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Evaluation of the Effects of Video Modeling Types and Technologies

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by

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DEDICATION

This thesis is dedicated to my family. Without their dedication and support, I am not sure how I would have achieved my dreams. I further dedicate this to my grandmother, Iona Shipman, who was such a strong woman and passed away this year. Rest in peace.

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ABSTRACT

This paper aims to explore the literature available on video modeling. Video modeling teaches a variety of skills, including play skills, social skills, and daily living skills. Delivery of the video model varies based on researcher preference and available technology of the time. The paper provides descriptions and examples of different types of video modeling including, video self-modeling, simultaneous video modeling, video priming, interactive video modeling, and treatment packages. The paper concludes with suggestions for future research including the use of modern technologies with video modeling.

CHAPTER ONE:

INTRODUCTION

Individuals with developmental disabilities commonly show deficits in social and communication skills (American Psychiatric Association, 2013). The deficits in social and communication skills may create an environment in which individuals with developmental disabilities struggle to communicate their basic wants and needs (DeBar, Reeve, Reeve, & Meyer, 2018; Kern-Dunlap, Clarke, Childs, White, & Stewart, 1992). Along with communication deficits, individuals with intellectual disabilities struggle with other skills, including independent living, and academic skills. There are numerous theories and methods to improve skill acquisition. Educational institutions and clinical settings seek out these methods, including the use of modern technology, to instruct children with a variety of abilities.

Video modeling (VM) is a treatment that can be simple to individualize and implement. Video modeling involves a video of a person modeling a target skill (LeBlanc et al., 2003). A person then views the video and imitates what the model did. Children can acquire skills through observing and imitating models (Bandura, 1977). Children with intellectual disabilities, including Autism Spectrum Disorder (ASD), show deficits in skills affecting progress in education, social communication, and survival skills (Carlile, DeBar, Reeve, Reeve, & Meyer, 2018). Behavior analysts seek effective interventions to teach these skills which should result in socially valid outcomes (Thiemann & Goldstein, 2001). Albert Bandura (1977) was one of the first to introduce the concept of observational learning. In his research, Bandura (1977) found that children will imitate models without additional reinforcement. These findings sparked present-day research on modeling. Modern technology allows researchers to take observational learning to a portable format with the use of cell phones and tablets. Children who have a history of imitation and consistent reinforcement may be more likely to benefit from VM (MacDonald, Sacramone, Mansfield, Wiltz, & Ahearn, 2009). In MacDonald, Dickson, Martineau, and Ahearn (2015), researchers assess the necessary pre-requisite needed for video modeling to be a successful intervention. They found delayed one-step motor imitation of actions using objects and delayed matching accuracy using a video model were predictors of individual's benefitting from video modeling. Some populations, such as those with learning disabilities, require more time to learn and perform skills.

Additionally, there are many modeling methods, such as in-vivo modeling (Charlop-Christy, Le, & Freeman, 2000; Bandura & Huston, 1961), static pictures (Evmenova, Behrmann, Mastropieri, Baker, & Graff, 2011), and VM. Charlop-Christy et al. (2000) found that VM led to faster acquisition and generalization of target behavior in comparison to in-vivo modeling. In contrast to static pictures, a video model can be a form of total task presentation in a video format (e.g., Haring, Kennedy, Adams, and Pitts-Conway, 1987). Banda, Dogoe, and Matuszny (2011) reviewed studies comparing VM to static images in teaching skills. Researchers used video prompting in combination with other strategies, such as error correction or video feedback. In 6 of the studies, researchers compared video prompting with other picture-based interventions and found VM to be more effective in five of the six studies (one of the five studies found them equally effective).

Behavior targets range from social skills (e.g., Charlop & Milstein, 1989; Nikopoulos & Keenan, 2003), to daily living skills (e.g., Alcantara, 1994), and play skills (e.g., MacDonald et al., 2009; Taylor, Levin, & Jasper, 1999). There are a variety of other skills in video modeling literature, but these skills are targeted the most with individuals with intellectual disabilities.

CHAPTER 2:

TYPES OF VIDEO MODELING

Video Modeling

Video modeling allows for a person to view a model engaging in a target behavior (Charlop-Christy et al., 2000) and allows for identical repetitions of the modeled skill, that children can imitate as the video plays. Traditional VM uses a model that is competent or someone the learner can relate to in terms of age, sex, or both (Bellini & Akullian, 2007).

Video modeling can teach social skills. Social skills are one of the key deficits in those diagnosed with ASD (Reichow & Volkmar, 2010). Social skills have recently become the focus of more research in comparison with years past (e.g., Carlile, DeBar, Reeve, Reeve, & Meyer, 2018; Jones, Lerman, & Lechago, 2014; Volkmar, Lord, Bailey, Schultz, & Klin, 2004). Elksnin and Elksnin (1998), devised a list of social skills into six categories: Interpersonal behaviors (e.g. asking someone's name), peer-related social skills (e.g. identifying others' emotions), teacher-pleasing social skills (e.g. working one's hardest), self-related behaviors (calming oneself down), assertiveness skills (avoiding physical aggression by expressing one's wants using verbal behavior), and communication skills (having a conversation).

Reichow and Volkmar (2010) evaluated evidence-based interventions for teaching social skills to people with ASD within a best evidence synthesis framework. Researchers evaluated 66 studies with a total of 513 participants. They concluded that video modeling had evidence of being an effective treatment to teach social skills. Jones, Lerman, and Lechago (2013) focused on the assessment of stimulus control and generalization of social skills from peers and adults using VM.

The original training (before the researchers introduced VM) taught the skill using most to least vocal prompts from the adults. The children then watched videos that portrayed their peers. The participants were able to use more correct responses and generalize responses to peers following the addition of the peer VM. Along with social responses, social initiation skills lack in children with ASD (Maione & Mirenda, 2006). Social initiations are any physical or vocal approaches to another person to begin a conversation or emit a mand (e.g., "let's play" and grabbing someone's hand) and social initiations cannot be contingent on a peer's prior vocalizations (Maione & Mirenda, 2006). Nikopoulos and Keenan (2003) evaluated the effects of VM on social initiations (e.g., leading the experimenter by the hand or gesturing towards toys) and play behavior (reciprocal play and sharing). The participants watched short clips (approximately 30 s) and would then be placed in the natural environment to perform the skills they watched in the video clips. Researchers found that latencies to social initiations decrease and play durations increase in three children with ASD following short VM clips.

Children with ASD often struggle with social or functional play skills. MacDonald et al. (2009) investigated the effects of VM for teaching two children with ASD and two typically developing peers reciprocal play skills. The study used second by second recording of the assessed play sessions, which followed the viewing of the video model. MacDonald et al. (2009) targeted duration and intervals of scripted and unscripted verbalizations, play actions, and cooperative play. There was an increase in all play skills following the VM intervention and during follow-up sessions.

Daily living skills include skills such as bathing, cleaning, dressing, shopping. etc. VM can utilize task analyses in the form of total task presentation to teach these skills. Instead of a written task analysis, the task appears in a video. Haring, Kennedy, Adams, and Pitts-Conway (1987) sought to instruct young adults with ASD how to purchase items in stores. Researchers initially used least to most prompting and positive reinforcement before introducing VM. Participants showed little to no social responses in the generalization probes prior to the introduction of VM. Percentage of steps completed were higher in both intervention and generalization phases in comparison to baseline.

A video can be reintroduced as a prompt during in-situ trainings. Carlile, DeBar, Reeve, Reeve, and Meyer (2018) used VM and prompting to instruct children with ASD to seek help when left alone in a store using contrived and natural environments. The study used two groups of communication technology for the participants: low-tech communication (e.g. identification cards or bracelets) or high-tech communication (e.g. live video calls via cellphone). Each child watched a video pertaining to his or her mode of communication. Trainings happened five times a week in a contrived environment. If the participant made a mistake, he or she watched the video again. If the participant made another mistake, the experimenter provided additional prompting. There was an increase in steps completed for all participants following treatment and the skill generalized to the natural environment. Altered videos such as this can include prompting (by the video or the instructor), other treatments, or include different models.

Video priming

Some researchers refer to VM as video priming. Video priming is a method of teaching a skill through observation and subsequent imitation of target skills seen in the video later following the video viewing. Researchers use video priming as an antecedent intervention (e.g., Schreibman, Whalen, & Stahmer, 2000). No prompting (except for prompts for attending) or testing occurs during the viewing of the video (Sancho, Sidener, & Reeve, 2010). Video priming, by itself, can be effective, but some skills may require additional feedback and reinforcement (Maione & Mirenda, 2006).

Simultaneous VM

Simultaneous VM involves the participant watching a video model and imitating the skill at the same time. Sancho et al. (2010) compared video priming to simultaneous VM. Participants also received prompts and reinforcement during simultaneous VM. Researchers found that both procedures increased the target skills and one participant showed higher acquisition in the simultaneous procedure compared to the priming procedure.

Similarly, Taber-Doughty, Patton, and Brennan (2008) studied the use of simultaneous VM. Researchers compared the effectiveness of simultaneous VM to delayed VM (the target behavior was preformed one hour following the video viewing). Using an alternating treatments design, the students learned to use the Dewey Decimal Classification System to find books and DVDs in a library. The results indicated that both simultaneous VM and delayed VM were equally effective, but the participants preferred simultaneous video modeling. Other than these studies, there is little research on this type of VM. Future research should focus more on preference of VM modalities when multiple modalities are effective.

Video Self-Modeling

Behavior analysts have also studied VM in comparison to video self-modeling. Video self-modeling showcases the learner as the model (Bellini & Akullian, 2007). Wert and Neisworth (2003) studied the effects of edited video self-modeling on spontaneous mands. Researchers recorded the children in the natural environment, while an adult prompted mands from the children by withholding reinforcers in plain sight. The adults prompted the mands, but researchers cut this out of the video used for teaching. Spontaneous mands increased for all 4 participants following the video self-modeling intervention. Although some studies use video self-modeling, it may not be better than traditional video modeling. Bellini and Akullian (2007) conducted a meta-analysis of studies including VM and video self-modeling. The researchers searched through 23 single-subject design research studies. Both types of VM were effective in teaching various skills and there was no significant difference in the effectiveness of the intervention when the learner was the model or watching another model. It would be beneficial to compare the two types within a study.

Interactive Video Modeling (IVM)

Petty and Rosen (1987) identified interactivity as active participation and control over a video's instruction in some way. Similarly, IVM, as it is used in this paper, refers to a type of video modeling that allows the participant to have control over how the video plays (e.g., playing and pausing) and what videos play next. This can include the viewer touching, clicking, scrolling through, or pausing the video. Researchers in other studies use programs similar to IVM, but call them computer programs (Vanselow & Hanley, 2014), multimedia programs (e.g., Hagiwara & Myles, 1999), or computer-based interventions (e.g., Hetzroni & Tannous, 2004). These programs appear in special education (e.g., Simpson, Langone, & Ayres, 2004), social science (e.g., Downs et al., 2004), and technology-based education literature (Petty & Rosen, 1987).

Petty and Rosen (1987) explored the linear progression of interactive videos and reviewed interactive video components with desktop computers and VCRs. They found that interactive videos can be set up in a variety of ways, including error correction, user directed video selection, and information review.

In other research, there are multiple short videos and edited content (Hagiwara & Myles, 1999). Researchers can divide a VM into multiple short video clips. Hagiwara and Myles (1999) used a multimedia program that separated each step in a short clip. They implemented a social story intervention to teach handwashing to children with ASD. Following training on the software, the viewers were able to navigate through the social stories by clicking. Each time the viewer clicked on a specific button, the program switched to the next video clip. Following the intervention, the children were able to complete more steps during in-situ than in baseline.

Similarly, children with ASD can acquire social skills using embedded video and computer-based instruction (e.g., Simpson et al., 2004). Once a participant acquires the skills necessary to use the technology, the participant can begin the intervention with little to no prompting from the researcher (e.g., Simpson et al., 2004). Simpson et al. (2004) used a computer program with embedded video modeling that involved examples and nonexamples of appropriate social skills to children with ASD to use in group activities. There were 18 videos ranging from 4-6 s. The participants interacted with this program by clicking on the answers to quiz questions following the viewing of the video model. Independent social behavior increased in all participants during group activities. This study provided an example of how up-to-date technology (e.g., IVM) taught skills to children with ASD.

More recently, Vanselow and Hanley (2014) conducted a study using computerized behavioral skills training (CBST). The program included three videos depicting the steps of abduction prevention: “say no”, “run away”, and “tell an adult”. Participants organized the videos into columns labeled: “no” go”, or “tell”. The program corrected errors by moving the videos back to their original position if the participant made a mistake, such as putting the video in the wrong order. After two mistakes, the video prompted the correct placement with a blue arrow. If the participant put the video in the correct spot, it would stay in place and receive a green check mark. The intervention worked for one participant and was able to teach at least one step to the four other participants. Overall, CBST plus in-situ training taught participants to self-protect from dangers.

Not all the research in this area uses single-subject experimental designs. Some studies have used group designs to examine VM. Zhang, Zhou, Briggs, and Nunamaker (2006) recruited undergrads and divided them into groups with IVM, non-interactive VM, no VM (PowerPoint slides), and traditional classroom environment. The IVM allowed the user to move between modules by clicking and taking notes in an open box next to the video. Zhang et al. (2006) used a pretest and posttest to test the students' knowledge on the material. Students in the IVM condition scored significantly higher than the other groups and showed the highest preference for instructional method in a self-report questionnaire. Interactive VM is also useful outside of the classroom. Downs et al. (2004) conducted a study that evaluated the effect of an interactive video program to teach 300 urban adolescent girls, recruited from clinical setting, about sexually transmitted diseases. One group of girls learned through IVM and the other groups learned

through reading a written manual or brochure. The IVM involved the participants to make choices on how the video models do and on the content they want to watch. According to self-reports, STD diagnoses and condom failures decreased, and abstinence reporting increased for the VM group. A limitation of this study is its reliance on self-reporting.

IVM allows for individually paced learning (Zhang, Zhou, Briggs, & Nunamaker, 2006). It is possible that IVM can be highly preferred intervention for some individuals. More research could focus on the social validity of different IVM modalities.

Treatment packages

Treatment packages use additional interventions during, before, or following VM. VM is effective in treatment packages (Charlop & Milstein, 1989). Although VM, in most cases, is an effective method on its own, prompting and reinforcement of performance following a video model can improve acquisition rate and preference (Maione & Mirenda, 2006). A video can be reintroduced as a model prompt during in-situ trainings. Carlile, DeBar, Reeve, Reeve, and Meyer (2018) used VM and prompting to instruct children with ASD to seek help when left alone in a store using contrived and natural environments. The study used two types of communication technology for the participants: low-tech communication (e.g. identification cards or bracelets) or high-tech communication (e.g. live video calls via cellphone). Each child watched a video pertaining to his or her mode of communication. Trainings happened five times a week in a contrived environment. If the participant made a mistake, the researcher provided error correction by having the participant watch the video again. If the participant made another mistake, the experimenter provided additional prompting (manual guidance and/or vocal prompting). There was an increase in steps completed for all participants following treatment and the skill generalized to the natural environment. Altered videos such as this can include prompting (by the video or the instructor) or feedback. The feedback can increase the rate of acquisition of the target skills (e.g., Thiemann & Goldstein, 2001).

Video feedback can use video self-modeling, which requires the video model to be the learner. The researcher records the participant performing a skill and the teacher later reviews the

video with the learner. Kern-Dunlap et al. (1992) used video feedback in a package intervention including delayed reinforcement to teach desirable peer interactions. Video feedback sessions involved the student responding yes or no on whether he or she had desirable behavior. Additionally, researchers gave participants one point for desirable behavior and one point for correctly identifying desirable versus undesirable behavior. These points could be exchanged for small prizes. The frequency of desirable peer interactions increased and the ratio between desirable and undesirable peer interactions grew following the packaged intervention (VM, video feedback, and delayed reinforcement). With the addition of delayed reinforcement, the authors noted that the reinforcement could have led, in part, to the behavior change. This brings into question whether the video feedback, by itself, would have been effective in increasing desirable peer interactions. Research shows that VM teaches the skills, but reinforcement maintains the behavior at higher levels along with video feedback. Apple et al. (2005) used VM with tangible reinforcers to teach compliment giving and initiations. Compliments and compliment initiations increased following both VM and VM plus reinforcement. When the researcher removed reinforcement in the final phase, there was a decrease in these target behaviors. Apple et al. (2005) showed a treatment package was necessary to maintain performance.

VM has also focused on verbal social interactions (Maione & Mirenda, 2006). Maione and Mirenda (2006) evaluated VM and video feedback to teach verbal social interactions during peer play. Researchers showed nine video tapes with adults using similar language abilities to the participant. One child with ASD interacted with multiple peers. Researchers took frequency on scripted vocalizations, unscripted vocalizations, and initiations. Social interactions increased in two of the three activities following video modeling plus feedback. Feedback and prompting were needed for the third activity, to help the participant identify appropriate social interactions versus inappropriate social interactions. After the second feedback session, the participant was able to discriminate between appropriate and inappropriate social interactions.

Recently, O’Connor, Cividini-Motta, and MacNaul (2020) evaluated the effect of video modeling of contingencies (without extinction) and video modeling with direct exposure to contingencies (DRA) on food selectivity. Video modeling was most effective when observing the contingencies in the video model and exposure to the direct contingencies. One way to enhance video modeling, by itself, would be to include feedback after the participant observes the videoed contingencies.

CHAPTER 3:

CONCLUSIONS ON VIDEO TECHNOLOGY

Modern technology may be a great intervention modality for many reasons. Modern technology allows for more portable options. Devices, such as tablets or cell phones, can fit into a child's hands and allow them to view the video from a preferred angle (Cihak, Fahrenkrog, Ayres, & Smith, 2010; Macpherson, Charlop, & Miltenberger, 2015). Researchers have developed modern interactive programs with tablets to teach skills such as reading. *Headsprout® Early Reading* has shown to be effective in teaching children to read in comparison to those children who did not use the interactive program (Twyman, Layng, T.J., & Layng, Z. R., 2011). Children, including those with intellectual disabilitieshave experience with manipulating the latest touch screens and watching videos (McCleery, 2015). It may be the case that providing a treatment in a modality that the individuals with ASD are familiar with may increase social validity.

Future research might investigate different modalities of delivering Video technology literature is emerging, and video technology is evolving quickly. Technology has made it easy to manipulate who is in a video and what behavior the viewer will see through video editing on cell phones and tablets without specialty professional programs. Live video can stream straight to one of these portable devices and the viewer can manipulate where the camera points. Technology has allowed for children to have more interaction with VM than ever before.

Technology can be personalized (Shic & Goodwin, 2015) which allows for individualized prompting and reinforcement methods to aid in skill acquisition. Interactive technology can function as a reinforcer for children, which may improve compliance with learning activities and may minimize the need for extraneous reinforcement contingencies in the program.

Technology affects those who learn from it, as well as those who use it to teach (Shic & Goodwin, 2015). Teachers and parents of those with intellectual disabilities stand to benefit from what technology has to offer, including allowing more time to do other tasks while a student is learning from a device without the need for live prompting. Video modeling is continuously adapting to current research and modern technology and is constantly evolving to decrease response effort in disseminating information. The use of video modeling is an effective method of teaching individuals with developmental disabilities and comes in a variety of modalities. When choosing a video modeling modality, it is important to consider preference of the individual and his or her skills with using certain devices. Hagiwara and Myles (1999), had to teach the software to participants, but many children, including those with intellectual disabilities, have experience with manipulating the latest touch screens and watching videos (McCleery, 2015). Clinicians should consider researching a variety of modern VM modalities, so one can ensure a stronger contextual fit by utilizing these newer technologies and programs with children who know how to interact with them. Given the potential for video modeling in the context of distance-based learning and telehealth delivery, we may see an increase in the use of video modeling in research and clinical practice.

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