly involves: (a) continuous assessment over time, (b) replication of intervention effects over multiple participants, behaviors, or settings; and (c) data evaluated through visual analysis (Kazdin, 1982).

This chapter presents the methodology of the study, which includes the following: (a) the participants and the selection process, (b) the setting, (c) the independent variable and training materials, (d) the dependent variables and their measurement, (e) the experimental design and calculation of effect sizes, (f) the

procedures, including the baseline, intervention, post-intervention, generalization, and maintenance phase probes; (g) the social validity measure, (h) the reliability measures, and (i) the fidelity of implementation measures.

Participants and Setting

This section provides an overview of the participant permission and selection process, additional criteria for determining eligibility, setting, and the instructor description.

Participant Permission and Selection

Permission to observe and conduct research in kindergarten classrooms in a mid-Atlantic state of the United States during the 2015-2016 school year was requested and granted. Following the observations and identification of a potential kindergarten classroom (see Appendix A for invitational letter to teachers of students with ASD and of typically developing students), a consent form was sent home to the parents of all students in the selected classroom (see Appendix B for cover letter and consent form). Additional criteria for selecting participants whose parents consented to their participation is outlined in the following section.

Another consent form was sent home to five parents of typically developing peers in kindergarten classrooms within the selected school (see Appendix C for cover letter and consent form). The consent form outlined the study and how their child might participate in filming the point-of-view video model and/or participate as a communication partner in the research. All participants and typically developing students were selected from a list of students whose parents consented to their participation.

Participants Eligibility

Five kindergarten participants, who met the criteria for ASD according to the DSM-IV-TR, were selected for the study. The participants selected for this study exhibited all of the characteristics and prerequisite skills outlined in Table 2. I observed the potential participants multiple times to become familiar with the students' present levels of ability and to identify whether the students met the criteria outlined below (see Appendix D for observation protocol to identify participant eligibility). Discussions were held with the potential participants' teachers to confirm the students met the outlined criteria. In addition, reported assessment scores were collected from students' administrative records, which are presented in the subsequent section. After five participants with ASD were selected, all parents who had consented to their child's participation in the study received a letter to inform them of whether their child was selected to participate in the study and the rationale.

Additionally, I worked with two typically developing peers, whose parents were the only ones to consent to their child's participation, to film the point-of-view video model and/or participate as a communication partner in the phases of the study.

Participants with ASD

Participant 1. At the time of the study, Participant 1 was 6 years, 2 months. The student was eligible for special education services under the category of autism. With the Autism Spectrum Rating Scale (ASRS; Goldstein & Naglieri, 2012), Participant 1 was assessed at 74 by his teacher and 77 by his parent. Both ratings fall in the very elevated score range.

Table 2.

Characteristics of Participants with ASD

1. Exhibits low rates of disruptive behaviors
2. Requires minimal prompting (e.g., gestures, verbal) across a majority of tasks
3. Uses at least two word phrases with adults and peers
4. Responds to "Do you want…?" questions by verbally answering yes or no
5. Answers who and what wh-questions with at least a one word response
6. Has been observed verbally initiating interactions with typically developing peers and verbally respond to peer initiations
7. Engages in emerging or basic imitation skills (e.g., vocalizations, body movements, object use)
8. Technology (e.g., iPad, tablet, computer) has been used as a reinforcer for correct responding
9. Exhibits the ability to attend to a video for approximately three to four minutes
10. Has social communication and interaction goals in their individualized education program (IEP)

Through multiple observations, the deficits observed included poor social-emotional reciprocity, developing and maintaining relationships, which included making friends and demonstrating interest in other peers. Additionally, the participant frequently engaged in perseverative speech and highly restricted interests (e.g., television shows, videos, animals). In a discussion with the teachers and staff about the participant's characteristics of ASD and behaviors within the classroom, these observations were corroborated.

Based on the Early Childhood Skills Development Guide, which addresses school readiness and utilizes the Work Sampling System (WSS; Meisels, Marsden,

Jablon, Dorfman, & Dichtelmiller, 2001), his receptive and expressive language were assessed to be the age-equivalent of 2-3 years of age. His social/emotional behavioral skills were assessed to be the age-equivalent of 2-3 years of age.

Participant 2. At the time of the study, Participant 2 was 6 years, 6 months. The student was eligible for special education services under the category of autism. The parent scored Participant 2 at 69 on the ASRS (Goldstein & Naglieri, 2012), which falls within the elevated range. With the Childhood Autism Rating Scale-2 (CARS-2; Schopler Van Bourgondien, 2010) scores were calculated at 42, which is consistent with severe symptoms of ASD.

Through multiple observations, the deficits observed included poor social-emotional reciprocity, nonverbal communicative behaviors, and developing and maintaining relationships. The participant was observed rarely communicating or interacting with other peers. Additionally, the participant was observed frequently engaging in perseverative speech, excessively adhering to routines, and engagement in self-stimulatory behavior (e.g., body rocking, flapping of hands). These observations were corroborated by the classroom teachers and staff.

Based on the Early Childhood Skills Development Guide, his receptive and expressive language were assessed to be the age-equivalent of 2-3 years of age. His social/emotional behavioral skills were assessed to be the age-equivalent of 2-3 years of age.

Participant 3. At the time of the study, Participant 3 was 5 years, 5 months. The student was eligible for special education services under the category of autism.

According to the ASRS (Goldstein & Naglieri, 2012), Participant 3 was assessed at 76 by his teacher and 79 by his parent, with both scores falling in the very elevated score range.

Through multiple observations, the deficits observed included poor social-emotional reciprocity, nonverbal communicative behaviors, and developing and maintaining relationships. I observed Participant 3 rarely communicating or interacting with other peers in the classroom. These observations were corroborated by the classroom teachers and staff.

Nonverbal IQ for Participant 3 was assessed at 72 with the Leiter International Performance Scale 3rd Edition (Leiter-3; Roid, Miller, Pomplun, & Koch, 2013). Based on the Early Childhood Skills Development Guide, his receptive language was assessed to be the age-equivalent of 2-3 years of age. His expressive language was assessed to be the age-equivalent of 1-2 years of age. His social/emotional behavioral skills were assessed to be the age-equivalent of 1-2 years of age.

Participant 4. At the time of the study, Participant 4 was 5 years, 6 months. The student was eligible for special education services under the category of autism. According to the ASRS (Goldstein & Naglieri, 2012), Participant 4 was assessed at 78 by his teacher and 77 by his parent, with both scores falling in the very elevated score range.

Through multiple observations, the deficits observed included poor social-emotional reciprocity, nonverbal communicative behaviors, and developing and maintaining relationships. The participant was observed rarely communicating or interacting with other peers in the classroom. Additionally, the participant was

observed frequently engaging in perseverative speech. These observations were corroborated by the classroom teachers and staff.

Nonverbal IQ for Participant 4 was assessed at 93 with the Leiter-3 (Roid et al, 2013). Based on the Early Childhood Skills Development Guide, his receptive and expressive language were assessed to be the age-equivalent of 3-4 years of age. His social/emotional behavioral skills were assessed to be the age-equivalent of 2-3 years of age.

Participant 5. At the time of the study, Participant 5 was 5 years, 10 months. The student was eligible for special education services under the category of autism. With the ASRS (Goldstein & Naglieri, 2012), Participant 5 was assessed by his teacher at 78, which falls in the very elevated range. The participant was assessed at 64 by his parent, which falls in the slightly elevated score range. Participant 5 was also assessed at 35 with the CARS-2 (Schopler Van Bourgondien, 2010), with scores considered to be in the mild-to-moderate range for symptoms of ASD.

Through multiple observations, the deficits observed included poor social-emotional reciprocity, nonverbal communicative behaviors, and developing and maintaining relationships. The participant rarely communicated or interacted with other peers in the classroom. Additionally, the participant was observed frequently engaging in perseverative speech and stereotypic behavior (e.g., flapping of hands). These observations were corroborated by the classroom teachers and staff.

Based on the Battelle Developmental Inventory 2nd Edition (BDI-2; Newborg, 2004), his receptive and expressive language were assessed to be the age-equivalent

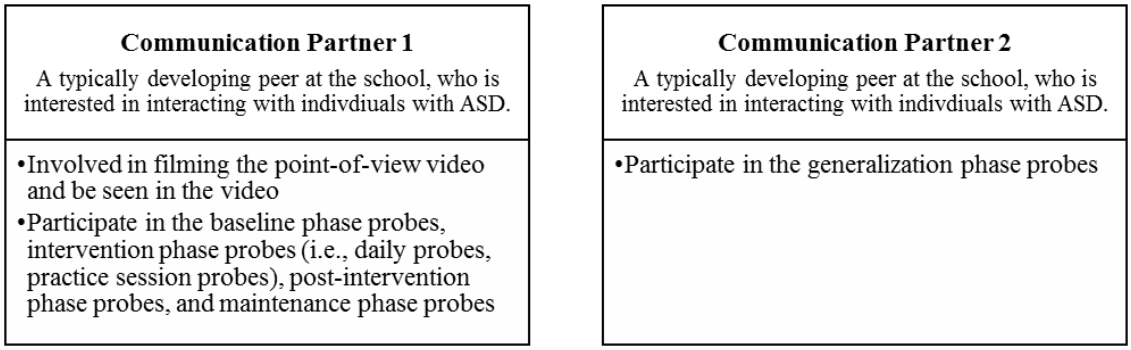
of 3-4 years of age. His social/emotional behavioral skills were assessed to be the age-equivalent of 2-3 years of age.

Communication Partners

Both Communication Partners 1 and 2 were approximately the same age as the five participants with ASD. Communication Partner 1 was a 6-year-old, male, kindergarten student. He was involved in filming the point-of-view video and was visible in the video. Communication Partner 1 also took part in the baseline phase probes, intervention phase probes (i.e., daily probes, practice session probes), post-intervention phase probes, and maintenance phase probes. Communication Partner 2 was a 5-year-old female, kindergarten student and was selected to participate in the generalization probes.

Figure 1 presents the specific responsibilities of the typically developing peers selected to participate in the study. Training involved practicing and role-playing the statements and actions of the point-of-view video model and probes (see Appendix E for an outline of training sessions and Appendix F for the procedural reliability form for training communication partners). Communication Partners 1 and 2 were first trained to facilitate social interactions (e.g., looking expectantly for a response, waiting for a response) with students with ASD. After discussing the targeted behaviors (i.e., social initiations), the communication partners then practiced the actions for participating in the practice session probes. Lastly, the communication partners participated in role playing. One communication partner would engage in different scenarios where he or she did or did not engage in the three measured behaviors of the dependent variable, which is discussed in a later section. The other

Figure 1. Typically Developing Peers' Participation in the Study



communication partner would then practice entering the room and responding accordingly. I then had participants switch roles. In addition, the correction procedures, which are also discussed in a later section, were implemented by me to ensure the two communication partners understood these procedures.

The training sessions were recorded for the purposes of collecting procedural reliability data on the training of the communication partners, and in order to train the reliability observer and the fidelity of implementation observer, which is discussed in a later section.

Instructor and Settings

I implemented the intervention study. The study took place in a public elementary school. The participants were students in a self-contained classroom that provided highly structured and individualized instruction. The classroom included 12 students, two special education teachers, four paraprofessionals, and an occasional volunteer. The program used both whole group and small group teaching procedures to target academic skills (i.e., reading and mathematics). The students also received whole group speech instruction for approximately one hour each week. The students in the program attended school five days each week, for six hours each day.

The probes in the baseline phase and probes in the post-intervention phase were conducted in the participants' classroom (see Appendix G for a flow chart of the settings of the study phases). The generalization probes within the baseline phase and the generalization phase following the post-intervention phase were also conducted in the classroom and in the school library, art room, music room, and/or computer lab.

The intervention and all probes in the intervention phase occurred in two similar intervention rooms in the school where distractions could be minimized. Intervention Room 1 contained shelves for textbooks, a rectangular table and two chairs. Intervention Room 2 was smaller and contained shelves for textbooks, a student desk, a chair, and a copy machine. Approximately 67.3% of the intervention phase probes were conducted in Intervention Room 1. Approximately 32.7 % of the intervention phase probes were conducted in Intervention Room 2, which was only used if Intervention Room 1 was unavailable. Maintenance phase probes were conducted in the participants' classrooms and also in the Intervention Room 1.

Institutional Review Board

Prior to the beginning of the study, plans were submitted for approval to the Institutional Review Board (IRB) at the University of Maryland, College Park. Plans were also submitted to a public school system's Department of Testing, Research, and Evaluation for approval to implement the research study.

Filming and Instructional Materials

Filming the point-of-view video involved the use of an iPad. The video was filmed at the approximate height or eye level of the participants and was filmed in the

intervention room where distractions could be minimized. Communication Partner 1 assisted in the filming.

The camera was first directed towards an area of the room across from the door. The sound of a door being opened and then shut occurred and the camera turned in the direction of the door, which mimics turning of the body and attention toward the door and the sound of an individual entering the intervention room. In the video frame of the camera was Communication Partner 1. While not in view of the video frame (i.e., from behind the camera), I stated, "Hello," which is the targeted verbalization signaling a social initiation and the target greeting to be taught to the participants. Then Communication Partner 1 smiled, waved and said, "Hello." Table 3 shows the scripted actions and vocalizations in the point-of-view video focusing on a social initiation.

Using the video editing program, Microsoft Windows Movie Maker®, an approximately 10 second visual introduction of a cartoon clip was inserted before the actual point-of-view video. The video clip was of a puppet singing a counting song, and was intended to gain the attention of the participant. This approach has been used successfully in previous research on point-of-view video modeling (Hine & Woolery, 2006; Tetreault & Lerman, 2010). Video editing software was also used to ensure seamless transitions, and that all actions and statements were completed correctly. The total length of the point-of-view video, including the introductory video clip, was 22 seconds.

Table 3.

Point-of-View Video Model Scripted Actions and Statements

Investigator		Communication Partner 1	
Action	Statement	Action	Statement
		1. Opens the door, enters the room, closes the door and looks at participant	
2. Turns to look at peer 3. Maintains attention toward peer	"Hello!"		
		4. Smiles and waves to participant	"Hello!"

Dependent Variable

The dependent variable was the percent of correct responses to three behaviors required to engage in the social initiation. The three measured behaviors of the dependent variable included: (a) shifting of attention toward Communication Partner 1 who is entering the room, which was identified as correct if the participant turned to look at the communication partner within five seconds of the door being shut; (b) maintaining attention toward Communication Partner 1, which was identified as correct if the participant continued to look in the direction of the communication partner while also verbalizing the greeting; and (c) engaging in the social initiation toward Communication Partner 1, which was identified as correct if the participant said, "Hello," or verbalized any variation of a greeting (e.g., hi, hey) within five seconds of the door being shut by Communication Partner 1 (see Appendix H for data collection instrument and operational definitions).

Experimental Design

A multiple baseline across participants design was used to assess the effectiveness of point-of-view video modeling in teaching social initiations to kindergarten children with ASD. A multiple baseline design requires that a series of baselines be concurrently established and an intervention is then introduced sequentially across baselines. Once an established criterion level has been met, the intervention is concluded and post-intervention, generalization, and maintenance data are collected.

The multiple baseline design controls for threats to internal validity by showing the dependent variable increases only when the independent variable is applied. Thus, a firm relationship between point-of-view video modeling and social initiations may be established if social initiations increase as the independent variable is applied successively to the target students' behavior.

Calculation of Effect Sizes

In addition to evaluating the data through a multiple baseline design, effect sizes were calculated for each participant. Statistical analyses in single-subject research has become increasingly prevalent, and methodologists such as Kratochwill and Levin (2014) and Gast (2010) suggested that it is more advantageous and objective than visual analysis. In the What Works Clearinghouse Single-Case Designs Technical Documentation, Kratochwill et al. (2010) identified Percentage of Non-Overlapping Data (PND), Percent Exceeding the Median (PEM), and Percentage of All Non-Overlapping Data (PAND) to be common methods used to calculate effect size.

PND is calculated by identifying the highest data point in baseline and calculating the percentage of data points which exceed this level during intervention (Scruggs, Mastropieri, & Casto, 1987). PND scores range from 0-100%. PND scores > 90% reflect highly reliable treatments, scores between 70%-90% reflect fairly effective treatments, scores between 50%-70% reflect questionably effective treatments, and scores <50% reflect unreliable treatments.

PEM is calculated by identifying the median data point in baseline and calculating the percentage of data points above this level, if the dependent variable data are expected to increase, and below this level if the dependent variable data are expected to decrease (Ma, 2006). PEM scores range from 0-1. PEM scores between .90-1 reflect highly effective treatments, scores between .70-.90 reflect moderately effective treatments, scores <.70 reflect questionable or not effective treatments.

PAND is calculated by identifying the total number of overlapping points and dividing it by the total number of points and subtracting the percentage from 100 (Parker et al., 2007). PAND scores may be translated to *Phi* and Phi^2 in order to determine effect sizes. Similar to the interpretation of the Pearson correlation coefficient, *Phi* ranges from −1 to +1, where ±1 indicates perfect agreement or disagreement, and 0 indicates no relationship.

Procedures

Baseline Phase Procedures

Baseline probes. Baseline phase probes were conducted in each participant's classroom (see Appendix G for a flow chart of study phases). A video camera placed in an unobtrusive area of the classroom recorded the baseline probes for the purposes

of data collection and reliability. The participant stood or sat in a chair positioned away from the classroom door. Communication Partner 1 entered the classroom. After five seconds of Communication Partner 1's entrance, the participant's social initiations were recorded as correct or incorrect on whether the participant shifted attention toward the communication partner, maintained attention toward the communication partner, and verbalized "Hello" (see Appendix H for data collection instrument).

Two to four baseline phase probes per participant were conducted daily between late morning and early afternoon (i.e., approximately the same time each day). Each probe was conducted in approximately 1-2 minutes, and each probe was represented as a single data point. I did not interact with the participants during these probes and no reinforcement or instruction was provided during this phase of the study.

Intervention Phase Procedures

Prior to beginning the daily probe, the participant was permitted to select a preferred reinforcer (e.g., game on the iPad) to be used during the practice session probes. Preferred reinforcers were identified through classroom observations and were confirmed with the participants' classroom teachers. Two choices were verbally provided to the participants, and participants were asked to verbalize their choice. Satiation of reinforcers was avoided by providing two different reinforcers each day.

Daily probes. Immediately prior to beginning the first intervention session of that school day, a daily probe was conducted, applying the same methodology as baseline (c.f., Hine & Wolery, 2006) but in the intervention room where distractions

could be minimized (see Appendix G for flow chart of study phases). The purpose of the daily probes was to identify the participant's performance without immediately seeing the video prior to practicing the targeted behaviors**.** A video camera placed in an unobtrusive area of the room recorded the daily probes for the purposes of data collection and reliability.

Intervention sessions. Two to four intervention sessions occurred daily from 11:30 a.m. to 12:10 p.m., and involved the delivery of the intervention and conducting the practice session probe. The intervention sessions took place in the intervention room where the daily probes were conducted (see Appendix G for flow chart of study phases). A video camera placed in an unobtrusive area of the room recorded the delivery of the intervention and practice session probes for the purposes of data collection, reliability, and treatment fidelity.

Each intervention session began by having the participant watch the entire point-of-view video on the iPad. I provided verbal praise at least once to the participant for attending to the point-of-view video model. Gestural prompts (i.e., pointing) were used to ensure the participant was attending to the point-of-view video, and I used my hand to block any attempts made by the participant to touch the iPad screen. If I provided gestural prompts, had to block the participant from touching the iPad screen, or any combination of gestural prompts or blocks three times, the point-of-view video was stopped and restarted from the beginning. It is important to note that no instructional statements elaborating on the point-of-view video were made during the delivery of the intervention.

A practice session probe immediately followed the viewing of the point-of-view video. The practice session probe took place in the intervention room and I stated, "Let's practice!" The participant stood or sat in a chair positioned away from the door. Communication Partner 1 then entered the room, and correct or incorrect shifting of attention toward the peer, maintaining attention toward the peer, and social initiation were scored for each practice session probe.

Verbal praise was provided continuously if the participant attempted to engage in any one of the three target behaviors. Both verbal praise and the participant's selected reinforcer were provided if the participant engaged in all three target behaviors with 100% accuracy.

A correction procedure was implemented if the participant responded incorrectly or did not initiate any targeted action or statement. If the participant did not turn in the direction of Communication Partner 1 after five seconds of the door being shut, I provided a gestural prompt (i.e., pointed) towards the communication partner who had entered the room. After an additional two seconds with no response or an incorrect response, I provided another pointing prompt accompanied by the verbal prompt, "Look." If there continued to be no response or an incorrect response after an additional two seconds, the practice session probe was concluded and another intervention session began.

However, if the participant did turn to attend to Communication Partner 1, but did not say, "Hello," within five seconds of the door being shut, I provided a pointing prompt towards Communication Partner 1 accompanied by a partial verbal prompt by first making a /h/ sound. If the participant did not engage in the social initiation or

responded incorrectly after an additional two seconds, I provided another pointing prompt towards Communication Partner 1 and a full verbal prompt, "Hello," or any variation of the greeting. If there continued to be no or an incorrect response after an additional two seconds, the practice session probe was concluded and another intervention session began (c.f., Tetreault & Lerman, 2010).

A correction procedure was also implemented if the participant did engage in the first two target behaviors, but did not maintain attention toward Communication Partner 1. In such instances, I provided a pointing prompt towards Communication Partner 1. After an additional two seconds with no or an incorrect response, I provided another pointing prompt accompanied by the direction, "Look." If there continued to be no or an incorrect response after an additional two seconds, the practice session probe was concluded and another intervention session began.

During the practice session probes, if the participant performed the behavior during the correction (i.e., after prompting), I provided verbal praise and continued to implement the *next* correction procedure for the following behavior if that behavior was not performed after two seconds. Any behaviors performed after the correction procedure was implemented were recorded as incorrect since the behaviors were not performed independently and did not meet the time restrictions outlined in the operational definition of the target behaviors. Table 4 outlines the correction procedures and how data were subsequently collected.

After the participant reached a 100% criterion level with the daily probes across three consecutive days, the intervention was discontinued, and the post-intervention phase began on the following day.

Table 4.

Implementation of Correction Procedures and Corresponding Data Collected

Scenario	Measured Behaviors of the Dependent Variable Performed or Not Performed	Correct and Incorrect	Correction Procedures Implemented		
A	All three measured behaviors of the dependent variable performed correctly.	✚ ✚ ✚			
B	Participant did not turn in the direction of Communication Partner 1 after five seconds of the door being shut	▬ ▬ ▬	Correction Procedure I	*Correction Procedure II*	*Correction Procedure III*
C	Participant did not say, "Hello," within five seconds of the door being shut	✚ ▬ ▬		Correction Procedure II	*Correction Procedure III*
D	Participant did not maintain attention toward Communication Partner 1 when saying "Hello."	✚ ✚ ▬			Correction Procedure III

Note. If the participant performed the behavior during the correction, the investigator continued to implement the next correction procedure for the following behavior if that behavior was not performed after two seconds.

Post-Intervention Phase Procedures

Data on the participants' ability to complete all three measured behaviors of the dependent variable were collected (see Appendix H for data collection instrument) in each participant's classroom after reaching the established intervention criteria. The procedures mirrored the baseline procedures. A video camera recorded the post-intervention sessions for the purposes of data collection and reliability.

Retraining procedure. However, following variable post-intervention data for Participant 1, retraining occurred in the form of having the participant view the point-of-view video once in its entirety in the classroom setting or in the hallway (i.e., delivery of intervention with video priming; c.f., Tereshko et al., 2010). Immediately

following retraining, the participant was returned to the classroom and a post-intervention probe was conducted. Retraining was repeated until Participant 1 demonstrated the three measured behaviors of the dependent variable (i.e., score 100%) across three consecutive post-intervention probes without retraining occurring between these three probes.

The retraining procedure occurred for Participants 3 and 5 after the first three consecutive data points in the post-intervention phase were calculated at 33% or below and did not demonstrate an ascending trend. Retraining was terminated once Participant 5 scored 100% across three consecutive data points in the post-intervention phase. Retraining was discontinued for Participant 3 due to continued variable responding despite the retraining.

Generalization phase procedures. Two methods of collecting generalization data were conducted to determine the participants' abilities to generalize the target behaviors with Communication Partner 2 and the targeted social initiation and other social initiations with other peers during naturally occurring opportunities (see Appendix G for a flow chart of study phases).

Generalization with communication partner 2. Baseline phase procedures were used to assess generalization prior to intervention and Communication Partner 2 participated in these generalization probes. These generalization probes were collected in the school library, art room, music room, and/or computer lab.

Two non-continuous generalization probes were conducted, one at the beginning and one at the end of the baseline phase to measure the occurrence of any social initiation skills in a novel setting and with Communication Partner 2 prior to

the implementation of the intervention. Additionally, four to five generalization probes were conducted immediately following the participants meeting the criteria on the post-intervention probes.

Natural generalization. Additional activities in the classroom, specifically indoor recess, leisure time, and snack time, were identified in which opportunities for social initiations with other peers in the classroom would be likely to occur. I observed and measured the frequency of the targeted social initiation and other social initiations (see Appendix L for data collection sheet and operational definition). The duration of each natural generalization probe was five minutes. For the purposes of the natural generalization probes, the targeted social initiation was the greeting, and the other social initiations included getting attention, organizing, sharing, seeking assistance, engaging in compliments, and demonstrating affection. The operational definitions of these target behaviors were modified from the work done by Odom and Strain (1986) on increasing social initiations of individuals with ASD with peers during play opportunities.

Two non-continuous natural generalization probes were conducted, one at the beginning and one at the end of the baseline phase to measure the occurrence of any social initiation bids during naturally occurring opportunities prior to the implementation of the intervention. Additionally, four natural generalization probes were conducted immediately following the participants meeting criterion.

Maintenance phase procedures. Baseline phase procedures were used to assess maintenance of the target behaviors, and Communication Partner 1 participated in these probes. Maintenance probes were conducted in the classroom and in the

intervention room two and four weeks following the conclusion of the study for each participant (see Appendix G for flow chart of study phases).

Social validity. All teachers (N=2), paraprofessionals (N=3), and parents (N=4) of participants with ASD were asked to complete a questionnaire on which they rated the extent to which they observed an increase in social initiations with others (e.g., classmates, siblings, parents) by the participants (see Appendices I and J for consent forms and see Appendix K for questionnaire form). The classroom teachers and paraprofessionals completed a questionnaire for each participating student within their classroom. One questionnaire was also sent home for parents to complete collectively.

Reliability

Interrater Reliability

Reliability data were collected for 40% of all probes across all phases (i.e., baseline, intervention, post-intervention, generalization, maintenance) for each of the participants (see Appendices M and N for reliability forms). Interrater reliability was calculated by dividing the smaller number recorded by the larger number recorded and multiplying by 100%.

I provided the training via explanation and review of the operational definitions of the targeted behaviors of the dependent variable. Multiple training videos were also created and used to train the reliability observer. The videos presented instances where I did or did not engage in the three measured behaviors of the dependent variable (i.e., shift gaze toward peer, maintaining attention, engaging in the social initiation). In addition, recordings of intervention sessions not used to

calculate fidelity of implementation were used as training videos. Additional feedback pertaining to timing restrictions (i.e., 5 seconds of sound of door being shut) was provided to the observer. The training was concluded once observers reached 80% agreement with the training videos. Periodic retraining of reliability observers, which addressed the operational definitions and timing restrictions, did occur three times in order to avoid observer drift and other complications (Kazdin, 1977).

Calculated interrater reliability. The average calculated interobserver agreement was 99.3% (range, 0% – 100%). It is important to note that there was only one occasion where there was 0% agreement between me and the observer. The disagreement was in regards to a natural generalization probe for Participant 2, where there was disagreement on whether the participant was seeking attention from another peer by stating the peer's name. The average calculated interobserver agreement for Participant 1 was 100%. The average calculated interobserver agreement for Participant 2 was 96.6% (range, 0% –100 %). The average calculated interobserver agreement for Participants 3, 4, and 5 was 100%.

Fidelity of Implementation

An independent observer conducted procedural reliability of the training sessions for the peers serving as communication partners (Appendix F for procedural reliability for training communication partners form). Training was provided by me via explanation and review of the training session agenda. Reliability was calculated by totaling the number of steps completed, and dividing by the total number of steps necessary, and multiplying it by 100%.

An independent observer conducted fidelity of treatment observations by using a checklist that included the components of the intervention (see Appendix O for fidelity of implementation observation checklist). I provided training on how to collect the fidelity of implementation data via explanation and review of intervention phase procedures. The same video used to train the reliability observer, along with the video recordings of the intervention sessions which were not used to calculate fidelity of implementation, were used in the training. The training was concluded once observers identified the procedures for delivering the intervention and conducting the practice session probe with at least 90% agreement with me on the training videos. Fidelity observations were conducted on 40% of the intervention sessions through video recordings. Periodic retraining of fidelity of implementation observers occurred three times in order to avoid observer drift and other complications (Kazdin, 1977).

Calculated fidelity of implementation. Procedural reliability of the training sessions for the peers serving as communication partners was calculated at 100%. The average calculated fidelity of treatment observations for the implementation of the intervention across all participants was 96.7% (range, 93.1%–100%). The average calculated fidelity of treatment observations for Participant 1 was 100%. The average calculated fidelity of treatment observations for Participant 2 was 93.8% (range, 85.7%–100%). The average calculated fidelity of treatment observations for Participant 3 was 96.8% (range, 88.9% – 100 %). The average calculated fidelity of treatment observations for Participant 4 was 100%. The average calculated fidelity of treatment observations for Participant 5 was 93.1% (range, 83.3% – 100%).

Chapter 4: Results

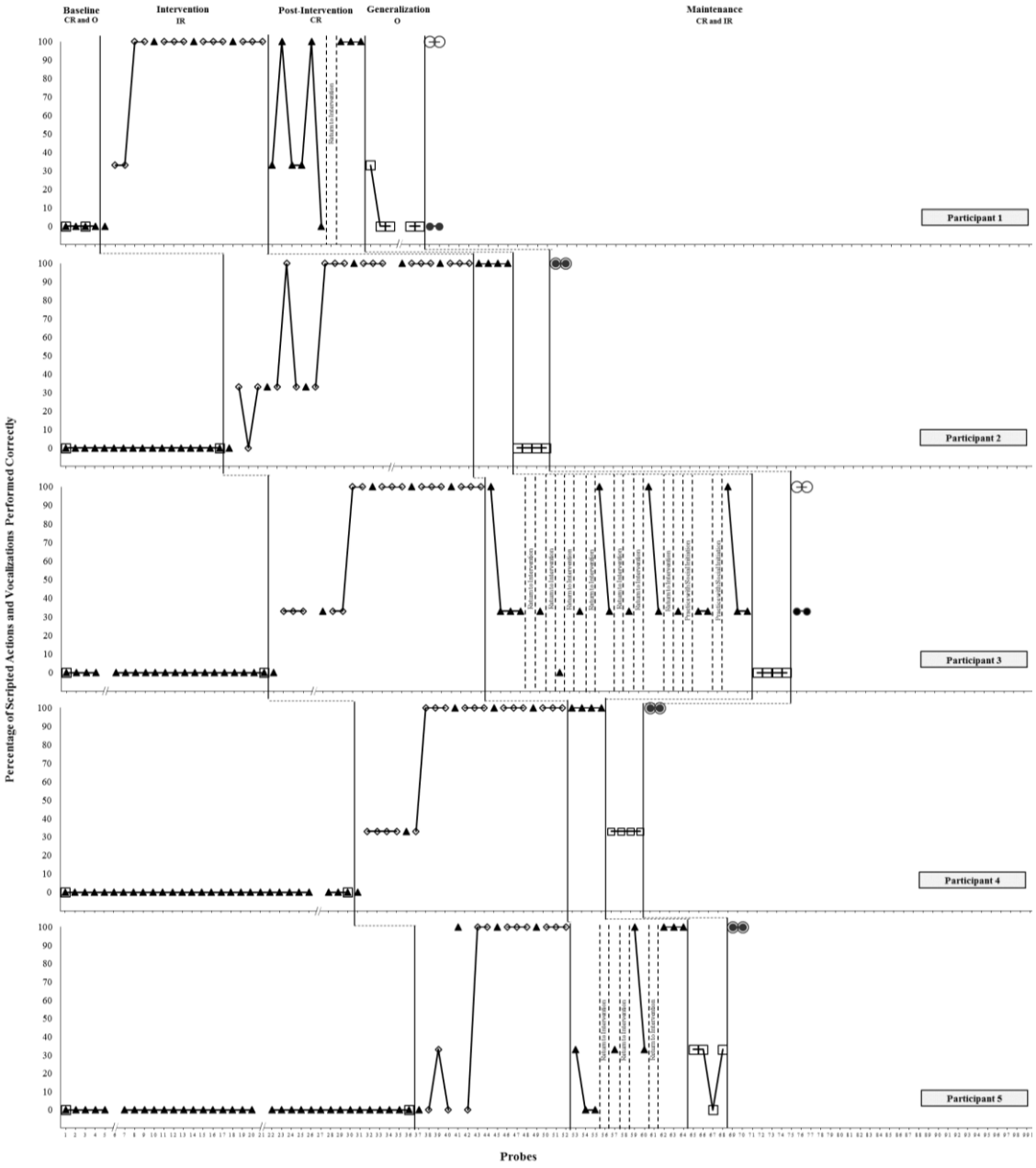
The results of the multiple baseline across participants design are represented in Figure 2. The percentage of correctly performed scripted actions and vocalizations are shown on the ordinate and the probes are on the abscissa. The first phase includes data collected during baseline. The second phase includes data collected from both the daily probes and the practice session probes when implementing the intervention, and the third phase, post-intervention, presents the data collected after the discontinuation of the intervention. The fourth and fifth phase includes both generalization and maintenance data.

Participant 1

Participant 1 did not engage in any of the targeted behaviors during the baseline phase. The average performance with the daily probes in the intervention phase was 75% (range, 0%-100%). The average performance with the practice session probes in the intervention phase was 82% (range, 33%-100%). The average performance for the probes in the post-intervention phase was 66.56% (range, 0%-100%).

The trend in the baseline phase was stable and low. From the baseline phase to the first daily probe in the intervention phase the level did not change, thus demonstrating a slight overlap between the phases. However, from the baseline phase to the first practice session probe (i.e., following the initial introduction of the intervention) in the intervention phase, the level ascended by 33%. When examining the last three data points in the baseline phase and the first three daily probes in the

Figure 2.Results of Study Examining the Effectiveness of Point-of-View Video Modeling in Teaching Social Initiation



Note. Multiple baseline design across participants, with percentage of accurately performed behaviors of the dependent variable during baseline, intervention, post-intervention, generalization, and maintenance probes. CR = participant with ASD's classroom; IR = intervention room in the school where distractions could be minimized; O = other room in the school (i.e., school library, art room, music room, and/or computer lab. Generalization probes with Communication Partner 2 are marked as open squares in the baseline and generalization phases. Daily probes in the intervention phase are marked as solid triangles. Practice session probes in the intervention phase are marked as open diamonds. Maintenance probes conducted in the classroom are marked with a solid circle. Maintenance probes conducted in the intervention room are marked as open circles.

intervention phase, immediacy of the effect was observed. Within the intervention phase and following the first daily probe and the introduction of the intervention, subsequent practice session probes and daily probes immediately ascended, and the data stabilized and remained high at 100%. From the intervention phase to the post-intervention phase there was a descending level change from 100% to 33%. The trend in the post-intervention phase was highly variable. However, following a single retraining for Participant 1, the trend and level of the post-intervention data ascended, from 0 % to 100%, and stabilized at 100% for three consecutive sessions.

A change in the average performance in the baseline phase to the average performance in the post-intervention phase for Participant 1 increased from 0% to 66.5%. There was both a change in trend and level from the baseline phase to the post-intervention phase.

Participant 2

Participant 2 did not engage in any of the targeted behaviors during the baseline phase. The average performance with the daily probes in the intervention phase was 61% (range, 0%-100%). The average performance with the practice session probes in the intervention phase was 77.1% (range, 0%-100%). The average performance for the probes in the post-intervention phase was 100%.

The trend in the baseline phase was stable and low. From the baseline phase to the first daily probe in the intervention phase the level did not change, thus demonstrating a slight overlap between the phases. However, from the baseline phase to the first practice session probe in the intervention phase the level ascended by 33%. When examining the last three data points in the baseline phase and the first three

daily probes in the intervention phase, immediacy of the effect was observed. Within the intervention phase and following the first two days of intervention sessions, performance with the practice session probes was highly variable with repeated ascension and declension from 0%, 33%, and 100%. Following the third daily probe, the subsequent practice session probes and daily probes ascended and the data stabilized and remained high at 100%. From the intervention phase to the post-intervention phase there was no level change, and the data in the post-intervention phase remained at 100% across four consecutive probes.

Participant 3

Participant 3 did not engage in any of the targeted behaviors during the baseline phase. The average performance with the daily probes in the intervention phase was 66.6% (range, 0%-100%). The average performance with the practice session probes in the intervention phase was 79.1% (range, 33%-100%). The average performance for the probes in the post-intervention phase was 46.1% (range, 0%-100%).

The trend in the baseline phase was stable and low. From the baseline phase to the first daily probe in the intervention phase the level did not change, thus demonstrating a slight overlap between the phases. However, from the baseline phase to the first practice session probe (i.e., following the initial introduction of the intervention) in the intervention phase the level ascended by 33%. When examining the last three data points in the baseline phase and the first three daily probes in the intervention phase, immediacy of the effect was observed. Within the intervention phase and following the first daily probe and the introduction of the intervention,

subsequent practice session probes and daily probes immediately ascended and remained high at 100%. From the intervention phase to the post-intervention phase there was no level change. However, the trend in the post-intervention phase descended to 33% for three data points. Throughout multiple implementations of retraining, the trend was highly variable and never ascended and stabilized at 100% for three consecutive data points.

A change in the average performance in the baseline phase to the average performance in the post-intervention phase for Participant 3 increased from 0% to 46.1%.

Participant 4

Participant 4 did not engage in any of the targeted behaviors during the baseline phase. The average performance during the daily probes in the intervention phase was 66.6% (range, 0%-100%). The average performance during the practice session probes in the intervention phase was 83.2% (range, 33%-100%). The average performance for the probes in the post-intervention phase was 100%.

The trend in the baseline phase was stable and low. From the baseline phase to the first daily probe in the intervention phase the level did not change, thus demonstrating a slight overlap between the phases. However, from the baseline phase to the first practice session probe (i.e., following the initial introduction of the intervention) in the intervention phase the level ascended by 33%. When examining the last three data points in the baseline phase and the first three daily probes in the intervention phase, immediacy of the effect was observed. Within the intervention phase and following the first daily probe, responding during subsequent practice

session probes and daily probes immediately ascended and remained high at 100%. From the intervention phase to the post-intervention phase there was no level change, and the data in the post-intervention phase remained at 100% across four consecutive probes.

Participant 5

Participant 5 did not engage in any of the targeted behaviors during the baseline phase. The average performance with the daily probes in the intervention phase was 75% (range, 0%-100%). The average performance with the practice session probes in the intervention phase was 69.4% (range, 0%-100%). The average performance for the probes in the post-intervention phase was 55.4% (range, 0%-100%).

The trend in the baseline phase was stable and low. From the baseline phase to the first daily probe and the first practice session probe in the intervention phase the level did not change, thus demonstrating an overlap between the phases. When examining the last three data points in the baseline phase and the first three daily probes in the intervention phase, immediacy of the effect was observed. Within the intervention phase, the data in the first two days of intervention sessions were highly variable, with an ascension from 0% to 33% and then a return to 0%. Then following the second daily probe, which was scored at 100%, there was a sudden declension to 0% and then immediate ascension to 100%. The data then stabilized and remained at 100%. From the intervention phase to the post-intervention phase there was a descending level change from 100% to 33%. The trend in the post-intervention phase was highly variable throughout the multiple implementations of retraining. However,

following the third retraining for Participant 5, the trend of the post-intervention data ascended and remained high at 100% for three consecutive data points.

A change in the average performance in the baseline phase to the average performance in the post-intervention phase for Participant 5 increased from 0% to 55.4%.

Effect Size Calculations

The calculated effect sizes for PND and PEM for participants is displayed in Table 5. PND and PEM scores for all five participants fell within the fairly effective treatment and moderately effective treatment range respectively. The calculation for PAND = 96.1% and the translated *Phi* coefficient (ϕ) = 0.87 suggests a strong positive relationship.

Table 5.

Calculated Effect Sizes

Participant	PND	PEM
Participant 1	75%	0.75
Participant 2	83%	0.83
Participant 3	80%	0.80
Participant 4	80%	0.80
Participant 5	75%	0.75

Note. PND = Percentage of Non-Overlapping Data; PEM = Percent Exceeding the Minimum

Generalization

Generalization with Communication Partner 2

Participant 1's performance during the generalization probes with Communication Partner 2 was 0% in the baseline phase. The average performance during the generalization probes following the intervention was 6.6% (range, 0%-33%). The trend was descending in the generalization phase, and from the post-intervention phase there was a descending level change from 100% to 33%.

Participant 2's performance during the generalization probes with Communication Partner 2 was 0% in the baseline phase. The performance during the generalization probes following the intervention was also 0%. From the post-intervention phase to the generalization phase there was a descending level change from 100% to 0%.

Participant 3's performance during the generalization probes with Communication Partner 2 was 0% in the baseline phase. The performance for the generalization probes following the intervention was also 0%. From the post-intervention phase to the generalization phase there was a descending level change from 33% to 0%.

Participant 4's performance during the generalization probes with Communication Partner 2 was 0% in the baseline phase. The performance in all generalization probes following the intervention was 33%. The trend was stable and low in the generalization phase, and from the post-intervention phase there was a descending level change from 100% to 33%.

Participant 5's performance during the generalization probes with Communication Partner 2 was 0% in the baseline phase. The average performance in the generalization probes following the intervention was 24.8% (range, 0%-33%). The trend was low and variable in the generalization phase, and from the post-intervention phase there was a descending level change from 100% to 33%.

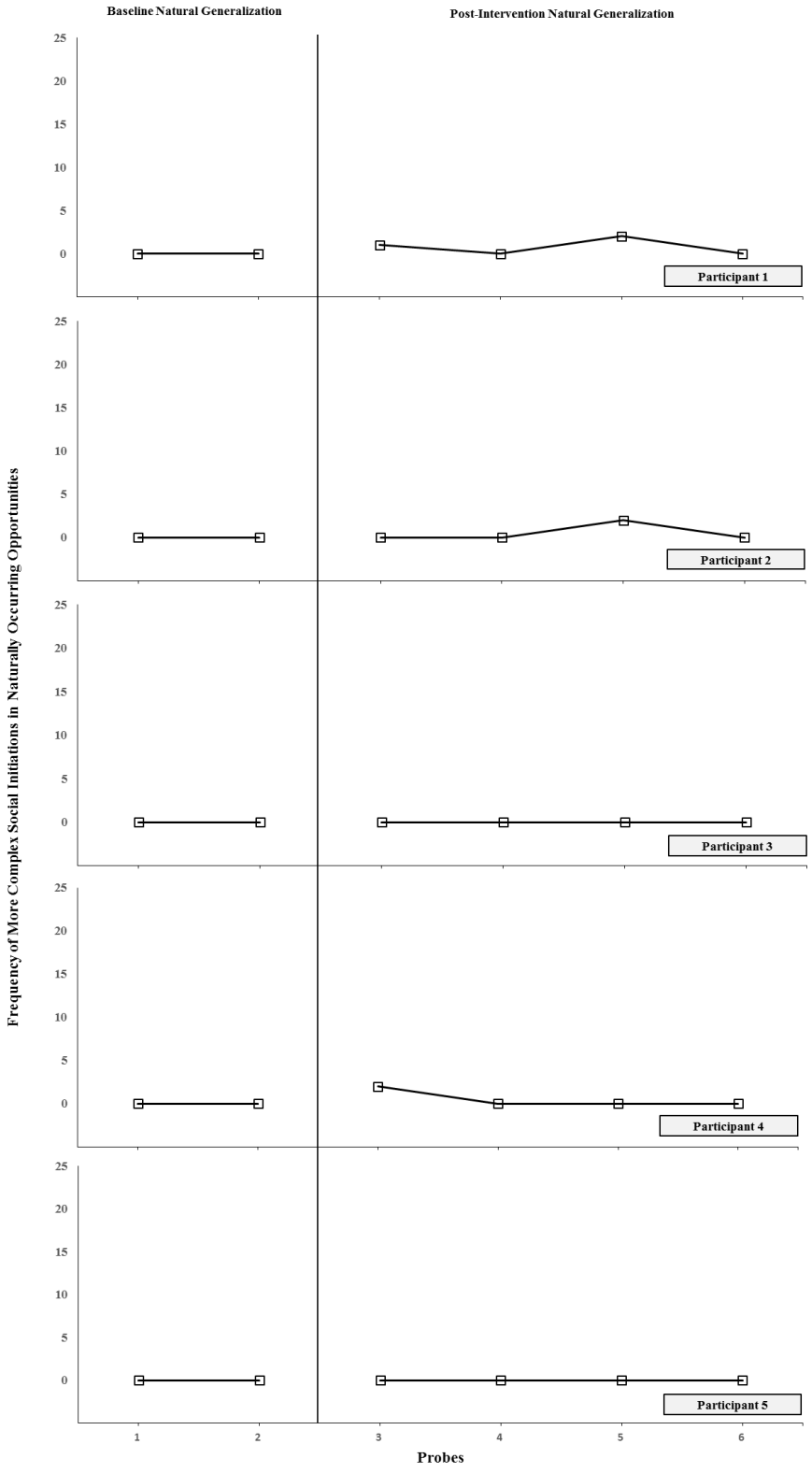
Natural Generalization

The results of the natural generalization probes in both baseline and in post-intervention phases are shown in Figure 3. The observed frequency of social initiations are shown on the ordinate and the numbered probes are on the abscissa. As mentioned previously, the targeted and the other social initiations, for the purposes of the natural generalization probes, included greetings, getting attention, organizing, sharing, seeking assistance, engaging in compliments, and demonstrating affection.

For Participant 1, the average performance for the natural generalization probes in the baseline phase was 0. The average performance for the natural generalization probes in the post-intervention phase was .75. Participant 1 was observed only requesting for toy cars from his peers, which was identified as *sharing*. The trends were low and stable in both the baseline phase and the post-intervention phase. From the baseline phase to the post-intervention phase, there was a minimal level change from 0 to 1 complex social initiation bids during naturally occurring opportunities.

For Participant 2, the average performance for the natural generalization probes in the baseline phase was 0. The average performance for the natural generalization probes in the post-intervention phase was .50. Participant 2 was

Figure 3. Frequency of Social Initiation Bids during Naturally Occurring Opportunities



observed seeking the attention of one female peer by saying her name, which was identified as *attention*. The trends for natural generalization were low and stable in both the baseline phase and the post-intervention phase. From the baseline phase to the post-intervention phase, there was no level change in complex social initiation bids during naturally occurring opportunities.

For Participant 3, neither the targeted social initiation nor the other social initiations occurred in the baseline phase or in post-intervention phase.

Participant 4's performance during the natural generalization probes in the baseline phase was 0. The average performance for the natural generalization probes in the post-intervention phase was .50. Participant 4 was observed greeting other peers, which was identified as *greeting*. The trends were low and stable in both the baseline phase and the post-intervention phase. From the baseline phase to the post-intervention phase, there was a minimal level change from 0 to 2 complex social initiation bids during naturally occurring opportunities.

For Participant 5, neither the targeted social initiation nor the other social initiations occurred in the baseline phase or in post-intervention phase.

Maintenance

The performance for the maintenance probes in the classroom for Participant 1 was 0%. From the post-intervention phase, there was a descending level change from 100% to 0%. The average performance for the maintenance probes conducted in the intervention room for Participant 1 was 100%, and from the post-intervention phase, there was no level change.

The average performance for the maintenance probes in both the classroom and the intervention room for Participant 2 was 100%. From the post-intervention phase to the maintenance phase, there was no level change.

The average performance for the maintenance probes in the classroom for Participant 3 was 33%. The trend was low and stable, and from the post-intervention phase, there was no level change. The average performance for the maintenance probes conducted in the intervention room for Participant 3 was 100%. From the post-intervention phase to the maintenance phase, there was a level change from 33% to 100%.

The average performance for the maintenance probes in both the classroom and the intervention room for Participants 4 and 5 was 100%. There was no level change from post-intervention phase to the maintenance phase.

Social Validity Questionnaire

The social validity questionnaire was completed by the classroom teachers, paraprofessionals, and participants' parents. The average scores in response to the statement "I have observed improvements in the student's/my child's social interactions with peers," are in Table 6.

Table 6.

Scored Responses on Social Validity Questionnaire

Participant	Teachers N=2	Paraprofessionals N=3	Parents N=4	Combined
Participant 1	4	3.5 (range, 3-4)	5	4.0 (range, 3-5)
Participant 2	3	1.3 (range, 1-2)	-	1.8 (range, 1-3)
Participant 3	3.5 (range, 3-4)	3.3 (range, 2-4)	3	3.3 (range, 2-4)
Participant 4	3.5 (range, 3-4)	2 (range, 1-3)	5	3.0 (range, 1-5)
Participant 5	3.5 (range, 3-4)	2.6 (range, 2-3)	5	3.3 (range, 2-5)

Chapter 5: Discussion

Expanding upon the current, yet limited literature, the present study investigated how effective point-of-view video modeling was in teaching social initiations to kindergarten students with ASD. Additionally, the study addressed methodological limitations of past research and continuing questions surrounding the intervention, which included the identification of participant prerequisite skills, impact of video editing and video priming, fading of reinforcement and prompting, and generalization and maintenance (Hine & Wolery, 2006; Sancho et al., 2010; Scheflen et al., 2012; Tereshko et al., 2010; Tetreault & Lerman, 2010).

With a vertical analysis of the data, a firm relationship between the three target behaviors of the dependent variable and the intervention was established because these behaviors increased only when the point-of-view videos were applied successively across participants (i.e., equivalence in baselines).

When examining consistency of data in the intervention phase across participants, there was an overall pattern of consistency, especially with Participants 1, 3, and 4. The data in the intervention phase for Participant 5 was also consistent with the aforementioned participants, with slight variability with the initial four practice session probes. The practice session probe data for Participant 2, following the first two daily probes, were highly variable. However, all participants met the established criterion level, which required a score of 100% with the daily probes across three consecutive days. Calculated effect sizes yielded percentages that corroborate the conclusions made from a visual analysis of the data.

When examining consistency of data in the post-intervention phase across participants, there was considerably less uniformity. The trend in the post-intervention phase remained high and stable for Participant 2 and 4. However, the data within this same phase was increasingly variable for Participant 1, Participant 5, and especially for Participant 3, which led to the implementation of the aforementioned retraining procedures.

Point-of-View Video Modeling and Social Initiations

With the utilization of video priming and the implementation of reinforcement and prompting (i.e., correction procedures) within an environment in the school where distractions could be minimized, Participant 1 rapidly met the criterion level by engaging in all three targeted behaviors of the dependent variable. Similarly, both Participant 3 and Participant 4 performed the three targeted behaviors in the daily probes and practice session probes following two days of the intervention.

In comparison to other participants at the start of the study, Participant 1 and Participant 4 engaged in more verbalizations, which were primarily with adults. In conjunction with their preference for visual stimuli (i.e., videos), and responsiveness to the correction procedures and reinforcement, the point-of-view video model was effective in teaching the social initiation skills. It is suspected that Participant 3 was also successful within the intervention phase due to his preference for videos and his receptiveness to reinforcement. The minimized distractions within the intervention room may have also been conducive to him imitating the targeted behaviors.

Both Participant 2 and Participant 5 reached the established criterion; however, there were some notable variation in responding within the intervention

phase. The data for Participant 2 showed the most variability following the initial two daily probes. These inconsistencies may in part be due to the sudden change in the classroom routine, which may have upset or made the participant uneasy. In addition, I had observed the participant frequently perseverating on the next period or lesson (e.g., speech, physical education, computer lab), which persisted at decreasing levels throughout the intervention phase. Participant 2 also engaged in perseverative speech about the copy machine in the intervention room, the camera used to record the sessions, and the use of the iPad for delivering the point-of-view video. These were all materials that Participant 2 did not have in his typical learning environments and his perseveration on these items may have interfered with his engaging in the target behaviors more consistently. Finally, teachers who had worked closely with the participant noted that it would take some time for the participant to become comfortable and cooperative with less familiar individuals. Therefore, it is plausible that as Participant 2 became more familiar with me, Communication Partner 1, and the routine of being taken to the intervention room and participating in the intervention sessions, he more successfully engaged in the target behaviors.

Similar to Participant 2, the results for Participant 5 were initially variable following the first two daily probes of the intervention phase. During these practice sessions, Participant 5 was engaging in perseverative speech, was distracted by books in the intervention room, was looking up at ceiling, and mimicking the music in the video clip preceding the point-of-view video model. However, following the correction procedures, the participant was able to perform the targeted behaviors independently with 100% accuracy and immediately received reinforcement with the

iPad. Because Participant 5 especially enjoyed playing with and watching Communication Partner 1 playing various iPad games, it is believed that he became increasingly motivated to perform the targeted behaviors with this reinforcement in place.

Additionally, I observed Participant 4 and Participant 5 verbally stating "Hi" or "Hello" immediately before the voice in the video model stated the greeting to Communication Partner 1. This suggests the participants were actively viewing the video, which led them to memorize the video model and anticipate the modeled behaviors before they occurred on screen. This engagement in the video may have then aided them in performing the targeted behaviors during the practice session probes and reaching the criteria level. During practice session probes, Participant 4 and Participant 5 were also observed looking directly down at the floor, and then immediately looking up once they heard the intervention room door open and engaging in the social initiation. These observations suggest these specific participants made a direct connection between the first person perspective of the video model and what they themselves were to see during the practice session probes. The differing response to the intervention for these two participants may be due to their previous experience with video games, which allow players to experience the game from the first-person perspective.

Overall, the data and corresponding observations suggest this particular form of video modeling facilitated the imitation of the behaviors by providing a clear frame of reference and drawing the participants' attention to the relevant stimuli. These results appear to coincide with the study conducted by Tetreault and Lerman (2010),

who examined how point-of-view video modeling may teach complex social scripts or conversations (i.e., gain attention, request assistance, share a toy). Specifically, the authors indicated an increase in eye contact with peers, which in this present study translates to increases in shifting and maintaining attention toward the communication partner. As implications for future research, the authors discussed that though previous researchers had found point-of-view video modeling to be effective, their own study was unsuccessful in replicating these results. This may have been due to the limited application of this form of video modeling to teach complex social skills. Tetreault and Lerman surmised that, "Further analysis of the usefulness of the [point-of-view video modeling] technique to teach social skills to children with autism is needed. An intermediary step between simple social skills (e.g., greetings) and more complex skills like those assessed here is warranted" (p. 416). Based on Tetreault and Lerman's inconclusive results on point-of-view video modeling and complex social skills, the current investigation reverted back to and focused on simple social initiations, which may give way to more complex social skills. Therefore, the results suggest this type of video modeling can be used to teach social initiation skills.

Social Validity Questionnaire

In explaining the rating in the social validity questionnaire, the teacher discussed observed changes in Participant 1 since the intervention. The teacher described an increase in communication and social initiations with the classroom staff, including teachers and paraprofessionals, and classroom peers. Another teacher of Participant 1 also substantiated these observations by discussing improved social interactions and eye contact with peers and adults. A paraprofessional working

closely with Participant 1 also described increases in waving and verbally greeting other students. The parents of Participant 1 wrote the following, "He uses his words much more. He uses words in different ways of expression correctly, words he normally would not use. [Participant 1] says much more sentences now in a much clearer manner."

For Participant 2, the classroom teacher observed no difference in social interactions with peers. Instead, the teacher observed continued adherence to the classroom routine and noted the student would only communicate questions pertaining to the schedule with teachers and staff. Paraprofessionals (N= 3) of Participant 2 also stated that prompts remained necessary for the student to interact with other peers.

In the explanation portion of the questionnaire, both parents of Participant 3 observed some increased interaction with the student's siblings with prompting. The classroom teacher and paraprofessionals (N= 4) observed minimal change in interactions with peers for Participant 3 and a sustained preference for gaining adult attention to meet the student's needs.

For Participant 4, the parents observed improvements in the child's social interaction and communication, including more greetings and interaction with peers in the community. The participant's parents also observed the child saying goodbye when leaving. The classroom teacher also noted Participant 4 was more willing to greet peers and adults. However, another classroom teacher and paraprofessionals (N= 3) expressed limited changes in social interactions with peers and discussed that the student continued to remain to himself.

In explaining their rating, the parents of Participant 5 wrote the following, "He has improved tremendously especially speech and communication." However, the classroom teacher and paraprofessionals (N= 4) discussed minimal changes in social interactions with peers. Instead, Participant 5 continued to prefer to interact with adults and with objects that are of interest.

Fading of Reinforcement and Prompting

The fading of prompting, which was provided through systematic correction procedures, led to independent performance of the targeted behaviors and all participants were able to reach the 100% criterion level with the daily probes across three consecutive days. When prompting and reinforcement were both removed during the post-intervention probes in the classroom setting, responding for Participant 2 and Participant 4 remained at 100%. However, the data were highly variable for Participants 1, 3, and 5. The probes conducted in the generalization phase, which were completed in a novel setting with a novel communication partner, were stable and lower than in post-intervention for Participants 4 and 5, and were low for Participant 1, 2, and 3.

Within the post-intervention phase, only Participant 2 and Participant 4 were able to perform the targeted behaviors in the classroom environment, which had more distractions and visual stimuli. Upon seeing Communication Partner 1 within the classroom, Participant 2 rapidly greeted and waved to the communication partner. In comparison to other participants, Participant 4 was observed being more engaged with Communication Partner 1 within the intervention phase. The participant frequently greeted Communication Partner 1 by his name, smiled, and also waved.

This increased interaction with the communication partner may have then translated to the successful performance of the targeted behaviors in the subsequent post-intervention phase.

For Participants 1, 3, and 5, retraining or a return to the point-of-view video model was necessary before the targeted behaviors were performed across three consecutive post-intervention probes. For these three participants, videos and songs displayed on the interactive whiteboard, which were used for a majority of instruction in the classroom, strongly maintained their attention. In addition, the classroom environment was oftentimes active, with increased movement and vocalizations by other students, educators, and paraprofessionals. These factors, which starkly contrasted the environment in the intervention room, may have prevented these participants from hearing the classroom door being opened and then shut, or seeing Communication Partner 1 standing in the classroom. These results and the potential impact of the classroom environment coincide with findings from Hine and Wolery (2006), who also indicated that limited performance of the target behaviors within the classroom may be attributable to the activities within the environment competing for the participants' attention.

With Participant 1, whose attention was strongly maintained by visual stimuli, a single retraining led to immediate performance of the targeted behaviors. However, this was not true for Participants 3 and 5, who required several retrainings. It is not clear why Participant 3 required numerous retraining and was unable to reach the established criteria. It is possible visual stimuli and the amount of noise in the classroom environment may be closely linked to the variable performance. Satiation

of baseline probes, which is discussed later, may have led Participant 3 to become comfortable with frequently seeing and not responding to Communication Partner 1 entering the classroom. Because Participant 3 was successful with imitating the point-of-view video model in the intervention room, generalization of performance may be improved with multiple exemplars of the video model filmed in multiple environments. The use of point-of-view video models of multiple exemplars is also suggested by Hine and Wolery (2006) to facilitate generalization. Generalization may further occur with the addition, and then fading, of prompting and reinforcement within these other environments.

Attention to other visual stimuli, including videos and books, may have played some role in the need for multiple retraining for Participant 5. Similar to Participant 3, satiation of baseline probes, especially since this participant was the last to begin the intervention, may have led to lower performance of the target behaviors in the classroom. On several occasions in the post-intervention phase, Participant 5 would see Communication Partner 1 and walk toward the door and ask to work in the intervention room with the communication partner. These observations suggest Participant 5 may have only associated Communication Partner 1 with the intervention sessions conducted in the intervention room and not in the classroom. However, with retraining, the participant performed the targeted behaviors in the classroom and met the established criteria.

The results of the post-intervention probes also correspond with the findings of Tereshko et al. (2010), who continually returned to the intervention until generalization of functional plays skills occurred for all participants. Excluding

Participant 3, all participants were able to generalize and demonstrate the targeted behaviors from the intervention room to the classroom with or without retraining.

Generalization

Within the generalization phase, which involved Communication Partner 2 and was conducted in a novel environment (i.e., school library, art room, music room, computer lab), none of the participants engaged in all three targeted behaviors. Similar to the classroom environment, the environments in which the generalization probes were conducted contained more distractions (e.g., additional students, computers, art supplies, books), which may have kept the students from noticing and/or greeting Communication Partner 2. It is also possible that the participants were less interested in interacting with her because Communication Partner 2 was a female. This may in part be due to there being only one female student in the participants' classroom. Participants 1, 4, and 5 did shift their attention toward the novel communication partner, but once again failed to verbalize the social initiation.

Though the results of the post-intervention probes correspond with the findings of Tereshko et al. (2010), the results of the generalization probes differ from the same conclusions made by Tereshko et al., because without retraining, generalization in a novel environment with Communication Partner 2 was low. These results suggest for generalization to occur, continued use of the point-of-view video model may be necessary.

Similarly, generalization probes conducted during naturally occurring opportunities for social initiations with other peers in the classroom presented limited generalization. The rationale for conducting these generalization probes was to

determine if learning the targeted social initiation would lead to engagement in other similar social initiations during play and opportunities to interact with peers. The only increase in frequency of social initiations was measured for Participants 1, 2, and 4. These results reflect the findings by Sancho et al. (2010), in which the investigators found limited engagement in unscripted play actions and vocal scripts and limited generalization following the intervention. The results also align with Tetreault and Lerman (2010), who concluded that there was minimal generalization with the social scripts.

Anecdotally, the teachers and I observed Participant 1 and Participant 4 engaging in increased greetings towards adults following the intervention. Oftentimes, these two participants would return to the classroom and greet each of the adults in the room. Participant 1 and Participant 4 were also observed saying farewell to those leaving the classroom, including Communication Partner 1 and other adults. On several occasions, Participant 5 was observed by the teacher engaging in social initiations with Communication Partner 1 in the hallway and the cafeteria. Though not evident in the generalization phase probes, these observations suggest that social behavior did generalize, but may not be viewed as empirical evidence of participant generalization. Therefore, it would be beneficial to systematically collect data on improved and specific social skills occurring throughout the school day and beyond the environments that were identified as naturally occurring opportunities to interact with others.

Maintenance

Overall, these results demonstrate that the participants were able to maintain the targeted behaviors when probes were conducted in the intervention room. However, when requiring generalized and maintained performance within the classroom setting, the results were variable.

In reference to maintenance data collected, Participants 2, 4, and 5 maintained the behaviors after two and four weeks in both the classroom environment and the intervention room. The performance of Participant 2 and 4 are consistent with their high performance in the intervention phase and post-intervention phase. For Participant 5, the multiple retraining and thus multiple viewings of the video model in post-intervention may have aided the participant in maintaining the skills.

After two and four weeks, Participants 1 and 3 did not maintain the skills in the classroom environment, but did perform all three behaviors in the intervention room. For Participant 1, receiving the retraining only once in the post-intervention phase may have contributed to the lower performance with the maintenance probes in the classroom. The performance for Participant 3 was consistent with his performance in post-intervention, where he was unable to consistently demonstrate the behaviors in the classroom environment, which impacted his performance with the maintenance probes in the classroom.

As previously noted, the overall findings of the study elaborate on prior research conducted on point-of-view video modeling. These studies, which targeted simple or complex social scripts with toy sets or an individual, include Sancho et al. (2010), Scheflen et al. (2012), and Tetreault and Lerman (2010). With the intention of

investigating the extent to which point-of-view video modeling may teach simple social initiation skills with a typically developing peer, the study broadens the understanding of this form of video modeling and provides additional implications for practitioners and future researchers.

Strengths and Limitations of the Study

Strengths of the Study

The present study attempted to address a number of methodological limitations in past research through the examination of point-of-view video modeling as a social skills intervention, with the application of video priming, fading prompting and reinforcement, and the collection of generalization and maintenance data (Hine & Wolery, 2006; Sancho et al., 2010; Scheflen et al., 2012; Tereshko et al., 2010; Tetreault & Lerman, 2010). The findings indicate that this form of video modeling is effective in teaching social initiation skills.

The intent of the study was to also provide socially important findings, which is specifically emphasized by Horner, Swaminathan, Sugai, and Smolkowski (2012), who discuss the "feasibility of achieving the effect in typical social contexts" (p. 273). In alignment with applied research practices, the study demonstrates that the intervention may be used by educators of young students with ASD within a school environment.

Alignment with quality indicators suggested by Kratochwill et al. (2010) and Horner et al. (2012) may be considered another notable and methodological strength of the present study. The indicators Kratochwill et al. and Horner et al. emphasized, and that are present in the study, include: (1) operationally defining and

systematically manipulating the intervention, (2) implementing the intervention in representative contexts, (3) systematically measuring the dependent variable across time, (4) calculating fidelity of implementation and interrater reliability, (5) demonstrating a functional relationship with at least three baseline conditions with a minimum of three data points in each phase, and (6) demonstrating impact of the intervention through past literature. Additionally, the presentation and discussion of the study results allows for documentation of visual analysis (e.g., trend, level, immediacy of effect, overlap, consistency across similar phases) and the discussion of deviations or inconsistencies in the data.

Limitations of the Study

The study has a number of notable limitations. With the large number of baseline probes conducted, testing may be a potential threat to internal validity. The scale of baseline probes conducted may have desensitized or may have led the participants to become accustomed to Communication Partner 1 repeatedly entering and exiting classroom. This possible limitation may have impacted the data and overall, may have weakened the participants' performance in the post-Intervention phase and maintenance phase. This is also suggested by Hine and Wolery (2006), who discussed satiation of the intervention materials as a possible reason for limited generalization in their own study.

In addition, the data collected in the post-intervention phase, generalization phase (with Communication Partner 2 and naturally occurring opportunities), and maintenance phase were markedly minimal and considered a limitation of the study.

This limitation thus provides implications for future research, which are discussed in the following section.

Another potential limitation may be the utilization of two environments for implementing the intervention, which was necessary due to restrictions on intervention room availability. However, since both intervention rooms were similar and one room was predominately used throughout the investigation, this may be identified as a minimal limitation, especially when considering the context of the study. In further considering the context of the study, another possible limitation may be the overall representativeness of the classroom environment in which probes were conducted in the baseline phase, post-intervention phase, generalization phase, and maintenance phase. As mentioned, the classroom environment was considered an active classroom environment, where videos were often used as both a way to instruct and to calm and gain the attention of students. Such an environment may not be representative of all kindergarten classrooms, and though not explored in this current study, it may be possible that with an inclusive environment that has fewer distractions the results of the study may be different.

When interpreting the results of the social validity questionnaire, a caveat is that the respondents (i.e., teacher, paraprofessionals, parents) were sensitized to the purpose of the study via the consent forms. Additionally, there were a limited number of questionnaires which were returned. Nonetheless, the social validity questionnaire did provide additional information about potential generalization from the school environment to the home and community.

Implications for Practitioners and Future Research

Despite the limitations of the study and variable results related to generalization and maintenance, there are a number of implications moving forward for both practitioners and future researchers examining point-of-view modeling and its potential impact on social initiation skills for individuals with ASD.

Implications for Practitioners

Overall, the data suggest point-of-view video modeling is an effective intervention for increasing social initiations skills in young students with ASD. The study further demonstrates the feasibility of point-of-view video modeling within the school context. This includes the creation of the video model and rapid implementation of the video model, thus limiting interruption to other instructional content already in place.

The findings also suggest that video priming, repeated viewings, and the insertion of a preferred video clip in order to gain the attention of the participants is effective. Additionally, practitioners should consider the outlined prerequisites or student characteristics that may be necessary for point-of-view video modeling to be effective. As discussed, students with emerging communication and a strong preference for visual stimuli and technology may be more successful with the intervention, whereas students who exhibit perseverative speech may be less successful.

However, given the maintenance and generalization data, practitioners should be aware of the limitations of point-of-view video modeling. It is necessary for practitioners to actively consider and provide additional instruction, prompting,

and/or reinforcement to ensure generalization to novel environments and peers, and to maintain those gained social initiation skills. Additional instruction to facilitate generalization, may also require the filming of multiple point-of-view video models of differing environments and with differing peers. In considering generalization and maintenance, it would also be imperative for students with ASD to have multiple quality opportunities to practice these skills through interactions with typically developing peers during naturally occurring opportunities.

Implications for Future Research

The findings from the current investigation give rise to future research on point-of-view video modeling as an intervention targeting social communication and interaction. Given the possible satiation of baseline probes and its impact on participants' overall performance, conducting the study in three tiers, replicated twice may avoid such an issue.

Future research should also focus on generalization of social initiations gained through this form of video modeling. It is imperative that individuals with ASD not only perform the skills in the environment in which the intervention was implemented, but in novel environments and with novel peers. Therefore, additional research should be conducted on how to assist individuals with ASD to generalize gained social initiation skills and further develop them into other similar social initiations and more complex social bids and interactions. Promising approaches may include the filming of point-of-view video models involving multiple exemplars that include multiple communication partners, and are filmed in novel and natural environments. Future researchers may also consider filming multiple point-of-videos

in other contexts with increasing degrees of distraction, as an approach to scaffolding generalization of skills in environments with increased visual and auditory stimuli and other distractions. In conjunction with filming multiple point-of-view video models, more opportunities to train, practice social initiations, and interact with typically developing peers in generalization contexts may increase both generalization and maintenance for these participants. In addition, periodically returning to the point-of-view video model as a way to remind and prompt the student may be necessary to promote maintenance.

In conjunction with the study conducted by Tetreault and Lerman (2010), it would be beneficial to examine the full extent of the intervention in terms of teaching social skills, including social initiations followed by maintained conversations. Future researchers should also implement the intervention for individuals with ASD in more inclusive classroom environments to demonstrate if there are contrasting or improved results.

Appendices

Appendix A

Invitational Letters to Teachers of Students with ASD and Teachers of Typically Developing Students

Dear Teachers,

My name is Jennifer Lee and I am a doctoral student in Special Education at the University of Maryland, College Park. I received my Master of Science Degree in Education of Students with Autism and Other Pervasive Developmental Disorders, and Advanced Methods for Differentiated Instruction, Inclusive Education for Mild to Moderate Disabilities at Johns Hopkins University, and received both Elementary and Special Education certification from Towson University. Additionally, I have a great deal of experience working with and instructing young students with autism spectrum disorder in the educational setting.

I am writing to inform you of an opportunity for your students to be selected to receive individual instruction this school year as part of a study I am conducting investigating the effectiveness of point-of-view video modeling in teaching greetings to young children with autism. Point-of-view video modeling is a strategy that involves filming the completion of a desired skill or replacement behavior from a first-person perspective. In other words, the video shows only what a person might see from his or her viewpoint.

There is no cost to participate and participation is strictly voluntary. In addition, you will be asked to complete a simple social validity questionnaire that will take approximately 2-5 minutes to complete. Please contact me if you have any questions or would like to discuss the study further.

Sincerely,

Jennifer Lee
Phone: 410-507-8981
E-mail address: jnlee@umd.edu

Dear Teachers,

My name is Jennifer Lee and I am a doctoral student in Special Education at the University of Maryland, College Park. I received my Master of Science Degree in Education of Students with Autism and Other Pervasive Developmental Disorders, and Advanced Methods for Differentiated Instruction, Inclusive Education for Mild to Moderate Disabilities at Johns Hopkins University, and received both Elementary and Special Education certification from Towson University.

I am writing to inform you of an opportunity for your students to be selected to participate and work with young children with autism spectrum disorder this school year as part of a study I am conducting investigating the effectiveness of point-of-view video modeling in teaching greetings to young children with autism. Point-of-view video modeling is a strategy that involves filming the completion of a desired skill or replacement behavior from a first-person perspective. In other words, the video shows only what a person might see from his or her viewpoint.

There is no cost to participate and participation is strictly voluntary. Please contact me if you have any questions or would like to discuss the study further.

Sincerely,

Jennifer Lee
Phone: 410-507-8981
E-mail address: jnlee@umd.edu

Appendix B

Parent or Guardian Cover Letter and Consent Form: Individuals with ASD

Dear Families,

My name is Jennifer Lee and I am a doctoral student in Special Education at the University of Maryland, College Park. I received my Master of Science Degree in Education of Students with Autism and Other Pervasive Developmental Disorders, and Advanced Methods for Differentiated Instruction, Inclusive Education for Mild to Moderate Disabilities at Johns Hopkins University, and received both Elementary and Special Education certification from Towson University. Additionally, I have a great deal of experience working with and instructing young students with autism spectrum disorder in the educational setting.

I am writing to inform you of an opportunity for your child to be selected to receive individual instruction this school year as part of a study I am conducting investigating the effectiveness of point-of-view video modeling in teaching greetings to young children with autism. Point-of-view video modeling is a strategy that involves filming the completion of a desired skill or replacement behavior from a first-person perspective. In other words, the video shows only what a person might see from his or her viewpoint.

There is no cost to participate and participation is strictly voluntary. If you would like your child to participate, please complete the attached form and return it in the addressed and stamped envelope. Please contact me if you have any questions or would like to discuss the study further.

Sincerely,

Jennifer Lee
Phone: 410-507-8981
E-mail address: jnlee@umd.edu

Initials_____ Date_____

Project Title	Point-of-View Video Modeling as a Social Skills Intervention for Children with Autism
Purpose of the Study	This research is being conducted by Jennifer Lee at the University of Maryland, College Park under the direction of Dr. Andrew Egel. We are inviting your child to participate in this research project because your child attends a kindergarten program for children with an autism spectrum disorder in (*insert name of school or county school system*). The purpose of this research project is to investigate the effectiveness of point-of-view video modeling in teaching greetings to young children with autism spectrum disorders. Point-of-view video modeling is a strategy that involves filming the completion of a desired skill or replacement behavior from a first-person perspective. In other words, the video shows only what a person might see from his or her viewpoint.
Procedures	The identification of potential participants will be done through observations of your child in the classroom. Following an initial measurement where data on your child's ability to engage in greeting with other students will be collected, your child will watch a video model of a greeting before participating in a practice session. In the practice session, your child will be evaluated on their greetings with a trained and typically developing peer serving as a communication partner. This procedure will occur each school day and the study will be implemented by the primary investigator, Jennifer Lee. Additional measurements of your child's performance of greetings will be conducted to assess whether your child shows the behavior with other peers and in other environments within the school, and whether your child shows the behavior after the conclusion of the intervention. All assessments will be conducted by the primary investigator, Jennifer Lee.
Potential Risks and Discomforts	There are no known risks associated with participating in this research study. However, we will be proactive in ensuring that your child is comfortable with the study and its procedures. Prior to conducting the study, we will interact with your child, show him/her the study location, and prepare him/her for the change in routine through their daily schedules. It is possible that your child will become frustrated or bored during the study. Multiple observations and guidance from your child's classroom teachers, will allow for the identification of strong reinforcers that your child will be willing to work for and other beneficial strategies specific to your child, which will be applied as the intervention study is being implemented. Your child's behavior plan will also be used throughout the study to address any behaviors exhibited during the study. Flexibility, such as conducting fewer probes on one day based on your child's behavior and needs, will also be exercised based on information and recommendations provided by his/her teachers.

Potential Benefits	Although there may be no direct benefits to your child, potential benefits may include an increase in greetings with other peers. We hope that, in the future, other individuals might also benefit from this study through improved understanding of the effectiveness of point-of-view video modeling as a social skills intervention for children with autism spectrum disorders.
Confidentiality	Your child's participation in this research study will be confidential. Only Ms. Lee, Dr. Egel, your child's teacher, and yourself will have access to the information we collect. Any potential loss of confidentiality will be minimized by not using your child's name in any publication or presentation associated with this project. We will also use a password-protected computer. We will use videotapes to document your child's progress in the research. With your permission, the videotapes may be used in research presentations, but your child will not be identified by name. These videotapes will be erased one year after the study has concluded. Your child's information may be shared with representatives of the University of Maryland, College Park or government authorities if your child is in danger or if we are required to do so by law.
Rights to Withdraw and Questions	Your child's participation in this research is completely voluntary. You may choose not to have your child take part at all. If you decide to allow your child's participation in this research, you may stop that participation at any time. If you decide not to allow your child to participate in this study or if you stop that participation at any time, your child will not be penalized or lose any benefits to which your child otherwise qualifies, and your child's grades or standing within the school will not be positively or negatively affected. If you decide to stop having your child take part in the study, if you have questions, concerns or complaints, please contact the investigator, Jennifer Lee at the Department of Counseling, Higher Education, and Special Education, University of Maryland, College Park, Maryland 20742 or at jnlee@umd.edu. Dr. Andrew Egel can be reached at the same address or at aegel@umd.edu.
Participant Rights	If you have questions about your child's rights as a research participant or wish to report a research-related injury, please contact: **University of Maryland College Park** **Institutional Review Board Office** **1204 Marie Mount Hall** **College Park, Maryland, 20742** **E-mail: irb@umd.edu** **Telephone: 301-405-0678**

	This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.	
Statement of Consent	Your signature indicates that you are at least 18 years of age; you have read this consent form; your questions have been fully answered to your satisfaction and you voluntarily agree to allow your child to participate in this research study. You will receive a copy of this signed permission form. In addition and if you do agree to allow your child to participate in the research study, please provide your mailing address in order to receive updates and a brief questionnaire. Please return the completed consent form in the addressed and stamped envelope.	
Consent for Videotaping	_____ I agree to have my child appear on the videotaped sessions to document my child's progress throughout the study _____ I agree to have my child appear on the videotaped sessions to be used for research presentations. _____ I do not agree to have my child appear on the videotaped sessions.	
Signature and Date	Child's Name (Please Print)	
	Parent's Name (Please Print)	
	Parent Signature	
	Date	
	Mailing Address	

Appendix C

Parent or Guardian Cover Letter and Consent Form: Students Serving as Communication Partners (Communication Partners 1 and 2)

Dear Families,

My name is Jennifer Lee and I am a doctoral student in Special Education at the University of Maryland, College Park. I received my Master of Science Degree in Education of Students with Autism and Other Pervasive Developmental Disorders, and Advanced Methods for Differentiated Instruction, Inclusive Education for Mild to Moderate Disabilities at Johns Hopkins University, and received both Elementary and Special Education certification from Towson University.

I am writing to inform you of an opportunity for your child to be selected to participate and work with young children with autism spectrum disorder this school year as part of a study I am conducting investigating the effectiveness of point-of-view video modeling in teaching greetings to young children with autism. Point-of-view video modeling is a strategy that involves filming the completion of a desired skill or replacement behavior from a first-person perspective. In other words, the video shows only what a person might see from his or her viewpoint.

There is no cost to participate and participation is strictly voluntary. If you would like your child to participate, please complete the attached form and return it in the addressed and stamped envelope. Please contact me if you have any questions or would like to discuss the study further.

Sincerely,

Jennifer Lee
Phone: 410-507-8981
E-mail address: jnlee@umd.edu

Initials_____ Date_____

Project Title	Point-of-View Video Modeling as a Social Skills Intervention for Children with Autism
Purpose of the Study	This research is being conducted by Jennifer Lee at the University of Maryland, College Park under the direction of Dr. Andrew Egel. We are inviting your child to participate in this research project because your child attends a kindergarten program in (*insert name of school or county school system*). The purpose of this research project is to investigate the effectiveness of point-of-view video modeling in teaching greetings to young children with autism spectrum disorders. The study involves typically developing peers taking part in developing the point-of-view video models, and being communication partners for the participants with autism.
Procedures	In order to create the point-of-view video models, your child will appear in the video to model appropriate greetings, by first entering a room, waiting for the student with autism to say, "Hello," and then responding by also saying "Hello." Your child will receive training to be communication partners by practicing and facilitating interactions with individuals with autism for approximately 10 minutes over a course of three days. In addition to assisting with the filming of the point-of-view video, your child will participate in practice sessions with individuals with autism. These practice sessions will mirror the steps of filming to point-of-view video models as mentioned above.
Potential Risks and Discomforts	There are no known risks associated with participating in this research study. However, we will be proactive in ensuring that your child is comfortable with the study and its procedures. Prior to conducting the study, we will interact with your child, show him/her the study location, and prepare him/her for the tasks associated with the study.
Potential Benefits	There are no direct benefits to your child, however, we hope that, in the future, individuals with autism might also benefit from this study through improved understanding of the effectiveness of point-of-view video modeling as a social skills intervention for children with autism spectrum disorders.
Confidentiality	Your child's participation in this research study will be confidential. Only Ms. Lee, Dr. Egel, your child's teacher, and yourself will have access to the information we collect. Any potential loss of confidentiality will be minimized by not using your child's name in any publication or presentation associated with this project. We will store any materials in a locked filing cabinet within a locked office. With your permission, the point-of-view video models may be used in research presentations, but your child will not be identified by name. These video models will be erased one year after the study has concluded. Your child's information may be shared with representatives

	of the University of Maryland, College Park or government authorities if your child is in danger or if we are required to do so by law.
Rights to Withdraw and Questions	Your child's participation in this research is completely voluntary. You may choose not to have your child take part at all. If you decide to allow your child's participation in this research, you may stop that participation at any time. If you decide not to allow your child to participate in this study or if you stop that participation at any time, your child will not be penalized or lose any benefits to which your child otherwise qualifies, and your child's grades or standing within the school will not be positively or negatively affected. If you decide to stop having your child take part in the study, if you have questions, concerns or complaints, please contact the investigator, Jennifer Lee at the Department of Counseling, Higher Education, and Special Education, University of Maryland, College Park, Maryland 20742 or at jnlee@umd.edu. Dr. Andrew Egel can be reached at the same address or at aegel@umd.edu.
Participant Rights	If you have questions about your child's rights as a research participant or wish to report a research-related injury, please contact: **University of Maryland College Park** **Institutional Review Board Office** **1204 Marie Mount Hall** **College Park, Maryland, 20742** **E-mail: irb@umd.edu** **Telephone: 301-405-0678** This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.
Statement of Consent	Your signature indicates that you are at least 18 years of age; you have read this consent form; your questions have been fully answered to your satisfaction and you voluntarily agree to allow your child to participate in this research study. You will receive a copy of this signed permission form. Please return the completed consent form in the addressed and stamped envelope.
Consent for Videotaping	_____ I agree to have my child appear on the point-of-view video models. _____ I agree to have my child appear on the videotaped sessions to be used for research presentations. _____ I do not agree to have my child appear on the point-of-view video models.

Signature and Date	Child's Name (Please Print)	
	Parent's Name (Please Print)	
	Parent Signature	
	Date	

Appendix D

Observation Protocol to Identify Participant Eligibility

Student Code: _____	Date of Observations: _____
	Meets criteria for ASD under the DSM-IV-TR
	Exhibits low rates of disruptive behaviors
	Requires minimal prompting (e.g., gestures, verbal) across a majority of tasks
	Uses at least two word phrases with adults and peers
	Responds to "Do you want…?" questions by verbally answering yes or no
	Answers who and what wh-questions with at least a one word response
	Has been observed verbally initiating interactions with typically developing peers and verbally respond to peer initiations
	Engages in emerging or basic imitation skills (e.g., vocalizations, body movements, object use)
	Technology (e.g., iPad, tablet, computer) has been used as a reinforcer for correct responding
	Exhibits the ability to attend to a video for approximately three to four minutes
	Has social communication and interaction goals in their individualized education program (IEP)
Additional Notes from Teachers and Staff:	
Additional Notes:	
Eligible to participate in study:	Yes No

Appendix E

Outline of Training Session for Communication Partners

Outline of Training Session for Communication Partners	
	Train Communication Partners 1 and 2 to facilitate social interactions (e.g., looking expectantly for a response, waiting for a response).
	Explain to Communication Partners 1 and 2 the actions in the probes (i.e., open door, enter room close door, looks at participant, wait for social initiation by participant, then smiles and waves, say greeting).
	Practice actions with Communication Partners 1 and 2.
	Explain correction procedures to be implemented by the investigator (e.g., gestural, verbal prompting, when practice session to be concluded).
	Practice correction procedures to be implemented by the investigator.
	Role-play different scenarios where the three measured behaviors of the dependent variable may or may not be performed and correction procedures must be implemented by the investigator.

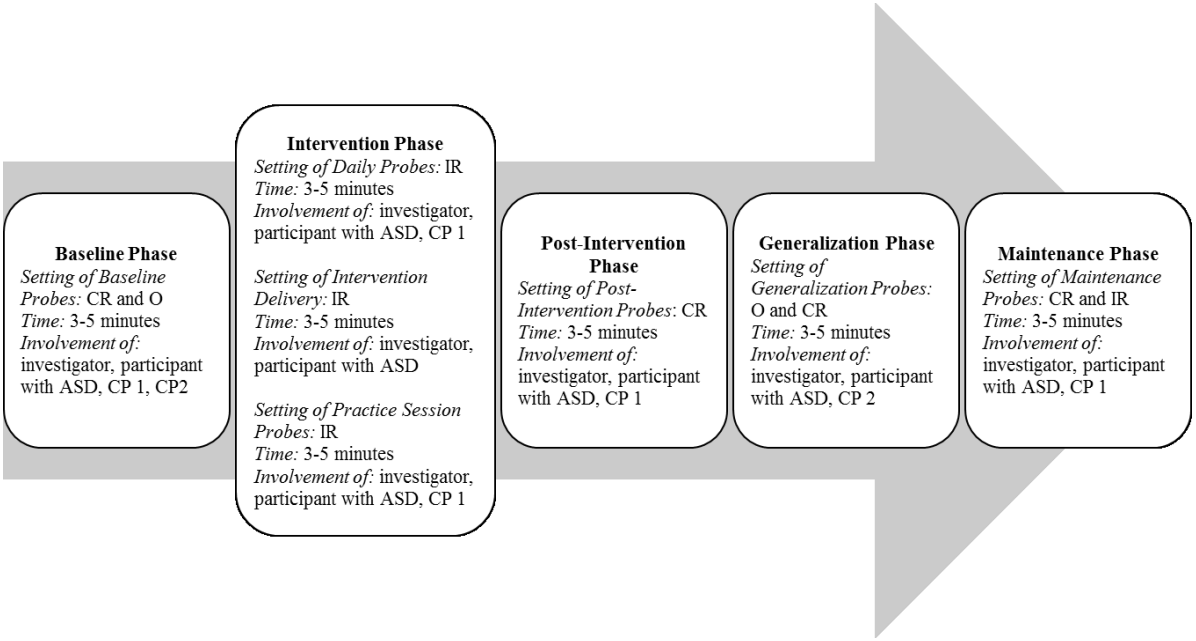
Appendix F

Procedural Reliability for Training Session for Communication Partners

Outline of Training Session for Communication Partners	
	Train Communication Partners 1 and 2 to facilitate social interactions (e.g., looking expectantly for a response, waiting for a response).
	Explain to Communication Partners 1 and 2 the actions in the probes (i.e., open door, enter room close door, looks at participant, wait for social initiation by participant, then smiles and waves, say greeting).
	Practice actions with Communication Partners 1 and 2.
	Explain correction procedures to be implemented by the investigator (e.g., gestural, verbal prompting, when practice session to be concluded).
	Practice correction procedures to be implemented by the investigator.
	Role-play different scenarios where the three measured behaviors of the dependent variable may or may not be performed and correction procedures must be implemented by the investigator.
Reliability Calculation: (_____ ÷ _____) × 100% = _____	

Appendix G

Flow Chart of Study Procedures



Note. CR = participant with ASD's classroom; IR = intervention room in the school where distractions could be minimized; O = other room in the school (i.e., school library, art room, music room, and/or computer lab); CP = communication partner

Appendix H

Data Collection Sheet with Operational Definitions

Probe: _____ Date: _____ Student Code: _____
Observer (circle one): Primary Reliability
Phase (circle one): Baseline Daily Probe Practice Session
Post-Intervention Generalization Maintenance

Record [+] for correct response and [–] for incorrect or no response.

Shifting of attention toward Communication Partner *The participant turns to look at Communication Partner within five seconds of the door being shut by the peer*	
Social initiation *The participant says, "Hello," or verbalizes any variation of a greeting (e.g., hi, hey) within five seconds of the door being shut by Communication Partner*	
Maintaining attention toward Communication Partner *The participant continues to look in the direction of Communication Partner while also verbalizing the greeting*	
Percentage Correct	_____%

Note. During the practice sessions, if the participant performs the behavior during the correction (i.e., after prompting), the investigator will provide verbal praise and continue to implement the next correction procedure for the following behavior if that behavior is not performed after two seconds. Any behaviors performed after the correction procedure was implemented are to be recorded as incorrect.

Appendix I

Consent Form to Collect Social Validity Data - Teachers

Initials_____ Date_____

Project Title	Point-of-View Video Modeling as a Social Skills Intervention for Children with Autism
Purpose of the Study	This research is being conducted by Jennifer Lee at the University of Maryland, College Park under the direction of Dr. Andrew Egel. We are inviting you to participate because your student participated in a research project investigating the effectiveness of point-of-view video modeling in teaching greetings to young children with autism spectrum disorders. The questionnaire will ask you to rate and explain whether or not you observed any increased engagement in greetings by your student.
Procedures	Upon receiving the questionnaire, please complete the questions to the best of your knowledge. The questionnaire should take approximately 2-5 minutes to complete. The questions include: Do you strongly disagree, disagree somewhat, neutral, agree somewhat, or strongly agree to this statement: "I have observed improvements in my student's social interactions with peers"? and Please explain your answer to the first question.
Potential Risks and Discomforts	There are no known risks associated with participating in this research study.
Potential Benefits	There are no direct benefits to you or the student, however, we hope that, in the future, other individuals might also benefit from this study through improved understanding of the effectiveness of point-of-view video modeling as a social skills intervention for children with autism spectrum disorders.
Confidentiality	Your participation in this research study will be confidential. Only Ms. Lee, Dr. Egel, the student's parents, and yourself will have access to the information we collect. Any potential loss of confidentiality will be minimized by not using your or your student's name in any publication or presentation associated with this project. We will also use a password-protected computer.
Rights to Withdraw and Questions	Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop that participation at any time. If you decide not to participate in this study or if you stop that participation at any time, your student will not be penalized or lose any benefits to which your student otherwise qualifies, and your student's grades or standing within the school will not be positively or negatively affected. If you decide to stop taking part in the study, if you have questions, concerns or complaints, please contact the investigator, Jennifer Lee at the Department of Counseling, Higher Education, and Special Education, University of Maryland, College Park, Maryland 20742 or at

	jnlee@umd.edu. Dr. Andrew Egel can be reached at the same address or at aegel@umd.edu.	
Participant Rights	If you have questions about your rights as a research participant or wish to report a research-related injury, please contact: **University of Maryland College Park** **Institutional Review Board Office** **1204 Marie Mount Hall** **College Park, Maryland, 20742** **E-mail: irb@umd.edu** **Telephone: 301-405-0678** This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.	
Statement of Consent	Your signature indicates that you are at least 18 years of age; you have read this consent form; your questions have been fully answered to your satisfaction and you voluntarily agree to allow your student to participate in this research study. You will receive a copy of this signed permission form.	
Signature and Date	Teacher's Name (Please Print)	
	Teacher Signature	
	Date	

Appendix J

Consent Form to Collect Social Validity Data - Parents

Initials_____ Date_____

Project Title	Point-of-View Video Modeling as a Social Skills Intervention for Children with Autism
Purpose of the Study	This research is being conducted by Jennifer Lee at the University of Maryland, College Park under the direction of Dr. Andrew Egel. We are inviting you to participate because your child participated in a research project investigating the effectiveness of point-of-view video modeling in teaching greetings to young children with autism spectrum disorders. The questionnaire will ask you to rate and explain whether or not you observed any increased engagement in greetings by your child. The same questionnaire will be completed by your child's classroom teacher as well.
Procedures	Upon receiving the questionnaire, please complete the questions to the best of your knowledge. The questionnaire should take approximately 2-5 minutes to complete. The questions include: Do you strongly disagree, disagree somewhat, neutral, agree somewhat, or strongly agree to this statement: "I have observed improvements in my child's social interactions with peers"? and Please explain your answer to the first question.
Potential Risks and Discomforts	There are no known risks associated with participating in this research study.
Potential Benefits	There are no direct benefits to you or your child, however, we hope that, in the future, other individuals might also benefit from this study through improved understanding of the effectiveness of point-of-view video modeling as a social skills intervention for children with autism spectrum disorders.
Confidentiality	Your participation in this research study will be confidential. Only Ms. Lee, Dr. Egel, your child's teacher, and yourself will have access to the information we collect. Any potential loss of confidentiality will be minimized by not using your or your child's name in any publication or presentation associated with this project. We will also use a password-protected computer.
Rights to Withdraw and Questions	Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop that participation at any time. If you decide not to participate in this study or if you stop that participation at any time, your child will not be penalized or lose any benefits to which your child otherwise qualifies, and your child's grades or standing within the school will not be positively or negatively affected. If you decide to stop taking part in the study, if you have questions, concerns or complaints, please contact the investigator, Jennifer Lee at

	the Department of Counseling, Higher Education, and Special Education, University of Maryland, College Park, Maryland 20742 or at jnlee@umd.edu. Dr. Andrew Egel can be reached at the same address or at aegel@umd.edu.	
Participant Rights	If you have questions about your rights as a research participant or wish to report a research-related injury, please contact: **University of Maryland College Park** **Institutional Review Board Office** **1204 Marie Mount Hall** **College Park, Maryland, 20742** **E-mail: irb@umd.edu** **Telephone: 301-405-0678** This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.	
Statement of Consent	Your signature indicates that you are at least 18 years of age; you have read this consent form; your questions have been fully answered to your satisfaction and you voluntarily agree to allow your child to participate in this research study. You will receive a copy of this signed permission form.	
Signature and Date	Parent's Name (Please Print)	
	Parent Signature	
	Date	

Appendix K

Social Validity Questionnaire

I have observed improvements in the student's/my child's social interactions with peers.

Strongly Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Strongly Agree
1	2	3	4	5

Please explain your answer to the above question:

Appendix L

Data Collection Sheet with Operational Definitions for Natural Generalization Probes

Probe: _____ Date: _____ Time: _____

Student Code: _____

Observer (circle one): Primary Reliability

Setting and Opportunity Description: _____

_____

_____

Record the number of times the items below were observed.

Greeting *The participant says, "Hello," or verbalizes any variation of a greeting (e.g., hi, hey) to another peer*	
Attention *The participant appropriately seeks the attention of another peer (e.g., wave, tap on shoulder)*	
Organizer *The participant verbally specifies an activity, suggests an idea, or directs another peer to engage in a behavior.*	
Share *The participant offers or gives an object to another peer or asks another peer to give an object to them.*	
Assistance *The participant helps another peer to complete a task or desired action or seeks assistance to complete a task or action.*	
Complimentary *The participant verbalizes a statement indicating affection, attraction, or praise.*	
Affection *The participant pats, hugs, or holds hands with another peer.*	

Appendix M

Interrater Reliability Form

Probe: _____ Date: _____ Student Code: _____
Observer (circle one): Primary Reliability
Phase (circle one): Baseline Daily Probe Practice Session
Post-Intervention Generalization Maintenance

Record [+] for correct response and [–] for incorrect or no response.

Shifting of attention toward Communication Partner *The participant turns to look at Communication Partner within five seconds of the door being shut by the peer*	
Social initiation *The participant says, "Hello," or verbalizes any variation of a greeting (e.g., hi, hey) within five seconds of the door being shut by Communication Partner*	
Maintaining attention toward Communication Partner *The participant continues to look in the direction of Communication Partner while also verbalizing the greeting*	
Percentage Correct	_____%
Reliability Calculation: (_____ ÷ _____) × 100% = _____	

Note. During the practice sessions, if the participant performs the behavior during the correction (i.e., after prompting), the investigator will provide verbal praise and continue to implement the next correction procedure for the following behavior if that behavior is not performed after two seconds. Any behaviors performed after the correction procedure was implemented are to be recorded as incorrect.

Appendix N

Interrater Reliability Form for Natural Generalization Probes

Probe: _____ Date: _____ Time: _____

Student Code: _____

Observer (circle one): Primary Reliability

Setting and Opportunity Description: _____

_____

_____

Record the number of times the items below were observed.

Greeting *The participant says, "Hello," or verbalizes any variation of a greeting (e.g., hi, hey) to another peer*	
Attention *The participant appropriately seeks the attention of another peer (e.g., wave, tap on shoulder)*	
Organizer *The participant verbally specifies an activity, suggests an idea, or directs another peer to engage in a behavior.*	
Share *The participant offers or gives an object to another peer or asks another peer to give an object to them.*	
Assistance *The participant helps another peer to complete a task or desired action or seeks assistance to complete a task or action.*	
Complimentary *The participant verbalizes a statement indicating affection, attraction, or praise.*	
Affection *The participant pats, hugs, or holds hands with another peer.*	
Reliability Calculation: (_____ ÷ _____) × 100% = _____	

Appendix O

Fidelity of Implementation Observation Checklist

Intervention Session	
Participant views the entire point-of-view video modeling.	
Gestural prompts provided to ensure the participant is attending to the point-of-view video model.	
Investigator blocks any attempts made by the participant to touch the iPad screen.	
If the investigator must provide three gestural prompts or must block the participant from touching the iPad screen three times, the point-of-view video model will be stopped and begin again from the beginning.	
Investigator provides verbal praise to the participant for attending to the point-of-view video model.	
No instructional statements elaborating on the point-of-view video modeling were made during the session.	
Practice Session Probe	
Practice session immediately follows the viewing of the point-of-view video model.	
The investigator states, "Let's practice!"	
Investigator provides verbal praise continuously to the participant for attempts to engage in the three targeted behaviors (i.e., shift gaze toward peer, maintaining attention, and engaging in the greeting).	
Both verbal praise and the participant's selected reinforcer are provided if the participant engages in the three-targeted behaviors (i.e., shift gaze toward peer, maintaining attention, and engaging in the social greeting).	
Practice Session Probe: Correction Procedure I	
A correction procedure is implemented if the participant responds incorrectly or does not initiate any targeted action or statement.	
If the participant does not turn in the direction of Communication Partner 1 after five seconds of the door being shut, the investigator provides a gestural prompt (i.e., pointing prompt) towards the communication partner who has entered the room.	
After an additional two seconds with no response the investigator provides another pointing prompt towards Communication Partner 1 accompanied by the verbal prompt, "Look."	
If there continues to be no response after an additional two seconds, the practice session is concluded and another intervention session begins.	
Practice Session Probe: Correction Procedure II	
A correction procedure is implemented if the participant responds incorrectly or does not initiate any targeted action or statement.	

If the participant does turn to attend to Communication Partner 1, but does not say, "Hello," within five seconds of the door being shut, the investigator provides a pointing prompt towards Communication Partner 1 accompanied by a partial verbal prompt by first making a /h/ sound.	
If the participant does not engage in the social initiation after an additional two seconds, the investigator provides another pointing prompt towards Communication Partner 1 and a full verbal prompt, "Hello," or any variation of the greeting.	
If there continues to be no response after an additional two seconds, the practice session is concluded and another intervention session will begin.	
Practice Session Probe: Correction Procedure III	
A correction procedure is implemented if the participant responds incorrectly or does not initiate any targeted action or statement.	
If the participant does attend to Communication Partner 1 and does say, "Hello," within five seconds of the door being shut, but does not maintain attention toward Communication Partner 1, the investigator provides a pointing prompt toward the communication partner who has entered the room.	
After an additional two seconds with no response the investigator provides another pointing prompt toward Communication Partner 1 accompanied by the direction, "Look."	
If there continues to be no response after an additional two seconds, the practice session is concluded and another intervention session will begin.	
Reliability Calculation: (_____ ÷ _____) × 100% = _____	

Note. During the practice sessions, if the participant performs the behavior during the correction (i.e., after prompting), the investigator will provide verbal praise and continue to implement the next correction procedure for the following behavior if that behavior is not performed after two seconds. Any behaviors performed after the correction procedure was implemented are to be recorded as incorrect.

References

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