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Video Modeling as an Effective Intervention for Young Children Diagnosed with Autism

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Video Modeling as an Effective Intervention for Young Children Diagnosed with Autism Spectrum Disorder

by

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Chapter 1: Introduction

Autism Spectrum Disorder (ASD) is characterized by impairments in communication and social interactions and includes restricted, repetitive patterns of behavior (American Psychiatric Association [APA], 2013). Although the *Diagnostic and Statistical Manual of Mental Disorders-5* (DSM-5; APA, 2013) currently uses the term ASD to describe the disorder, the term *autism* will be used most frequently in this paper to refer to this diagnostic category.

Children with autism demonstrate a variety of social and communication deficits. This may include a delay in language, difficulty with back-and-forth social communication, and lack of eye contact. Some children with autism initially have little or no functional communication skills, whereas others may use some words, phrases, and/or conversation skills to communicate their needs. However, the pitch, tone, rate, and rhythm of their speech is abnormal when compared to their peers (Johnson, 2004). In addition, they often engage in echolalia, which is immediate or delayed repetition of words and phrases (Johnson, 2004).

According to the Centers for Disease Control and Prevention (CDC, 2015), approximately 1 in 88 children were diagnosed with autism in 2012. The prevalence of autism was adjusted to 1 in 68 children in 2014; this makes autism the fastest growing developmental disability in the United States. The diagnosis of autism is five times more prevalent in boys than girls.

In my experience, children between the ages of 3-6 in the preschool setting diagnosed with autism typically have difficulties getting their wants and needs met in a functional, socially appropriate manner. They may prefer to play alone and appear unaware of peers and adults.

Children with autism in the preschool setting typically have difficulties adapting to the classroom routine and may struggle with more structured activities.

I have worked in the field of early childhood special education for over 12 years, and I have personally experienced an increased number of young children under the age of 6, who are diagnosed with autism. My personal experience also mirrors the CDC data that autism is far more prevalent among males. Given the increased prevalence of children with autism in educational programs, teachers need access to interventions that will address their complex needs.

I first heard of video modeling being used as an intervention for young children with autism at the 2012 Minnesota Department of Education Early Childhood Special Education Leadership Conference. After learning about this intervention, I was eager to return to my school and talk with other professionals about this new and exciting concept of video modeling. As is the case with many teachers, I went back to work and eventually the everyday aspects of teaching interfered with the ability to implement video modeling. More than 3 years after my exposure to video modeling, my interest has been renewed. The technologies now available for creating and producing videos make it easier to implement video modeling than in the past. In the next section, I provide an overview of the types of video modeling interventions being used with children ages birth-6.

Video Modeling

Using a video model to teach skills to young children is not a new theory. In 1961, Dr. Albert Bandura, a psychologist, was a pioneer in studying social behaviors learned through observation and imitation. In an experiment better known as the Bobo Doll Experiment, Bandura studied the effects of modeled aggressive and non-aggressive behavior (McLeod, 2011). Children were exposed to watching a basic video model of adults (one make/one female) act out either aggressive or non-aggressive actions toward toys (one of which was a Bobo Doll). Thirty-six boys and 36 girls participated and were divided into three groups; one group was exposed to aggressive behavior, one group was shown non-aggressive behavior, and one group was the control group (not exposed to either models). As predicted, the children exposed to the aggressive model were more likely to imitate these behaviors. This experiment helped lay the foundation for further study in the area of using models to shape behavior (McLeod, 2011).

Types of video modeling. There are three specific types of video modeling: Basic Video Modeling (BVM), Video Self-Modeling (VSM), and Point-of-View Modeling (PVM). The BVM approach involves the child with autism watching an actor portray a skill or desired behavior. The VSM approach has the learner completing the skill or desired activity. In PVM, actors other than the learner are performing the desired task, but it is filmed from the learner's point of view (Murray & Noland, 2013). An example of this would be only filming the hands while playing with a specific toy.

Summary

The purpose of this paper was to review a variety of research articles to gain more information on using video modeling as an intervention for young children with autism. I am interested in common types of video modeling being used and what skills were targeted by the research. Chapter 2 of this Starred Paper presents a review of current literature on the use of video modeling. Chapter 3 discusses findings of this study and discusses a working model.

Terminology and Definitions

Throughout Chapter 2 a variety of terms are used relating to video modeling techniques, autism, and training techniques. These terms are defined in this section.

Autism: a severe developmental disability which appears within the first 3 years of life. People with autism demonstrate impairments in social interactions and verbal and non-verbal communication. People with autism may demonstrate limited interests or display stereotypical behaviors, such as unusual motor movements (American Psychiatric Association, 2016)

Basic video modeling (BVM): a teaching strategy in which the learner watches a video of an actor, other than himself, appropriately demonstrating a specific skill or routine (Murray & Noland, 2013).

In vivo modeling: "live" modeling of the behavior (Wilson, 2012).

Joint attention: joint attention happens between two people and typically an object (when a child looks to a car and says, "Look a car!"). Joint attention typically develops in a child between the ages of 9-18 months (Rudy, Betz, Malone, Henery, & Chong, 2014).

Least to most prompting schedule: a hierarchy of prompts is used, and this hierarchy has a minimum of three levels. The first level is always the independent level (i.e., no prompts) and the remaining levels are sequenced from the least amount of help to the most amount of help. The last level of the hierarchy should be a controlling prompt–one that results in the learner doing the behavior correctly (Neitzel, & Wolery, 2009).

Pervasive developmental disorder–not otherwise specified: a disorder characterized by delays in the development in the areas of socialization and communication skills. Symptoms may develop in infancy, but the typically age of diagnosis is age 3 (NINDS, 2016).

Point of view modeling (PVM): the video captures exactly what the learner will see through his own eyes while an actor is demonstrating the skill or routine (Murray & Noland, 2013). An example of this would be only filming the hands while playing with a specific toy.

Video Self-Modeling (VSM): the main actor in a VSM video is always the learner himself (Murray & Noland, 2013).

Chapter 2: Review of Literature

In this chapter, I review the literature that examines the use of video modeling with children birth to age 6. Studies are included for review if they were published from 2006 to 2015 and if they included children diagnosed with Autism Spectrum Disorder (ASD), autism, or Pervasive Developmental Disorder (PDD-NOS). Studies are arranged in chronological order based on the date published, with the most recent being first.

Effectiveness of Teaching Naming Facial Expression

Akmanoglu (2015) used video modeling to teach facial expressions to four children in Turkey. One girl and three boys participated in the study, all falling within the age range of 4 to 6 years. All children attended a Turkish public university's developmental disability intervention unit. Children met specific criteria including: (a) looking at the face of another person for at least 5 s, (b) being able to watch an image on the computer for at least 2 min, (c) imitating sentences consisting of one or two words, and (d) participating in the activity for 4-5 min. Table 1 presents background information for each participant

Table 1

Participant Information

NAME	AGE AT TIME OF STUDY	AGE AT TIME OF AUTISM DIAGNOSIS	RATING ON *Gilliam Autistic Disorder Rating Scale–2* (Gilliam, 2006), Turkish Edition (TV-GARS-2) (Standard score of 85 or above = likely to be autistic)
Suna	6 years old	4.6 years	88
Emre	5 years old	5 years	107
Aras	5 years old	5 years	114
Ege	4.6 years old	3 years	116

Basic Video Modeling techniques were used to teach eight facial expressions: happy, sad, angry, scared, disgust, surprised, physical pain, and bored. Adult models with a variety of demographics were used in the video model. A multiple probe design was used. Training sessions took place in a small, quiet room, 5 days per week, once per day. For the intervention, the participants were asked if they were ready to work and were shown different video scenarios. One example of this would be an actor banging his or her hand with a hammer and demonstrating physical pain in the facial expression. The participant was then asked, "What do you think he is feeling?" and given 4 s to respond, incorrect responses were ignored, whereas correct responses were rewarded. After acceptable baseline data were obtained, the participants were then provided the intervention training. Once skills were mastered according to criteria, each child underwent the maintenance and generalization phases.

Results of this study revealed that video modeling was highly effective in teaching facial expressions and the generalization of this skill. Not only were the participants able to generalize this skill outside of the training location, but they were also able to generalize to different scenarios not included in the video model. Table 2 presents a summary of study findings.

Table 2

Study Findings

PARTICIPANT	BASELINE DATA	TARGET TRAINING TOTAL SESSIONS NEEDED FOR INTERVENTION MASTERY	MAINTENANCE/GENERALIZATION
Suna	0% correct responses	12 total sessions needed to learn all facial expressions	Maintained skills at 100% correct
Emre	0% correct responses	14 total training sessions needed to learn all facial expressions	Maintained skills at 100% correct
Aras	0% correct responses	10 total training sessions needed to learn all facial expressions	Maintained skills at 100% correct
Ege	0% correct responses	14 total training sessions needed to learn all facial expressions	Maintained skills at 100% correct

In this study, Akmanoglu (2015) found that the children were able to maintain and generalize the skills across settings; parents reported they were satisfied with the procedure and its effectiveness. The author reported that this study was effective in the area of generalization (when compared to previous studies) because of the diversity of the models and settings. Two study limitations were noted: only eight facial expressions were taught, and the situations used to teach facial expressions did not always happen in real life.

Teaching Social–Communication Skills

In the 2012 study completed by Wilson, the focus was to examine the efficacy of video modeling compared to in vivo modeling. Despite the video modeling concept being widely used since the 1990s primarily in clinical settings, it is not widely used in the educational setting. The four participants in the study were preschool age and attended a preschool classroom at least 3 days per week. To participate in the study, each child had to meet the following criteria: (a) were diagnosed with autism, (b) received school-based services under the autism criteria, (c) had vision and hearing falling within the average range, (d) were able to attend to a video screen for up to 3 min, (e) had the ability to demonstrate basic imitation skills, and (f) were enrolled in the local preschool program. Prior to becoming a participant, all children were administered the *Autism Diagnostic Observation Schedule* (ADOS; Lord & Rutter, 2006), *Vineland Adaptive Behavior Scales 2nd edition* (Vineland-2; Sparrow, Cicchetti, & Balla, 2005), the *Mullen Scales of Early Learning* (MSEL; Mullen, 1995), and *the Preschool Language Scale–4th Edition* (PLS-4; Zimmerman, Steiner, & Pond, 2002). The participants were selected from two different public school preschool programs, and children received services 5 days per week, 4 hours per day. Each classroom was made up of general education students and students with disabilities. Each program provided a similar schedule each day. Table 3 provides information regarding the four participants.

Table 3

Participant Information

PARTICIPANT NAME	AGE	ADOS DEFICIT AREAS	AGE RANGE ON THE MSEL	PLS-4 EXPRESSIVE AND RECEPTIVE LANGUAGE AGE RANGE
Isaac	5.4 months	Directed vocalizations, gestures, initiation of joint attention, qualify of social overtures, and use of stereotyped phrases	24 months (visual reception / fine motor) 13-18 months (expressive and receptive language)	13-18 months
Selena	4.8 years	Eye contact, shared enjoyment, and quality of social overtures	10-27 months (visual reception, fine motor, receptive and expressive language)	10-14 months
Nicholas	3.9 years	Limited use of gestures, eye contact, vocalizations, and facial expressions to communicate with others	8-26 months (visual reception, fine motor, receptive and expressive language) 10-27 months (visual reception, fine motor , receptive and expressive language)	8-13 months
Sarah	4.3 years	Limited use of eye contact, gestures, vocalizations, and facial expressions to communicate with others	13-20 months (visual reception, fine motor, receptive and expressive language)	11-13 months (receptive) 15-16 months (expressive)

For each participant, a social-communication behavior was identified as the target skill based on a 30-min observation in the classroom setting. To develop an appropriate intervention, each participant was observed with eight different stimuli over three different sessions. From this observation, preferred toys/materials were identified. The in vivo modeling and video modeling staff were trained in each target skill using a semi-structured script to use during modeling sessions. Once staff was trained in each target skill, a 3-min video model was created. The in-vivo model was also a 3-min session. Prior to beginning interventions, baseline data were collected for the target skill at least three times per week for 5-min per observation until baseline data stabilized for all participants except Selena. Despite not being able to obtain baseline data, she was still included as the team was on a time constraint.

During the intervention phase, each child was exposed to the video and in-vivo modeling approximately three times per week for at least a minimum of five sessions. The order of the treatments was randomized, with a break of at least 1 hr between interventions. The identified target skills were reaching to request an object, using gestures to request more, pointing and vocalizing to share attention, and using gestures to request more. Each child was exposed to an intervention targeting the behavior, but with different materials. For example, Isaac's target behavior was reaching for an object to request. In the video modeling a wooden car set was used, and in the in-vivo modeling a bingo board game was used.

Data were analyzed by using a non-overlap of all pairs (NAP) method. Scores falling in the 0-65% NAP range demonstrated weak intervention effects, scores falling in the 66-92% range indicated medium effects, and scores falling in the 93-100% indicated strong effects. Therefore, the higher percentage of the NAP score indicated a more effective intervention.

Data showed that this study demonstrated mixed results. None of the children demonstrated NAP scores in the "strong" range to indicate a highly effective intervention method. Results showed that both Isaac and Sara demonstrated more success with the in-vivo modeling, whereas Nicholas demonstrated more success with the video modeling. Data could not be reported for Selena due to the inability to stabilize baseline data. Video and in-vivo modeling (social-communication) results are presented in Table 4.

Table 4

Video and In-vivo Social-Communication Results

PARTICIPANT AND TARGET BEHAVIOR	VIDEO MODELING	IN-VIVO MODELING
Isaac (reaching to request)	63% NAP	81% NAP
Selena (pointing and vocalizing to share attention)	No score obtained due to poor baseline data	No score obtained due to poor baseline data
Nicholas (using gesture to request more)	73% NAP	53% NAP
Sarah (using gesture to request more)	80% NAP	86% NAP

Data were also collected on each child's visual attention to each modeling technique using a time/interval process. All participants demonstrated increased visual attention for the video modeling technique vs the in-vivo modeling technique. Isaac's visual attention was very close in both methods, whereas Nicholas demonstrated significantly more visual attention to the video modeling. Findings regarding video and in-vivo modeling for visual attention are presented in Table 5.

Table 5

Video and In-Vivo Visual Attention Results

PARTICIPANT	VIDEO MODELING	IN-VIVO MODELING
Isaac	55%	52%
Selena	87%	66%
Nicholas	65%	18%
Sarah	68%	43%

In the case of Isaac, he paid similar amounts of attention to both the video and in-vivo modeling intervention, yet demonstrated much higher success with the in-vivo modeling. Nicholas paid more visual attention to the video modeling intervention and also demonstrated higher success with this model. Sarah demonstrated increased visual attention to video modeling, yet she demonstrated more success with the in-vivo modeling.

In addition to the results, authors also found that practitioners working with the children preferred the video modeling method because the video modeling intervention was easier to provide and the participant's visual attention to the video model was increased. Limitations to this study included the inability to collect Selena's baseline data and the recognition that high-interest materials identified initially may not have continued to be of interest over time.

Improving Pretend Play Skills

In 2010, Boudreau and D'Entrement examined the effect of video modeling as an intervention to teach play skills to two boys, both age 4. Both boys were diagnosed as having PDD-NOS and had either no functional play skills or a limited range of play skills. Table 6 provides a profile of participants' functioning.

Table 6

Participants' Functioning Level

CHILD	AGE	Bayley Scales of Infant and Toddler Development (2nd edition) (Bayley, 1993)	Child Development Inventory Development Profile (Ireton & Glascoe, 1995)	Psycho-educational Profile (strengths/ weaknesses)	Vineland Adaptive Behavior Scales (2nd edition) (Sparrow, Ciccheti & Bala, 2005)
Child 1	2.10 years	17 months	20 months	Cognitive, fine motor (mildly delayed)/expressive and receptive language (severely delayed)	Motor and adaptive skills (strengths)/ communication and social skills (significantly delayed)
Child 2	2.8 years		15 months	Cognitive, language, fine motor (moderately delayed /visual-motor imitation and gross motor (severely delayed)	

Toys and target skills were selected based on the boy's interests and identified needs. Both videos were created with the same toy (Fisher Price construction set), but the scripts and themes were tailored to each child. Each video was slightly more than 1 min. In both videos, the Basic Video Modeling (BVM) techniques were used using the same adult model for both videos.

A single-study design was used, and each child participated in four phases: baseline, video modeling, generalization, and maintenance. Four variables were measured: modeled actions, unmodeled actions (spontaneous actions created by the child), scripted verbalizations, and unscripted verbalizations (spontaneous verbalization produced by the child). During the video modeling phase of the study, the phases were divided into sessions in which the child reviewed the video and then was provided an opportunity to play. This took place in a small, quiet intervention "cubby" with only the video and a small, child-sized table to play.

The results showed both boys had increased their mean use of modeled activities (M) and unmodeled activities (UM). Table 7 presents the findings.

Table 7

Modeled and Unmodeled Findings

CHILD	BASELINE PHASE	VIDEO-MODELING PHASE	SHORT-TERM MAINTENANCE	LONG-TERM MAINTENANCE
Child 1	M = 3.5 UM= 0.75	M = 11.25 UM= 0.5	M = 14 UM= 3.75	M = 0 UM= 0
Child 2	M = 2.14 UM= 2.71	M = 10 UM= 4.25	M = 11.75 UM= 5.25	M = 14 UM= 8

Both boys achieved success for short-term maintenance of skills, but only one of the boys was able to achieve long-term maintenance. The other child appeared to lose his ability to perform modeled and unmodeled behaviors. The results were similar for scripted (S) verbalizations and unscripted (US) verbalizations. Both children demonstrated an increase in amount of scripted and unscripted verbalizations, but once the reinforcement phase was introduced, the amount of unscripted vocalizations decreased. Also similar to the data on actions, one boy was able to maintain the scripted and unscripted vocalizations, whereas the other child seemed to lose these skills. Table 8 provides an overview of the results

Table 8

Scripted and Unscripted Vocalizations

CHILD	BASELINE PHASE	VIDEO MODELING PHASE	SHORT-TERM MAINTENANCE	LONG-TERM MAINTENANCE
Child 1	S= 0 US= 0.75	S= 10 US= 0	S= 10 US= 2	S= 0 US= 0
Child 2	S= 0.14 US= 8.43	S= 6.25 US= 4.75	S= 10 US= 6.25	S= 9 US= 2

The data indicate video modeling was an effective strategy to teach new play skills to children with autism. Although both children showed impressive short-term growth in their skills, one child was not able to maintain these skills. The reinforcement of scripted behaviors also resulted in decrease of unscripted behaviors, which is not an ideal outcome. The authors reported that the child who was not able to maintain the skills was also receiving toilet training during the maintenance phase, which may have caused a setback in his schedule and therapy routines. The authors suggested that viewing of the video models encouraged rote and rigid play for children, which would not necessarily be an intended result of the intervention. They recommended that future studies decrease the amount of viewing sessions because fewer sessions were needed for mastery of the scripted behaviors/verbalizations than actually administered.

Using Point-of-View Video Modeling to Teach Play to Preschoolers with Autism

Hine and Wolery (2006) studied the effects of point-of-view video modeling (PVM) on play skills. Two participants in this study were Christine (age 30 months) and Kaci (age 43 months). Both girls met the criteria of autism and had intervention goals in the areas of social, communication, and play skills. The authors decided that sensory bin play would be the focus of this study because both girls enjoyed the sensory table. Each girl attended an inclusive, full day preschool classroom.

Interventions took place in a therapy room away from other children. The videos were filmed showing only the model's hands playing with and manipulating toys. The sensory bins used for this study were not familiar to the girls. The dependent variables measured were the actions modeled on the videotape. Each child viewed two video modeled tapes: one with gardening tools and other with cooking utensils. The gardening sensory had six targeted actions, and the cooking had five modeled actions.

A multiple probe design was used to measure the dependent variable in both of the sensory tables (cooking/gardening). Each child participated in three data collection phases (baseline probes, daily treatment probes, and post-treatment maintenance probes). Baseline data were collected by observing the child play with each bin for 2 min, with a 30 s cartoon break. In the baseline for gardening, Christine obtained an average of one action performed, and Kaci demonstrated an average of 1.33 actions performed. Christine demonstrated 0 of the targeted actions in the cooking baseline, Kaci demonstrated 0.3 targeted actions. During the treatment procedures, each child was given a daily probe, time to view the video, and then practice time after viewing the video. Each treatment probe session lasted approximately 15 min. The children were not given instructions on how to play with the sensory bin materials.

During the treatment phase, Christine increased targeted skills for cooking to an average of 3.07, whereas Kaci increase her targeted behaviors to 2.6. During the treatment phase of cooking, Christine increased her targeted actions to an average of 3.1, whereas Kaci struggled to increase her targeted cooking skills due to satiation with the materials. In her case, the material in the sensory table was changed to colored rice in the hopes of bringing novelty to the activity.

During the maintenance phase, each girl was able to demonstrate increased target behaviors. In the gardening sensory bin, Christine demonstrated an average of 4.1 target skills, whereas Kaci demonstrated an average of 3.6 target skills. Christine demonstrated an average of 4.2 target skills in the cooking bin, whereas Kaci demonstrated an average of 4.3.

Overall, the results showed video modeling increased both girls' play actions, but Kaci needed additional verbal reinforcement to attempt the activities. Both girls were able to generalize the learned skills to other items in the therapy room where the video modeling took place, but the skills were not generalized to the preschool classroom setting. The author theorized this could have been due to a variety of reasons, including the lack of modeled toys in the classroom, other activities that may have interfered with the children's attention in the classroom, and satiation of materials in the classroom.

Teaching Pretend Play Skills with a Sibling as Model and Play Partner

In 2006, Reagon, Higbee, and Endicott examined the results of a video model created with one child's typically developing sibling. The child was age 4, and scored in the mild to moderate range on the *Childhood Autism Rating Scale* (CARS; Schopler, Reichler & Renner, 2002). The child could verbally label objects, request items he wanted, and greet others. He did not engage in pretend play with siblings or other peers, therefore, this skill was targeted. The study took place at a preschool located in the university based program. The sibling, age 6, also attended this program.

Training sessions took place during the recess break. After the training sessions, both the generalization and follow-up sessions took place in the participant's home. A total of four videos were created: two video models were created showing the sibling engaging in a play situation with a typically developing peer; whereas, the other two were filmed with two general education peers. Four scenarios were filmed: firefighter, cowboy, teacher, and doctor. Each video ranged from 20-70 s in length. The participant and his brother viewed the play scenarios once per day, most school days. They were then instructed to "go play," and they were allowed to play for 3 min. Specific scripted statements (taught in video) and unscripted statements were then recorded, along with scripted actions (modeled in video). Two scenarios were introduced at a time.

Results showed that the participant quickly mastered the modeled actions and, over time, his ability to master the scripted statements was 100%. This activity was then generalized in the child's home. Materials used in the home were replicated in the clinical setting. The participant and his brother were able to move through the play scenarios acting out the scripted actions and scripted vocalizations. Results revealed that the participant was also able to generalize these skills to others who had not been involved in the video model training (i.e., mother and other siblings). The participant was able to "act out" the roles of both parts modeled in the video. Data are represented in percentage of actions or statements used, with the exception of spontaneous statements, which was represented by the number of statements used.

Table 9

Video Modeling Results

SCENARIO	MEAN BASELINE DATA	VIDEO MODELING MEANS	MAINTENANCE AND FOLLOW–UP MEANS
Firefighter	Scripted Actions: 30% Scripted Statements: 0% Spontaneous Statements: 6	Scripted Actions: 96.25% Scripted Statements: 50% Spontaneous Statements: 3.4	Scripted Actions: 100% Scripted Statements: 65% Spontaneous Statements: 2.5
Cowboy	Scripted Actions: 15% Scripted Statements: 0% Spontaneous Statements: 0	Scripted Actions: 47.25% Scripted Statements: 50.5% Spontaneous Statements: .85	Scripted Actions: 55% Scripted Statements: 75% Spontaneous Statements: 2.5
Doctor	Scripted Actions: 35% Scripted Statements: 0% Spontaneous Statements:6	Scripted Actions: 100% Scripted Statements: 35% Spontaneous Statements: 2.75	Scripted Actions: 100% Scripted Statements: 80% Spontaneous Statements: 15
Teacher	Scripted Actions: 0% Scripted Statements: 0% Spontaneous Statements: 6	Scripted Actions: 60% Scripted Statements: 55% Spontaneous Statements: 3.5	Scripted Actions: 60% Scripted Statements: 55% Spontaneous Statements: 4

The authors reported that siblings can make effective video models and play partners. They also found the number of spontaneous actions and vocalizations decreased once the video modeling was introduced. Prior to the introduction of the video modeling, the spontaneous language consisted of primarily labeling items. The authors reported that the statements, although scripted, were more complex once the video modeling had been introduced.

Teaching Bids for Joint Attention to Children with Autism

Rudy et al. (2014) examined the effects of video modeling on teaching joint attention. Children with autism often need to be taught joint attention. All participants were 5 years old with a diagnosis of autism. Two boys and one girl participated in the study. Table 10 describes the functioning level of the three participants.

Table 10

Overview of Participant Functioning

CHILD	*Early Social Communication Scales* (ESCS; Steiner, 2013)	*Childhood Autism Rating Scale* (CARS; Schopler, Reichler, & Renner, 2002)	COMMUNICATION SKILL/STRENGTHS
Bryce	Unable to initiate bid for attention	39.5 (severely autistic range)	2-3 word sentences, able to imitate peers and adults (communication and motor skills), able to complete sequence of 5 instructions, and approach others to initiate interactions
Spencer	Unable to initiate bid for attention	35 (mild to moderate autistic range)	4-5 word sentences, verbally interact with others when prompted, imitate adults and peers, respond to bids for attention, and made eye contact when name was called
Alyssa	Unable to initiate bid for attention	31 (mild to moderate autistic range)	4-5 word sentences, engage in echolalia, compliance with adults, imitations, social interactions, requesting, eye contact with an adult and follow a point

Each child was currently receiving approximately 9-15 hrs of early intervention services in a setting designed from children diagnosed with autism. A 68-s video was created with a typically developing 5-year-old girl and an adult. The girl drew attention to five different target items. Each of these items was placed in a hallway, along with five other brightly colored items.

Two phases were used in the study: baseline and video modeling. Baseline data were collected by allowing the participants access to the 10 items, for 10 trials. Once the video modeling session started, the child watched the video, and then had access to the items. A delayed multiple baseline across participants was used. One child, Alyssa, required video modeling and in vivo prompting. This was used to help encourage eye gaze. Once the eye gaze was initiated, Alyssa received social praise. Three following joint attention behaviors were coded: pointing/orientating, vocal statement, and eye gaze shift.

Data found that, with the exception of Alyssa, the video modeling intervention was highly effective in increasing the two boys' independent and complete bids for joint attention. The percentage of opportunities with independent and complete bids for joint attention is described in Table 11.

Table 11

Independent and Complete Bids for Joint Attention

CHILD	BASELINE MEAN	VIDEO MODELING MEAN	VIDEO MODELING + IN VIVO PROMPTING MEAN	1 WEEK FOLLOW UP (% OF OCCURRENCES)
Bryce	0%	66.5%	--	100%
Spencer	4%	96.6%	--	100%
Alyssa	0%	8.5%	50%	--

Alyssa was only able to increase her bids for joint attention by 8.5%. Her intervention was then modified to include video modeling and in vivo modeling. Once the two interventions were paired, she was able to increase her bids 50%, which was still not as significant as the boys' results.

One significant limitation to this study is that this skill was never generalized outside of the hallway or with additional items. The authors suggested this study should be replicated with other children diagnosed with autism to learn more about specific characteristics that allow some to pick up so quickly on video modeling, while it is unsuccessful for others.

Toilet Training a Child with Autism

In 2013, Lee, Anderson, and Moore examined the effects of custom video modeling paired with picture prompts as an intervention to toilet train a child with autism. The common model used to toilet train individuals with disabilities is called the Rapid Toilet Training (RTT). The RTT approach involves increasing fluid intake and scheduling toilet breaks. The authors wanted to explore if a custom video model was more effective than a commercialized video model.

Andrew, age 4 years 6 months, was the only participant in this study. In addition to receiving home-based services, Andrew attended both a special education classroom and was mainstreamed in a general education classroom. Andrew was diagnosed with autism and was not yet showing signs of toilet training readiness, with the exception of feeling uncomfortable with a soiled diaper. Andrew had significant expressive language delays, but was making progress using the Picture Exchange Communication System (PECS). He also enjoyed watching videos. All intervention sessions took place in Andrew's home, whereas generalization sessions took place in the special education setting. For this study, a changing-criterion design was used to incorporate a baseline, 6-step intervention, and follow up. The six steps included, walking to the toilet, undressing, sitting on the toilet, redressing, and flushing. The dependent variable was unprompted completion of a step. A step was considered mastered when Andrew completed one step for three unprompted sessions. A reinforcer identification sheet was used to gain more information on Andrew's current interests.

The videos used during the video modeling phase were created during the collection of baseline data. The custom video contained two types of video modeling: video self-modeling (the participant performing the behavior) and point-of-view video modeling (video filmed from the learner's perspective). To obtain accurate data for success, pre-baseline data were collected to determine when Andrew would be more likely to need to use the toilet. Eight 30-min intervals were identified. These times were targeted during baseline and intervention phases.

During the baseline phase, Andrew was prompted to use the toilet eight times per day with the phrase, “It’s time to go to the toilet.” Andrew was then prompted using a least-to-most prompting schedule. During the intervention stage, prior to the eight identified times, Andrew was to watch the video, and was then prompted with the identified verbal stimulus. Again, if Andrew did not complete the identified step, he was prompted with the least-to-most prompting hierarchy. After session 89, in-vivo modeling was introduced because Andrew had still not successfully eliminated in the toilet. His father was used as a model, and this occurred approximately twice per day for 25 days. A toileting prompt card was used on four occasions (twice at home, twice at school). The follow up/maintenance occurred 5 days after the conclusion of the intervention; the same procedures that were used in the baseline were used again with the addition of a picture card cue. The video was not used during the maintenance phase.

Baseline data were collected during the first 20 sessions, whereas the intervention and generalization probes were completed for sessions approximately 21-140. At each session, the number of steps completed without prompts were recorded. Criterion changes occurred approximately at steps 20, 30, 45 and 50. These data are presented in Table 12.

Table 12

Steps Completed without Prompts

APPROXIMATE SESSION NUMBER	AVERAGE STEPS COMPLETED WITHOUT PROMPTS (6 STEPS TOTAL)
0-20 (baseline)	1
20-30	2
30-45	3
45-50	4
50-140	5

Results revealed Andrew was able to master five of the six steps, and he was only able to successfully eliminate in the toilet three times. Overall, Andrew's mother was not satisfied with this intervention; she found it disruptive to the family routine. The authors did report that in a follow-up interview with Andrew's mother (6 months after the study concluded), that Andrew was fully toilet trained. To indicate his need to use the toilet he was using a picture exchange system. Andrew's mother reported that she incorporated a new video that she created of a peer Andrew's age voiding into the toilet within 3 days of starting this intervention.

In follow-up, the authors reported they were concerned with the more sensitive nature of using peer as model for the toileting video, but did find it interesting that after watching a more explicit video of a peer using the toilet, Andrew was able to use the toilet successfully. The authors also reported that some unexpected life events may have affected outcomes. These included illness of both Andrew and his mother, and a significant change in his school setting.

Summary

This chapter presented a review of seven studies that examined the effectiveness of video modeling to teach identified skills in the areas of social communication, play, and functional skills to young children with autism. A summary of findings is provided in Table 13.

Table 13

Chapter 2 Summary of Video Modeling Studies

AUTHOR/DATE	PARTICIPANTS/AGE RANGE	STUDY DESIGN	TYPE OF VIDEO MODELING	RESULTS
Akmanoglu (2015)	4 total (three male, 1 female) 4.6-6 years of age	Multiple probe design	Basic Video Modeling	All participants were able to learn identified facial expressions and generalize this to other settings.
Wilson (2012)	4 total (two males, two females) 3.9–5.4 years of age	Single-case design	Basic Video Modeling compared to In-Vivo Modeling	2 of the 3 children (one child's data was unable to be included) performed better after being exposed to in-vivo modeling. All children demonstrated increased visual attention towards the video modeling technique.
Boudreau & D'Entrement, (2010)	2 total (both male) 4 years of age	Single subject design with multiple baselines across participants	Basic Video Modeling	Both showed increased short term modeled activities / scripted vocalizations, but one was only able to generalize skills long term.
Hine & Wolery (2006)	2 total (both female) 30-43 months of age	Multiple probe design	Point of View Video Modeling	Video modeling was an effective intervention to increase both girls play actions, although new skill were not generalized out of the intervention room.
Reagon, Higbee, & Endicott (2006)	1 male child 4 years of age	AB design across four play scenarios	Basic Video Modeling	Video modeling (using a sibling as a model) was an effective intervention in teaching modeled actions and scripted statement.

Table 13 (continued)

AUTHOR/DATE	PARTICIPANTS/AGE RANGE	STUDY DESIGN	TYPE OF VIDEO MODELING	RESULTS
Rudy, Betz, Maloe, Henery, & Chong (2014)	3 total (2 males, 1 female) 5 years of age	Delayed multiple baseline across participants	Basic Video Modeling	It was found that video modeling was effective in teaching independent and complete bids for joint attention for the two boys. The female was unable to gain skills using the video modeling alone. Additional interventions were needed in addition to the video modeling.
Lee, Anderson, & Moore (2013)	1 male child 4 years, 6 months of age	Changing criterion design	Basic video modeling paired with picture prompts	The video modeling paired with picture interventions was effective in teaching 5/6 toileting skills. The child was not able to complete the sixth step (eliminating in the toilet).

Chapter 3: Summary and Discussion

In reviewing the included studies, there is an underlying theme demonstrating the effectiveness of video modeling to teach skills to children with autism. Although research does support video modeling as an effective intervention to teach a variety of skills, it is apparent that many factors need to be considered before implementing a video model intervention. Chapter 3 provides a conclusion, summary, and reflection on using video modeling as an intervention to teach skills to young children with autism.

Conclusions

A number of similarities were noted. Most prevalent was the small sample size in all the studies. All research reviewed demonstrated sample sizes of one to four participants. This is understandable because all participants should demonstrate similar levels of functioning and needs in the areas of communication and social development. Single subject design research is an accepted method of research in special education, where it would be challenging to obtain same-age participants who were diagnosed with autism and demonstrated similar levels of developmental functioning.

Basic video modeling was the most common type of video modeling being used as an intervention. In contrast, the Hine and Wolery (2006) study included a point of view video of hands playing, and the Lee, Anderson, and Moore (2013) study employed video self-modeling to teach toilet training. From a teacher or research perspective, this would make the most sense because the video modeling is being used to teach a desired skill. Because the learner does not have that skill, it would be challenging to create a video using self-modeling.

In the studies that used basic video modeling, it should be noted that efforts were made to generalize the models used in basic video modeling as much as possible. For example, in the Akmanoglu (2015) study of teaching facial expressions, an attempt to use diverse models was considered. Another study used a child's peers and siblings to help the generalization process (e.g., Reagon, Higbee & Endicott, 2006). In the Lee et al. (2013) toilet training study, two types of video modeling were incorporated: video self-modeling and point-of-view video modeling. Although this was effective in teaching five of the six identified steps needed to master toilet training, it was not until after the study that the child's mother took the initiative to her own video model of a same-aged peer using the toilet. When combined with PECS, he was successful in eliminating in the toilet.

I was quite interested in the Reagon et al. (2006) study that examined teaching play skills using a sibling as a peer model. The participant's prior developmental evaluations demonstrated scores falling in the mild-to-moderate range of the autism spectrum and he was able to verbally label objects, request items he wanted, and greet others. When compared to the other studies, this child appeared to have more functional verbal skills. Results revealed the participant did indeed master the scripted actions and verbalizations, yet his play became somewhat "rigid" and for the most part, his unscripted verbalizations and play actions decreased. The authors noted that although scripted statements increased, he did expand on these scripted statements.

Reflections/Recommendations

Prior to beginning this review of literature I was expecting video modeling to be a highly effective intervention and something that I should be including with my students in my classroom. I anticipated that video modeling would be most effective with daily routine skills such as toilet training, walking in line, and sitting for calendar time. However, I learned that most of the research was conducted on teaching pretend play skills. I learned that many children did very well with learning pretend play scripts and actions, but struggled with expanding upon these basic scripts. Some of the authors reported that the children lost any spontaneous play or utterances, which to me, is not a result that is desired. In my personal experience, many young children diagnosed with autism have a skill for memorizing lines from movies or specific songs and jingles, but they do not comprehend what these words mean.

I primarily work with children ages birth to 3, and I would like to see interventions that assist children in learning routines and transitions in the classroom. I have personally found that when a child is able to participate in these basic skills, they are then able to learn and grow socially and academically.

When considering using a video model to teach skills, many factors need to be considered. First, what is the child's developmental level? For example, it would not be practical to teach verbalizations in a play routine if the child is nonverbal or cannot imitate words and phrases. After reviewing these studies, it appears that video modeling is a more effective and appropriate intervention for children who would be considered "higher functioning" and who demonstrate foundational verbal skills.

Second, the child must have an interest in watching videos and be able to attend to a screen for a short amount of time. In several of the studies, a child's interest in watching a screen was encouraged by first showing the child a clip from a favorite cartoon or television show.

Third, the type of video modeling needs to be considered. The target skill being taught needs to be considered and what type of video model would be most appropriate. Basic video modeling is the most commonly used method and point of view modeling is also frequently used. When basic video modeling is being used, consideration should be given to promoting generalization. Children were able to generalize the skills better during the play routines (e.g., carry over play routine into the home setting), although the daily routine (toilet training) was not as effective. One perceived negative outcome of video modeling is that some children lost their spontaneous utterances, or spontaneous play actions (Reagon et al., 2006).

Finally, when considering video modeling as an intervention, further studies should be reviewed that are similar to the target skill being taught. Research featuring this subject has greatly increased since the 1961 Bobo Doll Experiment. This is most likely due to the ease of access to video equipment and editing software. Other factors should also be considered such as the explicit or sensitive nature of the video (e.g., dressing and using the bathroom), and the need for permission from any peer models who might be used in a video.

After reviewing the selected research studies, I concluded there is a need for more research to be completed to examine video modeling as an intervention to teach functional skills. As a teacher in the preschool setting, I have observed that children are more prepared to learn academics when they have mastered functional skills such as participating in the classroom routine and being able to sit for small- and large-group activities.

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