Critical Review: Using Video Modelling to Teach Verbal Social Communication Skills to Children with Autism Spectrum Disorder

Alex Rice
M.Cl.Sc SLP Candidate
University of Western Ontario: School of Communication Sciences and Disorders

The purpose of this review was to examine the evidence supporting the effectiveness of video modelling as an intervention for verbal social communication skills in children with Autism Spectrum Disorder (ASD). A search of the literature yielded nine relevant papers. The results of this review indicate that there is suggestive evidence that video modelling is an effective way to teach verbal social communication skills to children with ASD.

Introduction

Autism Spectrum Disorder (ASD) is a developmental disorder involving impairments in communication and social interaction (Delano, 2007). Difficulties with social interaction can cause social rejection of people with ASD (Lowy Apple, Billingsley, & Schwartz, 2005). Development of social communication skills is therefore important for social participation outcomes for children with ASD (K. Wilson, 2013). One aspect of social communication is being able to use verbal speech socially. Verbal social communication skills like greetings, conversational speech, commenting, giving compliments, and asking questions are all important aspects of communication. Given the importance of these skills in helping children with ASD engage socially, it is necessary to identify effective methods of teaching these skills to children with ASD.

A technique known as video modelling has been gaining popularity as an intervention tool for children with ASD. Video modelling involves showing the client a video of a model performing a target behaviour with the goal that the client will imitate that behaviour. Research suggests that students with ASD are able to learn some target behaviours by watching video models (Bellini & Akullian, 2007; Delano, 2007). Video modelling has some advantages over in-person modelling. It is portable and can be implemented in the absence of a therapist. It is also thought to be highly engaging for students with ASD, since they often prefer video stimuli over in-person interactions (Mccoy & Hermansen, 2007). Video modelling also removes distracting information and provides only the key elements of the stimulus required for learning a target behaviour. Thus, video modelling could be a convenient and efficient way of teaching verbal social communication skills to children with ASD.

Commercial programs using video modelling have recently emerged, claiming to be effective in teaching a wide variety of social and functional skills to children with ASD. Among these claims is the idea that video modelling programs can improve social language skills in children with ASD, or even teach a nonverbal child to speak. Given that these programs involve a cost and time commitment from parents, it is important to investigate the effectiveness of video modeling on teaching verbal communication skills.

Objectives

The objective of this paper is to critically evaluate the literature supporting the use of video modeling interventions to teach verbal social communication skills to children with ASD.

Methods

Search Strategy
Online databases including: PubMed, PsycINFO, and CINAHL were searched using the following terms: ""video modeling" AND "autism" AND "social communication""

Selection Criteria
Studies were included if they involved the use of video modeling to teach verbal social communication skills to children with ASD. Verbal social communication skills were defined as skills that use spoken language to fulfill a social purpose, and that involve a communication interaction with another person. Studies involving children (age 0-12) were included in this review.

Data Collection
Results of this literature search yielded nine articles that met the selection criteria. All studies employed a single-subject multiple-baseline design.

Results

Multiple Baseline Studies
Multiple baseline studies are a type of single subject design, meaning that participants act as their own controls. Single-subject designs are appropriate for this topic due to the small sample sizes available. Multiple-

baseline designs are appropriate for evaluating treatment outcomes in children with ASD because they do not require treatment to be "withdrawn" at any point. For research involving intervention for children with ASD, it could be considered unethical to withdraw treatment, or to not provide treatment to some individuals.

Video Modelling as the Sole Intervention:
Six studies used video modelling alone as the intervention. The use of only one intervention at a time allows the reader to be more confident that the results of the study were truly due to the video modelling intervention.

Sherer et al. (2001) used peer video modelling and video self-modelling in a conversational skills intervention in children with ASD. This review will focus on the results of the peer video modelling condition. Participants were five male children with diagnoses of ASD or Pervasive Developmental Disorder- Not Otherwise Specified (PDD-NOS). Eligibility criteria for inclusion were specified. All participants had expressive language skills and could speak in short sentences. In the intervention phase, participants watched videos of a model answering questions in a conversation three times per day. The following day, a researcher tested the child's ability to answer target questions in conversation. Criteria used for scoring participant responses were described clearly, and appropriate reliability data were collected. It was not specified whether raters were blinded appropriately to study conditions. Visual analysis only was used to analyze the results. All participants demonstrated an improved ability to respond to questions, however only three of the five participants reached the criterion of 100% accuracy. High variability was observed in the rate of acquisition of the target skill among participants. Generalization probes provided some evidence of generalization to new settings and conversational partners, but not to new questions. Follow-up probes administered at two months post intervention revealed that gains were maintained for all participants. The authors noted that the two children who achieved the fastest progress were reported to have a strong preference for visual stimuli and videos. They suggested that a child's preference for video stimuli could be related the effectiveness of video modeling treatment.

A strength of this study is that video modeling was the only intervention used. Intervention sessions took place mostly in the child's home, which could lead to increased generalization to everyday activities. A weakness of this study is that generalization probes were inconsistently administered, with different types of probes administered depending on the participant. The failure to blind raters to the study's hypotheses is another weakness.

This study provides **suggestive** evidence that video modelling was effective in teaching conversational responding skills to children with ASD.

Maione and Mirenda (2006) conducted a study to determine the effects of video modeling on peer-directed social language in a child with ASD. The participant was a five-year-old male child with ASD. Language skills were reported to be below age expectations for this child using appropriate language assessment measures. During the intervention phase, the participant watched videos of adults talking to each other while playing with toys. The child's total number of verbalizations was then recorded during a play session with a similar-aged peer. Interrater reliability was reported to be appropriate. The primary transcriber was not blinded to the purpose of the study. Based on visual inspection, the participant's use of social language increased in 2 of 3 play activities following video modeling intervention. Informal reports revealed some evidence of generalization of this skill to a conversation with a novel peer. Gains made were maintained up to 18 days following the intervention.

This study explicitly defined each dependent measure with sufficient detail. They also provided detailed descriptions of the videos used for modeling, making replication in future studies possible. The use of video modeling as the sole intervention in this study is a strength, as it provides evidence for the effectiveness of video modeling alone as an intervention. A weakness of this study is that only a single participant was included.

The results of this study provide **suggestive** evidence for the effectiveness of video modeling alone in increasing peer-directed social verbalizations during play.

Charlop and Milstein (1989) assessed the effects of video modeling on acquisition and generalization of conversational skills. Three boys with high-functioning ASD participated in this study. Inclusion criteria were not specified. In this study, participants watched videos of familiar adult models having a scripted conversation. A therapist would then say the first line of the scripted conversation and allow the child time to make an appropriate response. To reach criterion, the child had to provide appropriate responses in the scripted conversation over two of three consecutive conversations. Interrater reliability was reported to be high. Each child eventually reached criterion, with varied rates of acquisition. When generalization probes

were conducted (including new partners, settings, toys), generalization was observed for most participants on most measures. These gains were maintained for all children up to 15 months later at follow-up.

A strength of this study was that it included many different types of generalization probes to determine whether the children would use their conversational skills in new conversations. It also included follow-up probes up to 15 months post intervention to determine whether gains were maintained. A weakness of this study is that raters were not blinded to the experimental conditions. Parents were also used as raters for some generalization measures. Without sufficient blinding, it is possible that ratings could have been biased.

Overall, this study provides **suggestive** evidence that video modelling is effective in teaching conversational skills in some children with ASD.

Charlop-Christy and Freeman (2000) compared the effectiveness of video modelling with in-vivo modelling in teaching skills in children with ASD. This review will focus on the video modelling condition only. Five children ages 7-11 years old participated in this study. Each child had a diagnosis of ASD based on gold-standard criteria. Participants had a range of cognitive and language abilities based on appropriate standardized measures. Target behaviours were identified for each child based on assessments performed as a part of their curriculum. Two children had target behaviours related to verbal social communication: spontaneous greetings, and scripted conversation. In the intervention phase of this experiment, participants watched a video of models performing the target skill two times. The child was then immediately prompted to "do the same", and the target skill was tested. Interobserver agreement was reported to be high. Visual inspection only was used to analyze the results. The use of spontaneous greetings increased following intervention in the first participant. Conversational responding increased following intervention.in the second participant. Spontaneous greetings and conversational responding were both demonstrated during generalization probes.

The methods and stimuli used in this study were well-described in adequate detail to allow for replication. The experimenters chose target behaviours that were high in face validity (giving compliments and conversational speech). Some experimenters were blinded to the experimental hypotheses, but not all. This could have contributed to biases in how testing was scored. The authors mentioned that prompting and reinforcement of correct behaviours was provided during baseline sessions. Thus, the participants had some exposure to teaching of target behaviours prior to the experimental phase of the study. This could have improved the participants capacity to learn the target behaviours. However, the participants' performance remained stable (0 correct responses) throughout the baseline period, suggesting that the prompting and reinforcements did not result in learning of these behaviours.

This study provides **highly suggestive** evidence that video modelling can improve greeting and conversational responding skills in children with ASD.

In a study by **Taylor, Levin, and Jasper (1999)**, video modelling was used to teach sibling-directed comments during play. Participants were two male children with diagnoses of ASD using gold standard measures. Inclusion criteria were not specified. During intervention sessions, participants watched video models of their siblings making play-related comments while engaging in play with an adult. The participants then practiced the script with an adult who provided praise and reinforcements when the participant said one of the scripted play comments. The participants then had the opportunity to play with their sibling using the same toys seen in the video. The amount of comments made were recorded by an observer. It was not specified whether observers were blinded appropriately. Interobserver reliability was reported to be high. Visual inspection alone was used to analyze the data. Following intervention, the amount of play-related comments increased substantially for both children.

A strength of this study is that the intervention occurred in the child's home and included their siblings. Thus, the results of this study are likely to generalize into the day-to-day activities of these children. However, the authors did not conduct any generalization or follow-up probes to determine whether this was the case. Another weakness of this study is the use of practice sessions which included reinforcements for correct responding. These practice sessions likely contributed to the child's learning, thus it is unclear whether improvements in the target skill would have resulted from a video modelling treatment alone.

This study provides **suggestive** evidence for the effectiveness of video modelling in improving use of sibling-directed play comments in children with ASD.

Miltenberger and Charlop (2015) used video modelling to teach a variety of verbal social communication skills, including play verbalizations, verbal requesting, asking questions, and conversational speech. Participants were five children with ASD, four of which had goals related to verbal social

communication. Target behaviours for each child were determined based on assessments, consultation with caregivers and therapists, and informal probes. After a baseline was established for each child's target behaviour, participants watched a video of adults modelling the target behaviour. Testing sessions were conducted immediately following video modelling sessions. Inter-observer agreement and treatment fidelity measures were reported to be high. Visual inspection alone was used to analyze results and revealed that all participants demonstrated improvements in the target skill. All participants also maintained this skill at follow-up 4 to 15 weeks later. Most of the participants generalized gains across person and setting, but not all.

Some strengths of this study include the larger sample size, and the inclusion of both male and female participants. This study also included appropriate generalization probes and followed up with participants to assess the maintenance of gains over time. Methods were clearly described, allowing for accurate replication. Correct responses were also operationally defined in sufficient detail. They also included measures of the social validity of treatment outcomes to evaluate whether treatment gains were practically significant. Weaknesses of this study include the use of visual inspection only to analyze results, and failure to describe how participants were recruited.

This study provides **compelling** evidence that video modelling was effective in increasing verbal social communication skills in children with ASD.

Video Modelling with Another Treatment Method:
Three studies used video modelling in conjunction with another treatment method. With two interventions being provided simultaneously, it cannot be determined whether results were caused by the video modelling intervention or the additional intervention.

Lowey Apple, Billingsley, and Schwartz (2005) evaluated the effectiveness of video modelling and explicit teaching videos to improve peer-directed compliment-giving behaviours in children with ASD. Participants were two males with ASD (aged 5 years old). Both children were reported to have near-normal language and cognitive abilities, but limited knowledge of how to use compliments socially. In this study, participants watched videos of similar-aged children modeling examples of compliment-giving initiations and responses. Videos also included explicit explanations of the skill of compliment-giving. Immediately following video presentation, frequency of compliment giving behaviours were recorded during a 15-minute play period. Interrater reliability was

reported to be high. Based on visual inspection only, compliments given in response to a peer increased for both children. Gains were reportedly maintained over the follow-up period, but the timing of follow-up measures was not reported. Compliment initiations (e.g. The child approaches someone and says "I like your shirt") did not increase following video modeling. Initiations increased when reinforcement was introduced, but these gains were not maintained when the reinforcement was removed.

The use of peers rather than adults as conversational partners to test skill acquisition is a strength of this study. The use of compliment as a target skill is also a strength, as compliment-giving is an important skill for building peer social relationships. Forming relationships with peers is often a challenge for children with ASD. Some limitations of this study include the failure to blind raters, as well as modification of the methods post-hoc to include reinforcements of some target behaviours. Additionally, participants' use of compliments was measured immediately following video viewing each day. Therefore, it is unclear whether these gains were maintained throughout the day. Finally, the use of explicit teaching in this study makes it difficult to determine whether video modeling alone would be effective in teaching this skill.

This study provides **equivocal** evidence for the effectiveness of video modelling alone as an intervention for teaching compliment-giving behaviours to children with ASD.

Sansosti and Powell-Smith (2008) investigated the use of video modeling combined with social stories to teach social communication skills to children with ASD. Participants were three males aged 6 to 10 years with diagnoses of ASD, Asperger's or PDD-NOS using appropriate diagnostic criteria. All participants were reported to have average levels of cognitive and language functioning using well-established assessment measures. Inclusion criteria for the study were specified. Target social communication behaviours were identified for each child based on interviews with parents and teachers, as well as direct observations. Target behaviours included "joining in" to a conversation and maintaining conversations. Each target behaviour was operationally defined and described in sufficient detail. Observers responsible for coding behaviours were blinded as to which child was receiving intervention during each phase of the study. Interrater reliability was reported to be adequate. Visual inspection only was used to analyze results. Results indicated that only one participant maintained a consistent increase in the target behaviour. The intervention for the other two participants was then

modified post-hoc to include teacher prompting and initiations by peer confederates. These changes resulted in improvements in the target skill. All children then maintained their gains at follow-up 2-4 weeks after treatment. No generalization to new situations was observed following video modelling treatment.

Strengths of this study include specifying inclusion criteria for participants and appropriate blinding of observers. Intervention procedures were well-described, and behaviour scoring criteria were clearly outlined. A weakness of this study is that methods were modified post-hoc. Methods were also modified to include reinforcements and peer confederates in addition to video modelling. Finally, this study used a combination of treatment approaches (video modelling and social stories), making it impossible to determine the effectiveness of each approach on its own.

This study provides **equivocal** evidence that video modelling alone is effective in teaching verbal social communication skills in children with ASD.

Scattone (2008) investigated the effectiveness of video modelling in conjunction with "social stories" in increasing conversation skills. Social stories are written short stories that provide explicit instructions about how to behave in certain social situations. In this study, a nine-year old boy with high functioning ASD (Asperger's Disorder) watched an intervention video three times daily. The video consisted of a social story focusing on a target behaviour followed by a video of two adults performing the behaviour. The verbal social communication skill targeted in this study was "initiations", which included any unprompted question or comment made by the participant. After watching the videos, the child was observed during a social interaction with an adult in the clinic and the amount of conversational initiations was recorded. Results were analyzed using appropriate statistical measures. Analysis of results revealed that the participant's amount of initiations increased following treatment. The effect size was calculated to be 0.8, indicating a large effect. Generalization probes with peers at school revealed some generalization of the initiation skill.

A strength of this study was the use of appropriate statistics like PND and effect size calculations rather than visual inspection alone to analyze the results. Methods and materials were described in detail, allowing for accurate replication. Some weaknesses of this study include raters not being blinded appropriately, as well as lack of follow-up measures. In addition, data were mostly collected during interactions with adults rather than peers, aside from two probes conducted before and after the intervention. Since interactions with peers are so important for social

inclusion of children with ASD, it would have been more relevant to have information about how the participants used the skills with peers. Finally, this study used the treatment modalities of social stories and video modelling simultaneously to target initiation skills. Gains in initiation skills can thus not be attributed to video modelling alone.

Given the above critique, this study provides **equivocal** evidence of the effectiveness of video modelling in improving social initiation and reciprocal interaction skills in children with ASD.

Discussion

All studies provided some evidence of improvement in verbal social communication skills following a video modelling intervention. However, in some studies criterion was reached for only some participants, or for only some target skills. The results of these studies suggest that the effectiveness of video modelling can depend on the individual with ASD, and on the specific verbal social communication skill targeted.

Sherer et al. (2001) noted that the two participants in their study that made the fastest progress were reported to have a preference for visual stimuli presented through videos. They suggested that a child's preference for visual stimuli and visual processing skills may affect their ability to learn from videos. Further research is needed to establish whether there is a correlation between a child's preference for visual stimuli and their response to video modelling interventions.

Two studies reported that participants showed improvements in "responding" skills, but not in skills involving initiations (Lowy Apple et al., 2005; Sansosti & Powell-Smith, 2008). One study suggested that initiations were not learned because participants were receiving negative reinforcement from peers when attempting to initiate or "join in" to a play activity (Sansosti & Powell-Smith, 2008). Initiations may be difficult to teach through video modelling alone if participants receive negative reinforcement from peers. The majority of studies included only male participants. It is thus unclear whether the results of these studies can be applied to females with ASD. In addition, all studies included participants who already had some language and cognitive skills. Many of the participants had average to above-average language and cognitive skills. It is unclear whether these results are generalizable to children in the lower range of cognitive and language skills. None of the studies included participants who were non-verbal. This has implications for commercial programs that claim to have videos that will teach

nonverbal children with ASD to speak. This review did not find any evidence for the use of video modelling to teach verbal social communication skills in non-verbal children with ASD.

Clinical Implications

Video modelling may be an effective way to teach verbal social communication skills to some children with ASD. However, due to the limited strength of evidence, clinicians should employ caution when recommending video modelling interventions.

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