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Teaching Play Activities to Children with Autism Comparing Adult and Peer Models



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Abstract

Video modeling is a strategy used to teach skills to children with autism. Few researchers have investigated whether peer or adult video models are more effective in teaching skills such as play. While typical children may learn better from peers than adults, it is possible that children with autism do not detect differences between peer and adult models and learn equally well from both. This study used a multiple baseline design to assess whether video modeling was associated with changes in the frequency of appropriate play behaviors for two preschoolers with autism. Results showed that the video modeling intervention increased modeled toy play for both participants, while only one participant demonstrated better performance with adult models. These results are discussed, and implications for future research are outlined.

Introduction

Today, it is estimated that one in every 110 children is diagnosed with an Autism Spectrum Disorder (Centers for Disease Control, 2010). Autism is a developmental disorder that appears in the first 3 years of life and affects the brain's normal development of social, cognitive, and communication skills (American Psychiatric Association [DSM-IV-TR], 2000). This affects the way a child perceives the world, and it makes communication and social interaction difficult. Typically-developing children generally learn social interaction and symbolism through play, usually with toys or by observing others. Many children with autism lack these skills and instead demonstrate repetitive behaviors or intense interests that interfere with social interactions. They will play with a single toy to the exclusion of all others, or arrange toys in precise stacks or lines. They also lack pretend play skills and are sometimes unable to use one object to represent another symbolically, such as using a banana as a telephone.

Play provides a plethora of benefits to developing children. It is an important part of social development. Play provides an avenue for practicing culturally and socially important activities and preparing the child for life (Jordan, 2003). It is the medium through which children develop skills, experiment with roles, and interact with others. Children develop social and communication skills by playing with other children. They also develop cognitive and abstract thinking skills by playing with toys. By improving the play skills of children with autism, social interactions and communication skills may also be improved.

Typically-developing children learn and practice social behaviors by engaging in cooperative and parallel play. Children with autism, however, usually show deficits in these areas (DSM-IV-TR, 2000). Rather than playing near and with other children, children on the autism spectrum may show repetitive play behaviors with

specific toys, and they may avoid including others in these play activities. It would be logical to propose that if appropriate play behaviors in children with autism were improved, then opportunities for social interactions would also increase.

Behavioral Strategies to Improve Play Skills

Behavioral methods are often used to improve the play skills of children with autism. Skills can be taught in isolation, that is, a researcher can teach a child play skills that can be used alone or with others. This method helps children with autism learn skills that will help them play with peers (Terpstra, 2002). For instance, after learning isolated play skills, children demonstrated more ideas about how to play with the toys during spontaneous play when cues and instruction were provided (Lewis & Boucher, 1995). Discrete trial training is a behavioral method used to teach play skills to children with autism. This involves breaking down complex skills into smaller sub-skills. These sub-skills are then taught through a series of massed teaching trials. In discrete trial training, the learning environment is highly structured and controlled by the therapist. Play materials are chosen by the teacher, and the child is presented with a clear instruction to elicit a response. Acquisition is facilitated by the use of explicit prompting and shaping techniques, and systematic reinforcement is provided contingent upon the child's production of the target response (Ingersoll, 2003). Another behavioral method that can be used to teach play is Pivotal Response Training. This method is designed to increase a child's motivation to participate in new learning activities and can be used in either a structured environment or a naturalistic setting (Stahmer, Ingersoll, & Carter, 2003). Pivotal Response Training is a naturalistic training method that is structured enough to allow children to learn both simple and complex skills while still allowing for creative opportunities during play.

Video Modeling

Increasingly, research has focused on video modeling to improve the skills and social interactions of children with autism. Video modeling involves videotaping an individual who is performing target behaviors. This video is then shown

to the child, and the child is expected to imitate the behaviors she or he observed in the video. It has been suggested that video modeling may be effective for children with autism because television is an engaging medium that leads to longer sustained attention while it also does not require social interaction (Charlop-Christy, Le, & Freeman, 2000). Video modeling could be considered more advantageous than in vivo modeling for several reasons. First, the cost of making videotapes can be lower than the cost of bringing therapists into the chosen setting to serve as models. Also, a videotape can be used anywhere there is a playback device. A video can be played repeatedly, giving the child a chance to watch the video more closely and practice a skill. Finally, tasks on video can be shown and taught in a standardized way, which might make a skill easier to learn (Charlop-Christy, Le, & Freeman, 2000).

Video modeling has been used to teach a wide variety of skills to individuals across a range of disabilities and ages (Maione & Mirenda, 2006). In one study by Cihak, Fahrenkrog, Ayres, and Smith (2010), four students with autism improved transitioning skills using video modeling. The children were shown an iPod video of themselves properly transitioning from one place to another. All four children were able to transition more independently when the intervention was in place than when it was not. In a similar study using video modeling, Keen, Brannigan, and Cuskelly (2007) used an animated toilet training video along with operant conditioning strategies to teach daytime urinary control to five boys with autism. Frequency of in-toilet urination was found to be greater for the children who watched the video in conjunction with the operant conditioning than for those who only received the operant conditioning treatment.

Only a few studies have explored the use of video modeling to teach social play and toy play skills. In an early study of the use of video modeling to improve play, Charlop and Milstein (1989) increased levels of correct responding to questions about particular toys in three boys with autism by having them observe video conversations of two people discussing toys. Correct responding general-

ized across novel topics of conversation, people, and toys and was maintained for 15 months. In another study, Nikopoulos and Keenan (2004) showed that video modeling successfully improved the social initiations of three children with autism. The children watched a video featuring a typically-developing peer and an experimenter engaged in social interactive play using one toy. All three children showed improvements in social initiations and reciprocal play, with effects being maintained for three months. Taylor, Levin, and Jasper (1999) conducted a study to teach play-related statements to two boys with autism. They videotaped an adult model performing a scripted routine with each of the boys' siblings and then showed each boy the video with their sibling. An increase in the scripted play-related statements was shown as well as an increase in unscripted play-related statements. Video modeling has also been used to teach complex play sequences to children with autism. Tereshko, MacDonald, and Ahearn (2010) created a segmented video of a model performing an eight-step sequence to build a toy structure that resembled a monster. The video was then shown to four boys with autism to teach them to imitate the same eight-step sequence and create the same toy structure the model in the video created.

Although there have been several studies demonstrating the effectiveness of video modeling to teach play, there is still only limited understanding of the types of models that make this strategy most successful. For example, early work by Bandura (1977) suggested that individuals were more likely to model behaviors if the model was similar to the observer. From this perspective, we might hypothesize that children with autism would respond better to peer models than to adult models. If this is the case, we might expect to see greater increases in modeled behaviors when peer models are viewed than when adult models are viewed. In the only known study that looked directly at this issue, Jones and Schwartz (2004) showed that children with autism demonstrated no clear preference for a single model, although some of the children did respond correctly to the presented stimuli more often when a child (either peer or sibling) was used in the video rather than an adult model. However, this

study looked at video modeling to teach academic concepts, such as labeling “actions,” “opposites,” and “professions” in pictures. It is unclear whether child models would be more beneficial for teaching play-based activities; therefore, further research on model features in the context of play interactions is desirable.

The present study was initiated to assess further the utility of video modeling in teaching play skills and play verbalizations to preschoolers with autism. Furthermore, the present study was also designed to evaluate whether the age of the model was an important factor in teaching play behaviors. Specifically, the study was designed to assess whether the play skills of children with autism improved more in conditions where peer models were viewed, as opposed to conditions where adult models were viewed.

Methods

Participants

Two boys participated in this study. Parental consent was obtained for both children, and each student participated for approximately 4-6 months. Participant 1, Jeremy, was 3 years, 5 months at the time the study was initiated. On Jeremy’s most recent pre-study testing, conducted at 30 months of age, he received a standard score of 57 on the Mullen Scales of Early Learning, a score that suggested a significant cognitive delay. Jeremy showed the most significant deficits in Receptive and Expressive Communication skills, although he demonstrated emerging language at the time the study was conducted. Participant 2, David, was 3 years, 9 months at the time the study was initiated. Although formal cognitive testing scores were not available, David’s Adaptive Behavior Composite score of 74 on the Vineland-II Adaptive Behavior Scales was in the Moderately Low range, and David’s Communication and Socialization scores were also in the Moderately Low level. Both participants had been educationally classified as meeting criteria for an Autism Spectrum Disorder and were currently receiving services in classrooms designed for preschoolers on the autism spectrum.

Toy Set	Toys
Blocks & Cars	<ul style="list-style-type: none"> • Cardboard blocks • 3 toy cars, varied sizes
Farm	<ul style="list-style-type: none"> • Barn • Plastic farm animals
Music	<ul style="list-style-type: none"> • Drum & drumsticks • Tambourine
Play Food	<ul style="list-style-type: none"> • Toy food • Pans, plates • Toaster • Food basket

Table 1. Toys used in the study

Materials

The toys used in this study included a barn with animals, musical instruments, toy food, cars, and blocks (see Table 1).

Video Models and Video Intervention

Prior to initiating the study, experimenters created videos of peer and adult models playing appropriately with the toys described in Table 1. The peer models were a boy (age 7) and a girl (age 5). As the first step in creating the video modeling segments, peer models were videotaped playing with and talking about the toys available in the session room. Brief segments of appropriate play were then clipped together to show a series of appropriate play actions and statements. For the purposes of this study, two peer video clips were created. These clips totaled approximately 3-min in length when both were viewed consecutively. The play behaviors and verbalizations of the child models were then transcribed to allow experimenters to create videos of the adult models engaging in identical actions and play statements. The adult models were both female undergraduate students at a local university who volunteered for the study. The two adult models were videotaped playing with the toys following the transcribed notes from the peer modeling sessions. Again, these videos were clipped together to show an identical sequence of play behaviors and statements. The two clips of adult models were viewed consecutively, and both sessions together totaled approximately 3-min in length.

Design and Procedure

This study used a multiple baseline across participants with an alternating treatments design to evaluate whether there was an effect in regards to the treatment and model types used (Cooper, Heron, & Heward, 2007).

Baseline sessions.

Baseline sessions were conducted in a small 8’ x 8’ room adjacent to participant classrooms. The examiner placed the toy sets on the floor of the room in random order and gave the child the instruction, “Let’s play.” The child was videotaped for three minutes playing with the toys. Every thirty seconds or when the child changed activities, the experimenter provided a prompt (i.e., “What are you doing?”). This prompt was used to elicit verbal commenting and social engagement. No other prompts were provided during baseline sessions.

Intervention sessions.

Intervention sessions took place in the same room. Initially, participants were seated at a table and observed videos of either peer models (A phase) or adult models (B phase) playing appropriately with the toys. Videos were played on a laptop. After watching the videos, the experimenter closed the laptop and moved the child from the table. The experimenter provided the same instruction (“Let’s play”) and used the same prompt rules (i.e., the experimenter stated, “What are you doing?” approximately every 30-sec or when the

child changed activities). The child was videotaped during play with the toys for three minutes.

Measures

An undergraduate student who was receiving credit for a psychology course transcribed the digitally-recorded sessions. The transcribed sessions were then coded for modeled play behaviors and modeled verbal behaviors by two different undergraduate student volunteers. Approximately 30% of transcribed sessions were coded by two independent observers to allow for calculation of reliability.

The following measures were scored from videotaped sessions: modeled play behavior, and modeled play statements. Modeled play behaviors and play statements are described in Tables 2 and 3. Modeled play behaviors were defined as any play action that was performed by the video model (e.g., popping the toast from the toaster, building a tower out of blocks and knocking it down with a toy car). Modeled play statements were defined as verbal words or phrases related to play that were modeled in the videos.

Modeled Behaviors			
	A		B
1	builds tower with blocks	1	places an animal at trough
2	pushes car on floor	2	places animals in barn
3	knocks down block tower with car	3	takes animal out of barn
4	puts drum strap over neck	4	marches and bangs on drum
5	bangs on drum with drumsticks	5	makes sandwich (2 pieces)
6	hits or shakes tambourine	6	eats sandwich
7	eats French fries	7	pops food item from toaster
8	places animals in barn	8	puts ketchup on hotdog
9	closes gate (inner door)	9	eats hot dog
10	closes barn (outer door)	10	opens u-shape made from blocks
		11	drives car between blocks
		12	eats food item from toaster
		13	knocks down blocks with hand

Table 2. Modeled Behaviors separated by model A and model B

Modeled Verbalizations			
	A		B
1	uh-oh	1	I'm giving the animals a drink
2	marching in a band	2	moo, moo
3	playing the tambourine	3	rooster noise
4	eating French fries	4	baaaa
5	they're all gonna go asleep	5	neigh
		6	I'm playing the drums
		7	making a sandwich
		8	I'm making toast
		9	making a hotdog
		10	I'm putting the cars in the garage
		11	I'm building a tower then I'm
			gonna knock it down

Table 3. Modeled Verbalizations separated by model A and model B

Results

In order to evaluate the overall effectiveness of the video modeling intervention to teach play skills, peer and adult sessions were combined in Figures 1 and 2. The frequency of modeled play actions performed by the children is shown in Figure 1. During baseline, the children engaged in only a few modeled play behaviors and verbalizations. Participant 1 averaged 4.71 modeled play behaviors per session and participant 2 averaged 4.45 modeled play behaviors per session during baseline. Both children showed increases in modeled play actions during the intervention phase. The frequency of modeled actions following intervention ranged from 2 to 18 modeled play behaviors each session, with an average of 8.38 modeled play behaviors per session for participant 1 and 11.25 modeled play behaviors per session for participant 2.

The frequency of modeled verbalizations performed by the children is shown in Figure 2 below. During baseline the children used the modeled verbalizations rarely. Only David showed an increase in modeled verbalizations during the intervention phase. David's verbalizations increased from an average of 0.27 modeled verbal statements in baseline to an average of 6.22 modeled verbal statements in the intervention phase.

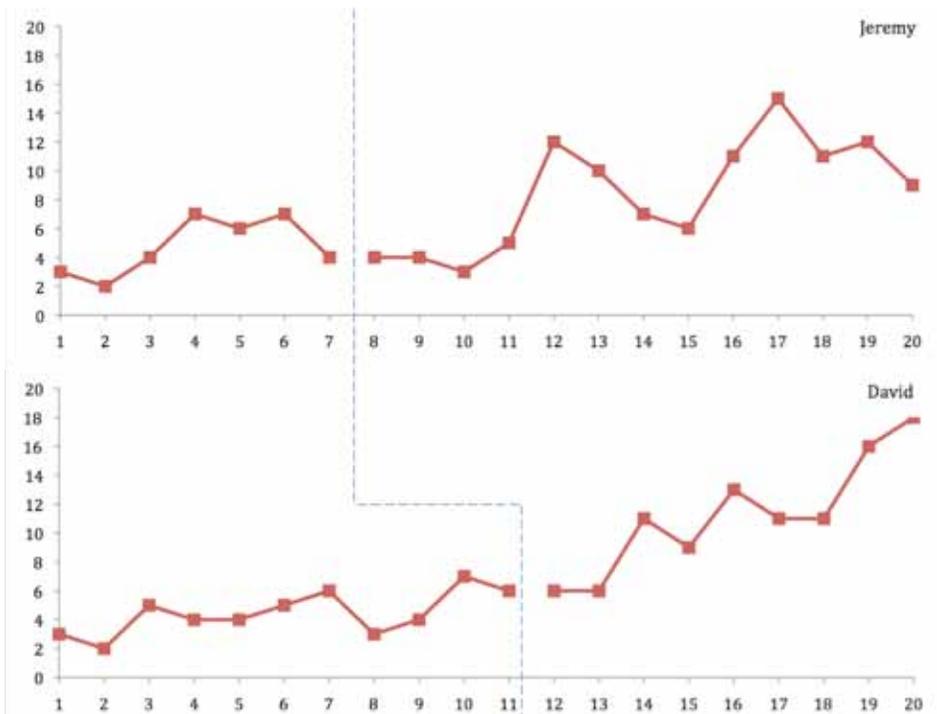


Figure 1. Modeled Play (Reliability 83.8% range 66.67%-100%)

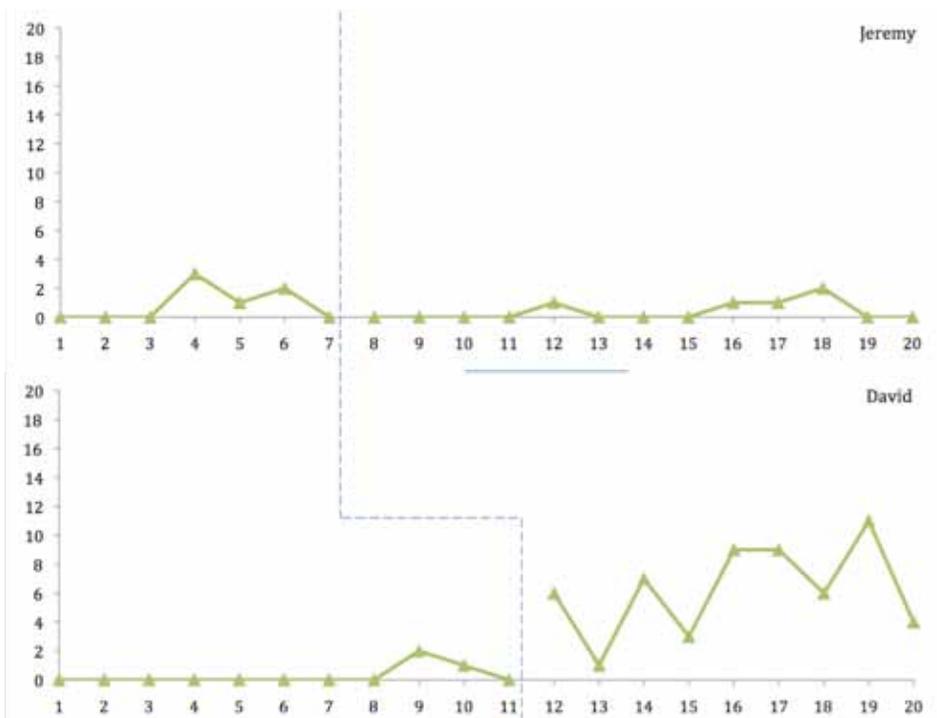


Figure 2. Modeled Verbalizations (Reliability 95.83% range 50%-100%)

In order to assess whether peer or adult models were more effective in teaching play skills, intervention sessions were also separated by adult condition and peer condition, and the overall averages were calculated. For modeled behaviors (Figure 3), Jeremy showed a preference for the adult models while David did not show any model preference.

For modeled verbalizations (Figure 4), Jeremy showed a slight preference for the peer model over the adult model. Again, David showed no preference for either the adult or the peer model.

Discussion

Both participants responded positively to video modeling, demonstrating gradual increases in modeled play behaviors after observing video models performing these actions. These results are consistent with those of other researchers (Charlop & Milstein, 1989, Nikopoulos & Keenan, 2004, Taylor, Levin & Jasper, 1999) who have reported that video modeling is a useful tool for teaching young children with autism important social-play skills.

One of the benefits of video modeling is that it is a low-cost intervention in terms of time and staff resources. In this study, after approximately five sessions, which translates to about 15 minutes of intervention time, each participant showed a marked increase in the frequency of modeled behaviors. This presents a large contrast with discrete trial training, where intervention can often require high levels of staffing and dedicated resources. Whereas discrete trial training requires that staff use systematic prompting and reinforcement strategies, video modeling does not necessarily require these additional features. Given the difficult economic climate facing many schools, video modeling may be an ideal adjunctive intervention that can be used to teach certain skills effectively, even during times when personnel are not available to conduct one-to-one teaching. Future studies might more carefully assess how video modeling might be used as a supplementary intervention within a child's educational program.

This study did not demonstrate a con-

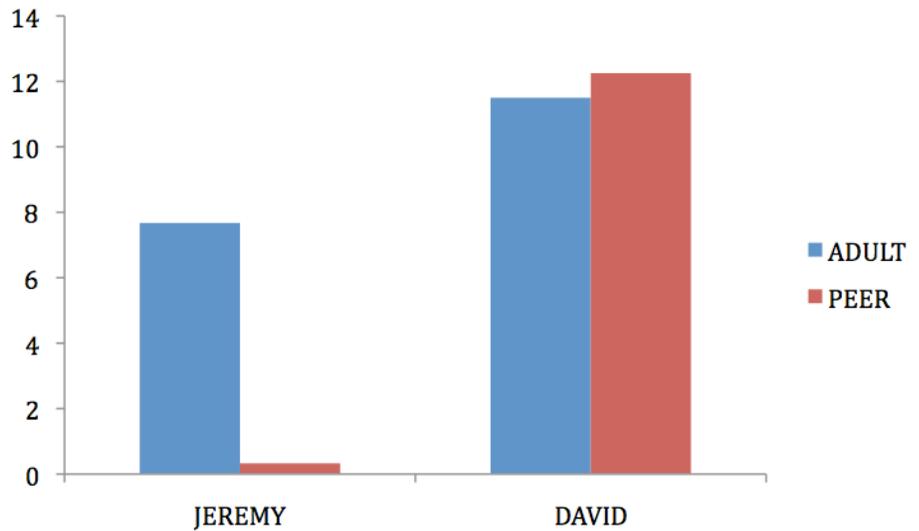


Figure 3. Adult versus Peer Modeling for modeled behaviors separated by child

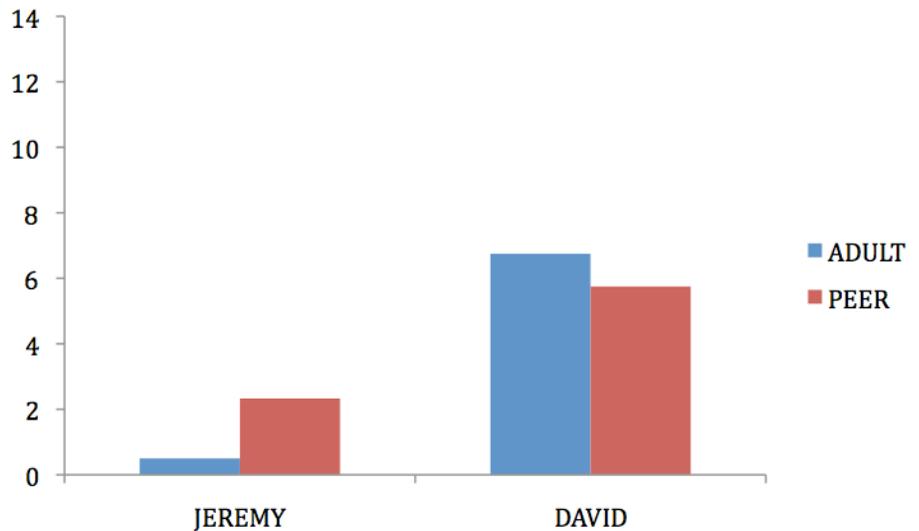


Figure 4. Adult versus Peer Modeling for modeled verbalizations

sistent effect of video modeling on play verbalizations (Figure 2). Although David did show significant increases in modeled play statements, Jeremy did not improve in his verbalizations following intervention. It is unclear why this would be the case, but it is possible that Jeremy's poor articulation may have contributed to his deficient performance in this area. Because Jeremy was difficult to understand, many of his verbalizations could not be scored as accurate imitations of video statements made by peers or adults. It is possible that for children with particularly poor articulation, additional services may be needed to assure improvements in articulation. While video modeling may be helpful, just hearing the statements may

not be enough if the child cannot correctly form the sounds and words that are depicted in the videos.

When the intervention sessions were separated by adult and peer conditions, Jeremy showed a marked preference for the adult models. It is possible that this difference emerged because adult models more explicitly showcased the target behaviors, making it easier for Jeremy to imitate those behaviors. For example, adults may be more deliberate and obvious as they engage in scripted behaviors, as opposed to when children engage in natural play that is less clear and distinct. However, this difference may be artificial, as there were not enough sessions to de-

termine fully whether this was a consistent effect. The design of the study also leaves open the possibility that there was carry over from one condition to the next. One day the participant observed peer models displaying play behaviors, and the next day he observed adult models displaying the same behaviors. Given the memory strengths often demonstrated by children with autism, it is possible that the participants were modeling behaviors viewed from prior intervention sessions; therefore, it is unclear whether the model's age alone determined their performance.

There was some anecdotal evidence from the study suggesting that several other aspects of behavior may have improved as a result of the intervention. Among these were echolalia, repetitive behaviors, and engagement with the examiner. Future researchers could assess whether video modeling interventions systematically affect these behaviors through designing video modeling interventions that specifically address these targets.

The current results are somewhat limited by lack of maintenance and generalization data. Due to the fact that participants moved to new school placements in geographically-distant buildings during the school year, it was difficult to conduct the study long enough to address whether the play skills were maintained across time and/or whether they generalized to different environments (e.g., the school classroom) or to similar toys (e.g., similar, but non-identical blocks). Despite these limitations, the current project serves to add to the growing body of research that supports the use of video modeling to teach young children with autism to engage in play skills. Given the importance of play skills in leading to positive social, cognitive, and developmental outcomes, it is important to direct targeted efforts toward teaching and promoting play in young children with autism. Video modeling is one intervention that can efficiently and successfully improve skills in this area. Although our knowledge of the features of video models that make this intervention most impactful is only emerging, this study, coupled with future research on model characteristics, will help to determine how practitioners can successfully impact outcomes for preschoolers with autism.

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