Using video modeling to teach conversational skills to high school students with autism spectrum disorder

Breton R. Gardner
California State University, Monterey Bay

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USING VIDEO MODELING TO TEACH CONVERSATIONAL SKILLS TO HIGH SCHOOL STUDENTS WITH AUTISM SPECTRUM DISORDER

by

Breton R. Gardner

A thesis submitted in partial fulfillment for the degree of Master of Arts in Education

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USING VIDEO MODELING WITH HIGH SCHOOL STUDENTS WITH ASD

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APPROVED BY THE GRADUATE ADVISORY COMMITTEE

DR. JOSH HARROWER
GRADUATE ADVISOR

DR. LOU DENTI
CULMINATING MAE PROJECT ADVISOR
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Abstract

USING VIDEO MODELING TO TEACH CONVERSATIONAL SKILLS TO HIGH SCHOOL STUDENTS WITH AUTISM SPECTRUM DISORDERS

By

Breton Gardner

Dr. Josh Harrower, Thesis Chair
Associate Professor of Special Education
California State University, Monterey Bay

This multiple baseline study investigated the effects of viewing a video model on the conversational speech of three high school students with autism. Research has shown that video models have been used to effectively teach many skills to both typically developing students and students with autism but little research exists with secondary students with autism. The dependent variables were the spontaneous conversational initiations and percentage of on-topic verbal and nonverbal responses to peers’ statements. The intervention consisted of each student with autism viewing a three-minute video of two peers eating and interacting at a picnic table during the break between periods immediately before interacting in the same situation with one of the peers from the video. All three participants showed gains in both the number of initiations and percentage of appropriate responses. These results were generalized to novel neuro-typical peers. The study provides preliminary evidence that video modeling is an effective way to teach conversational skills to high school students with autism.
# Table of Contents

Abstract ................................................................................................................................. iv  

CHAPTER 1: Introduction ........................................................................................................ 1  
  Problem Statement .............................................................................................................. 1  
  Theoretical Model ............................................................................................................... 2  
  Purpose ............................................................................................................................... 4  
  Personal Background ......................................................................................................... 4  
  Research Questions .......................................................................................................... 6  
  Definitions of Terms .......................................................................................................... 6  
  Limitations .......................................................................................................................... 7  

CHAPTER 2: Literature Review .............................................................................................. 8  
  Introduction ........................................................................................................................ 8  
  Applications ......................................................................................................................... 9  
  Types of Video Models ....................................................................................................... 12  
  Conclusion .......................................................................................................................... 13  

CHAPTER 3: Methods ........................................................................................................... 15  
  Introduction ......................................................................................................................... 15  
  Setting ................................................................................................................................. 15  
  Participants .......................................................................................................................... 16  
    Mike ................................................................................................................................. 16  
    Emily ............................................................................................................................... 17  
    John ............................................................................................................................... 18  
    Technical Assistants ....................................................................................................... 18  
  Experimental Design ......................................................................................................... 19  
  Procedures .......................................................................................................................... 19  
    Materials ......................................................................................................................... 19  
    Baseline .......................................................................................................................... 20  
    Intervention and Independent Variable ......................................................................... 20  
    Generalization Probes ................................................................................................. 21  
  Data Collection ................................................................................................................... 22  
  Dependent Variables ......................................................................................................... 22
CHAPTER 1

Introduction

Autism is pervasive developmental disorder that occurs in 1 out of 110 American children (Center for Disease Control, 2011). In 2007, this number was reported to be 1 out of 150 American children (Center for Disease Control, 2011), showing a dramatic increase in the number of diagnoses in just the past few years. People with autism spectrum disorders (ASD) typically demonstrate significant needs in the areas of communication and social skills, as well as unusual or repetitive behavior (Center for Disease Control, 2011). The Center for Disease Control lists some examples of social and communication issues that are associated with ASD including avoiding eye contact, preference to play alone, not sharing the interests of others, repeating words or phrases over and over (echolalia), reversing pronouns, not pretending in play, giving unrelated answers to questions and trouble understanding other people's feelings or expressing their own feelings (2011).

Problem Statement

Literature suggests that social impairments have significant impacts on future relationships, employment, independent living, and other mental health issues for students with autism (Gillis & Butler, 2007). Teaching students with autism to interact in socially appropriate ways continues to be a challenge for researchers and educators. The use of video modeling predisposes students to interact with others, thus increasing the likelihood that students with autism will more readily interact with others, rather than be prompted by external mediation. With the population of students rapidly increasing, it is imperative for researchers to further develop video modeling approaches and techniques to teach initiating pro-social interactions, and
responding appropriately to social cues and nuance. There is a lack of research related to secondary students with autism using video modeling as an instructional technique therefore analyzing the efficacy of video modeling using a multiple baseline design across participants to assess learning provides educators with added knowledge and research to validate the continued use and importance of the approach for secondary students with autism.

Theoretical Model

Video modeling’s theoretical basis comes from Bandura’s Social Learning Theory (1977). This theory states that human behavior is primarily learned through observing and modeling others. These experiences create the framework for generalizing new events. Bandura defines observational learning as the cognitive and behavioral change that occurs as a result of observing others engaged in similar actions (Bandura, 1986). Modeling is then the process by which a person demonstrates the behavior to be imitated.

There are four processes of observational learning that determine the effectiveness of modeling: attentional, retention, production and motivational (Bandura, 1986). The attentional process refers to the student’s ability to attend to the model, retention is the process that mediates the internal coding and memorization of the model and production is when the learner reproduces the behavior (Corbett & Abdullah, 2005). Lastly the motivational process refers to the reinforcement that occurs as a result of engaging in the modeled behavior. If the behavior results in a desired outcome for the learner it is much more likely to be adopted (Corbett & Abdullah, 2005).

Video modeling involves the student watching a videotape of a model engaged in a target behavior and subsequently imitating it (Maione & Mirenda, 2006). It application lends itself to the processes of observational learning, especially for students with autism. Many children with
USING VIDEO MODELING WITH HIGH SCHOOL STUDENTS WITH ASD

autism find watching videos to be highly motivating and reinforcing to watch (Maione & Mirenda, 2006), which would support the attentional process. The video monitor provides a restricted field of focus and can focus on only the relevant stimuli as well as filter out extraneous noises which can help the learner focus more directly on the behavior to be modeled (Corbett & Abdullah, 2005). The retention process is supported by video modeling because the same instruction can be presented in a uniform and predictable way as well as using the same setting and materials that would be used in natural settings. Video modeling permits repetition of the same model until mastery of the target behavior is produced - the next component of observational learning (Corbett & Abdullah, 2005). The motivational process of observational learning is addressed as watching videos is typically a recreational activity and students may prefer this type of instruction. This practice has been used by many different researchers and educators to effectively teach a variety of different social skills including generalizing toy play (Paterson & Arco, 2007), conversational speech (Charlop & Milstein, 1989), communication (Baharov & Darling, 2007), peer-directed social language skills (Maione & Mirenda, 2006), social initiation and complex social interactions (Nikopoulos & Keenan, 2007).

The multiple baseline single-subject research design utilized in this study to demonstrate and quantify the effect of the video modeling intervention is closely associated with the experimental analysis of behavior and applied behavior analysis (ABA). B.F. Skinner's work in the 1950's and 60's contributed the scientific framework to study behavior and lead to the development of ABA. The experimental analysis of behavior was characterized by using single subjects, acting as their own control to make within subject comparisons instead of group designs (Cooper, Heron & Heward, 2007). This is the experimental design used in this study,
which when applied to make socially significant improvements in human behavior is applied behavior analysis.

**Purpose**

The data collected in this study is expected to add to the wealth of information regarding the use of video modeling as an instructional tool. The researcher investigated the effects of video modeling on social initiations and on-topic responses of high school students with autism during unstructured leisure times and whether positive social change occurred and generalized with novel peers. The researcher will use the data from this study to inform and enhance current classroom practice and will share the data with colleagues at the school and district level. The data collected may prove useful to special education teachers, general education teachers, behavior analysts, speech and language pathologists, psychologists, parents and any other professionals developing programs to teach social skills to students with autism. More specifically, the information gathered from this intervention will be considered to demonstrate video modeling's viability as an intervention by the moderate-severe education specialists in my district and the speech pathologist at my site, both with students with autism and students with social-cognitive disorders.

**Personal Background**

I have been an educator of students with autism for 7 years, serving students ages 8-22, and have witnessed firsthand my students' needs regarding social communication. I currently teach at a public high school and every day during breaks for snack and lunch with their neurotypical peers, navigating the complex social word of a high school campus proves to be a challenge for my students. When the routine order of the classroom is removed it is even more difficult for children with autism to engage in meaningful exchanges with their peers (Hess,
USING VIDEO MODELING WITH HIGH SCHOOL STUDENTS WITH ASD

The web of social interaction from initiation, to maintaining the conversation, to politely ending the interaction is an area that requires much direct instruction to demonstrate and maintain social competency. Social competency can benefit a student with autism and provide them with more opportunities to lead a full life and fully access society. Grimm lists some of the benefits of social skills including: (a) peer acceptance, (b) friendship, (c) feelings of self-worth, (d) positive judgments by parents and teachers, (e) ability to adapt to different environments, and (f) academic achievement and vocational opportunities (2002). These are all short and long term objectives that I have for my students and I am constantly investigating new practices to best teach to their needs.

Video modeling is an attractive practice to me because it allows a model of the appropriate skills to be presented in a way that seems accessible and is attuned to the learning strengths of many students with autism. Video modeling also is a way to teach the targeted behavior or skill in the natural setting without physically needing to be there. Frequently, when students with autism do engage in social interactions with peers, they are heavily reliant on adult prompts and do not demonstrate much spontaneous play (Hess, 2006). With video modeling, the prompts are given prior to peer interaction so the teacher is able to take more of an assessor role during the interaction allowing the student to participate with greater independence.

This study investigates the question of whether or not, and to what degree, video modeling affects the spontaneous social initiations and percentage of on-topic responses in a typical unstructured high-school leisure environment among students with autism. The results will be shared with other educators who want to augment the quality of life of their students through enhanced social competency and the friendships and other societal benefits associated with it.
Using Video Modeling with High School Students with ASD

Research Questions

Within this context the research questions are as follows:

- What effect does viewing a video model of a typical conversation between two high school peers have on conversational initiations and responses of a high school student with autism when they are in a similar situation with trained typically developing peers from the video?
- Do these results generalize in the same setting to novel peers who did not appear in the video?

Definitions of Terms

- Video Modeling: A video stimulus that demonstrates a behavior that is then to be performed by the viewer (Maione & Mirenda, 2000).
- Autism: A pervasive developmental disorder that is characterized by needs in communication and social skills as well as repetitive behavior (Center for Disease Control, 2011).
- Applied Behavior Analysis: The design, implementation, and evaluation of environmental modifications to produce socially significant improvements in human behavior (Martinez-Diaz, 2007).
- Generalization Probe: A measurement of a learner’s performance of a target behavior in a setting and/or stimulus situation in which direct training has not been provided (Cooper et al, 2007).
- Social Initiations: Any verbal attempt by the student with autism to start an interaction with the neuro-typical peer; by greeting them, asking them a question
or commenting to a peer (e.g., “looks good”, “That was funny”) without being prompted to do so.

• Social Responses: Any verbal response by the participant with autism to a question or comment by the typically developing peer (for example answering the question “What are you eating?”), or saying “thank you” when a peer gives you something or by receptively responding to a direct instruction from the peer (for example handing an item to the peer when asked or moving to one side if the peer asks for a turn).

• Multiple Baseline Design Procedure: An experimental design where after two or more independent baselines are established, the independent variable is then introduced in a staggered fashion to each baseline (Kennedy, 2005).

• Single Subject Design: A variety of research designs that use a form of experimental reasoning to demonstrate the effects of independent variables on the behavior of individual subjects (De Leon, 2007).

Limitations

This study is limited in its number of participants, which must be taken into account when considering the generality of the results. One cannot expect a video model to have the same effects on all students, especially a population as diverse as students with autism. Data was also only collected at one school site and in only one test condition, which also restricts the scope of the study.
CHAPTER 2

Literature Review

Introduction

Autism is a pervasive developmental disorder that occurs in 1 in 110 American Children (Center for Disease Control, 2011). One of the core deficits of autism is in the area of social skills (Center for Disease Control, 2011). Being a spectrum disorder this can manifest itself in a lot of ways from difficulties with social interactions, reciprocity, verbal and non-verbal communication, play skills and even imitations. An intervention being investigated as a tool to teach these skills to students with autism is video modeling (McCoy & Hermansen, 2007). Video modeling involves the child watching a videotape of a model engaging in a target behavior and subsequently imitating (Maione & Mirenda, 2006). Maione and Mirenda (2006) have identified several reasons why video modeling may be effective. First, it is unobtrusive and can be incorporated into any model of autism intervention. Many children with autism also find watching videos to be highly motivating and reinforcing to watch. Third, videos can help to overcome stimulus over-selectivity in children with autism by zooming onto the relevant stimuli. Fourthly, many students with autism learn more effectively when information is presented visually as opposed to orally (Maione & Mirenda, 2006). Lastly, the same instruction can be presented in a uniform and predictable way until mastery of the skill can be shown. Corbett and Abdullah (2005) echo many of these sentiments as well as suggesting that features of autism such as avoidance of face-to-face attention are what make video modeling such an effective intervention. Video modeling offers a way to learn through social models without initial face-to-
face interactions, which can be preferable for many students with autism (Corbett & Abdullah, 2005).

Applications

Video models have been used to effectively teach a myriad of skills to typically developing students and students with a variety of developmental delays, including autism (Allen, Wallace & Renes, 2010; Baharov & Darling, 2007; Biederman & Freeman, 2008; Charlop & Milstein, 1989; Delano, 2007; Maione & Mirenda, 2006; Nikopoulous & Keenan, 2004; Paterson & Arco, 2007). This practice has been used by many different researchers and educators to teach a variety of different skills including vocational tasks (Allen, Wallace & Renes, 2010), generalizing toy play (Paterson & Arco, 2007), conversational speech (Charlop & Milstein, 1989), communication (Baharov & Darling, 2007), peer-directed social language skills (Maione & Mirenda, 2006), social initiation and complex social interactions (Nikopoulous & Nicopoulou-Smyrni, 2008). Many of these studies have investigated video modeling’s effectiveness with a wide range of students across many different age groups. A number of these successful interventions have specifically targeted social skills, a core deficit of students with autism.

One very important social skill is conversational speech (Charlop & Milstein, 1989). This is an area that can be very difficult for children with autism, as in order for this language to develop children need to have the ability to integrate what they are hearing into the motor planning for speech while cognitively processing the new information resulting from the conversation. However, in the case of autism, all of these processing components are deficient to one degree of another (Baharov & Darling, 2007). Educators must teach to these deficits and teach the basic components of conversational speech including sub-skills like asking questions,
providing contextually appropriate statements and taking turns to speak (Charlop & Milstein, 1989).

A number of studies by Charlop and colleagues have shown that video modeling is a promising and cost effective intervention to teach these conversational skills (Charlop & Milstein, 1989; Charlop-Christy & Freeman, 2000). These studies assessed the effects of video modeling on the acquisition of conversational skills, the generalization of these skills across settings and the maintenance of the new skills learned over time. This study was limited in the relatively low number of participants but did demonstrate an increase in the areas of conversation investigated: response variation, question asking and contextual social comments. In addition to the immediate success, these skills were retained and generalized. Charlop and Milstein (1989) attributed the successes of the video modeling instruction to the student’s excellent rote memory and echolalic responding, which are classic characteristics of autism. This demonstrates the natural fit and potential benefits of this type of intervention on increasing critical conversational skills for students with autism.

Other studies have supported these findings and utilized instructional techniques that incorporate video modeling to teach complex social skills. Conversational skills (Charlop & Milstein, 1989), peer-directed social language skills (Maione & Mirenda, 2006) and complex social sequences (Nikopolous & Keenan, 2007) have all been shown to significantly improve as a result of video modeling when evaluated within single subject research studies. Each of these studies was limited by a small sample size (at most three participants), but in each study a video model alone was proven to cause a measurable gain. In some cases reinforcement and prompting were necessary to supplement the model in order to produce the desired behavior change.
USING VIDEO MODELING WITH HIGH SCHOOL STUDENTS WITH ASD

(Tetreault & Lerman, 2010). These results show that video modeling is at least a promising component for effectively teaching complex social skills to students with autism.

Nikopolous and Keenan (2004) thought that the participant’s ability to imitate the social sequence with relatively few repetitions was facilitated by the video model itself. The belief being, the fact that the model was on the video made it an intrinsically more motivating skill to engage in. Nikopolous and Keenan (2004) also believed that video modeling was a good alternative to traditional pictorial/written activity schedules because they made better use of the visual processing strengths of students with autism. This study suggested that skill acquisition could be accelerated using video models, as fewer pre-requisite skills are required to follow a video model than a live one. One of the pre-requisite skills typically required with traditional social skills interventions includes picture-object correspondence, or identifying a picture or a word and matching it with the identical object. Video modeling, however, does not require students to master this skill prior to benefitting from the intervention. While the gains in this study were significant in the controlled setting, it was unclear if these sequences were generalized into more natural settings like the home or the school.

Most of these studies focused on teaching these complex skills to high functioning students on the autism spectrum. There is also a smaller research base documenting the effectiveness of video modeling in teaching the components of social communication to students who are more severely affected by autism. Barahav and Darling (2007) had great success teaching basic conversation skills, such as eye contact and body orientation, using video modeling to a minimally verbal student with autism. Nikopolous (2004) also showed promising results in teaching basic social initiations to students with moderate levels of autism, as indicated by the Childhood Autism Rating Scales. This shows the versatility and adaptability of a video
modeling intervention. These results again show promise but there is a clear need for more investigation in regards to the utility of video modeling with students who are categorized as being more severely affected by autism.

**Types of Video Models**

There have been a multitude of skills taught using video modeling and along with that a variety of types of models. This is an important consideration when selecting what type will be most appropriate and effective for an individual learner. The question of who is in the video providing the model is important. Video modeling instruction typically uses adults or peers to demonstrate the target behavior. Point-of-view modeling is also used. McCoy and Hermansen define point-of-view as “the visual image that would be seen if the participant was engaged in the behavior” (2007 pp. 185). As students with autism can show difficulties in taking perspective (Corbett & Abdullah, 2005), it is significant whether the model is a typically developing peer (Nikopoulos & Keenan 2004, 2007), an adult (Charlop and Milstein, 1989; Mainone & Mirenda, 2006; Paterson & Arco, 2007) or video taken from the learner’s point of view (Hine & Wolery, 2006; Tetrault & Lerman, 2010). In each of these studies the video model alone was successful in teaching some sort of social skill to at least two thirds of the participants. For the remaining participants modifications to the original video modeling intervention needed to be made to reach the desired results, such as video feedback (Maione & Mirenda, 2006) or prompting (Tetreault & Lerman, 2010).

In an extensive literature review of 34 studies of video modeling with students with autism, McCoy and Hermensen found that adults, peers and visual point-of-view models could all produce positive results for individuals with autism (2007). However, when the studies were compared to each other, the data indicated that peer modeling was the most effective practice
USING VIDEO MODELING WITH HIGH SCHOOL STUDENTS WITH ASD

(McCoy & Hermensen, 2007). This could possibly be attributed to difficulties students with autism typically have with perspective taking (Corbett & Abdullah, 2005). It is easiest for the learner to acquire behavior from a model who shares similarities, such as age or gender.

McCoy and Hermensen also took into consideration factors such as the length of the video clip, and the learner’s existing imitation repertoire and attention skills (2007). These considerations are echoed in Shekla-Mehta, Miller and Callahan’s (2010) review evaluating the effectiveness of video instruction on social and communication skills training for children with autism spectrum disorders. They offer guidelines for creating video models for use with students with autism including “to evaluate students in attending, imitation, visual processing and comprehension, matching to sample and spatial ability in order to determine the amount of content and length of the video” (Shekla-Mehta, Miller & Callahan, 2010, pp. 33). This study also noted that students who are able to attend for more than 1 minute are more likely to benefit from this instructional strategy when compared to students who are more distracted by irrelevant features. They also recommended that videos should be kept to 3-5 minutes in length and focus at a close angle on the relevant cues that the learner should attend to (Shekla-Mehta et al., 2010).

**Conclusion**

Video modeling has taken many forms and has been implemented in a multitude of ways to teach a myriad of social skills. Its utility has been proven in a variety of situations but there are still limitations to the research base. Thus far all of the studies have involved a small sample size and have been primarily conducted with higher functioning students on the autism spectrum. Also limited data exists on the use of video modeling with adult learners who are over 16 years of age (Shekla-Mehta, Miller & Callahan, 2010). Allen, Wallace and Renes (2010) demonstrated that video modeling can be used to teach vocational skills to adolescents and adults with ASD,
however, to this point no studies exist investigating its effectiveness in teaching social skills to this age group. Clearly this is a promising mode of intervention based on the reinforcing qualities of the video itself, the stability and ease of the intervention and the decreasing price and availability of both video and editing equipment. Yet more investigation needs to be done to prove the depth and possibilities that this approach can provide. Therefore, the purpose of this study was to expand on the research base of this intervention with populations that have been underrepresented. This study explored the utility of video modeling as an instructional method to increase the social-conversational skills of high school students with moderate/severe ASD by measuring social initiations and on-topic responding to peers during unstructured leisure times.
CHAPTER 3

Methods

Introduction

As rates of autism continue to skyrocket, it is imperative for educators to develop research-based interventions that effectively teach to the core areas affected by this disorder, including social skills and communication (Center for Disease Control, 2011). Using a video model to teach these skills is a promising intervention that seems well suited to the learning strengths of students with autism (Corbett & Abdullah, 2005; Maione & Mirenda, 2006). This study added to the foundation of research being built about this modality of instruction, and investigated the research questions as to whether a video modeling intervention will improve the social skills of students with autism by increasing the student’s spontaneous social initiations and percentage of on-topic responses in an unstructured leisure activity, and whether these results generalize to novel peers in the same setting. This question was investigated through quantitative methods using a multiple baseline design across participants. Data was collected to track the frequency of social initiations and the frequency of both on-topic responses and total opportunities, which will be calculated into the percentage of on topic responses. The multiple baseline design was most appropriate for determining if the video modeling strategy was responsible for any observed improvements in social interactions for the students with autism.

Setting

This study was conducted at a public high school located in central California. The school is located on the urban fringe of a large city, has a student enrollment of approximately 1,329 students and has a diverse population. The school is comprised of 36% white, 24%
Hispanic, 17% Asian, 4% African-American, 1% Filipino, 1% Pacific Islander and 17% multiple or no response. Approximately 12% of the students are classified as English language learners (California Department of Education, 2011). The school is in session from mid-August to early-June and serves 9th to 12th grade.

The video models were viewed in each student’s home classroom at the school. The classroom is approximately 17 feet wide by 22 feet long and the videos will be viewed on a laptop computer while wearing earphones. During viewings of the video each student will be alone in the classroom with only an instructor present, in order to minimize distractions. After viewing the video the students immediately transitioned outside of the classroom to a picnic table where the typically developing peer was waiting to participate in the leisure activity.

Participants

The subjects in this study were recruited from a special day class for students who are categorized as having moderate-severe disabilities, which is located at the High School but whose students come from across the entire district. There are two of these classes located at the high school containing ten total students, three of whom qualify for special education services with a primary disability of autism. These three students were selected for this study. All of the participants are primarily English speaking.

Mike

Mike is a male student and was 16 years and 11 months old at the beginning of data collection. He was a junior in high school and was beginning his second year at the high school in a self-contained classroom for students with severe handicaps. Mike was first referred for evaluation at age 2 years and ten months due to parental concerns of language delays and possible developmental disability. As a result of this evaluation Mike was found to have
significant developmental delays and was diagnosed with Autistic Disorder. He has been receiving special education services throughout his schooling and has been primarily served in special day classes while additionally receiving direct services from occupational therapy, language and speech and adaptive physical education.

During a reassessment for special education services at the age of 15 Mike was administered a number of standardized tests. His score on the Stanford-Binet Fourth Edition Test indicated an IQ of 40, which is in the first percentile and is in the mentally retarded range. The Vineland Adaptive Behavior Scales, which provided percentile rank and age equivalence scores in communication and socialization domains. While 15 years old at the time, Mike’s communication score was in the 36th percentile and the age equivalent of 5 years and 5 months. His socialization score was in the 44th percentile and the age equivalent of 4 years 2 months. His composite score placed him in the moderate deficit range.

**Emily**

Emily is a female junior at the high school and was also beginning her second school year in this educational setting at the beginning of data collection. At that time she was 16 years 4 months old. She was reclassified as having a primary diagnosis of autism when she was eight years old after previously qualifying for special education services as having mental retardation. She takes medication to help to regulate her anxiety and in addition to special education services in a special day class she also receives direct speech and language services twice a week and adaptive physical education.

At Emily’s last re-evaluation took place when she was about 13 years and 10 months old. She was determined to have an IQ of 36, which was below the first percentile. Her scores on the Vineland Adaptive Behavior scales in the communication domain and socialization domains
were also below the first percentile with an age equivalent of four years and one month and three years and eight months respectively. Her communication score fell into the severe deficit range while socialization fell in moderate.

**John**

John was first diagnosed with autism when he was 2 years and 7 months old. He is a male high school sophomore and is enrolled in a special day class with direct speech and language and occupational therapy services. He has a history of echolalic speech and often repeats the last few words spoken in a conversational exchange. At the beginning of the study John was 15 years 7 months old and just beginning his second year of high school.

At an evaluation when John was 12 years old, he was given the Test of Nonverbal Intelligence 3 (TONI 3) and scored in the significantly below average range. The tester noted that other cognitive assessment was attempted but ultimately not scored because John did not appear to understand the questions. His language abilities were re-assessed again when John was 14 years old using the Oral and Written Language Scale (OWLS). The oral expression subtest revealed an age equivalent of 5 years and 10 months which was below the 1st percentile.

**Technical Assistants**

Additionally 4 "technical assistants" were recruited from the Teens Offering Peer Support (T.O.P.S) class at the school. Two of these assistants served as the models for the video models and then as conversational partners during the baseline and intervention phases of the study. The other two served as novel conversational partners during the generalization phase at the conclusion of the study. These students were recruited after a brief presentation regarding characteristics of autism and the purpose and scope of the study on a volunteer basis. The first four students to return video consent forms were selected. No data was collected on these
students during the course of the study, as they only served as conversational partners for the students with autism.

**Experimental Design**

To study the effects of the video modeling intervention on the social conversation skills of students with ASD, a single subject, multiple baseline design across participants was used (Kennedy, 2005). This method of study varies from an ABAB design, where the independent variable is withdrawn, and baseline conditions are reintroduced. If the video modeling intervention was successful and meaningful social benefits were observed, it would not be in the best interests of the students to halt the intervention in order to verify its effectiveness (Kennedy, 2005). The use of a multiple baseline experimental method, and staggering the implementation of the intervention with the individual students, allowed the level and trend of the target behavior to be easily visualized after the intervention was introduced. In this way, it was possible to evaluate the extent to which the intervention is responsible for any observed changes.

**Procedures**

**Materials**

With the typically developing peer volunteers serving as the models, an approximately three minute long digital video clip was created, using a Digital Flip Mino HD M2120M camcorder. The video clip depicted the neuro-typical students engaged in a typical mealtime social interaction. This activity was selected as it is a social situation that the students engage in twice a day at school, during morning break and lunch, and could potentially generalize to other situations at home or in the community. When creating these video models the general education participants were asked to engage in these activities for approximately 3 minutes on camera and
interact verbally as they would typically, with the one restriction of no foul language. They were also directed to speak clearly and in English, as all three of the students with autism are English speaking only.

**Baseline**

To establish a baseline level of performance the leisure activities were conducted between the students with autism and their typically developing peers without the pre-teaching using the video model. The students with autism were directed to the snack table with a typically developing peer and given the direction “Go have snack”. The two students interacted in a 1:1 environment, while a teacher remained in close enough proximity so as to collect data.

All participants began the baseline condition simultaneously. After three sessions, intervention began with Emily once she had established a stable baseline with both target behaviors. After two more sessions, intervention began with Mike. Finally, once John had reached a stable baseline and two more sessions had occurred, intervention was implemented across all of the students. Due to block scheduling at the high school and availability of the peers, one session was conducted with each student every other school day between 9:00am and 9:15am.

**Intervention and Independent Variable**

After a baseline level of frequency of social initiations and percentage of on-topic responses were established for each student, the intervention phase was implemented in a staggered fashion for each. Prior to each session in this phase, the student with autism watched the three-minute video model of the neuro-typical high school peers interacting during snack time, socially initiating and responding appropriately, on a laptop in the classroom. Immediately afterwards the students with ASD transitioned to the tables they usually eat snack at where one
of the peers from the video was waiting along with typical snack materials. Across all phases of
the study, data was collected during a snack time activity involving both the target student and
the peers. At the start of each session the student with ASD was directed to the table and told to
“go have snack”. After this direction was given the researcher started a timer and data collection
began. The observer did not provide feedback or reinforcement during the snack session with the
peer.

For this study the sole intervention and independent variable was the viewing of the video
model before the break/snack session with the peers. The peer partner, physical setting and time
of day remained the same throughout both baseline and intervention phases limiting confounding
variables. Sessions were conducted outside of school-wide scheduled break times so the majority
of the student body was in class and environmental noise was limited and randomized.

**Generalization Probes**

Generalization was tested during two test sessions occurring four and six days after
intervention had ended. During this phase, the students with autism ate with a novel typically
developing peer who was not featured in any of the video models nor had participated during the
baseline or intervention phases. Each student with autism was probed with two novel peers (one
at a time), while engaged in the familiar snack scenarios from the video models. During this
phase, the extent to which effects of the intervention are being generalized to social interactions
with new grade level communication partners was evaluated. In this phase the video model was
not shown immediately before the leisure session. Generalization data was collected after the
video modeling intervention had been implemented with each participant for a minimum of eight
sessions.
Data Collection

During the three-minute leisure activity session the observer made tally marks to track the frequency of social initiations made by the student with autism and on-topic and off-topic responses made to statements and questions by the typically developing peer. Examples of social initiation include any verbal greeting (ex. Hi, hey, hello), question (for example: what’s your name?, can I have a napkin?, what are you doing?, what are you eating?) or comment (ex. That looks good, it is cold today). Grammatical errors, incomplete phrasing and/or pronoun reversals were ignored for this purpose and statements made that include these types of errors were still counted as social initiations. When tracking on-topic and off-topic responses both expressive (answering a direct question) and receptive (performing an action requested by a peer i.e. passing the napkins) responses were recorded. Then the number of correct responses was divided by the total number of opportunities and multiplied by one hundred to calculate the percentage of on-topic responses. This data collection procedure was utilized during the baseline, intervention and generalization procedures.

Dependent Variables

Social initiation. For this study social initiations were defined as any verbal attempt by the student with autism to start an interaction with the neuro-typical peer; by greeting them, asking them a question or commenting to a peer (e.g., “looks good”, “That was funny”) without being prompted to do so. Examples would include saying “hi” at the beginning of the session, asking for an item, saying “may I sit here?”, “how are you?”, or commenting on what is going on around them i.e. weather. Data was collected on this variable by the teacher-observer, situated no more than four feet from the participants, using a pen to make tallies on a teacher-made data sheet (Appendix A.) for each initiation made by the student with autism.
**Percentage of social responses.** This variable was defined as any verbal response by the participant with autism to a question or comment by the typically developing peer (for example answering the question “What are you eating?”, or saying “thank you” when a peer gives you something or by receptively responding to a direct instruction from the peer (for example handing an item to the peer when asked or moving to one side if the peer asks for a turn). In each example listed, the student was given five seconds to respond appropriately and independently in order to be marked correct. If the student with autism failed to make a response or if the response was off-topic or non-contextual then it was marked as incorrect.

Data on the percentage of social responses was collected using a pen and a teacher-made data sheet (appendix A). The data collector was situated no more than four feet from the two students during all sessions. Tallies were made for both correct and incorrect responses, which were then added to determine the total number of social response opportunities. The amount of correct responses were then divided by the total number of response opportunities to calculate the percentage of on-topic responses.

**Interobserver agreement.** Interobserver agreement (IOA) was collected during eight data collection sessions during the study. Both observers simultaneously collected data during the snack activity. The other observer was a classroom aide who worked directly with all of the participants in the study who was highly trained on the study and data collection methods. All scorers were provided with operational definitions of the dependent variables, and the scoring criteria were reviewed before every session involving IOA. Percent agreement was calculated for both dependent variables by dividing the number of agreements by the total number of agreements plus disagreements and multiplying by 100.
The mean IOA for social initiations was 86% across the eight sessions for each participant with multiple raters. There were three sessions with 100% agreement and only one in which IOA was below 80%. In this session only three initiations were recorded for any participants so a discrepancy on the occurrence and non-occurrence of one initiation resulted in 67% agreement. For percentage of on topic social responses, the mean IOA calculated to be 89% across all sessions and participants. IOA was very stable for this dependent variable and ranged from 87% to 91%.

**Data Analysis**

As data was collected, a line graph was created to demonstrate the individual trends among the three participants with autism, which graphically showed the effect of the video model intervention. The frequency of social interactions and the percentage of appropriate social responses from the baseline period to the intervention period were analyzed to determine what, if any, effect there was on the level and/or trend. As video modeling was the sole intervention targeting the dependent variable a determination could be made as to whether the intervention produced change in the desired direction, and to what degree, based the improvement shown after introduction of the independent variable.
CHAPTER 4
Results
Overview

This study attempted to answer the two research questions:

• What effect did the viewing of a video model of a typical conversation between two high school peers have on conversational initiations and responses of a high school student with autism when they are in a similar situation, with trained typically developing peers from the video?

• Do these results generalize in the same setting to novel peers who did not appear in the video?

Data was collected for all students over 17 total sessions. The first 15 sessions made up the baseline and intervention phases and the last two tested generalization with novel peers. One session was conducted with each student on each day of data collection. The results of this study showed that all three students showed an increase in level and/or trend in percentage of social responses and number of social initiations after introduction of the video model prior to the leisure/snack interaction (see Figures 1 and 2). The results for each dependent measure are summarized below.

Social Responding

Emily

During the baseline phase, Emily responded appropriately to her peer partner an average of 44% over 3 sessions with a range from 38-50%. She was given exactly eight opportunities to
respond on the first two sessions and nine on the third. Emily demonstrated a fairly stable baseline and was the first student to begin in the intervention phase. Her level of social responding rose immediately in her first session with the neuro-typical peer after viewing the video model. In her first session after viewing the model her percentage of correct responses jumped from 44% to 62.5%. This trend continued throughout Emily’s twelve sessions within the intervention phase, ranging from 53%-85%, with an average of 72%. When generalization probes were conducted with novel peers and without viewing the video model prior to the snack session, Emily’s performance dropped off very little from the end of the intervention phase.

During the final two days of intervention, Emily responded appropriately to her peer 85% of the time. She responded appropriately 80% and 82% during two generalization probes with different peer in each session.

Mike

Mike was the second student to move into the intervention phase after five days of baseline. His percentage of correct and on-topic responses ranged from 50%-80%, with an average of 65.1% during the baseline phase. He was given between 8-16 chances to respond to his peers across during all phases. Mike also showed an immediate increase in level of responding up introduction of the video model. In the session prior to intervention he had responded correctly 68% of the time and in the session after first viewing the video model, he immediately increased to 80%. This increased level stayed relatively stable throughout the intervention phase with a high of 91% appropriate social responding and a low of 75%. Overall, Mike averaged approximately 82% across ten intervention sessions. This stable level was also maintained during generalization probes. When tested with two separate novel peers, without
viewing the model before hand, Mike appropriately responded to his peers 92% and 81% of the time, across two days.

**John**

John was the final student to move from the baseline phase into intervention. During a seven-day baseline, John demonstrated a downward trend in his percentage of social responding. His peer partners offered him between 8-16 opportunities to respond per session. Of these opportunities John responded appropriately an average of 69% of the time, with a range from 62% to 78%. John’s highest percentage of social responding during baseline occurred on the first day of data collection and his lowest was on the final session before intervention was implemented. John also increased his percentage of responding during the first session after viewing the video model. His percentage rose to 80% in the first session and maintained a steady, increased level throughout the intervention with a high rate of 91% during the last session of intervention. John averaged 82% correct social responses during seven intervention sessions. During the generalization probes with two novel peers, John responded correctly 91.6% and 92.3% over the two days, continuing his increasing trend.
Figure 1. Percentage of On-Topic Social Responses Graph

Baseline Intervention Generalization

Emily
Mike
John

Sessions

Percentage of on-topic social responses
Social Initiations

Emily

Emily initiated very little throughout the course of the study. Her baseline average of social initiations per session during the baseline phase of the study was .3, with two sessions with no initiation and one session with one. After viewing the video her average increased slightly to .75, with a high of 2 and a low of zero. On 8 occasions she offered “Hi” before sitting down at the table and on two others she commented on the weather, which was modeled in the video. This small gain was generalized to novel peers. During the generalization probes, Emily initiated once in the first session and twice during the second.

Mike

Mike had the widest range of initiations amongst all of the participants. During baseline Mike had a session with zero initiations and several sessions with only one initiation but also had a session where he initiated seven times, which was almost as much as his conversation partner. During this session, a man was filling up a vending machine near the picnic table, which was a conversation topic of high interest for Mike and may explain this outlying data point. Overall the average count of his initiations per session during baseline was 2.8, but if you ignore the day the vending machine was being filled because of confounding variables, the average number of initiations during baseline was 1.75. This number increased slightly to 2.1 during intervention. Mike’s initiating was trending upward as intervention concluded and ranged from 0-5 initiations per session. During generalization Mike initiated three times in each session showing a slight increase over the intervention phase.
John

John had very low levels of social initiation during baseline data, only .3 per session. John’s baseline lasted for seven days and on only one day did any initiations occur (2 of them). His rate of initiations per session increased in trend and level during intervention with initiations occurring in his last four sessions after watching the video model. Overall his range of initiations during intervention was from zero to three per session and average 1.1. In generalization, John offered two initiations during both probes. By the end of data collection John had reliably started a conversation by greeting the person and saying “how are you?” across 6 consecutive sessions as well as asking to share the peers snack twice.
Figure 2. Number of Social Initiations Graph

Emily

Baseline
Intervention
Generalization

Mike

John

Sessions
CHAPTER 5

Discussion

Overview

The purpose of this study was to teach conversational skills to high school students with autism using video modeling as the sole intervention and independent variable. Students with autism typically demonstrate deficits in both social skills and communication (Center for Disease Control, 2011) and are rapidly increasing in number so it is imperative to investigate and develop research-based instructional technology to teach these skills. The efficacy of the video modeling intervention was measured using a single subject multiple baseline design across three participants, measuring the unprompted initiations made by the students with autism to typically developing peer conversation partners during a break/snack interaction and the percentage of on-topic responses made in response to these peers.

Much research exists using video modeling to effectively teach a variety of skills to students with autism (Allen, Wallace & Renes, 2010; Barahov & Darling, 2007; Biederman & Freeman, 2008; Charlop & Milstein, 1989; Maione & Mirenda, 2006; Nikopolous & Keenan, 2006; Paterson & Arco, 2007). Many of these interventions focused on teaching social-communication skills, such as conversation (Charlop & Milstein, 1989), peer-directed social language (Maione & Mirenda, 2006) and complex social sequences (Nikopolous & Keenan, 2006). All of these behaviors significantly improved as a result of video modeling when evaluated within single subject research studies.

Research also indicated that while adult, peer and self-video models could all be used to teach skills to students with autism, when compared to each other peer modeling was most
using video modeling with high school students with ASD

effective (McCoy & Hermensen, 2007). As students with autism can exhibit difficulty in taking
others perspectives, it is best for the learner to acquire behavior from a model who shares
similarities, such as age and/or gender. The literature also recommended that videos should be
kept to 3-5 minutes in length and focus at a close angle on the relevant cues that the learner
should attend to (Shekla-Mehta et. al., 2010).

This study built on these findings and recruited four typically developing peers to create
the video model from the High School the students with ASD attend. Two of these peers filmed a
three-minute video model of a typical break/snack time interaction between two students sitting
at a picnic bench in the center quad of the school. Close angles of the student's faces were used
in the video to draw attention to the conversational speech that was being used. The same
students from the video were then used during the baseline and intervention conditions for the
students with autism. During baseline, and without viewing the video model, the students with
autism would choose a snack item and were instructed to go and eat at a picnic table with a peer.
During intervention the conditions were the same except the students with autism would view the
video model immediately before sitting down with their peer. During this phase, the peer was
one of the students filmed in the video model and the interaction took place at the same picnic
table featured in the video. Finally during the generalization phase at the conclusion of the study,
the students with autism did not view the video prior to sitting down for snack and the
conversation partners were novel peers who did not appear in the video model.

While video modeling has an extensive research base with primary aged students with
autism, there is very little addressing its effectiveness with high school learners. This study
attempted to bridge this gap and answer the following research questions:
USING VIDEO MODELING WITH HIGH SCHOOL STUDENTS WITH ASD

- What effect did the viewing of a video model of a typical conversation between two high school peers have on conversational initiations and responses of a high school student with autism when they are in a similar situation, with trained typically developing peers from the video?
- Do these results generalize in the same setting to novel peers who did not appear in the video?

The first research question was answered during the intervention phase of the study. For all three participants both the level and trend of the number of initiations made during a session increased as well as the level and trend of on-topic responses made to peers. For initiations the gains were relatively small for all three participants while increased responding was more significant and apparent.

The generalization probes conducted at the end of the study answered the second research question. All three students showed an increased level of percentage of social responses and number of initiations over baseline. When interacting with a novel peer who was not present during intervention or featured in the video model the students with autism were still able to generalize and maintain the gains made during the intervention phase.

Limitations

This study demonstrated that video modeling can make an impact on the social initiations and responses of High School students with autism but is limited in several ways. First, only three students were involved and data was only collected at one school site. This affects the generality one can draw from the data. With a spectrum disorder such as ASD, one needs to take into account the individual student’s pre-existing imitative repertoire and ability to attend to the video when considering the viability of a video model intervention.
An additional limitation to consider is the relatively small gains made by the students with autism across the two dependent variables, particularly initiations. While gains were evident for all students, none of the students increased by more than an average of .8 initiations per session. Considering that during the 3-minute snack sessions peers were initiating between 10-16 times, the conversations were still extremely one-sided. This brings the question of whether the extent of the behavior change was significant enough to have social validity. Social validity refers to the extent to which target behaviors are appropriate, intervention procedures are acceptable, and important and significant changes in target and collateral behavior are produced (Cooper et al., 2007). While it is a big step for a student like Emily or John, who made only one attempt at initiation each during baseline, to be consistently offering a “Hi” and making another comment to a peer, it is clearly not an endpoint to an intervention. The conversation is still very one sided and none of the students are anywhere near a mastery criteria.

While the gains in social responding are more significant there is still a question of social validity for them as well. Emily’s mean gain of 28% in social responding is clearly of significant value but John and Mike’s mean gains of 12% and 14% respectively, are less clear. While improvement was apparent, Mike and John were only responding to about one more social stimulus per ten opportunities, which may not be obvious or even detectable to a conversation partner.

Implications for Research

This study demonstrates that video modeling alone can have a positive affect on high school students with autism’s abilities to initiate conversation with peers as well as make an on topic response but it may not make enough of an impact to have social validity. This suggests that in order to produce a high level of competence in the students other factors must be
considered to enhance the intervention. The concepts of motivating operations and reinforcement in the context of conversational behavior are two crucial areas that need to be investigated in conjunction with video modeling to teach conversational speech.

Reinforcement is when a stimulus change immediately follows a response and increases the future frequency of that type of behavior in similar conditions (Cooper et al., 2007). When considering the behavior of conversational initiations for the students with autism, the stimulus change immediately following the initiation would be attention and generally a verbal response by the neuro-typical peer. The data compiled in this study suggests that simply the attention and verbal response from the conversational partner did not function as a strong reinforcer for the students with autism. There was an increase in the level of initiations for all students and the gain was maintained throughout the sessions, so it is clear that the peer attention did not have a punishing effect. The trend in initiating was fairly flat after an initial gain for all of the participants, especially Emily.

One potential way to produce a more significant improvement in social initiations for students with autism would be to arrange the training scenarios so the peers themselves become conditioned reinforcers. A conditioned reinforcer is a stimulus change that functions as a reinforcer because it has a history of being paired with other reinforcers (Cooper et al., 2007). In this study, it may have been beneficial to have the peer deliver some sort of tangible item to the student with autism contingent upon initiation in order to enhance the effectiveness of the instruction the video model provided. A common characteristic of students with autism is the preference to be alone (Center for Disease Control, 2011), so it should not be surprising that peer attention by itself would not be enough to maintain significant growth in conversational skills. While the video model may effectively teach the skills to maintain a conversation with a peer, if
USING VIDEO MODELING WITH HIGH SCHOOL STUDENTS WITH ASD

the conversation itself is not valuable the behavior (initiations) still won’t be emitted at high levels.

The more significant gains in social responding found in this study can also be explained through theories of reinforcement. If social attention is not necessarily a highly valued reinforcer for students with autism then responding appropriately to their peers is possibly maintained through negative reinforcement. A negative reinforcer would be a stimulus, in this case the peer’s initiation to the student with autism, that’s termination functions as a reinforcer (Cooper et al, 2007). The appropriate response from the student with autism, without a reciprocal initiation, effectively ended the conversation momentarily. For example, the neuro-typical peer would typically ask the student with autism what they were eating for snack, and if they didn’t answer appropriately (or not at all) then the typically developing peer would either ask again or immediately make another initiation but if the student with autism responded correctly, but bluntly, the first time then there was generally a pause in conversation. This is another area that may warrant investigation when considering any kind of intervention to facilitate conversation between people with ASD and typically developing peers.

Motivating operations (MOs) are another factor to consider when interpreting the data from this study. An MO is “an environmental variable that (a) alters (increases or decreases) the reinforcing or punishing effectiveness of stimulus, object or event; and (b) alters the (increases or decreases) current frequency of all behavior that has been reinforced by that stimulus, object or event” (Cooper et al., 2007, p. 699). Again, in the case of initiations this can explain the data found in this study and offer implications for further study. In the cases of Emily and John, both students made few initiation and those few were primarily situated at the very beginning of the interaction. Both students said “Hi” reliably by the end of intervention and both were making one
other comment; Emily mentioning the weather and John saying, “How are you?” So if the reinforcer is attention from the peers, then it appears that after receiving it several times (for their two initial comments) there was no motivating operation in place to continue initiating conversation. Prior to sitting down with their peers, the students with autism had been engaged in quiet work tasks for approximately the past 45 minutes, so presumably the MO for social attention was at its highest at the beginning of the session but was quickly satiated. It is important to investigate whether having the peers provide some sort of tangible reinforcer for initiations by the students with autism could possibly avoid this effect and augment the motivating operation to initiate as well.

**Implications for Practice**

The video modeling intervention conducted in this study was a simple intervention for a teacher to implement and by itself did produce a measurable positive gain for all three of the students involved. As a component to a treatment package, teachers of students with ASD can use video modeling as an unobtrusive instructional tool to teach to conversational skill deficits in natural settings without physically needing to be there. The abilities to restrict the field of view and zoom in on relevant variables makes this practice more attractive than in person modeling and allows the teacher to use peers to model skills at all times throughout the day. This is especially valuable when working in a high school setting as it can be difficult to find times when typically developing peers are not in class or engaged in academic activities during the school day and are available for any type of peer modeling.

When examining the types of initiations made by the students with autism it offers insight into ways this intervention could be modified to make more socially valid gains. In the video model, there were only two conversational exchanges where a tangible reinforcer was delivered.
Using Video Modeling with High School Students with ASD

From one student to another. In one situation, a student asked the other to pass a napkin and the peer responded receptively, and in the other one a peer asked the other to share their snack and the peer verbally replied “Sure” and offered their bag of chips. After intervention, Mike was consistently asking his peer to pass him a napkin (rather than reaching over them as he did during baseline) and John asked his peer for some of their snack twice. Practitioners may want to consider this and include more examples of the tangible gains that can be had through interactions with peers when creating their own video models. When using a video, one can model not only the conversational behavior to be emitted but the partner mediating the reinforcer as well. By focusing more on this aspect of conversation, a practitioner may see more gains than in the more abstract, purely socially mediated reinforcers (asking how a peer is doing, what their name is etc.) that were featured in the video created for this study.

Another visible pattern derived from the responses of the students with autism after viewing the video model was that the parts of the video that were of highest interests to the students with autism were what they chose to mimic during interaction with their peers. For example, Emily enjoys reading the weather report in the newspaper every morning so it is not surprising that she initiated comments about the weather on several occasions, as shown in the video model, after intervention. John is a student highly motivated by food, so again it was not surprising that he began to use a request to share the peer’s snack after seeing it modeled in the video. Perhaps most telling was that the highest rate of initiating by any student, was with Mike during baseline on the day the snack machine was being refilled and a big truck was there during data collection.

For each of these students, they chose to initiate about topics of conversation that were of particular interest to them, but in the case of Emily and John they still lacked the conversational
repertoire to elaborate on the subject. The implication being that teachers may want to customize specific video models to the individual students conversational interests. For example, a video created solely for Emily could depict a conversation with more exchanges surrounding the weather and may be beneficial in evoking more instances of social initiations and one for Mike might include exchanges with peers reminiscing about exciting experiences they have shared (i.e. when the snack truck came). Customizing each student’s video model with the students unique needs and interests in mind could certainly be a way to increase the limited existing motivating operations in place for conversational speech.

Conclusion

This study demonstrated that video modeling alone was able to positively impact both the percentage of on-topic verbal and non-verbal responses High-School students with moderate/severe autism were able to make to a peer during a break/snack activity and the number of verbal social initiations (comments, questions, statements) made by students with autism during that same activity. These results were also generalized to novel peers who did not participate in the training video or intervention phases. Each student did show some degree of maintained improvement across both dependent variables, but for some of the behaviors the gains were minor and may not have social validity. This suggests that viewing the video model was able to teach the skills to initiate and maintain a conversation but was limited in the degree of impact by the level motivation the students with autism had to interact with their peers and the limited reinforcing value of peer attention. High-School students have more extensive histories of reinforcement (or lack thereof) with their peers than students in primary grades and future research is necessary to gain a more complete understanding of how this effects observational learning, particularly video modeling.
Instructional methodology for the treatment of social skills deficits in autism remains a challenge for educators. The tendency of students with autism to better follow visual instructions (Tissot & Evans, 2003) along with advances in technology that make creating, editing and presenting videos increasingly easy for classroom teachers makes video modeling an attractive practice for social training. This study begins to show the efficacy of this practice for high-school students with autism and through its limitations demonstrates how it may be improved upon in order to produce more socially significant behavior change.
References


## APPENDIX A: Data Collection Form

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