Video Self-Modeling as Evidence-Based Intervention

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Abstract

Video Self-Modeling (VSM) is a visual application that has been used for teaching students with ASD. It refers to a cognitive behavioral treatment in which an individual views an edited video clip of her\ himself performing a target behavior appropriately, and is then given the opportunity to perform the behavior. Video self-modeling (VSM) considers as an evidence-based intervention that has been shown to be effective in addressing a variety of skills in individuals with Autism Spectrum Disorder (ASD). This article reviews the empirical evidence supporting the use of video self-modeling among a wide range of skills and abilities. Future research and suggestions are provided.

Keywords: video self-modeling, evidence based practice, autism spectrum disorder.

Introduction

Evidence-based practice (EBP) has become a worldwide concern in numerous professions that focuses on evidence quality in decision making. The implementation of EBP has been associated with positive results and improved practitioners' decisions (Gibbs & Gambrill, 2002). Evidence-based practice originated in the medical field, the term EBP involves "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of the individual patient" (Sackett, 1996, p. 71). As defined, EBP refers to individual decision based on clinical expertise and supported by "the best available external clinical evidence from systematic research" (p. 71). In the United States, some legislation (i.e. the No Child Left Behind Act [NCLB] and the Individuals with Disabilities Education Act [IDEA]) have emphasized the importance of identifying and using the EBPs both in general and in special education (Cook, Tankersley, Cook, Landrum, 2008). Thus, professionals who work in special education generally and in the field of autism specifically have a legal and ethical obligation to support the use of empirical research that is well established or as known as "evidence-based practices."

The number of students with ASD has increased in recent decades with an estimated one in 68 children now identified (Centers for Disease Control, ADDM, 2014). Yet, educators worldwide frequently suffer from dealing with these students. Children with ASD demonstrate a history of persistent deficits in social interactions across settings and people. As a result, the amount of time these children spend engaging with others is significantly less than their typically developing peers. Thus, it is important to identify where a child with ASD falls along the spectrum of social development in order to intervene successfully to improve their social interaction skills and promote high levels of social communication and engagement (APA, 2013). Moreover, the characteristics and symptoms associated with social deficits may interfere with a child's academic achievement throughout his or her educational career (Estes, Rivera, Bryan, Cali, & Dawson, 2011). The inability to communicate with others and interact in a social world can lead to a very challenging school experience for most children with ASD. Even students without ASD find school to be a more difficult environment when they are not able to build close peer relationships.

A lack of friendships has been associated with low levels of academic achievement; as a result, these close friendships and positive peer interactions at school are considered an important component of child development, as they are positively related to classroom participation and engagement (Estes et al., 2011).

In the United States, two national research entities implemented extensive investigations in order to determine the level of empirical evidence of treatments available for children, youth, and young adults with autism spectrum disorders, including (a) the National Autism Center (NAC) National Standards Project (NSP, 2009), and (b) the National Professional Development Center (NPDC, 2013). Both investigations addressed hundreds of articles using trained and expert reviewers, who applied strict criteria to identify what treatment approaches should be considered as "evidence- based." (NPDC, 2013; Wilczynski, 2010).

In 2009, the NAC National Standards Project evaluated 775 studies published from 1957 through 2006. Eleven interventions met the criteria as being "established treatments" for individuals under the age of 22. This research review showed sufficient evidence to "confidently determine that a treatment produces favorable outcomes for individuals on the autism spectrum" (National Autism Center, 2015, p. 34). Examples of these treatments include the antecedent package, behavioral package, modeling, peer training package, and schedules (Wilczynski et al., 2009). More recently, the National Professional Development Center (NPDC) conducted a review of 456 studies published between 1997 and 2011 (Wong et al., 2014). The NPDC stated that:

> a practice is considered evidence-based if it was supported by: (a) two high quality experimental or quasi-experimental design studies conducted by two different research groups, or (b) five high quality single case design studies conducted by three different research groups and involving a total of 20 participants across studies, or (c) there is a combination of research designs that must include at least one high quality experimental/quasi-experimental design, three high quality single case designs, and be conducted by more than one researcher or research group" (Wong et al. 2014, p. 15).

The results of this literature review yielded 27 focused intervention practices that met criteria as being "evidenced based." Examples of these interventions include antecedent-based intervention, modeling, peer-mediated instruction and intervention, prompting, reinforcement, and social skills training.

It is imperative that educators have more evidence based practical information about supporting the learning and development of children with ASD. This article provides a brief overview of Video-self modeling (VSM) as a research based practice targeting certain problem behaviors or increasing specific skill deficits present in individuals with ASD.

In addition, this review is intended to educate and inform special education teachers as they consider and implement effective teaching techniques to help their students acquire the appropriate social skills and background knowledge needed for success. Teachers may find that these practices are beneficial with a wide range of children who persistently engage in challenging behaviors.

Video Modeling (VM)

The past 20 years of research has seen an incredible shift in many interventions that target social deficits for individuals with ASD (DiGennaro Reed, Hyman, & Hirst, 2011). Several interventions aimed at improving social difficulties have incorporated the use of video technology as a viable strategy for teaching individuals with ASD (Scattone, 2007). Among the wide range of intervention approaches that have been used to address social impairments for individuals with ASD, video-modeling intervention has steadily increased over the last decade. The concept of modeling originally emerged from Bandura's social learning theory (Bandura, 1969). He suggested that modeling increases ". . . the probability of occurrence of a wide variety of neutral and socially approved behavior[s]" (Bandura, 1969, p. 196).

Modeling is an instructional strategy that can be accomplished by having an individual engage in behavior to be learned by observing or imitating others (Bandura, 1977). Various skills can be taught using modeling techniques, among them social skills, play skills, academic skills, functional life skills, and appropriate behavior versus inappropriate behavior. Modeling can be demonstrated in vivo, where there is an individual in front of the child engaging in the target behavior to be learned, or through videos, where the child is watching the target behavior on an iPad, TV, or computer.

Both video modeling and live modeling have been shown to be successful strategies for teaching new behaviors to children with autism, as well as in promoting maintenance and generalization of these behaviors (Charlop-Christy and colleagues, 2000).

VM is a teaching strategy that has been approved to produce rapid acquisition of a variety of skills in children with autism. Video modeling uses visual cues as an effective technique for instructing students who are often visual learners. Current research qualifies video modeling as an evidence-based intervention, which has implications for its use with students with ASD in the school setting (Bellini & Akullian, 2007). Video modeling interventions involve a child watching videotapes of a target skill exhibited by a person such as a peer, adult, or the subject himself/ herself. In video modeling, "a target behavior is chosen, individuals are selected to act or engage in the target behavior, training or practicing is conducted, videos are filmed, prompts are edited out, and then the individual who is learning the skill repeatedly watches the video" (Charlop-Christy et al., 2000).

Video modeling comes in different forms. The most common types are adult and peer video models, point-of-view models, video self-models, and mixed models (McKoy & Hermansen, 2007).

Adult and peer video models. Adult and peer models are a common method of training through the use of video. In an adult model, a person who is familiar to the participant models the desired skill or behavior. In the peer model, the person modeling the behavior is often the same age, gender, or race as the participant completing a task. One of the benefits of using video modeling, as opposed to live modeling, is that the video offers learners the ability to view the same material, modeled the same way, many times and across different settings and instructors (Hammond et al., 2010).

Point-of-view modeling. Point-of-view video modeling is when the target behavior or skill is recorded from the perspective of what the learner will see when he or she engages in the behavior or skill.

Video self-modeling. Video self-modeling utilizes the idea of adult and peer video models but with the advantage that the participant is observing himself or herself modeling the desired behavior. VSM uses two approaches to attain the goals of increasing the appropriate behavior: feed-forward and positive self-review.

Mixed modeling. This approach may include a combination of any of the above models.

Even though research shows that video modeling proves a level of effectiveness regardless of the type of model, there is some disagreement regarding whether one type of model may be more beneficial than others. Some research suggests that peer modeling may be more effective than adult modeling, and that self-modeling may, in turn, be more effective than peer modeling (Buggey, 1999; McCurdy & Shapiro, 1998; McKoy & Hermansen, 2007). Other research suggests that peer and self-models have equal effectiveness (Sherer et al., 2001).

Efficacy of Video Modeling

Many studies have been conducting using video modeling as a successful intervention to teach a variety of skills to individuals with autism. Some of the skills that have been taught using video modeling include social and communication skills, functional living skills, and appropriate behavioral functioning (Bellini & Akullian, 2007; Delano, 2007; McCoy & Hermansen, 2007; Odom et al., 2010; Reichow & Volkmar, 2010; Shukla-Mehta et al., 2010; Wang & Spillane, 2009). Other skills that have been effective using video modeling include:play skills (D'Ateno, Mangiapanello, & Taylor, 2003); securing attention; initiating comments and requests (Thiemann & Goldstein, 2001); and basic first-aid skills (Ergenekon, 2012).

Charlop and Milstein (1989) published one of the first studies using VM with children with autism. The researchers assessed the effects of video modeling on acquisition and generalization of conversational skills among three autistic children. All three children were verbal, but their spontaneous conversation skills were severally delayed (Charlop & Milstein, 1989). Four specific conversation scripts were developed to assess whether each child could hold a brief conversation. Videotape for each conversation was created and consisted of two adults engaging in the particular conversation. The adults were facing the camera and held the pertinent toys as they modeled the conversation by taking turns in saying their lines. "A multiple-baseline design across children for Conversations A and B (with the therapist) and within subjects across Conversations A and B was used" (Charlop & Milstein, 1989 p. 277). The video treatment was introduced to the children. The children were slowly introduced to each line of the conversation, and the therapist would say, "let's do same," followed by praise if the modeling was successful (Charlop & Milstein, 1989).

The result demonstrated the efficacy of teaching conversational speech through a video modeling with three autistic children. All three children were able to generalize and maintain their conversational speech over a 15-month period (Charlop & Milstein, 1989).

Video modeling has also been used to teach social skills to children with autism. The term "social skills" can cover everything from eye contact to gestures, social initiation, social conversation, play skills, basic interaction, and emotional reciprocity. Nikopoulos and Keenan (2007) examined the impact of using video modeling to teach complex social sequences to children with autism. Three children who were attending a private school participated in this study. A multiple baseline across subjects design was used for all the participants. All children viewed the videotapes, where a 10-year-old child (the model) and an adult (the experimenter) engaged in a simple sequence of activities. Results showed that this video modeling procedure improved the social initiation skills of all children, and it facilitated not only reciprocal play engagement but also imitative responding of a sequence of behaviors.

Charlop, Dennis, Carpenter, and Greenburg (2010) conducted a study to examine the efficiency of using video modeling to promote appropriate gestures, verbal comments, facial expressions, and intonation to three boys with autism. The videotapes consisted of two individuals engaging in a scenario. One individual acted as a therapist and presented the stimulus. The second individual acted as a child and displayed the appropriate actions that include verbal comments, intonation, gestures, and facial expressions. After the child had watched the video two times, the experimenter took the child to the playroom, where the experimenter began to interact with the child by providing the same toy that was presented in the videotape. All three children reached the proficiency level in each of the four target behaviors after watching the video only a few times. The children also displayed generalization of these socially expressive behaviors in probes across setting, stimuli, and persons.

Video modeling has been shown to be a successful intervention in teaching pretend play skills. Reagon, Higbee, and Endicott (2006) taught a four-year-old boy diagnosed with autism and his older sibling to engage in pretend play scenarios using video modeling. The older brother acted in the video models with a typically developing peer. Both the child with autism and the sibling watched the video and were then told to play with the same materials that were presented in the video. The findings showed that the child with autism and his sibling successfully engaged in the scenarios during intervention as well as generalization probes conducted in their home. This study illustrated that children with autism may benefit from sibling-oriented interventions and video modeling intervention in teaching play skills.

The findings of another study by MacDonald, Sacramone, Mansfield, Wiltz, & Ahearn (2009) also showed that video modeling was an effective strategy for teaching sequences of cooperative play. In the VM, both adults and typically developing peers acted out a pretend airport, a zoo, and cooking on a grill (MacDonald et al., 2009). Two pairs of children (a child with autism and a typically developing child) were shown the videos and asked to repeat the play. Results indicated that both pairs of children exhibited rapid acquisition of pretend play scenarios and maintained this performance during follow-up probes. This research demonstrated that video modeling could be efficient to teach a typically developing child how to play with a child with autism, which can be important to promote inclusion in the classroom.

Similarly, video modeling can be used to teach a wide range of academic skills to children diagnosed with autism and co-morbid disorders such as Down's syndrome. In a pilot study conducted by Biederman and Freedman, children diagnosed with autism and Down's syndrome were shown a video depicting the teacher printing lower- and upper-case letters. The instruction on the video was slow, deliberate, and repeated for 30 minutes. The video was presented in school and at home. Results indicated that children who previously were unable to print any letters started showing success after only 14 sessions (Biederman & Freedman, 2007).

Safety and independence are among the biggest concerns for parents with children with autism (Shipley-Benamou, Lutzker, and Taubman, 2002). Children with autism need to learn safety skills to be independent in the community and to avoid dangerous situations. Ergenekon (2012) conducted a study aimed at teaching basic first-aid skills. Three children with autism as well as a sibling model participated in the study. All three children were aware of the dangerous situations that required first aid, but they lacked the knowledge of how to apply first-aid skills. Sessions were conducted in the participants' home. The dependent variable of the study was learning the first-aid skills to be applied after the accidents such as cuts, abrasions, and minor burns. The independent variable was the first-aid skills training packet.

First, the participant read a short story about a specific situation where first aid would have to be implemented. Then the participant watched a video on the specific situation and how to respond. If the correct response was given, the trainer provided verbal praise. If the child gave the incorrect response, the trainer gave feedback, and the child repeated the skill direction. Findings of the study showed that the first-aid skills training package was found to be effective in teaching basic first-aid skills to children with autism. All three subjects generalized their acquired skills to themselves, to the researcher's different parts of the body, and to different materials.

Video Self-Modeling (VSM) as Evidence-Based Practice

Video Self-Modeling is a strength-based approach that has been validated as an effective intervention for promoting appropriate student behaviors rather than reducing negative behaviors. Through the use of videos and editing, students can view themselves successfully performing the target behavior that was previously challenging (Collier-Meek, Fallon, Johnson, Sanetti, & Delcampo, 2012). Specifically, VSM "allows children to view positive examples of their behavior or demonstration of skills slightly beyond their present ability" (Buggey & Hoomes, 2011, p. 2).

The concept of VSM is supported by Bandura, Ross, and Ross (1961), who suggested that children learn through observing the behavior and skills of others. After further research, Bandura found that modeling was the most effective if the child was a his\her own model (Bandura, 1969). Bandura (1997) stated that seeing a positive image of oneself performing a task successfully "provides clear information on how best to perform skills" and "strengthens beliefs in one's capability" (p. 64). Therefore, this image of the self builds self-efficacy, increases confidence, and supports generalization of that behavior across different settings.

Two types of VSM are recognized in the research: positive self-review and feed-forward (Dowrick, 1999; Hitchcock et al., 2003). Positive self-review is a process where individuals observe optimal examples of their own behavior on a video. This approach is used when individuals have the skill, but they need either to increase the frequency of a certain behavior or to reach the desired level of effectiveness of that behavior (Dowrick, 1999). In contrast, feed-forward is a process involves creating a video where individuals are watching a version of themselves being successful at particular behavior that they are not yet able to perform independently (Collier-Meek et al., 2012). Both positive self-review and feed-forward types of VSM have been proven to be effective in school settings and across a wide range of skills (Buggey, 2007; Hitchcock et al., 2003).

There are several benefits of using VSM over other types of VM. First, research has shown that the more similar a model is to the observer, the more likely the viewer will repeat the behavior (Prater et al., 2012). VSM is tailored specifically toward the target student who is to be performing the behavior. This similarity can help the viewer, especially during the initial acquisition phase (Gelbar et al., 2012). Second, VSM is cost-effective (Wilson, 2013; Buggey, 2009; Buggey, 2007). If VSM intervention is used in a school setting, many schools already have basic equipment of making a video such as computers, iPads, and tablets. Hence, the cost of making a video is relatively minor. If VSM intervention is utilized in a home setting, parents or caregivers should be able to afford the equipment needed for VSM. According to Buggey (2009), the cost of making a video is roughly $500 to purchase basic equipment (a camcorder and a VCR and/or DVD/TV combination) as well as the editing software that costs less than $100 (Buggey, 2009). Third, VSM procedures can be implemented quite easily because of technological advances, with the result that many people today are knowledgeable about it (Buggey, 2009; Buggey, 2007). Fourth, videos with students seeing themselves engaged in and succeeding at a task often inspire more interest, and thus increase the motivation and attention that facilitates the learning process (Dowrick, 1999). Finally, using the self as a model can increase the individual's self-efficacy for performing the target behavior (Bellini & Akullian, 2007).

Guidelines to Implement Video Self-Modeling

Collier-Meek et al. (2012) suggested six steps to follow when implementing VSM. These steps are recommended for professionals and educators who use VSM techniques in their practice:

Identifying if video self-modeling is an appropriate intervention. Professionals, educators, parents, and others working with students with ASD must first determine if VSM is the most suitable intervention for a given student. Students' characteristics and target problems should first be assessed through different resources.

Planning to implement video self-modeling. Once parental permission is obtained, a collaborative team (parents, teachers, and speech and language pathologists) work together to plan and prepare the VSM procedures.

An operational definition of the target behavior must be clearly defined, the target behavior must be observable and measurable, baseline data should be collected, and goals for the student need to be developed.

Video recording. Several approaches can be used to videotape students. One way is to videotape the student over a period of time to demonstrate the desired behaviors. The other way is to simultaneously shoot the video and prompt the student to engage in desired behaviors. Finally, it is appropriate to involve peers in the video for the student to be in an authentic interaction (role-playing).

Editing the video. Editing occurs after videotaping. Only the desired behaviors are shown in the video; all undesired behaviors are removed. Students only watch their desired behaviors to ensure positive self-review.

Viewing the video. After editing the video, students view the edited video in which the target behavior is being successfully performed. Videos are usually no more than 5 minutes long and can be shown to students in any setting as long as the student can attend the video. Videos can be shown to students daily or weekly; however, consecutive weeks of presenting are optimal for a behavior change to occur.

Evaluation. Collecting data before and after implementation of VSM is important to determine if the intervention was effective in changing undesired behaviors to desirable behaviors. Reviewing the data continually is crucial to verify if VSM is an effective intervention, and to check whether the intervention's steps were implemented as planned (intervention integrity).

Efficacy of VSM with Autism Spectrum Disorder

The effectiveness of VSM has been demonstrated in treating a variety of social, behavioral, and functional skill deficits. It has helped improve acquisition of skills, increase the performance of skills, or reduce problem behaviors (Bellini & McConnell, 2010). VSM has also been shown to be efficient with different ages (Clare, Jenson, Kehle, & Bray, 2000; Rickards-Schlichting, Kehle, & Bray, 2004; and Buggey, Hoomes, Sherberger, & Williams, 2011) and with a variety of disability categories including autism (Bellini et al., 2007), Tourette's syndrome (Clarke, Bray, Kehle, & Truscott, 2001), and selective mutism (Kehle, Madaus, Baratta, & Bray, 1998).

However, there have been several studies with the preschool age group where positive effects of VSM were not realized (e.g., Buggey, 2011; Clark et al., 1993). Some factors that may impact this age limit include the ability to self-recognize, the severity of a child's disability, nature of the behavior, ability to attend to the video, and ability to recognize the salient features of the video. Therefore, much more research is needed to determine at what age VSM gains the efficacy needed to be considered as a therapeutic intervention. Other than this age-based limitation, VSM seems to be an effective method that can be used with anyone who can attend to a video (Buggey & Ogle, 2012).

A review of empirical evidence completed by Gelbar et al. (2012) supported the use of VSM for individuals with ASD to increase language and communication deficits, increase social skills, modify problem behavior, and teach functional skills. The researchers found that various participants responded differently to the variety of VSM interventions. In general, VSM has been useful to increase language and communication skills in children with ASD and most effective in social skill acquisition (Buggey, 2005). It has been useful to decrease off-task behaviors, tantrums, and improve learning classroom rules (Gelbar et al., 2012). Selected major studies across language/communication, behavior, and social skills are discussed below.

VSM and Language/Communication Skills. VSM has been used to increase language and communication skills in individuals with ASD. Several studies have been conducted to examine the effect VSM has on language skills in students with autism. Buggey, Toombs, Gardner, and Cervetti (1999) used VSM to increase responding behaviors in three children with ASD between the ages of 7 and 12 years. Students were taped over two weeks during play sessions at their homes and were asked frequent questions by the researchers. The percentage of appropriate verbal responses from baseline increased in all three children after they began to watch their videos. A similar study using VSM attempted to increase unprompted and appropriate responses questions with one student with autism (Buggey, 2005). During the baseline phase, with all opportunities to respond to questions, the student made only one response but showed no increase in his unprompted responses. When the student was shown a shorter self-modeling videotape in which the inclusion of peers asking questions was removed, the results showed more responses to questions, an increase in the student's unprompted responses, and an increase in the average length of responses.

Wert and Neisworth (2003) conducted a study to investigate spontaneous requesting with four preschoolers with ASD aged 3 to 6 years. All students were shown videos of themselves engaged in spontaneous requesting behavior such as asking, "May I have a game piece?" for five days prior to attending school. Findings indicated that significant and immediate increase were made in the frequency of social initiations, and data on the maintenance phase revealed that the frequency of social initiations was maintained following the intervention phase for all students. All students also generalized the target behaviors to the school setting.

VSM and Behavioral Skills. The use of VSM has been effective in modifying the classroom behavior of individuals with ASD. The uses of VSM began in the 1970s to encourage positive behavior change in children ages 4–12 years. In the 1980s, self-modeling techniques were used to improve more adaptive behaviors (reducing tantrums, repetitive hand flapping, or anxious behaviors) (Dowrick, 2012). Hitchcock et al. (2003) completed a review of behavioral interventions and found that interventions using VSM for decreasing behavior problems (fighting, distracting, making noises, and out-of- seat behaviors) were effective and produced positive outcomes for individuals with ASD.

Coyle and Cole (2004) used video self-modeling and self-monitoring interventions to decrease off-task behavior with three students with ASD. Off-task behavior includes "looking around at other children, fiddling with a pencil or other objects, rolling items from the desk, inspecting objects and other students at close proximity, touching other students, staring blankly, and leaving their seats" (Coyle & Cole, 2004, p. 6). The students were shown videos of themselves demonstrating only the appropriate behavior, with all off-task behavior edited out. As a result, the on-task behavior increased in a classroom setting with all three students.

Another study conducted by Buggey (2005) used VSM to decrease tantrum behavior in two students with autism. The researchers created scenarios where the children would act out situations that typically resulted in the tantrums. The children had scripts and were prompted to act in the videos with appropriate behavior and reactions. Then a video was made by editing out all but the most positive reactions to these situations. After the children memorized the scripts, they watched the edited video in the classroom before class. The result indicated that the rate and duration of tantrum behavior decreased substantially.

Similarly, Lang et al. (2009) utilized a VSM intervention for two boys with ASD who require additional instruction to learn classroom rules (Lang et al., 2009). Even though the students in this study had previously received some modifications including posted rules, praise, and token reinforcers to improve adherence to classroom rules, they were unable to recall the classroom rules until VSM was implemented. The results demonstrated that both the children improved in their ability to recall classroom rules following the VSM intervention. The results were maintained after the intervention was withdrawn. These findings suggest that VSM is an effective tool for teaching classroom rules to children with Asperger's syndrome.

VSM and Social Skills. The use of VSM interventions for social skills has been particularly effective against deficits in individuals with ASD. Buggey (2005) conducted an experiment to demonstrate how VSM could be used to increase social initiations in two elementary children who had high functioning autism. At the beginning of the experiment, the first student had zero social initiations with his peers over eight school days, while the second student had only two interactions over 12 school days. After a VSM video was introduced that showed the participants engaging in appropriate behavior with their peers, both participants made significant gains in the frequency of their social initiations.

Another study done by Bellini et al. (2007) involving students with ASD, specifically Asperger's syndrome, examined two young children ages 4 and 5. The purpose of the study was to investigate the effectiveness of VSM on increasing peer social engagement. Social engagement in this study was defined as unprompted "participation in an activity or play sequence with a peer involving shared toys, objects, and play items" (Bellini et al., 2007, p. 83). The study measured social interactions with same-aged peers in a natural setting rather than with adults. Following the video viewing, increases in social engagement were observed during the intervention phase and were maintained during follow-up phase.

Crandell and Johnson (2009) concluded that VSM showed positive outcomes as a teaching method for children with ASD. The study described a 4-year-old preschool student with Asperger's syndrome. The target behaviors included following directions, sharing, choosing different activities, and participating during music time. Findings indicated that VSM intervention was successful in increasing participation in activities.

For instance, the participant initially did not sing at all during music time; however, after the intervention was introduced and then withdrawn, the participant was observed singing.

Finding further support for the effectiveness of VSM, a recent study done by Boudreau and Harvey (2013) studied three children with ASD to examine if a VSM intervention would increase social initiations to others. The study employed a multiple baseline design. Researchers showed 6- to 7-minute videos to each participant initiating play with peers after all prompts were edited out of the videos. After viewing the video, participants were moved to a playroom for observations and data collections, and the number of independent social initiations made by each participant was recorded. Results showed that each participant made significantly more social initiations during the intervention phase and that these results lasted through a maintenance phase after the videos were removed. However, the authors noted that the participants had to be prompted to attend to the VSM. It was also noted that a shorter video might have been more effective at holding participants' attention. Therefore, it was recommended to conduct follow-up studies to monitor a child's attention and how this associates with positive outcomes (Boudreau & Harvey, 2013).

Conclusion

Video Self-Modeling (VSM) is a cognitive-behavioral treatment that has shown to be successful as a treatment for children with ASD in prompting social interactions, increasing the frequency of verbalizations, and improving daily living skills. Due to the wide range of deficits and behaviors in students with ASD, different participants responded differently to VSM intervention. Further research investigating different types of VM, including adults modeling, peer modeling, or even point of view modeling to explore the relative effectiveness of VSM compared with other video modeling techniques. More research is necessary to better understand how the use of VSM can be successful in conjunction with other treatment methods such as reinforcement or prompting for targeting the varied deficits or behavior problems observed in individuals with ASD.

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