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Addressing Social Communication in Autism Spectrum Disorder:

A Guide to Video Modeling for Speech-Language Pathologists

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Addressing Social Communication in Autism Spectrum Disorder:

A Guide to Video Modeling for Speech-Language Pathologists

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Abstract

Addressing Social Communication in Autism Spectrum Disorder: A Guide to Video Modeling for Speech-Language Pathologists

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Social communication deficits have been identified as one of the core features of autism spectrum disorder (ASD). Previous studies have shown that video modeling is an effective intervention for improving social communication in children with ASD. The purpose of this project is to provide an accessible resource for speech-language pathologists (SLPs) seeking to implement video modeling interventions for children with ASD, drawing upon empirical research to inform recommended procedures for SLPs. This guidebook provides step-by-step procedures for implementing video modeling intervention, including selection of target behaviors and video models, video production, techniques for implementing interventions, and methods of measuring progress. Associated intervention strategies are also discussed. Additional resources are provided to support SLPs in implementing video modeling interventions, including data collection forms, sample scripts, and sample lesson plans. This project also includes examples of videos created using children and adults as models. As video modeling appears to be an effective approach for ameliorating social communication deficits in children with ASD, SLPs may benefit from a practical guide for implementing video modeling interventions in a variety of settings.

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Chapter One: Introduction

Autism spectrum disorder (ASD) indicates a developmental disability that is characterized by impairments in social skills and communication, as well as repetitive and stereotypic behavior (American Psychiatric Association, 2001). Though these characteristics vary considerably among individuals diagnosed with ASD, some degree of social impairment is typically present. The prevalence of ASD has risen rapidly in recent decades. In the mid-1980s, approximately one in 1,333 children were diagnosed with ASD (Zhang & Wheeler, 2011). The Centers for Disease Control and Prevention (2012) estimate that one in 88 children are currently diagnosed with ASD. In addition, intensive behavioral interventions, which may include social skills training, cost between $40,000 and $60,000 for each child with ASD per year (CDC, 2012). Clearly, speech-language pathologists (SLPs) in a variety of settings will serve an increasing number of children with ASD and will need cost-effective interventions to address their needs.

Deficits in social interaction have been suggested as one of the core features of ASD (White, Keonig, & Scahill, 2007). Individuals with ASD typically have difficulty initiating and maintaining reciprocal social interactions (Flynn & Healy, 2012). They may demonstrate deficits in conversational skills, such as turn taking and maintaining conversations. For example, during conversation, individuals with ASD may dwell on topics of particular interest to them. In general, they may also have difficulty understanding and expressing emotions (White et al., 2007). Individuals with ASD also tend to have difficulty taking others' perspective, and thus may find it difficult to infer others' interests (Flynn & Healy, 2012). Deficits in social skills are likely to be present

even in individuals with ASD who have an interest in social interaction. Difficulties with social communication increase the likelihood that children and adolescents with ASD will experience social rejection and isolation (White et al., 2007).

WHAT IS VIDEO MODELING?

Video modeling is a promising intervention that SLPs may use to address the social communication needs of children with ASD (Wilson, 2013). This technique allows individuals to learn skills by viewing videos in which target behaviors are exemplified. Though there are many variations in video modeling procedures, it generally involves showing video examples repeatedly, for several days or even weeks to a client who shows a deficit in the skill pictured in the video (e.g., setting the table). After viewing the video, individuals are given an opportunity to practice the targeted skill. Reinforcement is occasionally used during this practice period to facilitate acquisition of target behaviors. This guidebook, intended specifically for SLPs, provides clear recommendations for implementing evidence-based video modeling interventions for children with ASD. As this guidebook focuses exclusively on social communication skills and presents clinical applications of video modeling, SLPs may easily use this resource to implement video modeling interventions with children with ASD.

Video modeling procedures vary according to the type of model used. Major variations include "peer modeling," "adult modeling," and "self-modeling" (see Table 1 below for examples). In "peer modeling," familiar or unfamiliar peers, who typically receive some training, model target behaviors (McCoy & Hermarisen, 2007). In "adult modeling," adults model target behaviors and would likely require less training, leading

to a more efficient process (McCoy & Hermarisen, 2007). In "self-modeling," the child is filmed performing the targeted skill (Buggey, 2005). Clinician prompts are then edited out so the child may view himself performing the behavior successfully and independently. "Point-of-view modeling," another variation that is less frequently used, involves recording the target behavior from the model's perspective, so that the model is not actually seen in the video (Shukla-Mehta, Miller, & Callahan, 2010).

Table 1: Video Modeling Variations

Type of Model	***Targeted Skills***	***Example***
Peer Modeling	Reciprocal Play: Taking Turns	Child's peers filmed building a toy train track, taking turns adding pieces of track.
Adult Modeling	Conversation Skills	Adult actors filmed engaging in a conversation, maintaining conversational topic by asking and answering questions.
Self-Modeling	Social Initiations	Clinician films child demonstrating appropriate social initiations in natural environment (e.g., "Let's play"). Any clinician prompts needed are edited out.
Point-of-view Modeling	Play Actions and Verbalizations	Adult actor filmed manipulating toys and using relevant verbalizations (e.g. "Uh oh, fall down"). Video recorded from child's perspective, showing only adult's hands and play materials.

The video modeling approach is based on Albert Bandura's social learning theory (Bandura, 2008), which emphasizes observational learning. This theory refers to the idea that children learn skills by observing and imitating others' behavior. While typically developing children learn social communication skills through observational learning in their natural environments, children with ASD may need more focused instruction. Video

modeling can be an effective instructional approach for children with ASD, as it makes the most of their strengths in visual processing and learning (Rayner, Denholm, & Sigafoos, 2009).

In order to successfully imitate behaviors, children must attend to the models' behavior. One advantage of video modeling is the ability to edit out irrelevant stimuli, increasing the likelihood that individuals with ASD will attend to the target behavior. Observational learning also requires sufficient motivation in order for the individual to perform modeled skills. Individuals with ASD may find watching videos to be highly motivating, thereby improving their chances of acquiring target behaviors (Bellini & Akullian, 2007). In addition, social interaction may produce discomfort or anxiety in individuals with ASD (White et al., 2007). Thus, another advantage of the video modeling approach is that the individual with ASD need not interact with others while observing target behaviors.

WHAT DOES RESEARCH ON VIDEO MODELING SUGGEST?

Video modeling has been used with individuals with ASD to address a variety of skills, including functional skills (Shipley-Benamou, Lutzker, & Taubman, 2002), challenging behaviors (Buggey, 2005), and social skills (Reeve, Reeve, Buffington Townsend, & Poulson, 2007). For example, video modeling has been used to target daily living skills, such as mailing a letter, taking care of pets, and setting the table, in three to five year-old individuals with ASD (Shipley-Benamou et al., 2002). In addition, video modeling has been used to address problem behaviors such as tantrums and aggressive behavior towards peers in children with ASD aged five to 11 (Buggey, 2005). Video

modeling has also been used to target general social skills, for example helping adults with tasks like cleaning and carrying objects, in children with ASD aged five to six (Reeve et al., 2007).

Researchers have also used video modeling to address a wide range of social communication skills. Based on several systematic reviews and meta-analyses, it appears that video modeling is effective in improving social communication behaviors in children with ASD (Bellini & Akullian, 2007; Delano, 2007; Mason, Ganz, Parker, Burke, & Camargo, 2012; Shukla-Mehta et al., 2010). In the following section, terms displayed in italics are defined in the glossary.

Shukla-Mehta and colleagues (2010), for example, conducted a systematic review of 26 empirical studies that utilized video modeling to target social communication skills, such as verbal and non-verbal play skills, *social initiations*[1], *social responses*[2], *perspective-taking skills*[3], and conversation skills. The studies considered in this review were conducted in a variety of settings, including school settings, specialized preschool programs, home settings, medical centers, and university clinics. While the participants in these studies included children with ASD as young as two and a half and as old as 15 years, the majority of studies were conducted on preschool and elementary school children. Although the results of their review suggest that there is evidence to support using video modeling to target social communication skills in children with ASD, Shukla-Mehta and colleagues (2010) did not find consistent evidence regarding which intervention components are most effective, such as the number of video examples, the

number of video viewings per session, the time between viewing and opportunity to practice skills, and the overall length of intervention.

In this review, Shukla-Mehta and colleagues (2010) evaluated several studies that used video modeling alone, without other intervention components, with the results suggesting that video modeling leads to improvements in play behavior, including verbalizations, play actions, and reciprocal play (D'Ateno, Mangiapanello, & Taylor, 2003; MacDonald, Clark, Garrigan, & Vangala, 2005), as well as improvements in social initiations, with evidence of generalization across peers and maintenance of intervention effects (Nikopoulos & Keenan, 2004, 2007). Several studies reviewed by Shukla-Mehta and colleagues (2010) used video modeling in combination with other intervention strategies, such as *instructional prompts*[4] (Paterson & Arco, 2007), review of video content after viewing (Charlop-Christy & Daneshvar, 2003), *verbal reinforcement*[5] (Taylor, Levin, & Jasper, 1999), *tangible reinforcement*[6] (Charlop & Milstein, 1989), and *self-management*[7] of target behaviors (Apple, Billingsley, & Schwartz, 2005). Other studies have combined video modeling with *Social Stories™*[8] (Scattone, 2008) and integrated video modeling into *computer-based social skills instructional programs*[9] (Simpson, Langone, & Ayres, 2004). Shukla-Mehta and colleagues (2010) suggest that interventions combining video modeling with instructional prompts and feedback are most effective for learners with ASD.

Bellini and Akullian (2007) performed a meta-analysis of 23 single-subject design studies that used video modeling to address a variety of target behaviors, consisting of *social communication skills*[10], *functional skills*[11], and *behavioral functioning*[12] in

individuals with ASD between the ages of three and 20. The results of this meta-analysis suggest that video modeling is effective in promoting social communication skills such as compliment giving (Apple et al., 2005), social greetings (Simpson et al., 2004), and play behavior and verbalizations (MacDonald et al., 2005). The studies analyzed by Bellini and Akullian (2007) also indicate that video self-modeling interventions lead to improvements in social communication behaviors such as social initiations (Buggey, 2005), *contingent responses*[13] and *initiating comments*[14] (Thiemann & Goldstein, 2001), and *spontaneous requesting*[15] (Wert & Neisworth, 2003). The findings of their meta-analysis indicate that there were no statistically significant differences between video modeling and video self-modeling in terms of intervention, maintenance, and generalization effects (Bellini & Akullian, 2007).

Sherer and colleagues (2001) conducted a video modeling study comparing "self" and "other" as model and also found no differences between the effects of video modeling and video self-modeling. However, these researchers noted that video self-modeling was a more complex and time-consuming method than video modeling using "other" as model (Sherer et al., 2001). Given the results of these studies (Bellini & Akullian, 2007; Sherer et al., 2001), there appears to be no significant difference in the effects of video modeling depending on the type of model used: peers, adults, or self-modeling.

Based on the studies analyzed by Bellini and Akullian (2007), there appears to be some evidence of maintenance and generalization of intervention effects based on use of video modeling techniques in individuals with ASD. Among the 17 studies that targeted

social communication behaviors in children with ASD between the ages of three and 15, 13 studies provided maintenance data and seven studies measured generalization effects (Bellini & Akullian, 2007). However, several of the studies considered by Bellini and Akullian (2007) that measured maintenance effects did not clarify the length of the follow-up period (Apple et al., 2005; Buggey, 2005; MacDonald et al., 2005). In contrast, Nikopoulos and Keenan (2004) found that improvements in social initiations and reciprocal play were maintained at a three-month follow-up period. Another study by these researchers (Nikopoulos & Keenan, 2003) targeted similar social communication skills and showed evidence of generalization of skills to other settings, people, and materials. Additionally, findings from a study by Charlop and Milstein (1989) indicate that the effects of video modeling on conversation skills generalized across settings, people, and materials and maintained over a 15-month period. Given the results of these studies, there appears to be limited evidence that skills acquired through video modeling are maintained and generalize to other conditions.

In another systematic review, Delano (2007) analyzed 19 video modeling studies that targeted a variety of skills, such as social communication behaviors, functional living skills, answering perspective-taking questions, and challenging behaviors, in individuals with ASD between the ages of three and 20. One study reviewed (Charlop-Christy, Le, & Freeman, 2000) targeted a range of skills across five participants including expressive labeling of emotions, social greetings, conversation skills, self-help skills, oral comprehension, and play skills. This study compared video modeling with in vivo (i.e., live) modeling and found that video modeling led to faster acquisition of skills than in

vivo modeling (Charlop-Christy et al., 2000). Twelve of the studies that Delano (2007) reviewed addressed social communication skills, with results suggesting that video modeling interventions were associated with improvements in social communication skills. Delano (2007) found that video modeling alone did not sufficiently improve social initiations in some studies (Apple et al., 2005; Nikopoulos & Keenan, 2003), which suggests that video modeling may need to be used with other intervention strategies in order to effectively improve social initiations. Only three studies considered in this review addressed treatment fidelity, which is an important limitation noted by Delano (2007) and points to the need for studies to demonstrate that video modeling interventions are developed and implemented consistently.

Mason and colleagues (2012) performed a meta-analysis of 42 single-subject design studies that used video modeling with "other" as model to target independent living skills and social communication skills, in individuals with ASD aged two through 18. While ASD was the primary diagnosis for the majority of participants in these studies, 16% of the participants had been diagnosed with developmental disabilities other than ASD. Mason and colleagues (2012) found that while video modeling with "other" as model was highly effective for participants with ASD, it was only moderately effective for participants with other developmental disabilities. Results also suggest that while video modeling appears to be effective for all age groups, it seems to be most effective for children between the ages of six and 10. The findings also indicate that video modeling with "other" as model is most effective for individuals with ASD when used with reinforcement, as opposed to video modeling used alone or as part of a package.

Based on the results of this meta-analysis, video modeling appears to be highly effective in improving social communication skills for individuals with ASD, with the greatest impact on play skills (Mason et al., 2012).

IS VIDEO MODELING AN EVIDENCE-BASED INTERVENTION?

Evidence-based practice, which refers to making clinical decisions by incorporating evidence from research, clinical experience, and client needs, has become increasingly important in the field of speech-language pathology (Gillam & Gillam, 2006). Researchers have suggested a classification system for evaluating research evidence, comprised of five levels of evidence. The highest of these is level one, reserved for high quality randomized controlled studies, while the lowest is level five, which includes expert opinion (Gillam & Gillam, 2006). The majority of the studies included in the systematic reviews and meta-analyses previously reviewed (Bellini & Akullian, 2007; Delano, 2007; Mason et al., 2012; Shukla-Mehta et al., 2010) utilized a single subject, multiple baseline design, which would fall under level two according to this evidence-based practice rubric. Only one study that addressed social communication skills (Kroeger, Schultz, & Newsom, 2007) employed a group comparison design. However, Kroeger and colleagues' (2007) study lacked random assignment of subject participants.

Although well-designed group comparison studies would increase the level of evidence in this area, researchers may have difficulty recruiting sufficient numbers of participants with ASD who fit consistent inclusion criteria. As previously described, several systematic reviews and meta-analyses of single-subject video modeling studies have been conducted, yielding a higher level of evidence (Bellini & Akullian, 2007;

Delano, 2007; Mason et al., 2012; Shukla-Mehta et al., 2010). Researchers who performed the meta-analyses on single-subject video modeling studies have classified video modeling as an evidence-based intervention for individuals with ASD (Bellini & Akullian, 2007; Mason et al., 2012). Based on the results of these systematic reviews and meta-analyses, video modeling appears to be emerging as an evidence-based intervention for addressing the social communication needs of children with ASD (Bellini & Akullian, 2007; Delano, 2007; Mason et al., 2012; Shukla-Mehta et al., 2010).

Although video modeling appears to provide an evidence-based intervention for individuals with ASD, there are several limitations to consider. For example, it is not clear which features of video modeling intervention, such as specific video content, are most effective in improving social communication skills. There is also no conclusive evidence regarding whether video modeling is most effective when it is used alone or in combination with other intervention strategies. In addition, further research is needed regarding which participant characteristics, such as cognitive and language abilities, lead to positive outcomes from different variations of video modeling. More information is also needed regarding specific pre-requisite skills. For example, children may need attention and imitation skills in order to benefit from video modeling intervention. Although video modeling appears to be a promising intervention for improving social communication for children with ASD, a greater number of well-designed studies are needed in order to address these limitations and provide higher levels of evidence for important components of this approach to support professionals in making intervention decisions.

WHAT RESOURCES ARE CURRENTLY AVAILABLE?

In addition to research conducted on video modeling, there have also been numerous guides published for implementing video modeling interventions for individuals with ASD. These guidebooks are primarily intended for professionals in the special education field. One recently published guidebook, *How to Use Video Modeling and Video Prompting* (Sigafoos, Reilly, & Cruz, 2007), provides detailed instructions for carrying out video modeling interventions, with examples of how to target daily living skills. While Sigafoos and colleagues' (2007) guidebook includes social communication skills as examples of target behaviors, the information in this area is limited. Another guidebook, *Seeing is Believing* (Buggey, 2009), was recently developed to provide a thorough description of how to use video self-modeling for individuals with ASD. While this guidebook gives examples of social communication behaviors, it is not focused exclusively on these skills.

As well as these comprehensive guidebooks, numerous brief, step-by-step guides have been published in the special education literature (Banda, Matuszny, & Turkan, 2007; Ganz, Earles-Vollrath, & Cook, 2011; Graetz, Mastropieri, & Scruggs, 2006; Ogilvie, 2011). These guides provide limited information regarding social communication behaviors and do not include examples of videos that could be created for video modeling intervention. Wilson (2013) created a step-by-step tutorial for SLPs seeking to implement video modeling interventions in school settings. While this tutorial focuses on social communication skills and information specific to SLPs, it does not

provide video examples that SLPs could use as a guide to focus on relevant intervention targets within their scope of practice.

Based on the available research literature as well as the presence of applied guidebooks, the purpose of this project is to provide speech-language pathologists with a user-friendly guidebook for implementing video modeling interventions, specifically addressing social communication. Video examples are also included, demonstrating various ways to use video modeling to improve social communication. Chapter One, above, provides an introduction to video modeling and a brief overview of video modeling research. In order to implement video modeling interventions, SLPs may follow the detailed procedures discussed in Chapter Two. The step-by-step process outlined in Chapter Two includes applied examples of how to use video modeling to target social communication behaviors in a variety of settings. Chapter Three provides descriptions of the video modeling examples that were created for this project. Chapter Four presents strengths and challenges of video modeling as an intervention approach, along with recommendations for clinical practice. Additional resources for implementing video modeling intervention can be found in the Appendices, including data collection forms, sample scripts, and sample lesson plans.

Chapter Two: How to Implement Video Modeling Intervention

STEP ONE: CHOOSING SOCIAL COMMUNICATION TARGETS

Before determining social communication behaviors to target in intervention, it is crucial to assess whether video modeling is an appropriate intervention for a given child with ASD. While there is no conclusive research evidence identifying pre-requisite skills needed to benefit from video modeling, researchers have suggested that the child with ASD must be able to imitate the type of skill pictured in the video (Rayner et al., 2009). If the child lacks basic imitation skills, the SLP may need to train imitation skills prior to implementing video modeling intervention. In addition, researchers have suggested that video modeling is likely to be more effective for children who are be able to attend to a video for at least one minute (Shukla-Mehta et al., 2010). Assessing the child's ability to sustain attention to a video with actors who have characteristics (e.g., age) similar to those that will be shown in the intervention video will allow the SLP to determine the suitability of video modeling.

If video modeling is deemed appropriate for the child with ASD, the first crucial step in implementing intervention is to determine the specific skill or skills that will be pictured in the video. If the goal of intervention is to improve social communication skills, it is important to gather information about the child's behavior in the environment in which he will utilize these skills. This step involves determining the settings in which the child is having the greatest challenges in social communication, as well as the skills that would have the greatest impact on the child's ability to communicate with others.

The process of gathering this information will vary somewhat depending on the SLP's setting. In a school setting, observing the child's behavior in the classroom, on the playground, and during enrichment activities such as physical education would provide valuable information. The SLP would also benefit from interviewing the child's parents and teachers. SLPs who provide services in either the child's home or in a clinic may learn more about the child's social communication skills through interviewing parents and consulting with teachers and other professionals (e.g. occupational therapists) who provide services to the child. If the SLP's schedule allows, arranging either a school or home visit would allow her to observe the child's social communication skills firsthand.

After developing a picture of the child's social communication skills through observation and consultation with parents and professionals, a general area of concern may emerge. For example, it may be clear that a preschool child lacks adequate play skills. While this is an appropriate area to target using video modeling, it is necessary to specify observable and measurable target behaviors. This requires clearly defining the skill that will be targeted (e.g., the pragmatic skill of "play comments") within the general area of impairment (e.g., play skills). Determining observable and measurable target behaviors may be challenging, as social communication is not easily quantified. Examples of observable and measurable target behaviors are given in Table 2 below. Previous studies that have addressed these types of behaviors are also given as a reference.

Table 2: Social Communication Target Behaviors

Area of Impairment	*Example Target Behavior*	*Previous Research*
Play Skills	*Play Comments* Definition: spontaneous verbalizations referencing play materials or actions, directed at peers and occurring during play. *Examples:* "Let's play house." "My turn." "Your turn." "He's riding in the car."	(MacDonald et al., 2005) (Sancho, Sidener, Reeve, & Sidener, 2010)
Social Engagement	*Social Responses* Definition: unprompted, behaviorally appropriate verbalizations directed at the peer initiating interaction, which result in continuing social interaction.	(Apple et al., 2005)
	Social Initiations Unprompted, spontaneous, and behaviorally appropriate verbalizations directed at peers, which result in social interaction	(Buggey, 2005) (Nikopoulos & Keenan, 2007) (Kroeger et al., 2007)
Conversation Skills	*Answering Questions* Definition: responding to questions with contextually relevant information (e.g. in response to "Where do you live?" "I live in Austin.") *Asking Questions* Definition: asking questions that are related to the conversational topic and designed to elicit information from the communicative partner (e.g. "What do you do on the weekends?" "Where do you go on vacation?" "What is your favorite book?")	(Charlop & Milstein, 1989) (Charlop-Christy et al., 2000) (Sherer et al., 2001)

STEP TWO: COLLECTING BASELINE DATA

After social communication target behaviors have been clearly identified, it is important to collect baseline data prior to beginning the intervention process. Baseline data provides a measure of the child's performance of the targeted skill prior to beginning intervention and is an essential component of progress monitoring. As standardized

assessments are unlikely to accurately capture changes in selected target behaviors, observational methods of data collection are recommended. A variety of methods may be used to systematically measure a child's social communication behavior. Definitions of several of these methods (i.e., event recording, interval recording, and duration recording) are provided in Table 3 below.

Table 3: Observational Methods of Data Collection

Method	***Description***	***Example***
Event Recording	Measures frequency. Observer counts the number of times the target behavior occurs within a defined observational period (e.g. using tally marks).	Observer counts the number of times the child asks questions during a five-minute conversation.
Interval Recording	Whole Interval – Observer records occurrence of behavior if it occurs for the duration of the specified interval (e.g. 30 seconds).	Observer records the child's reciprocal play behavior with peers if this occurs for the entire interval.
	Partial Interval – Observer records occurrence of behavior if it occurs at any point during the interval (e.g. 20 seconds).	Observer records the child's use of play comments towards peers if a comment occurs at any point during the interval.
Duration Recording	Observer records the length of the occurrence of the target behavior.	Observer records the length of time (e.g. 2 minutes) the child is engaged in reciprocal interaction with peers.

Event recording is a straightforward method of data collection, as long as the behavior has a clear beginning and end and the observer develops a reliable method of recording behaviors. Buggey (2009) suggests several methods for recording the frequency of behaviors, such as using a handheld counter or marking tallies on a piece of

masking tape to allow for movement. Regardless of the specific method used, Banda and colleagues (2007) recommend collecting baseline data during a minimum of three sessions in order to establish stability. Examples of data collection forms are included in Appendices A, B, and C.

Baseline data may also be used to inform the creation of video modeling materials. For example, if social greetings (e.g., "hello") are one of the target behaviors selected, baseline data may reveal that social greetings are used with familiar adults, but not with peers. In this case, it would make sense to feature social greetings directed towards peers in the video created for intervention. It is also possible that closer behavioral observation could indicate that the targeted skill is too advanced for the child's developmental level. For example, if social initiations are initially selected as a target behavior, and the child is observed to rarely interact with peers even when others initiate interactions, this target behavior may not be appropriate. In this example, it may be more appropriate to choose social responses as a target behavior. After the child is more successful in responding to peer interactions, video modeling can be used to address social initiations.

STEP THREE: SELECTING MODELS

Before beginning the filming process, the SLP should select the type of model that will be used to depict the targeted skill. Available research indicates that video modeling appears to be effective regardless of the type of model used (Bellini & Akullian, 2007; McCoy & Hermarisen, 2007; Sherer et al., 2001). Models frequently used in video modeling include peers, familiar and unfamiliar adults, and the child

himself (i.e., video self-modeling). In another technique, "point-of-view modeling," the target behavior is recorded from the model's perspective and the model is not pictured in the video. When using peer or adult models, it is beneficial to write scripts that detail verbalizations and actions that will be recorded. The use of scripts with each model type is discussed below, as well as other factors to consider when selecting models. Examples of adult modeling scripts are included in Appendix D, and examples of peer modeling scripts can be found in Appendix E.

Peer Modeling

Peers, including siblings and classmates, may be used as models in intervention videos. Unfamiliar peers may also be used, and either another peer or an adult may act as a communicative partner if needed. Typically developing peer models of the same age and gender as the child are commonly selected. Bandura's social learning theory (Bandura, 2008) suggests that children tend to be more successful in learning from models who share some of their characteristics, for example age or ethnicity. According to Bandura (2008), children are also more likely to pay attention to a model they perceive to be competent. Therefore, a preferred classmate may be an appropriate choice. As many target behaviors may involve communication with peers, selecting peer models as opposed to adult models may result in a video that better portrays natural peer interaction. This is particularly true for target behaviors that involve play skills.

Although researchers (McCoy & Hermarisen, 2007) have suggested that selecting peers as models may lead to more significant impacts from intervention, there is currently no conclusive research evidence to indicate that peer models are more effective than adult

models. It should be noted that using peers as models presents several challenges. For example, training peers to act in videos is more difficult than training adults. Children are likely to have more difficulty memorizing scripts than adults. If peer models are unable to memorize detailed scripts, the SLP should provide a general structure or storyboard of the scene that will be recorded. Cue cards may also be used to help children remember their scripted actions and language for the video. For example, verbalizations may be written in large print on a poster board and displayed near the video camera for children to refer to. The SLP may also use nonverbal cues to assist peer models, such as pointing to each child when it is his or her turn to speak.

As typically developing preschool children will likely be unable to act from a script, verbal prompting may be used to elicit the desired verbalizations. Prompts may be edited out of the video later on. Alternatively, picture cue cards (e.g., picture depicting "say hello") could be utilized to train young children and to prompt them before various segments in the video. Preschool children may also require redirection to attend to the task. For these reasons, using young children to depict social communication skills successfully may be a time intensive process.

Selecting peer models also requires obtaining parent permission. Parents should be provided with a letter that explains the video modeling intervention, as well as information regarding where and to whom the video will be shown. Despite these potential limitations, peer models may be an appropriate choice in many situations, especially if the peers selected are motivated to participate in the video recording process.

Adult Modeling

Adults (e.g., teachers, SLPs, paraprofessionals) may act out the targeted social communication skills. Although adults either familiar or unfamiliar to the child may provide the model, Wilson (2013) suggests using a familiar adult who the child perceives to be a competent authority figure. In addition to the primary model, another adult may be used as a communicative partner. In school settings, it may be beneficial to choose professionals such as special education teachers, who are likely to be aware of the child's social communication needs in the classroom. The SLP may also model the targeted skills herself, by using a tripod to mount the video camera or asking another professional to record the video.

The chief advantage of using adults as models is ease of training. If provided with a script, adults can memorize scripted verbalizations and actions relatively easily. Adults are likely to be more deliberate than peers when acting out these elements of the script, leading to clear modeling of target behaviors that minimizes irrelevant stimuli. However, adults may appear less natural when modeling social communication behaviors that require interaction with peers. For example, if adults are modeling play actions (e.g., feeding toy animals) and play comments, the resulting video is less likely to truly resemble the way young children play with one another. It may be more difficult for children to apply skills modeled by adults to situations that require peer interaction. It should be noted, however, that selecting adult models is an appropriate choice if time constraints are an important factor.

Video Self-Modeling

In video self-modeling, the child himself is filmed performing the targeted skill. Buggey (2009) suggests several different methods that may be used to capture the child performing target behaviors successfully. If the child has sufficient abilities, role-playing may be used, in which the child acts out the target behavior using similar methods as those described for peer models (e.g., using scripts). This approach may be more suitable for higher-level social communication skills, such as conversation skills (e.g., asking and answering questions). In this case, a peer or adult may be used as a communicative partner.

If role-playing is not possible, imitation may be used to elicit target behaviors (i.e., the child is asked to imitate the clinician's actions and verbalizations, and clinician prompts are later edited out). Buggey (2009) suggests that this method may be particularly effective for skills that involve increased language production, as some children with ASD may easily imitate spoken language.

Of course, some children with ASD may lack adequate imitation skills. In this case, the SLP would need to record the child performing the targeted skill in his natural environment. Here, the child would need to have the target behavior in his repertoire, even if occurrences of the behavior are rare. Clinician prompting may still be used to elicit target behaviors. However, even if prompting is successfully used, this method is likely to require extensive video recording in order to capture instances of successful performance of the target behavior. Buggey (2009) notes that it may be possible to leave the video camera unattended if it is mounted on a tripod, and then return after the selected

time period (e.g., if the target behavior is likely to occur while the child is seated in a classroom).

With the exception of role-playing, these methods are likely to require more intensive video editing after footage has been collected. Depending on the method used to capture footage and the amount of editing needed, video self-modeling may require more time to accomplish than both peer modeling and adult modeling. It should be noted that research (Bellini & Akullian, 2007; Shukla-Mehta et al., 2010) indicates that video self-modeling has been found to be effective in improving social communication skills such as social initiations. As Bandura's social learning theory (Bandura, 2008) suggests that children are more likely to attend to models that are similar to themselves, video self-modeling has the potential to be highly motivating for the child with ASD.

Point-of-View Modeling

In "point-of-view modeling," videos are filmed from the perspective the child would have while performing the target behavior. In this method, videos typically only show the adult model's hands performing scripted actions. According to McCoy and Hermarisen (2007), point-of-view modeling is a recently developed method of video modeling and has been less frequently used than peer modeling, adult modeling, and video self-modeling. However, this method may be beneficial for portraying targeted skills in which actions and materials need to be viewed at close range. It appears that this method would be appropriate for recording videos that depict play actions (e.g., pretend play with toy figurines). In this case, the child with ASD could easily view and attend to modeled actions.

STEP FOUR: PREPARING FOR FILMING

After selecting the type of model that will act out the targeted skills, and providing appropriate training, logistical preparations for filming should be made. This step involves obtaining all equipment needed to film the video. At the minimum, a device with video-recording capabilities is needed. A dedicated video camera is recommended, as this will likely produce a higher quality video and provide the user with more options during the recording and editing process. There are a variety of relatively inexpensive video cameras available; however, a detailed discussion of available options is beyond the scope of this report. Resources such as Consumer Reports© may be helpful in determining the most appropriate video camera for the SLP's needs (Consumer Reports, 2012).

Depending on the setting, the SLP may have access to a video camera or a device with video recording capabilities. Wilson (2013) notes that this may be particularly true in school settings, and if the necessary technology is unavailable to the school SLP, she suggests collaborating with other school faculty members in applying for an educational grant to fund equipment purchases.

If the SLP is unable to obtain access to a video camera, a digital camera with a video recording function is an alternative. However, compared to a video camera, a digital camera is likely to have poor video and audio quality. Another type of device that may have video recording capabilities is a tablet, which is a general purpose computer contained in a single panel. An example of a tablet computer is the Apple iPad®. Other

manufacturers - such as Asus©, Dell©, and Sony© - have produced a variety of tablets, and an Internet search will easily reveal more information and reviews of these products.

The iPad is an option worth considering, as many SLPs may already have access to an iPad, as this device features a variety of applications that may be used in speech and language therapy. The latest version of the iPad includes a higher quality video camera with features such as image stabilization; users may also edit videos on the iPad using an inexpensive iMovie® application (Phillips, 2012). Audio quality on the iPad, however, may be lacking, and the SLP should experiment with video recording on the iPad prior to using this device for video modeling.

In addition to a video camera or a device with video recording capabilities, several other items are recommended. A tripod should be utilized in order to support the weight of the camera and maintain stability. Wilson (2013) suggests using a tabletop tripod, as this option may be less expensive. When filming videos that model social communication skills, audio quality is particularly important. Using an external microphone, a device that connects to and may be mounted on the video camera, is recommended in order to improve audio quality. If lengthy video recording sessions are needed (e.g., as in video self-modeling), an extra battery for the video camera may be helpful. If the SLP is using a borrowed video camera, it is important to ensure that all necessary cables are included. For example, a USB or FireWire cable is needed to connect the video camera to a computer for uploading videos. If the video camera uses an SD (secure digital) card, the SLP may use an SD card reader, which is a device that connects to the computer and reads video data.

A computer is also needed to edit videos and may be used to record DVDs to share with parents and other professionals involved in video modeling intervention. Video editing software is necessary in any case in which adjustments to the video recording are needed, and especially in the case of video self-modeling. Buggey (2009) suggests using either Apple iMovie® or Windows Movie Maker®, which are easy to use video editing programs available free of cost to Mac and PC users (see Buggey's book titled *Seeing is Believing* for a more detailed discussion of video editing software). A list of recommended equipment is provided in Table 4 below.

Table 4: Recommended Equipment for Video Production

Recommended Equipment	***Purpose***
1) Video Camera	To record videos
2) Computer	To upload, playback, and edit videos May be used to record DVDs
3) Connector Cable or SD Card Reader	To upload videos to the computer
4) Tripod	To maintain stability during video recording
5) External Microphone	To improve audio quality
6) Video Editing Software	To edit videos after recording
7) Blank DVDs	To share videos with other individuals involved in the video modeling intervention

STEP FIVE: CREATING THE VIDEO

After obtaining the necessary equipment, the next step is to determine the appropriate setting in which to film the video. If possible, the video should be recorded in the setting in which the child is expected to perform the targeted skill (e.g., preschool classroom). Otherwise, the SLP should choose a setting with similar characteristics (e.g., classroom with similar layout and furniture). Any materials used in the video, such as

toys used in modeling play skills, should be materials that are typically available to the child. If the child is expected to perform the targeted skill in her home, it may be more difficult to record the video in this setting. In this case, the SLP should collaborate with the child's parents in selecting materials and arranging the setting similarly to the child's home environment. For example, parents may bring in toys the child regularly uses at home for the SLP to use during filming.

If there are toys that are especially distracting to the child and could inhibit social interaction, these materials should not be used to demonstrate targeted skills. In addition, the SLP should arrange the environment to reduce any additional stimuli (e.g., posters) that could be distracting to the child. As much as possible, the only toys and materials pictured in the video should be those used to model the targeted skills; other toys and materials should be removed from the frame.

As audio quality is particularly important when recording social communication skills, it is important to reduce or eliminate background noise. This may be particularly difficult in the case of video self-modeling, as this technique is likely to involve recording the child is his natural environment (e.g., classroom setting). When recording other types of models (i.e., adult and peer models), filming in a quiet environment such as an empty classroom or therapy room is recommended. An external microphone may improve audio quality in cases in which filming in a setting with background noise is necessary.

Prior to recording, the SLP should mount the video camera on a tripod and do a quick test recording to make sure that the camera's video and audio functions are

operating correctly. Unless point-of-view modeling is being used, the SLP should also ensure that both the actors and any necessary materials are in the frame. In order to fully capture the targeted skills, it is helpful to start recording and then provide a clear signal to the actors to begin. It may be necessary to film several takes, especially in the case of peer modeling. During recording, the SLP should avoid moving the video camera around unnecessarily, as excessive and sudden movements will produce a bumpy video that may be distracting to the child with ASD. Immediately after recording, the SLP should review the video to ensure that targeted skills were successfully recorded.

During the preparation and recording process, the SLP should be mindful of the intended length of the video. Shukla-Mehta and colleagues (2010) recommend creating videos that are between three and five minutes in length, as children with ASD appear to successfully attend to videos of this length. As mentioned previously, the child's ability to attend to videos should be assessed prior to beginning the intervention process. The SLP should use this information when deciding on the length of the completed video. For example, if the child sustained attention to a similar video for two minutes, a shorter video may be indicated. If the SLP intends to create a video significantly shorter than three minutes, it is important to ensure that the targeted skill is still modeled clearly and effectively. Even in shorter videos, multiple examples of the target behavior should be pictured. Future research is needed in order to determine the most effective number of examples of the target behavior that should be pictured in the video.

Editing the Video

After collecting video footage, basic video editing will be needed in most cases. As mentioned previously, Apple iMovie® and Windows Movie Maker® are recommended options for video editing programs. In both of these programs, it is relatively easy to learn basic video editing functions such as rearranging, splitting, and trimming video clips. The SLP can also easily add creative touches such as title screens and transitions between clips. If multiple takes were needed, the SLP may need to piece together the best examples of the targeted skill. Any irrelevant stimuli should also be removed from the video. For example, if another student entered the room during recording, the SLP should use video editing to delete this interruption. Video editing may also be used to adjust the audio quality of video recordings. For example, iMovie® includes functions that increase or decrease audio in selected video clips, as well as a function that may improve audio quality by reducing background noise.

Video self-modeling is likely to require more intensive editing, as this technique typically involves multiple sessions of video recording. It may be necessary to review a great deal of video footage in order to find sufficient examples of the targeted skill. The SLP would then need to edit together successful examples of the target behavior. Any clinician prompts that were used to elicit the target behavior also need to be edited out. In his book *Seeing is Believing,* Buggey (2009) provides a detailed discussion of video editing techniques. While this discussion focuses on video-self modeling, it may also be applied to other types of video modeling.

STEP SIX: IMPLEMENTING THE INTERVENTION

After recording and editing the video, the SLP may finally implement the intervention. The steps involved in implementing the intervention, as well as questions the SLP should address prior to beginning intervention, are listed in Table 5 below.

Table 5: Procedures for Implementing Video Modeling Intervention

Steps in Implementing Video Modeling Intervention
1) **Identify the setting for the intervention.** • Where will the child watch the video? • Where will the child practice the targeted skill?
2) **Determine when the child will view the video.** • How often will the child view the video? (i.e., frequency) • What time of day will the child watch the video? (i.e., timing)
3) **Decide who will implement the intervention.** • Will the SLP, parent, or other professional present the video?
4) **Introduce the video to the child.** • What instructions will be given to the child before viewing the video?
5) **Show the video to the child.** • Will the child watch the video once, or multiple times per session?
6) **Provide opportunities for the child to practice the targeted skill.** • When will the child practice the target behavior? • With whom will the child practice the target behavior?

The first step in implementing video modeling intervention is identifying the setting in which the intervention will take place. The SLP should arrange a quiet space, free from distractions, for the child to view the completed video. Sigafoos and colleagues (2007) recommend selecting a specific place for video viewing, in order to maintain consistency. The SLP should also determine the setting in which the child will practice the targeted skill. For example, if the intervention is targeting conversational skills, the child may be given an opportunity to practice conversing with peers. In a school setting,

this opportunity could occur during group therapy sessions or unstructured activities like lunch or recess. If the SLP is providing services to the child with ASD individually, the child can practice the targeted skills with the clinician, or additionally, the child's parents or siblings, if they are available during the therapy session.

The next step is to determine when the child will view the video, which requires considering the child's attentional capacities. When planning the timing of intervention, the SLP should take into account the time of day during which the child is most likely to be attentive. According to Sigafoos and colleagues (2007), the child should view the video daily, at the same time of day, immediately prior to when he would be expected to perform the targeted skill. For example, in an intervention targeting play skills in a preschool classroom, the child could view the video immediately before play-based activities are scheduled. This would give the child the opportunity to practice modeled play skills with her peers. If the child has multiple daily opportunities to exhibit the targeted skill, the video may be shown more than once per day. The video may also be shown multiple times in one session.

After specifying when the child will view the video, the next step is determining who should implement the intervention, a choice that may be affected by the timing of video viewing. In a school setting, for example, if it is determined that the child should view the video immediately before recess, the SLP may not be available at this time. In this case, one of the child's teachers, or a paraprofessional, may show the video to the child. If another professional is presenting the video, the SLP should provide training regarding intervention procedures, such as any instructions that should be given to the

child. If the child is given opportunities to practice targeted skills at home, the child's parents may present the video. In this case, the SLP should also show the video during the child's scheduled therapy sessions and arrange situations in which the child can practice target behaviors.

Prior to presenting the video, the SLP should specify instructions that will be given to the child. The SLP may choose to provide instructions or explanation of targeted skills prior to showing the video. Ogilvie (2011) recommends explaining targeted skills in detail, by reviewing settings in which the skill could be used and describing each step of the skill. If the SLP chooses this method, it may be necessary to provide this type of instruction in each video modeling session.

Alternatively, a brief introduction may be presented to the child at the beginning of the video modeling session. For example, the clinician may briefly introduce initiating play to the child (e.g., "This is how we ask our friends to play."). A brief recorded introduction could also be included in the video itself, which would be particularly helpful if someone other than the SLP is presenting the video. Voiceover may also be used to record an introduction or explanation of targeted skills. For instance, the clinician could record descriptions of the modeled actions as they are occurring in the video (e.g., "We share our toys with friends."). Voiceover could also be used to record specific instructions regarding targeted skills (e.g., "You could say, 'Let's build a tower.'"). Sigafoos and colleagues (2007) provide a more detailed discussion of the use of voiceover instructions in video modeling. Refer to Video Example Five in Appendix H for an example of voiceover instruction of targeted skills in video self-modeling.

The next step in implementing the intervention is presenting the video to the child. Before showing the video, it is crucial to ensure that the child is attending. If the child is not paying attention to the video, it will be impossible for him to benefit from modeling of targeted skills. The SLP should decide if it would be appropriate to prompt the child to pay attention while watching the video. Sigafoos and colleages (2007) explain that the child may be reminded to attend to the video and praised for successfully sustaining attention. However, if many prompts are needed, it is recommended that the SLP replay the video without prompting afterwards. Even if the child does not require prompting to sustain attention, repeated viewings during one session may be beneficial. Shukla-Mehta and colleagues (2010) suggest that children may benefit from viewing the video at least twice, and as many as four times, per session. In this case, the child may also be given multiple brief opportunities to practice targeted skills, after each presentation of the video.

The final step in implementing video modeling intervention is providing an opportunity for the child to practice targeted skills. As mentioned previously, this may occur immediately after video viewing. Wilson (2013) also suggests providing an opportunity for practice at a different time during the day, as this may encourage learning as opposed to direct imitation of target behaviors. For example, in a school setting, if the SLP shows the video in the morning, the child could be given an opportunity to practice target skills later in the day during physical education. This method may be more appropriate in the later stages of intervention, after the child has started to demonstrate the targeted skill.

The SLP should also select communicative partners with whom the child may practice targeted skills. Of course, the SLP may act as a communicative partner for the child. For many social communication behaviors, such as play skills, it would be beneficial for the child to practice skills with peers. This could occur naturally within the child's routine, either at home or at school. Alternatively, the SLP could arrange structured opportunities for the child to practice target behaviors. Ogilvie (2011), for example, suggests pairing the child with a typically developing peer mentor, instructing the two children together, and then guiding the children in practicing the skill. In this case, the peer mentor would need training in working with the child with ASD.

In a school setting, a similar opportunity could be arranged during group therapy sessions, even if the students have different language goals. Suppose a student with ASD is working on conversation skills and the other students in the group are practicing narrative language skills. The SLP could present the video to the student with ASD prior to beginning a lesson on narratives in which the students discuss a story. During the discussion, the student with ASD could practice conversation skills by asking the other students questions related to the story (e.g., "Who was your favorite character?").

Video modeling could also be easily incorporated into a social skills group, in which students are working on similar social communication skills. Any student with pragmatic language goals can be included in a social skills group, along with children with ASD. By using video self-modeling, students may participate in the process of creating the video during therapy sessions. Buggey (2009), for instance, suggests using role-playing as a method for filming target behaviors. If students are able to follow

instructions, the SLP may guide them in acting out social communication skills (e.g., social greetings). If appropriate, students may also be involved in other aspects of creating the video, such as choosing roles and contributing to the script.

In this example, the process of producing the video becomes an additional social skills intervention, requiring students to work together to create the video and work with the SLP to troubleshoot problems that may arise. If the students are invested in creating the video, recorded roleplaying sessions are likely to be more successful. Students are also likely to find it rewarding to watch a video that they were active in producing. This type of intervention may be more appropriate for older students (i.e., upper elementary or middle school students); however, younger children with sufficient attentional capacities may also benefit from active involvement in the video production process.

When deciding on specific methods for incorporating video modeling into therapy sessions, the SLP should consider each student's abilities and preferences. Video modeling intervention procedures are relatively straightforward, which allows the SLP flexibility in planning intervention to best meet the child's needs. A sample video modeling lesson plan for targeting play skills with preschool children is provided in Appendix F. In addition, a sample lesson plan for addressing conversation skills with school age children is included in Appendix G.

Associated Strategies

While the previous discussion describes basic video modeling procedures and examples of video modeling intervention techniques, it is also possible to use other intervention strategies and approaches in conjunction with video modeling. These

strategies may also be beneficial if using video modeling in isolation does not result in expected improvement.

For example, reinforcement may be used to facilitate acquisition of target behaviors. In this case, verbal reinforcement, or praise, may be given after the child successfully performs target behaviors (e.g., "Great job asking a question."). The SLP may also provide tangible reinforcement, or concrete rewards, to the child after he or she demonstrates targeted skills. Examples of tangible reinforcers are stickers, preferred food items, and small prizes such as toy cars. The SLP may arrange a system of reinforcement, in which the child works for a specific prize. For instance, the SLP may reward the child with a small prize after the child performs the target behavior two times per session. In order to encourage maintenance of target behaviors, the SLP may also gradually increase the number of target behaviors needed in order for the child to receive tangible reinforcers. In later sessions, for example, the SLP may reward the child with a prize after five occurrences of the target behavior. Reinforcement should be selected based on the child's preferences and characteristics, and should only be used if necessary to motivate the child to successfully perform targeted skills.

Self-management is another strategy that may be used with video modeling. Self-management involves teaching the child to self-monitor his performance of target behaviors. In self-management, the child keeps track of the number of target behaviors he performs, reducing dependence on the SLP or other professionals involved in intervention. For example, a child working on conversation skills could keep track of the target behavior "asking questions" using a sticker chart. In this case, the child could place

a sticker on his chart every time he asks one of his peers a question. Apple and colleagues (2005) used self-management in addition to video modeling to encourage compliment-giving behavior in three children with ASD aged four to five. In this study, two of the children used wrist counters, which allowed them to press a button on the device each time they gave a compliment. Another child in the study used a checklist with two boxes to keep track of compliments. After she gave two compliments and crossed off the boxes on her checklist, she received a tangible reinforcer (e.g., bubble gum). In this case, the combination of video modeling and self-management appeared to be successful in improving compliment-giving behavior in participants with ASD (Apple et al., 2005). It is important to note that self-management would not be appropriate for children with ASD who lack the cognitive capacities needed to self-monitor their behavior.

In addition to strategies such as reinforcement and self-management, other intervention approaches have been used with video modeling. For example, Scattone (2008) presented Social Stories™ in a video format, along with video modeling examples, in order to target social communication skills in a nine-year old child with ASD. According to Scattone (2008), Social Stories™ are brief stories typically presented in a storybook format to "provide the child with an autism spectrum disorder accurate social information about an activity or event, a description of the possible reactions of others, and direction as to the responses he or she is expected to provide in a given social situation" (p. 395). A comprehensive discussion of the Social Stories™ approach is beyond the scope of this project; however, Gray's (2000) book titled *The New Social Story Book* is recommended for detailed information and examples.

Video modeling has also been embedded into computer-based social skills instructional programs. For instance, Simpson and colleagues (2004) used a computer-based instructional program to present definitions of social communication target behaviors, show peer video modeling, and present questions about target behaviors to children with ASD aged five to six. To use this method, the SLP would need additional expertise or training in designing computer-based instructional programs. If the SLP wishes to use other intervention approaches in conjunction with video modeling, it may be beneficial to assess the child's response to each intervention individually prior to using the approaches together.

STEP SEVEN: MEASURING PROGRESS

Throughout the intervention process, it is important to consistently monitor the child's progress towards mastery of targeted skills. Progress monitoring is particularly important, as research has not conclusively demonstrated the number of intervention sessions required for video modeling to produce behavioral change. Bellini and Akullian (2007) noted that across 23 single-subject video modeling studies, the number of intervention sessions conducted ranged from four to 33 sessions, with a median of nine sessions. These findings suggest that the number of sessions needed to demonstrate change is likely to vary considerably depending on the child, as well as the nature of the target behavior. For example, relatively concrete social communication behaviors, such as play actions, may be acquired at a different rate than more complex behaviors, such as conversation skills.

As a variety of factors may contribute to the required length of intervention, the SLP should collect observational data systematically. It may be beneficial to involve other professionals, such as special education teachers, in progress monitoring. This may be particularly appropriate if others are involved in implementing the intervention, and if scheduling constraints prevent the SLP from observing the child in contexts in which target behaviors are likely to occur. In this case, the SLP should provide clear instructions regarding progress monitoring procedures, in order to ensure consistency in data collection. Sigafoos and colleagues (2007) recommend collecting data in every video modeling session and suggest employing the same method of data collection used to collect baseline data. This allows for a reliable comparison to the child's skills at baseline and provides an objective measure of progress. Refer to "Step Two: Collecting Baseline Data" above for a more detailed discussion of methods of collecting observational data, such as event recording, interval recording, and duration recording. Data collection forms in Appendices A, B, and C may be used to collect data during the baseline period, as well as to monitor progress throughout the intervention process.

In assessing the child's response to video modeling intervention, the SLP should also consider generalization and maintenance of target behaviors. Even if observational data indicates that the child has mastered the target behavior in one setting, the SLP cannot assume that learned skills will automatically generalize to other settings. Wilson (2013) suggests addressing generalization during the intervention process by including video examples from several different settings, such as the classroom and library. In any case, the SLP should collect observational data in a variety of settings to ensure that the

child demonstrates targeted skills consistently. In order to monitor the child's maintenance of target behaviors, the SLP should also continue to gather observational data periodically after concluding video modeling intervention.

Associated intervention strategies, such as reinforcement and self-management, may be effective in facilitating maintenance of target behaviors. However, based on the results of a meta-analysis conducted by Bellini and Akullian (2007) and a systematic review conducted by Shukla-Mehta and colleages (2010), more research is needed to determine specific features of intervention that contribute to maintenance and generalization. Regardless of the particular procedures employed during video modeling intervention, the SLP should diligently monitor the child's progress, including the extent to which the child maintains and generalizes target behaviors.

Chapter Three: Video Modeling Examples

ADULT VIDEO MODELING: PLAY SKILLS

In order to demonstrate adult video modeling, two example videos were created using adults as video models. The actors in these videos were two graduate students in communication sciences and disorders. These video examples provide a demonstration of pretend play skills and reciprocal play. Specific social communication target behaviors modeled include initiating play (e.g., "Let's play."), taking turns during play (e.g., "My turn." "Your turn."), and play comments (e.g., "I feed cow."). The first video example depicts play actions with a farm play set and scripted verbalizations in the form of telegraphic speech, or simplified language (see Video Example One in Appendix H). The second video example models play actions using a house play set and scripted verbalizations in the form of grammatical models (see Video Example Two in Appendix H). Prior to filming, the actors were provided with detailed scripts outlining verbalizations and actions. Refer to Appendix D for adult modeling scripts, including a discussion of telegraphic speech and grammatical models. See Appendix H for video file details.

PEER VIDEO MODELING: PLAY SKILLS

An example video was created to show peer modeling of reciprocal play skills. In this case, reciprocal play refers to joint engagement with play materials and the exchange of language during play. Two typically developing four year-old boys were used as peer video models. They were provided with verbal cues to facilitate performance of play behaviors (e.g., "Talk about what you're doing."). Any prompts required were later

edited out of the video. The children were filmed while engaged in play with familiar, preferred play materials (e.g., Legos). Target behaviors depicted in this video example include social greetings (e.g., "Hi"), play comments (e.g., "We're making a castle."), and concluding play (e.g., "Thanks for having me over." "Bye."). Refer to Video Example Three in Appendix H for video file details.

PEER VIDEO MODELING: CONVERSATION SKILLS

Another peer modeling example video was produced in order to demonstrate conversation skills. The actors in this video were two typically developing children: one seven year-old girl and one eight year-old boy. Prior to filming, the children were provided with instructions and scripted examples of targeted language skills. Cue cards were also used during filming to assist with recall of scripted verbalizations. The target behaviors depicted in this example include conversation skills such as initiating conversations (e.g., "Hi, my name is…"), maintaining conversation by asking questions (e.g., "What is your favorite sport?") and answering questions (e.g., "My favorite sport is basketball."), and concluding conversations (e.g., "Well, I have to go now."). An example script, as well as examples of conversation questions, is included in Appendix E. Refer to Video Example Four in Appendix H for video file details.

VIDEO SELF-MODELING: SOCIAL ENGAGEMENT

In order to demonstrate video-self modeling, a six year-old boy was filmed in his preschool setting. The social communication target behavior depicted in this video example is social engagement. Consistent with the definition provided by Bellini and colleagues (2007), social engagement is defined as active involvement in a social or play

activity with a peer. Social engagement includes both social initiations (e.g., joining in a play activity) and social responses (e.g., accepting a toy when offered by a peer). Filming was conducted during the child's natural routine at his preschool. Several sessions of filming were needed in order to obtain sufficient footage of the target behavior. Prompting was used in an attempt to facilitate performance of target behaviors. Any prompts utilized during filming were later edited out, so that the resulting video displays only successful examples of unprompted social engagement. In the first segment of this video example, voiceover was used to provide instruction of targeted skills as they occurred. Refer to Video Example Five in Appendix H for video file details.

Chapter Four: Discussion

Video modeling is an effective intervention approach that SLPs may use to address the social communication needs of children with ASD (Wilson, 2013). Regardless of the specific intervention procedures utilized, video modeling involves presenting video examples that exemplify target behaviors the clinician is addressing with the client. Various forms of video modeling, including peer modeling, adult modeling, and video self-modeling, were previously discussed. Video modeling has been shown to be effective in improving a wide variety of behaviors in individuals with ASD, including social skills, functional skills, and behavioral functioning (Bellini & Akullian, 2007). Several systematic reviews and meta-analyses conducted on video modeling studies (Bellini & Akullian, 2007; Delano, 2007; Mason et al., 2012; Shukla-Mehta et al., 2010) suggest that video modeling is an evidence-based intervention for targeting social communication behaviors in individuals with ASD.

In addition, many step-by-step guides to video modeling have been published; however, these materials provide limited information regarding social communication skills (Banda et al., 2007; Buggey, 2009; Ganz et al., 2011; Graetz et al., 2006; Ogilvie, 2011; Sigafoos et al., 2007). It is important to note that Wilson (2013) published a video modeling tutorial for SLPs who serve children with ASD in school settings. While this tutorial provides valuable information for school-based SLPs, additional resources are needed to assist SLPs in implementing video modeling interventions in a variety of settings. The purpose of this project was to develop a video modeling guidebook intended for SLPs, focusing specifically on social communication skills. This guidebook provides

detailed procedures for implementing video modeling intervention for SLPs to follow regardless of the clinical setting.

In order to provide demonstrations of video modeling, five video examples were produced, using both children and adults as models. These example videos provide illustrations of the various types of video modeling: adult modeling, peer modeling, and video self-modeling. Social communication target behaviors depicted in these videos include play skills, conversation skills, and social engagement. The production of these videos informed recommendations provided in the video modeling procedures described in Chapter Two. The process of creating these videos also illuminated the strengths and challenges of producing videos for intervention.

As an intervention for social communication, video modeling has several strengths. A primary advantage of this intervention approach is that videos provide consistent modeling of social communication skills. Through the filming and editing process, the SLP can ensure that the video includes sufficient and salient examples of the selected social communication behaviors. In addition, the video editing process allows the SLP to edit out irrelevant and distracting stimuli, so that the child with ASD views only the targeted skills.

After the video examples are created, implementing video modeling intervention is relatively easy. The SLP can easily present videos to children with ASD during therapy sessions in a variety of settings. This allows for creativity in implementing the intervention, in that the SLP has many options for integrating video modeling into therapy activities. Alternatively, the SLP may enlist other professionals or parents to

assist in implementing the intervention. As showing video examples is straightforward, the child may benefit from viewing videos multiple times per day, increasing the frequency of observation of target behaviors. It should be noted that additional research is needed to determine the most effective number of video viewings.

Although video modeling intervention has many advantages, there are several challenges that may limit its feasibility. For example, creating videos is a time consuming process. In order to create the peer modeling videos for this project, for instance, it was necessary to provide training and instruction to the peer models. As multiple takes were needed to record target behaviors, the actors became fatigued and needed encouragement to continue participating. The younger children also needed frequent prompting to produce play comments. Video editing was required in order to edit out prompts and remove distracting behaviors exhibited by peer models; however, it was not possible to completely eliminate these behaviors. Although the resulting videos effectively demonstrate the targeted social communication skills, they would be improved by a greater number of distinct examples of the target behaviors.

Producing the video self-modeling example was also a time intensive process. In order to create this video, the child was filmed during his typical routine in a preschool setting. Multiple filming sessions were needed in order to successfully record the target behavior, social engagement. Approximately 155 minutes of raw video footage was recorded in order to acquire sufficient examples of the target behavior. As prompting the child to imitate verbalizations and actions was only occasionally successful, it was necessary to record extensively to capture instances of social engagement. If the child had

been able to role-play target behaviors, the time required to create the video would have been significantly reduced. Extensive editing was also required to identify video footage that could be used, and then edit out irrelevant behaviors and teacher prompts. Despite these challenges, it was possible to create a video in which the child's social engagement was effectively portrayed.

Based on the production of videos for this project, adult modeling appears to be the most efficient form of video modeling. Adult models required far less training than child models. Although several takes were needed to successfully film the video, the overall process was less time consuming than either peer modeling or video self-modeling. As the actors modeled scripted actions deliberately, the resulting videos provide clear modeling of targeted skills. The videos also required very minimal video editing, as there were no irrelevant behaviors to remove from the footage. Consequently, the overall process of creating adult modeling examples was less time consuming than producing either peer modeling or video self-modeling examples.

In addition to the time required to produce videos, video modeling also necessitates technical skills. In order to create high quality videos, SLPs must know how to operate a video camera and related equipment, use video editing software, and troubleshoot technical issues that arise. For example, during the process of creating the videos for this project, there were several issues with the camera's external microphone. In one case, the microphone malfunctioned and failed to capture audio in recorded footage. In another instance, the cord became disconnected and audio was lost for portions of another video recording session. As SLPs are not trained in these types of

technical skills, additional practice may be needed in order to become proficient in video recording and editing. If the SLP is skilled in video production, as a result of practice or prior experience, the process of creating videos may be much more efficient.

Although the video production process may be time intensive, it is important to note that video modeling has been identified as an evidence-based intervention for children with ASD (Bellini & Akullian, 2007; Delano, 2007; Mason et al., 2012). In particular, video modeling appears to be effective in improving social communication behaviors (Shukla-Mehta et al., 2010). However, additional research is indicated in several areas. For example, future research is needed to determine specific features of video modeling intervention (e.g., length of videos, number of examples of target behaviors, number of intervention sessions) associated with positive behavioral change. In addition, research should address the effects of using additional strategies (e.g., self-management) with video modeling, as opposed to using video modeling alone.

Future studies are also needed to identify skills and abilities children with ASD must have in order to benefit from video modeling. Researchers should also investigate individual characteristics (e.g., age, cognitive ability) that would indicate the maximal outcomes from use of a particular form of video modeling (e.g., video self-modeling). Finally, future studies should address the social validity of video modeling intervention. While this intervention approach appears to be effective in improving social communication skills, additional research is needed to determine the practicality of video production in educational and clinical settings.

RECOMMENDATIONS

This project required drawing upon empirical research in order to develop recommended procedures for video modeling intervention, which were discussed in Chapter Two. For instance, findings from systematic reviews of video modeling studies (e.g., Shukla-Mehta et al., 2010) yielded guidelines that can be applied to clinical intervention. Existing video modeling guides (e.g., Wilson, 2013) provided valuable recommendations regarding procedures for intervention. Producing video examples also informed suggested procedures for selecting models, filming, and editing videos. Clinical recommendations, based on previous research as well as the process of creating videos, are listed on the following pages. Recommendations regarding clinical settings are listed in Table 6, suggestions regarding types of models are provided in Table 7, and recommendations regarding video production are listed in Table 8.

Table 6: Video Modeling Recommendations Based on Clinical Settings

Recommendations: Clinical Settings
1) Video modeling is recommended in school settings for the following reasons: • The student with ASD may have the opportunity to practice social communication skills with a variety of peers. • Professionals such as special education teachers may be available to assist in video production. • SLPs may apply for educational grants to fund the cost of technology such as video cameras (Wilson, 2013).
2) Video modeling is also recommended for group therapy (e.g., social skills groups) in other clinical settings, as group therapy provides the child with ASD an opportunity to practice social communication skills with peers.
3) Video modeling is recommended for individual therapy in clinical settings (e.g., private clinics, university clinics, medical settings), with the following caveats: • Producing the video may be time consuming, and it may be difficult to locate actors for peer or adult video modeling. • It is recommended that the SLP arrange opportunities for the child to practice target behaviors with communicative partners other than the clinician (e.g., parents, siblings), to ensure that target behaviors generalize to interaction with other individuals.
4) Video modeling is recommended for home health settings, in the following cases: • Family members (e.g., siblings, parents) are available to act as communicative partners during practice sessions. • Parents are available to act as video models during the video production process. • In an Early Childhood Intervention Services (ECI) setting, for example, the process of creating the video could serve as parent training, as this would teach the parent to effectively model social communication skills.
5) Video self-modeling may be appropriate for individual therapy in a variety of settings, including home health settings, in any of the following cases: • Actors are not available for peer or adult video modeling. • The target behavior is in the child's repertoire. • The child is able to imitate or role-play the targeted skill.

Table 7: Video Modeling Recommendations Based on Model Types

Recommendations: Types of Video Models
1) Adult video modeling is recommended as the most efficient form of video modeling, particularly if time constraints are a concern for the SLP.
2) Peer video modeling is recommended if peer actors follow instructions easily and are motivated to participate in the video production process.
3) Video self-modeling is recommended with the following caveats: • The video recording process is likely to be time consuming, unless the child is able to readily imitate or role-play the targeted skill. • Video editing is likely to be more intensive in video self-modeling than in peer or adult video modeling.

Table 8: Video Modeling Production Recommendations

Recommendations: Video Production
1) Video recording sessions should be conducted in a quiet environment in order to minimize background noise, as audio quality is particularly important when filming social communication skills.
2) The SLP should ensure that all equipment used for video recording (e.g., video camera) is working properly prior to filming.
3) The SLP should receive training in technical skills, or at least practice using equipment, prior to filming.
4) Video editing is recommended in order to improve video quality. Apple iMovie® and Windows Movie Maker® are suggested as easy to use video editing applications.

CONCLUSION

Video modeling can provide an effective, evidence-based intervention for targeting the social communication needs of children with ASD (Bellini & Akullian, 2007; Delano, 2007; Shukla-Mehta et al., 2010). Although video production may be time intensive, children with ASD may benefit significantly from video modeling. Video examples provide another avenue to allow children to observe social communication skills, without the added demands of attending to irrelevant stimuli. In addition, implementing intervention is a relatively straightforward process, allowing the SLP flexibility in integrating video modeling into therapy sessions. This project was designed to provide a user-friendly guidebook for implementing video modeling interventions in a variety of clinical settings. SLPs may benefit from following the recommendations provided as they design video modeling interventions to assist children with ASD in communicating effectively with both peers and adults.

Appendices

APPENDIX A: EVENT RECORDING DATA COLLECTION FORM

Student Name: _____

Observer: _____

Target Behavior: _____

Date of Observation	Observation Time	Activity (e.g., English)	Tally of Occurrences	Total Occurrences

APPENDIX B: INTERVAL RECORDING DATA COLLECTION FORM

Student Name: ______________________________

Observer: __________________________________

Date of Observation: _________________________

Activity (e.g., English): _______________________

Target Behavior: ____

Interval Length: ___________________________

Partial Interval: Record occurrence of target behavior if behavior occurs at any point during interval.
Whole Interval: Record occurrence of target behavior if behavior occurs for the entire interval.

Time	Int. 1	Int. 2	Int. 3	Int. 4	Int. 5	Int. 6	Int. 7	Int. 8	Int. 9	Int. 10	% of Total
Time	**Int. 1**	**Int. 2**	**Int. 3**	**Int. 4**	**Int. 5**	**Int. 6**	**Int. 7**	**Int. 8**	**Int. 9**	**Int. 10**	**% of Total**
Time	**Int. 1**	**Int. 2**	**Int. 3**	**Int. 4**	**Int. 5**	**Int. 6**	**Int. 7**	**Int. 8**	**Int. 9**	**Int. 10**	**% of Total**
Time	**Int. 1**	**Int. 2**	**Int. 3**	**Int. 4**	**Int. 5**	**Int. 6**	**Int. 7**	**Int. 8**	**Int. 9**	**Int. 10**	**% of Total**
Time	**Int. 1**	**Int. 2**	**Int. 3**	**Int. 4**	**Int. 5**	**Int. 6**	**Int. 7**	**Int. 8**	**Int. 9**	**Int. 10**	**% of Total**

Percentage of total intervals in which target behavior occurred:

$$\frac{\text{Number of intervals in which target behavior occurred}}{\text{Total number of intervals}}$$

APPENDIX C: DURATION RECORDING DATA COLLECTION FORM

Student Name: _____

Observer: _____

Date of Observation: _____

Time of Observation: _____

Target Behavior: _____

Activity (e.g., Play Centers):	Target Behavior Start Time	Target Behavior End Time	Total Time (in minutes)

APPENDIX D: ADULT VIDEO MODELING SCRIPTS

Target Behaviors:

- Pretend play skills and reciprocal play
- Initiating play (e.g., "Let's play.")
- Taking turns during play (e.g., "My turn." "Your turn.")
- Play comments (e.g., "I feed cow.")
- Play actions (e.g., pouring play food into bowl)

Rationale for Modeled Language:

When modeling language in videos, either telegraphic speech or grammatical models may be used. Telegraphic speech refers to simplified language utilizing simple syntax, limited vocabulary, and exclusion of function words (Wolfe & Heilmann, 2010). Alternatively, using grammatical models, or expanded input, means modeling language with appropriate syntax in well-formed phrases and sentences. According to Wolfe and Heilmann (2010), there has not been conclusive evidence to show that one of these approaches is more effective than the other in improving children's expressive language abilities. These researchers compared the use of simplified input and expanded input in focused stimulation intervention for a child with expressive language impairment and found that neither approach was clearly advantageous (Wolfe & Heilmann, 2010).

These two approaches are also reflected in studies that target play skills using video modeling (Boudreau & D'Entremont, 2010; MacDonald et al., 2005; Sancho et al., 2010). Among the studies that included scripts of the exact verbalizations used, it appears that MacDonald and colleagues (2005) utilized grammatical models, while Sancho and colleagues (2010) and Boudreau and D'Entremont (2010) used telegraphic speech in their scripts. As there appears to be no clear advantage to using either telegraphic speech or grammatical models, an example of each approach is provided in the following scripts. The scripted verbalizations for the first scene are presented using telegraphic speech, while the script for the second scene utilizes grammatical models.

Scene One

Appropriate for a client with the following language abilities:
MLU: approximately 2.80 (Based on mean length of scripted verbalizations.)
Approximate developmental age: between 2 years, 6 months and 3 years (Based on Brown, 1973).
Note: Verbalizations presented using telegraphic speech.

Play Set #1: Farm
Base structure: Barn and Pond
Characters: Horse, Cow, Duck, Dog Objects: Bowl, Play food

Running time: Approximately 2.5 minutes
AM = Adult Model CP = Communicative Partner

Actor	Object	Action	Verbalization
AM	Farm	Opens barn.	"We play farm."
AM	Cow	Moves cow across floor in front of barn.	"Mooo! Cow hungry."
AM	Cow, food, bowl	Pours food in bowl. Moves cow towards bowl to eat.	"I feed cow."
CP	Food	Reaches for food.	"My turn!"
AM	Food	Gives food to CP.	"Your turn!"
CP	Horse, food, bowl	Pours food in bowl. Moves horse towards bowl to eat.	"Horse wants food." "Yum."
CP	Horse	Moves horse away from bowl towards barn.	"All done eating."
AM	Dog	Picks up dog.	"Ruf ruf! Puppy thirsty."
AM	Dog	Moves dog towards pond to drink.	"Puppy drinks."
CP	Cow	Picks up cow and moves toward pond to drink.	"Cow wants water."
AM	Duck	Picks up duck and puts in pond to swim.	"Look! Duck swims."
AM	Duck	Gives duck to CP.	"Your turn!"
CP	Duck	Puts duck in pond to swim.	"My turn!"
AM	Dog	Picks up dog and walks towards barn.	"Puppy wants nap."
CP	Cow	Picks up cow and walks towards barn.	"We go home."
AM	Dog	Puts dog inside barn.	"Go sleep puppy."
CP	Cow	Puts cow inside barn and closes barn.	"Bye-bye cow!"

Scene Two

Appropriate for a client with the following language abilities:
MLU: approximately 4.40 (Based on mean length of scripted verbalizations.)
Approximate developmental age: between 3 years, 5 months and 3 years, 9 months (Based on Brown, 1973).
Note: Verbalizations presented using grammatical models.

Play set #2: House
Base structure: Toy House
Characters: Mom, Dad, Boy, Girl Objects: Bed, Tool, Car

Running time: Approximately 2.5 minutes

AM = Adult Model CP = Communicative Partner

See the following page for Scene #2 Script.

Note:

- For both scenes, selection of materials (base structure and approximately 7 characters or objects) guided by (MacDonald et al., 2005).
- For both scenes, selection of scripted play comments and actions guided by (MacDonald et al., 2005) and (Sancho et al., 2010).

Actor	Object(s)	Action	Verbalization
AM	Toy house	Opens house.	"Let's play house."
CP	Boy	Picks up boy figurine. Gives boy figurine to AM.	"Look! I found a boy!"
AM	Boy, bed	Boy figurine walks towards the bed in the house.	"He wants to jump on the bed."
	Boy	Boy figurine jumps on bed.	"Weee! He's jumping up and down."
CP	Boy	Reaches for boy figurine.	"My turn!"
AM	Boy	Gives boy figurine to CP.	"Your turn!"
CP	Boy, bed	Boy figurine jumps on bed.	"Look! He's jumping high.
AM	Bed	Bed falls onto the floor while boy is jumping.	"Uh oh! The bed fell down!"
CP	Girl	Moves girl figurine next to boy figurine, pretending to talk to boy.	"Go tell Daddy."
AM	Dad	Moves dad figurine next to boy and girl figurine.	"I'm the Daddy!"
	Dad, tool	Moves dad figurine to get tool. Uses tool to fix bed.	"I'm fixing the bed."
CP	Girl	Moves girl figurine closer to bed.	"Daddy fixed the bed."
AM	Boy	Moves boy figurine closer to girl and bed.	"Don't tell Mommy."
CP	Girl, dad	Moves girl figurine closer to dad figurine.	"Where is Mommy?"
AM	Mom, car	Mom figurine rides in car towards house.	"Mommy's home now!"
CP	Dad, mom	Moves dad figurine next to mom figurine.	"Let's go eat!"
AM	Dad, car	Places figurines in car. Dad figurine drives in car away from house.	"I'm driving the car."
AM	Dad, car	Hands dad figurine to CP.	"Your turn!"
CP	Dad, car	Takes dad figurine from AM.	"My turn!"
CP	Dad, car	Figurines ride in car away from house.	"Vroom! I'm driving the car fast!"
AM	Boy	Car stops. Picks up boy figurine and waves at house.	"Bye-bye"

APPENDIX E: PEER VIDEO MODELING SCRIPT

Example Script for School Age Children

Target Behaviors:

- Initiating conversations (e.g., "Hi, my name is _____." "How are you doing?")
- Maintaining conversations
    - Asking questions (e.g., "Where do you live?" "What do you do after school?")
    - Answering questions (e.g., "I live in Austin." "I ride my bike and play with friends.")
- Concluding conversations (e.g., "Well, I have to go now." "I'll see you later.")

Scene 1: Introducing Yourself

Example:

Actor 1: Hi, my name is _____. What's your name?
Actor 2: My name is _____. How are you doing today?
Actor 1: I'm doing well. How about you?
Actor 2: I'm good, thanks.

Scene 2: Asking and Answering Questions

Example:

Actor 1: Where do you live?
Actor 2: I live in Austin. Where do you live?
Actor 1: I live in Austin too. What grade are you in?
Actor 2: I'm in third grade. What about you?
Actor 1: I'm in second grade. What's your favorite subject?
Actor 2: I like science and art. Do you like art?
Actor 1: Yeah, I like to paint and draw. What do you do after school?
Actor 2: I ride my bike and hang out with friends. What do you like to do?
Actor 1: I really like to go swimming. Do you have any pets?

Scene 3: Saying Goodbye

Example:

Actor 1: Well, I have to go now.
Actor 2: Me too.
Actor 1: Nice to meet you.
Actor 2: You too. I'll see you later.
Actor 1: Okay, goodbye.

Sample Conversation Questions:

- What do you like to do at recess?
- What do you do on the weekends?
- Where do you go on vacation?
- Where is the most exciting place you have ever been?
- Do you have any brothers or sisters?
- What is your favorite thing to do with your family?
- What do you like to do with your friends?
- What is your favorite food?
- What is you favorite movie?
- What is your favorite book?
- Do you like to go out to eat? Where?
- What kind of music do you like?
- Do you play any instruments?
- Do you play any sports?
- What do you want to be when you grow up?

APPENDIX F: SAMPLE PRESCHOOL LESSON PLAN

Setting: Preschool group therapy session, in the children's preschool or in another clinical setting (e.g., private clinic, university clinic) in which group therapy is provided. Group therapy sessions may include one or more children receiving video modeling intervention. Any form of video modeling (i.e., peer modeling, adult modeling, video self-modeling) may be used, as appropriate. See Video Examples One and Two in Appendix H for an example of adult modeling of play skills. See Video Example Four for peer modeling of play skills.

Target Behavior	Materials	Procedures
Play Skills *Play Comments* Definition: spontaneous verbalizations referencing play materials or actions, directed at peers and occurring during play. *Examples:* "Let's play house." "My turn." "Your turn." "He's riding in the car."	• Visual schedule • Video modeling example • Computer, television, or projector screen to present video • Play center materials (Developmentally appropriate toys) • Materials for reinforcement (as needed) • Hello song • Goodbye song *Note: any songs appropriate for preschool children may be chosen.	1) Hello Circle • Review visual schedule. • Hello activity: Prompt each child to say hello to one other child in the group. • Hello song: SLP leads song and prompts children to sing song together. 2) Video Presentation • Present the video example. If multiple children are receiving video modeling intervention, children may view videos on separate computers or on a larger screen, as appropriate to the particular group of children. 3) Play Centers • Arrange multiple centers for play (e.g., blocks, play kitchen, farm play set) • Guide children in rotating through play centers, with at least two children per center at any given time. • Reinforcement or prompting may be provided, as previously determined by the SLP (refer to Chapter 2, Step 6). 4) Goodbye Circle • Goodbye activity: Prompt each child to say goodbye to one other child in the group. • Goodbye song: SLP leads song and prompts children to sing song together. *Note: Structure guided by (Kroeger et al., 2007)

APPENDIX G: SAMPLE SCHOOL AGE LESSON PLAN

Setting*:* School age individual therapy session, at the student's school or in another clinical setting (e.g., private clinic, university clinic) in which individual therapy is provided. Any form of video modeling (i.e., peer modeling, adult modeling, video self-modeling) may be used, as appropriate. See Video Example Four in Appendix H for an example of peer modeling of conversation skills.

Target Behaviors	Materials	Procedures
Conversation Skills: Maintaining Conversation The following skills may be targeted separately, or in combination: *Answering Questions* Definition: responding to questions with contextually relevant information (e.g., in response to "Where do you live?" "I live in Austin.") *Asking Questions* Definition: asking questions that are related to the conversational topic and designed to elicit information from the communicative partner. (e.g. "What do you do on the weekends?" "Where do you go on vacation?" "What is your favorite book?")	• Schedule • Dry erase board • Video modeling example • Computer or television to present video • Materials for reinforcement and/or self-management of target behavior	1) Introduce the Lesson • Review schedule. • Introduce the targeted skill, providing examples of maintaining conversation by answering and asking questions. • Highlight examples visually (e.g., by drawing on a dry erase board). *A brief introduction may also be used (e.g., "Today we're learning about talking to our friends."). Refer to Chapter 2 for more details. 2) Video Presentation • Present the video example to the student. Student may view video on a computer or on a larger television screen, as appropriate. 3) Practice in Therapy Setting • Student practices maintaining conversation with the SLP, by answering and/or asking questions. • Instructional prompts may be provided during conversation. • Reinforcement or self-management of target behaviors may be used, as previously determined by the SLP (refer to Chapter 2). 4) Practice with other Communicative Partners • Student may view video again before second opportunity for practice. • Arrange opportunity for student to practice maintaining conversation with family members (e.g., siblings), peers, and/or other professionals (e.g., occupational therapist). • Collect observational data while student practices conversation skills.

APPENDIX H: SUPPLEMENTARY FILES

List of Video Modeling Examples

1) Video Example One

Type of Video Modeling: Adult Modeling

Target Behavior: Play Skills

File Name: AVM Play Example Scene One.m4v

2) Video Example Two

Type of Video Modeling: Adult Modeling

Target Behavior: Play Skills

File Name: AVM Play Example Scene Two.m4v

3) Video Example Three

Type of Video Modeling: Peer Modeling

Target Behavior: Play Skills

File Name: PVM Play Example.m4v

4) Video Example Four

Type of Video Modeling: Peer Modeling

Target Behavior: Conversation Skills

File Name: PVM Conversation Example.m4v

5) Video Example Five

Type of Video Modeling: Video Self-Modeling

Target Behavior: Social Engagement

File Name: VSM Social Engagement Example.m4v

Glossary

1) **Social initiations:** Social engagement involving unsolicited verbalizations (i.e., not immediately preceded by prompts) addressed to peers or adults (Buggey, 2005).

2) **Social responses:** Social engagement that includes providing assistance following a request, responding to questions, joining in activities following an invitation, responding to a greeting or compliment, accepting a toy or object when offered, and accepting physical affection (Bellini et al., 2007).

3) **Perspective-taking:** The ability to determine mental states of others in order to explain or predict behavior (Charlop-Christy & Daneshvar, 2003).

4) **Instructional prompts:** Verbal cue directing the child to the target behavior, when the child is engaged in any other irrelevant behavior (e.g., "Give the block to Sally.") (Paterson & Arco, 2007).

5) **Verbal reinforcement:** Verbal praise in response to the child's successful performance of target behavior (e.g. "Great job talking to friends.") (Taylor et al., 1999).

6) **Tangible reinforcement:** Concrete rewards (e.g., preferred foods, stickers) provided by the clinician after the child successfully performs the target behavior (Charlop & Milstein, 1989).

7) **Self-management:** Strategies for increasing the child's independent performance of target behaviors by training the child to self-monitor, or keep track of, occurrences of the target behavior (Apple et al., 2005).

8) **Social Stories™:** Short stories that are written to "provide the child with an autism spectrum disorder accurate social information about an activity or event, a description of the possible reactions of others, and direction as to the responses he or she is expected to provide in a given social situation" (Scattone, 2008, p. 395).

9) **Computer-based social skills instructional programs:** Any program that uses computer software to visually display social skills concepts. Simpson and colleagues (2004) used a computer-based instructional program to define social communication target behaviors and display peer video modeling of target behaviors.

10) **Social communication skills:** Social skills used to communicate with others, such as conversational skills, play skills, social initiations, and social responses (Bellini & Akullian, 2007)

11) **Functional skills:** A generic term used in the developmental disabilities field to "refer to sets of life skills that people need to use in the community, in their home, and in their work place" (Ayres & Langone, 2005, p. 192)

12) **Behavioral functioning:** Improvements in behavioral functioning involve a reduction in problem behaviors (e.g., aggressive behavior such as pushing) and off-task behaviors (e.g., behavior other than what the child was asked to perform) (Bellini & Akullian, 2007).

13) **Contingent response**: A child's utterance is considered contingent if it occurs within a two second interval following a peer's utterance (Thiemann & Goldstein, 2001).

14) **Initiating comments: "**Descriptive comments that are related to the ongoing topic or event, but not contingent on a peer's prior utterance and not used to request information" and that occur after a three second interval following a peer's utterance (Thiemann & Goldstein, 2001, p. 430).

15) **Spontaneous requesting:** Independently asking for a desired object or action without assistance or prompting (Wert & Neisworth, 2003).

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