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Teaching Social Skills to Children with Asperger's and High Functioning Autism:

An Evaluation of Video Self-Modeling and Behavior Skills Training

by

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A thesis manuscript submitted in partial fulfillment
of the requirements for the degree of
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Teaching Social Skills to Children with Asperger's and High Functioning Autism: An

Evaluation of Video Self-Modeling and Behavior Skills Training

Krystal M. McFee

Abstract

The purpose of this study was to evaluate the effects of video self-modeling and

behavior skills training to teach social skills to children with Asperger's and high

functioning autism. The targeted social skills were social initiations and social responses.

The video self-modeling alone condition was implemented first using a video

feedforward approach. A behavior skills training (BST) procedure was implemented

following the video self-modeling alone condition for each participant. BST consisted of

instructions, modeling, rehearsal, and feedback. The frequency of each target behavior

was scored from videotapes using 10-second frequency within interval recording. After

the video self-modeling was introduced, a mean increase was demonstrated in the target

behaviors for 3 of the 4 participants. However, following the video self-modeling plus

behavior skills training procedures, the social skills increased further for each participant.

Follow up measures showed that the social interactions for each participant remained

higher than baseline, however slightly lower than levels during BST+VSM.

Introduction

Social skills are a general class of behaviors that result in positive social exchanges that are essential for successful interpersonal communication (Elliott & Gresham, 1987; Gresham, 1986). Both verbal and nonverbal behaviors work together to form what most people know as effective social skills (Strain & Schwartz, 2001). Behaviors such as smiling, eye contact, asking and responding to questions, as well as giving and acknowledging compliments (Beidel, Turner, & Morris, 1995) are some examples of the types of behaviors commonly labeled as social skills.

Social skills are generally learned in the natural environment through observation of other people's behaviors (Bandura, 1977). Typically developing children frequently acquire this behavioral repertoire implicitly (Bellini, 2008). People of high status or those that are similar to the child model appropriate (or sometimes inappropriate) behaviors and typical children learn these skills through imitation and social reinforcement (Bandura, 1977). This however, may not usually be the case for individuals with developmental disabilities in general and autism spectrum disorders in particular (Bellini, 2004). Individuals with disabilities may not always attend to the social behavior modeled by others, which may be one of the reasons for observed deficits in social skills. People with autism have varying levels of abilities, but most share some degree of difficulty with social skills (American Psychiatric Association, 2000).

People with Asperger's syndrome and high functioning autism typically have intellectual abilities and language within the average range of functioning for their age (American Psychiatric Association, 2000). Even with these strengths, most individuals with Asperger's disorder or high functioning autism share similar difficulty with social skills such as eye contact, initiating social interactions, interpreting verbal and nonverbal social cues, regulating emotional responses, and showing empathy for others' distress (Weiss & Harris, 2000). Many times, these individuals also have difficulty sharing affective experiences and understanding the perspective of others, which are important skills to have for social reciprocity and the development of friendships (Gutstein & Whitney, 2002).

The acquisition of social skills is an important part of development beginning in childhood and progressing throughout adulthood. Failure to learn these skills at a younger age could negatively affect employment, independent living, and mental health during the transition into adult life (Strain, 1991). Failure to learn social skills can further isolate individuals with disabilities from exposure to positive social opportunities and also affect their ability to independently support themselves financially. Without the ability to seek independence, these individuals may tend to have limited social interactions with others, and sometimes develop social anxieties that further limit their social interactions and relationships (Bellini, 2004).

A lack in the development of social skills for individuals with Asperger's and High Functioning autism can negatively effect peer interactions (Church, Alisanski, & Amanullah, 2000). The possibility of ridicule or rejection is one reason why socially valid social skills interventions are important, especially for people with higher functioning developmental disabilities. The individuals that hold an average or near average level of cognitive functioning but lack the skills to interact socially with others are commonly aware of their differences and are usually most affected by the social consequences of their skill deficits (Bellini, 2004).

Assessing the current level of an individual's social skills functioning prior to any intervention is the first step to developing an effective social skills program. It is also important to determine whether the individual has a skill deficit or performance deficit for each skill he or she struggles with, as the approach for intervention would be different. A skill deficit indicates that an individual doesn't have the skills to engage in a particular behavior, whereas a performance deficit would signify that an individual won't engage in a behavior for some reason (Bellini, 2008). A "can't do" versus "won't do" situation is different and should be treated as such, with social skills training being most appropriate for a "can't do" situation.

Once the social skills deficits have been determined an appropriate intervention strategy should be selected. Many different methods have been used to teach social skills to individuals with autism, including imaginative play, pivotal response training, incidental teaching, direct instruction, social stories, and social skills groups (Bandura, 1977; Farmer-Dougan, 1994; Kamps et al., 1992; Koegel, Koegel, Harrower & Carter,

2001; Sansosti & Powell-Smith, 2006). For the purpose of this study a focus on teaching social skills using video modeling procedures will be discussed.

Video modeling (VM) focuses on observational learning (Delano, 2007). Several studies have used video modeling strategies to teach social, behavioral, and functional skills (Apple, Billingsley, & Schwartz, 2005; Buggey, 2005; Charlop & Milstein, 1989; D'Ateno et al, 2003; Nikopoulous & Keenan, 2003). Basically VM consists of an individual watching a video of a model that engages in a positive behavior to be learned. Other procedures have been used with VM such as in vivo modeling, prompting and reinforcement (Bellini & Akullian, 2007; Graetz, Mastropieri, & Scruggs, 2006; Sigafoos, O'Reilly, & de la Cruz, 2007). VM procedures use another person as the model (i.e. peers, siblings, adults, etc). Some studies have evaluated VM as the only intervention component (D'Ateno, Mangiapanello, & Taylor, 2003; MacDonald, Clark, Garrigan, & Vangala, 2005; Nikopoulos & Keenan, 2004b; 2007) while others have evaluated the effects of VM paired with instructional prompts and reinforcement (Charlop &Milstein, 1989; Charlop-Christy & Daneshvar, 2003; Kroeger, Schultz, & Newsom, 2007; Paterson & Arco, 2007; Taylor, Levin, & Jasper, 1999). However, no studies have evaluated VM alone compared to VM plus prompts and reinforcement.

Video modeling can be individualized for a particular person or it can be created to teach a group of people the same targeted skills (Rayner, Denholm, & Sigafoos, 2009). To increase the effectiveness of this technique, other distractive stimuli that are not relevant to the target behaviors should be eliminated when filming (LeBlanc et al., 2003). Elimination of distracting stimuli will help facilitate better attention to the target skills.

Several studies have implemented video modeling interventions that target social-communication skills (Apple, Billingsley, & Schwartz, 2005; Buggey, 2005; Charlop & Milstein, 1989; D'Ateno et al, 2003; Nikopoulous & Keenan, 2003). More specifically, some of the behaviors addressed have been social initiations, language production, duration of appropriate play, latency to social initiation, verbal statements about play, conversational speech, and compliment giving (Delano, 2007). This list is not exhaustive, but helps to show the variety of skills that have been taught using video modeling.

Video self-modeling (VSM) is similar to VM except that the target individual is used as the model and learns skills though observation of his or her own behavior. VSM may be a highly effective approach, as researchers suggest it is best to use a model that is similar to the person targeted for intervention (Bandura, 1969).

Two different categories of VSM may be used. One approach is called positive self review, which involves the target individual observing him or herself successfully engaging in a skill that occurs infrequently or it was once mastered, but no longer occurs (Bellini, 2007). The individual is videotaped successfully engaging in the low frequency target behavior and then the individual is shown the clip of him or herself exhibiting this behavior. This category is usually more time consuming because the target behavior occurs at such low frequency.

Another category applied in VSM procedures is called video feedforward. This approach is developed for behaviors that have not reached mastery or when an individual holds only part of the target behavior in his or her repertoire. Video feedforward requires some type of prompt for the individual to engage in the behavior correct and independent.

The video is then edited to remove any prompts and display the individual successfully engaging in the skill set independently.

Video self-modeling procedures have been implemented successfully with a variety of populations. Individuals with typical cognitive functioning (Dowrick, 1999; Hitchcock, Dowrick, & Prater, 2003) as well as individuals with developmental disabilities (Bernad-Ripoll, 2007; Buggey, 2005; Lang et al., 2009) have benefitted from this type of intervention. Video self-modeling techniques have also targeted both child (Buggey, 1995; Dowrick & Raeburn, 1995; Hitchcock, Dowrick & Dove, 1980; Pigott & Gonzales, 1987; Woltersdorf, 1992) and adult (Griffin & Bartholomew, 1994; Meharg & Lipsker, 1991) participants.

VSM has been used to teach appropriate classroom behaviors (Clare, Jenson, Kehle, & Bray, 2000; Lonnecker, Brady, McPherson, & Hawkins, 1994; Possell, Kehle, McLoughlin, & Bray), teach parenting skills (Mehar & Lipsker, 1991), increase language for electively mute individuals (Holmbeck & Lavigne, 1992; Kehle, Owen, Cressy, 1990; Pigott & Gonzales, 1987;), teach athletic skills (Dowrick & Dove, 1980; Scraba, 1989) and teach language skills to individuals with autism (Buggey, 1995; Hepting & Goldstein, 1996).

Some studies have evaluated the effects of VSM alone without additional prompts or reinforcement (Bellini, Akullian, & Hopf, 2007; Buggey, 2005; Buggey, Toombs, Gardener, & Cervetti, 1999; Wert & Neisworth, 2003). The results showed VSM was an effective procedure for teaching social skills to individuals with autism. However, there is a lack of research evaluating the effects of VSM to teach social skills to individuals with Asperger's or high functioning autism.

Considering the promise of VSM for teaching skills (Bellini, 2008) and the lack of research on VSM and social skills for children with high functioning autism and Asperger's disorder, the first purpose of this study is to evaluate VSM to teach social skills to children with Asperger's disorder and high functioning autism. The second purpose of this study is to evaluate VSM plus behavioral skills training following VSM alone to enhance the effects of treatment. Behavioral skills training (BST) procedures consist of instructions, modeling, rehearsal and feedback (Miltenberger, 2008). Poche, Yoder, and Miltenberger (1988) showed that video modeling plus rehearsal and feedback was more effective than video modeling alone for teaching abduction prevention skills to young children. Because instructions and modeling have been shown to be less effective when used alone than when paired with rehearsal and feedback (Bandura, 1977, Poche et al., 1988) and no studies have evaluated VSM and BST for teaching social skills to children with high functioning autism and Asperger's disorder, this study will compare the effects of VSM alone to VSM plus BST.

Method

Participants and Setting

The participants included 4 individuals with a diagnosis of Asperger's Disorder or High-Functioning Autism. The participants were recruited from the Center for Autism and Related Disabilities, a Florida statewide autism support program. Recruiting occurred through an email blast sent out to all constituents that meet the specified characteristics listed above. All participants attended an inclusive public charter school and were in class with typically developing peers. The participants were selected by the faculty member at the school that monitored the Individual Education Plans (IEP's). No formal diagnosis was collected for the participants. Each participant had an average level of cognitive functioning (by prior assessment as indicated by teacher report), the ability to imitate others, as well as reported deficits in social skills. The participants did not receive any additional assistance in the classroom.

Jimmy was a 7-yr old boy (note, all names are pseudonyms). His teacher indicated that he was very creative in his writing and storytelling. Some of his weaknesses regarding social skills were lack of appropriate eye contact, as well as inconsistent initiating and responding to others. Specifically, initiating a conversation with classmates was his main deficit in social skills.

George was an 8-yr old boy. His teacher indicated that he followed directions well. It was also reported that he had some toileting issues and that he was

hypersensitive to loud noise. In the area of social skills, he had a difficult time initiating and responding to his classmates.

Alice was an 8-yr old girl. Her teacher indicated that she had a strong interest in animals. Some of her weaknesses were talking over her classmates during class discussion as well as frequently perseverating on a topic and having a difficult time transitioning to a new topic. It was also reported that Alice did not typically talk to her peers.

Cindy was an 8-yr old girl. Her teacher indicated that she was an excellent student and followed directions well. Some of the weaknesses pointed out regarding her social skills were her prolonged emotional reactions towards her peers when she encountered a negative social interaction (she got angry and ignored them), as well as a lack of initiating with her peers.

Each participant was paired with one same age peer (i. e., a classmate) who participated in each phase. The peers, 3 boys and 1 girl, were selected by the target children's teacher as a classmate they did not typically interact with. The peers were then rotated during generalization probes and paired with a different target child. Video self-modeling and behavior skills training were conducted at a school in a small town in south central Florida where each participant currently attended. All sessions were conducted in the school speech therapy room, which was not currently occupied. An interview was held with each participant's teacher, prior to intervention, as a final screening to learn more about each child. The interviews were semi-structured (see Appendix A for interview script) to help highlight each participant's strengths and weaknesses.

Materials

A flip video camera was used for taping the video self-modeling clips and the assessments. A laptop was present in the room where the intervention took place, which was used to show each participant their video self-modeling clip when appropriate for each intervention phase. A table and chairs were also in the room. Three age-appropriate games were chosen for the activity condition (i.e. Sorry, Monkey's in a Barrel, and Connect Four). The games were used to create a more natural setting for the participants, however no social skills were taught or reinforced during the activity. Data was recorded using paper and pencil recording methods.

Target Behaviors and Data Collection

To assess the social skills targeted for intervention, each participant was video-taped interacting with his or her peer for 10 min. Two conditions took place during the 10-min sessions as a means to create a more natural setting for the participants, as well as analyze the difference in responding when an adult or activity was present. For the first 5 min a research assistant was present in the room to engage the participant and peer in a game. The research assistant then excused him or herself and the participant and peer were left in the room for 5 min with no one else present and the activity was put away. Once the researcher left the room, the participants had the option of getting the game out to play again. All sessions were held in the same room. The video camera was set up in the environment prior to the assessments to limit reactivity. The peer was instructed prior to each session to ask a question or make a comment at least five times in the 5 min conversation.

The target behaviors were social skills important for a successful social interaction with a peer. These behaviors included social initiations and social responses. All of the target behaviors were recorded using a frequency within interval recording procedure with 10-s intervals. Initiations included both verbal and nonverbal responses. Verbal initiations were defined as making a comment or asking a question on a new topic or on the same topic. Non-verbal initiations were defined as giving or showing an object, initiating appropriate touching (e.g. hugs, high-fives, pat on the back), or pointing towards an object to initiate a conversation. Responses included both verbal and nonverbal responses. Verbal responses were defined as an on-topic verbal response (making a comment, answering a question, or asking a question) following a question or comment from a peer. Finally, non-verbal initiations were defined as smiling, head nodding, reciprocating appropriate touching (e.g. hugs, high-fives, pat on the back), shrugging shoulders, etc.

Each target behavior was scored from video recordings on a datasheet using a frequency within 10-s interval recording as described above. Video recorded observations were 10 min in length (i. e., 5 min of the activity condition and 5 min alone/no activity), conducted two times a week for each participant. All target behaviors were scored using the same datasheet. Each 10-s box had a designated abbreviation for each target behavior, and the person scoring the data marked a slash over the abbreviation for the behavior if it occurred in that interval (see Appendix C). Additional slashes were recorded if the behavior occurred two or more times within the same 10-s interval. A 3 s pause in interaction indicated a new instance of one of the target behaviors. Although

initiations and responses were recorded, the categories were collapsed and the data were reported as a frequency of social interactions.

Peer Training

Prior to the assessments, the researcher worked with each peer individually to identify five or more appropriate initiations that could be used in their conversation with the participant. This training was facilitated by a list of topics (Appendix B) that the RA went over with the peer. After the peer selected at least 5 five topics, the RA reviewed the necessary wait time (5 s) that should be provided for the participant to respond and/or initiate a comment or question directed at the peer. The RA then modeled the selected topics for conversation and the wait time, for the peer. This modeling was followed by a role-play of the conversation, between the RA and the peer, where the RA acted as the participant. Specific feedback was provided immediately following the role-play to help the peer to better understand the expectations of the assessment.

Observer Training

Training on the data collection procedures was provided for all persons assisting with video coding. Typical peers between 7 and 10 years old were video taped in a similar context to how the sessions were run in the study between the participants and peers. These videos included exemplars for each target behavior throughout the tape, and were used during the data coding training. The data collectors each coded the 10-min segments independently and then their responses were compared to the correct responses that had been previously scored. Specific corrective feedback and positive reinforcement were provided until 90% criterion was met across all data collectors.

Training was also provided for each RA that conducted the assessment and intervention sessions. This training consisted of a power point presentation that included information on each procedure, followed by the researcher and another person modeling each procedure for the RAs. After this, the RAs were partnered up and given the opportunity to role-play these procedures. The researcher observed each RA participate in the role-play scenarios and provided immediate specific feedback to each dyad. Each RA was considered qualified to conduct these procedures after they consecutively engaged in three correct role-plays independently.

Interobserver Agreement

Interobserver agreement (IOA) data were collected for 33% of the video recording observations across all phases for each participant. IOA data were collected by having two different observers score the same videos independently. IOA was calculated separately for each target behavior, as well as for the total number for social interactions for each session. The target behaviors were scored using a frequency within interval method. IOA was calculated by determining the percentage of agreement in each interval (smaller number divided by the larger number), summing the percentages, and dividing by the number of intervals. The mean IOA was 84% for initiations (range 76% to 98%) and 80% for responses (range 72% to 96%). The mean IOA for total interactions was 97% (range 91% to 100%), indicating a high percentage of agreement on the occurrence of social interactions.

Generalization

Generalization was measured across people. Video recording of a social interaction took place once per phase, for each participant. The generalization probes

were conducted with a different typical peer participating in the study. The generalization sessions were identical to the other sessions.

Social Validity

Social validity was measured in three ways. First, it was measured using a scale developed by the researcher given to each participant's teacher in baseline and at the end of each intervention phase (Appendix D). This questionnaire helped to assess whether the teachers observed any changes in the students' social skills following the intervention (Barry et al., 2003).

A second measure of social validity was collected using a brief questionnaire developed by the researcher (Appendix E). An autism expert observed videos randomly selected from baseline and intervention phases for each participant and used the questionnaire to judge how normal or natural the participant looked during the social interaction.

A third measure of social validity was collected from the participants themselves at the conclusion of the study. The researcher met with each participant separately and asked him or her to fill out a brief questionnaire (Appendix F). The researcher read each question aloud while the participant followed along, and then the participant answered the questions independent of further instructions.

Experimental Design and Procedures

A multiple baseline design across four participants was used. Following baseline, the effects of video self modeling were evaluated. BST was implemented after the VSM phase.

Baseline. During baseline, 10-min observations were videotaped and scored to measure the level of each target behavior across all participants prior to intervention phases. The first 5-min video recording was during the game condition, with an RA present in the room. The participant and peer were alone during the second 5-min video recording in the no game condition. No other procedures took place.

Video self-modeling. Two video self-modeling tapes were created for each participant following baseline. There were more than 10 demonstrations of each target behavior on each video to help train multiple exemplars and avoid rote responding. The target behaviors were demonstrated by both the participant and peer. The videos were created in the same room in which the sessions took place. To make the self-modeling videos, the participants were prompted to engage in a correct response and the successful performance of the behavior was recorded. The participants were prompted to engage in multiple instances of the correct responses for each of the target behavior. In this approach the video was edited so that the participant was only shown engaging in the correct response. The researcher also videotaped the peer engaging in social behaviors that corresponded to the behaviors the participant was prompted to engage in. There was a list of questions provided to help facilitate conversation topics (Appendix B). The participants and peers also came up with several novel questions to ask each other that were included in the VSM clips. The option to pick his or her own questions seemed to increase the reinforcing value of the video creation process. The taping sessions took about 1 hr for each dyad. The researcher then edited the video in a way that it appeared the participant was responding with the appropriate social skills to the peer during a social interaction.

Once the videos were created, each participant was given the opportunity to watch the video self-modeling clips. There was at least a 5-min latency from the participant watching the video self-modeling clip to the time the observation recording began.

The participant was instructed to watch one of the video self-modeling tapes in a previously arranged room. The video self-modeling procedure consisted of the RA and participant walking into the room equipped with a laptop and the VSM clips. The RA then stated the expectation to watch the VSM clip. For example, "The video you are about to watch is going to show you and your friend having a conversation. Please watch the entire video. I will be in the other room with (peer) and when the video is finished we will all play a game."

While the participant was viewing the VSM clip, the RA conducted a booster training with the peer on the specifics of their role in the study. This was to help remind him or her of the material that was presented in the initial peer training and prepare him or her for the assessment that took place directly after. The training lasted approximately 5 min and overlapped with the time that the participant was watching the VSM clip. Each RA conducting the booster trainings followed a script to help facilitate procedural fidelity (Appendix G).

After the participant finished viewing the VSM clip, the RA and peer joined him or her in the room. The room was pre-equipped with a video camera. The RA engaged the children in a game for 5 min; however no prompting on any of the target behaviors or additional social skills training was provided. After the game was finished the RA excused him/herself (e.g. "I will be right back I need to run to my car. You guys hangout in here until I get back. Please do not leave this room." The RA then exited the room

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and waited outside the door (out of view) for 5 min. No feedback was given following the assessment. The participants continued in the VSM phase until their responding was stable. Once the participants responding were stable, the students were moved to the BST + VSM phase.

Behavior Skills Training Plus Video Self-Modeling. A behavior skills training procedure was implemented following the video self-modeling alone condition. This procedure consisted of a trainer initially providing instructions on how to engage in the target behavior. For instance the RA said something like the following. "When people talk to each other they look at the other person's face to show them that they are listening. We can also show people we are listening by nodding our head, smiling, or saying things like uh-huh. Let's watch a video now of you and your friend having a conversation. When you're watching, notice how you are looking in the direction of your friend's face, nodding your head, smiling, saying uh-huh, or doing something similar to let your friend know that you are listening. Let's watch!"

After the RA provided these instructions one of the video self-modeling clips was shown. The RA strategically paused the VSM clip after the demonstration of one of the target behaviors was shown, and made a statement about the behavior. This was repeated for each target behavior. An example of this was, " Look how you nodded your head/smiled after your buddy said something. That is a great way to show them you are listening".

Video modeling was followed by a role-play between the participant and peer to provide an opportunity to practice the appropriate response. To set up the role play, the trainer said, "Let's practice the skills you just saw in the video." At this point the trainer

prompted the peer to ask the participant a question. When the participant engaged in one of the social skills, the trainer provided descriptive praise (positive feedback). If the participant did not engage in a social skill correctly, the trainer provided prompts to assist him or her to engage in the behavior (corrective feedback). Both positive and corrective feedback was given as appropriate during each role-play.

BST was conducted until the participant engaged in three unprompted correct responses for each target behavior. After the participant reached this criterion, the participant and peer were given the opportunity to select a game. The session then proceeded identical to the VSM phase.

Results

The results showed an increase in appropriate social skills from baseline to treatment across all of the participants in both the game and no game conditions (see Figure 1). In addition, the there was some degree of generalization to interactions with a new peer. Finally, follow up data showed that the increase in social skills was maintained at a high level up to 3 weeks following intervention.

Figure 2 shows that during the game condition Jimmy had a mean of 0.9 social interactions per min in baseline. In the VSM phase, Jimmy's social interactions increased to a mean of 3.3 responses per min. His social interactions increased further in the BST+VSM phase to a mean of 7.3 social interactions per min. In follow up, he engaged in a mean of 6.8 responses per min. For Jimmy, generalization probe data in the game condition were 3.6 responses per min in baseline, 4.4 in VSM, and 7.8 in BST+VSM (see Figure 1). Figure 3 shows that during the no-game condition Jimmy's social interactions also increased substantially. He had a mean of 3 social interactions per min in baseline, 8.2 responses per min in VSM, 11.3 responses per min in BST+VSM and 8.6 responses per minute in Follow up. Generalization probe data in the no game condition were 4.6 responses per min in baseline, 11.5 in VSM, and 10.3 in BST+VSM (see Figure 1).

For George, VSM produced a small increase while BST+VSM produced a substantial increase in social interactions. During the game condition, his mean social interactions were 4.2 responses per min in baseline, 4.5 responses per min in VSM, 9.0 responses per min in BST+VSM, and 8.9 responses per minute at follow up (Figure 2).

For George, generalization probe data in the game condition were 0.8 responses per min in baseline, 9.6 in VSM, and 5.6 in VSM +BST (see Figure 1). During the no-game condition, George engaged in a mean of 4.4 responses per min in baseline, 5.5 responses per min in VSM, 9.8 responses per min in BST+VSM, and 8.4 responses per min at follow up (Figure 3). Generalization probe data in the no game condition were 2.0 responses per min in baseline, 2.3 in VSM, and 10.5 in BST+VSM (see Figure 1).

Alice had minimal increases in her responses across phases in the game condition. During the game condition, her mean level of social interactions was 4.6 responses per min in baseline, 5.7 responses per min in VSM, 5.9 responses per min in BST+VSM and 6.7 responses per minute in follow up (Figure 2). During the generalization probes in the game condition, Alice engaged in 4.6 responses per min in baseline, 5.4 responses per min in VSM and 8 responses per min in BST+VSM (see Figure 1). During the no game condition social interaction showed a larger increase, with 4.9 responses per min in baseline, 7.2 responses per min in VSM, 7.2 responses per min in BST+VSM and 5.9 responses per minute in follow up (Figure 3). The generalization probes conducted during the no game condition were 6.8 responses per min in baseline, 2 responses per min in VSM and 3.7 responses per min in BST+VSM (Figure 1).
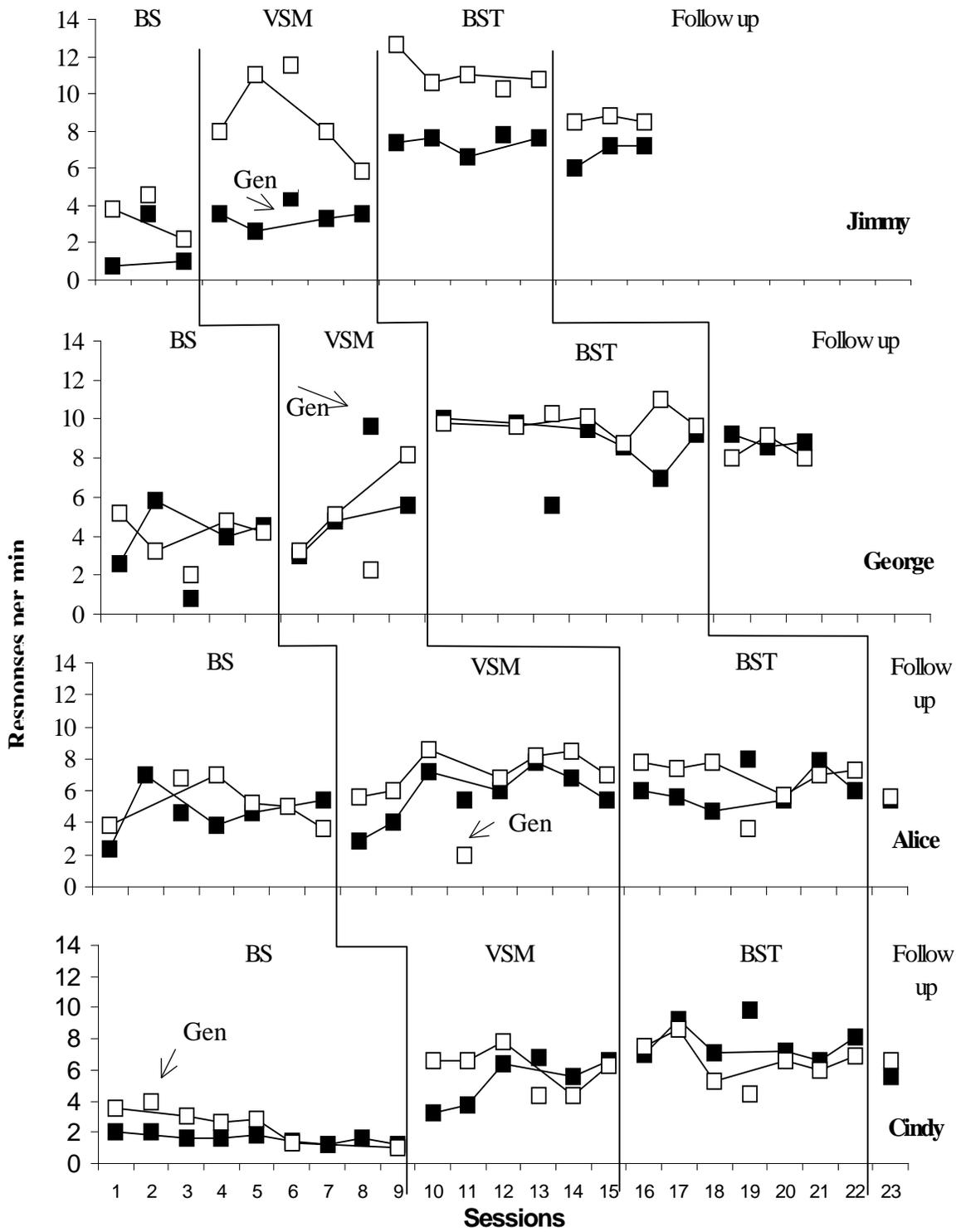
Figure 1. Total Social Interactions in Game and No Game Conditions. Generalization

probes conducted with a different peer.

Treatment had a clear effect on Cindy's social interactions. During the game condition, she engaged in a mean of 1.6 responses per min in baseline, 5.12 responses per min in VSM, 7.54 responses per min in BST+VSM and 5.54 responses per minute in follow up (Figure 2). The generalization probes conducted during the game condition showed 2 responses per min in baseline, 6.8 responses per min in VSM and 9.8 responses per min in BST+VSM phase (Figure 1). During the no game condition, Cindy's social interactions were at a mean of 2.45 responses per min in baseline, 6.34 responses per min in VSM, 6.81 responses per min in BST+VSM and 6.59 responses per minute in follow up (Figure 3). During the no game condition, Cindy's social interactions in the generalization probes were 4 responses per min in baseline, 4.4 responses per min in VSM and 4.5 responses per min in BST+VSM (Figure 1).
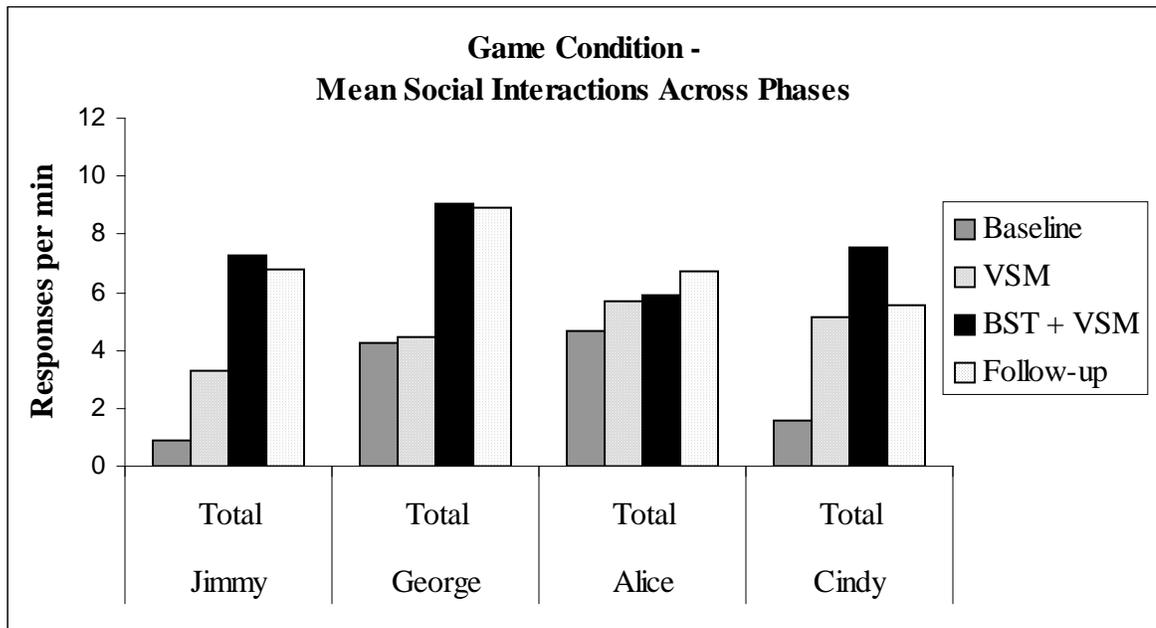

**Game Condition -
Mean Social Interactions Across Phases**

Figure 2. Total social interaction means of each participants initiations and responses across phases in the game condition.
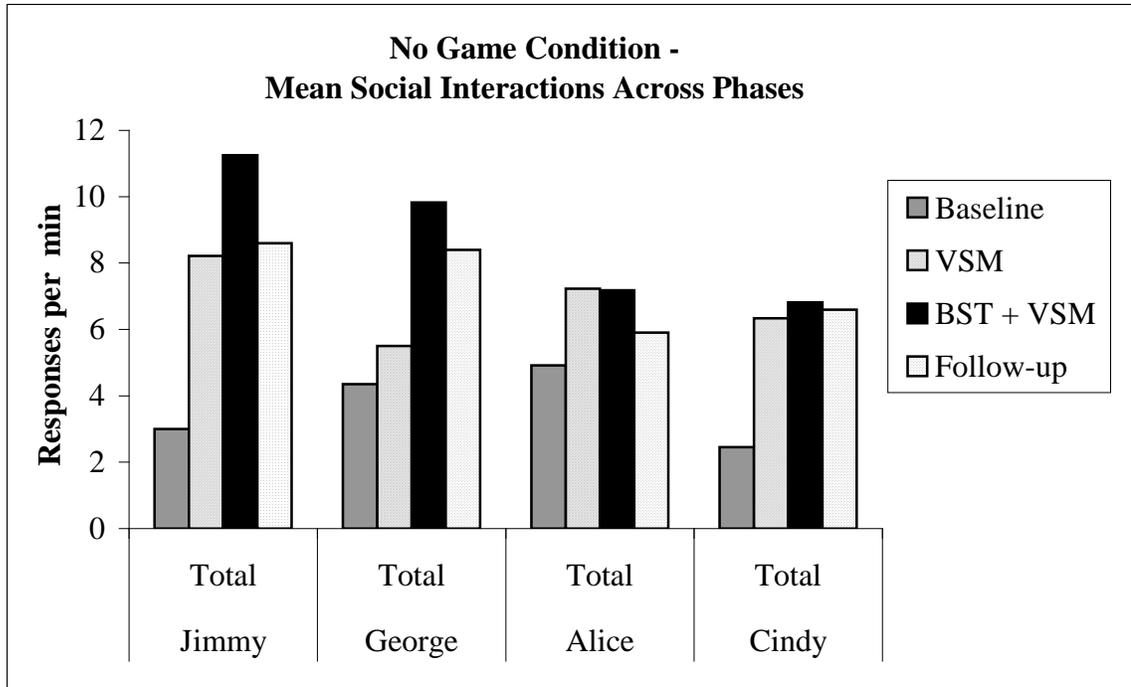
Figure 3. Total social interaction means of each participants initiations and responses across phases in the game condition.

The social validity data collected from the participants at the end of the study showed that all participants had a positive experience, made a friend, and learned more about social skills (Table 1). The social validity measures completed by the participants' teachers showed almost no change from baseline to post-treatment (Table 2). These results show the skills gained in the treatment setting were not very noticeable to the teachers in the classroom setting. The social validity results from an autism expert following a review of the videos showed a substantial increase in social skills from baseline to post-treatment (Table 3).

Table 1.

Responses by each participant to the five questions asked by the researcher at the

conclusion of the study (see Appendix F).

Social Validity Data - Participants				
	Participant			
Question:	**Jimmy**	**George**	**Alice**	**Cindy**
Did you have fun being part of the program?	Yes	Yes	Yes	Yes
Did you learn skills that could help you make new friends?	No	Yes	Yes	Yes
Did you and you classmate become friends?	Yes	Yes	Yes	Yes
Will you keep hanging out with your classmate after the program?	No	Yes	Yes	Yes
What was your favorite part of the program?	The video.	When we asked each other what our favorite snake was. I liked the games.	Everything. My favorite game was Connect Four. It was interesting to know that X had pets of his own.	I like to play the games. Being on the video.

Table 2

Data from the questionnaires distributed to the teachers in baseline and post treatment.

The table shows the scores across the eight questions (see Appendix D) the teachers

answered for each student (scale from 1-5 with higher scores showing improvements in

social skills).

Social Validity Data – Teacher Survey								
	Participants							
	Jimmy		George		Alice		Cindy	
Questions	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Eye contact	2	3	3	3	4	3	5	4
Non-verbal or minimal verbal responses	5	4	3	2	2	2	1	1
Responding to questions and comments	3	3	4	3	4	4	5	5
Social initiations	2	3	3	3	3	3	4	4
How good are the students social skills, compared to other children their age?	1	2	2	3	1	1	3	2
How successful does the student interact with peers?	3	3	2	3	2	2	3	3
How natural does the student look when interacting with peers?	3	3	2	4	2	2	3	3
How pleased are you with the students social skills?	2	2	2	4	2	2	3	3

Table 3

Data from the surveys taken by an autism expert following the review of the participant assessments in baseline and post treatment. The table shows the mean scores across the five questions (see Appendix E) the autism expert answered for each student (scale from 1-5 with higher scores showing improvements in social skills).

	Social Validity Data - Video Clips			
	Game		No Game	
	Baseline	**Post Treatment**	**Baseline**	**Post Treatment**
Jimmy	2.2	4.2	2	4.2
George	2	4	3.4	3.8
Alice	1.6	4	3.6	4.6
Cindy	1.4	4	1.4	3.4

Discussion

The results showed an increase in total social interactions for all participants in both the game and no game conditions from baseline to treatment, with highest levels of social interactions in the combined treatment phase (BST+VSM). In addition, the increases were maintained at levels well above baseline in the follow-up observations. During the game condition, VSM increased social initiations for Jimmy, Alice, and Cindy. Following BST+VSM, an additional increase in total social initiations was demonstrated for Jimmy and Cindy, with a substantial increase for George. Alice had a similar rate of responding from VSM to BST+VSM. During the no game condition, an increase in total social interactions following VSM was demonstrated for all participants. Following BST+VSM, an additional increase was seen for Jimmy and George. Alice and Cindy showed very slight differences in their mean social interactions from VSM to BST+VSM, however both maintained much higher levels of responding than in baseline.

Figure 1 shows the participants' trends of social interactions across phases. For Jimmy, treatment effectiveness is clear across each phase. His follow-up sessions demonstrate a slight decrease in responding; however social interactions continued to remain steady at high levels. Although George showed an increasing trend in responding during the no game condition at the end of his VSM phase, the researcher

changed phases and implemented BST+VSM,, therefore the effectiveness of VSM cannot be evaluated for this participant. However an increase in his social interactions was demonstrated from baseline to treatment and social interactions remained at high levels during follow-up, suggesting that the combination of procedures was effective. Alice had the highest level of responding among all participants during baseline and showed the most modest increases with the interventions in both the game and no game conditions. However, her mean social interactions increase from baseline to treatment and remained higher than baseline at follow-up. Cindy's total social interactions show a clear increase from baseline to treatment and follow-up across both conditions.

These findings suggest that VSM may increase social interactions but that BST+VSM is a more effective treatment than VSM alone for some children with Asperger's or high functioning autism. The follow-up results suggest that after treatment is removed, social interactions remain at levels similar to or slightly lower than treatment. Therefore, pending further research substantiating these findings, it appears that BST+VSM would be an effective procedure to implement in the classroom setting and fade out when responding became stable. Creating a VSM video takes only a couple of hours. Training to make the videos and implement the BST procedures can be provided easily to teachers who could then conduct the procedures on their own, within the classroom environment. Future research should evaluate the effectiveness of teacher training in these procedures.

Peer training was implemented in this study to facilitate persistence in conversation with the participants when there was a lack of initiating or responding. This training took about 5 min each session and was provided during baseline and treatment to

insure the ability to analyze the effects of VSM and BST independent of the peer training. The rational for providing training for the peers was to increase the opportunity for interaction between the two students within the brief session time. Future research should evaluate the effects of BST + VSM without the implementation of peer training. This would provide an evaluation of the treatment on the natural contingencies of a social interaction with typical peers.

Video self-modeling has been shown in the literature to be an effective treatment for individuals with autism, and this study has supported those findings. At this time, no research on the effects of video self-modeling alone have been evaluated for teaching social skills to individuals with high functioning autism or Asperger's Syndrome. The current study has demonstrated the effectiveness of VSM alone to increase social interactions for this population. The current study also demonstrated the effectiveness of BST+VSM to increase social interactions for these individuals. No research has demonstrated these procedures used together to target this skill set for this population. Therefore, the current study can add an effective treatment for social skills to the literature for this growing population..

There were some limitations to the current study. First, all sessions were conducted in the school setting outside of the classroom. Training in this setting was not ideal to help facilitate generalization in the classroom setting. However, common stimuli were used in training as a strategy to facilitate generalization, as typical peers in the classroom environment participated in the training. If these procedures were to be used clinically, teachers would be encouraged to provide praise or other reinforcers when they

observe the social skills occur in the classroom following training as a way to promote generalization as well.

Another limitation was that only one generalization probe was conducted for each participant in each phase. Without more data, the findings related to generalization are difficult to analyze. Another limitation as mentioned above is that George was moved to the BST+VSM phase prior to stability in his responding. Therefore the VSM treatment effectiveness could only be evaluated for 3 of the 4 participants.

Finally, only two VSM clips were created for each participant, due to time constraints. Additional VSM clips would provide multiple exemplars to promote generalized responding. In addition, more clips would provide more variety that might have made viewing the clips more reinforcing and would have provided the opportunity for participants to make a choice when selecting the clip to watch. Future research should investigate whether the addition of more self modeling videos produces a greater increase in responding and more generalized responding.

One final limitation to consider is the possibility of sequence effects resulting from the fact that the BST+VSM phase always followed the VSM phase. It is not clear whether BST+VSM would have produced the same increase in responding if it had followed baseline as it did when it followed the prior VSM phase. Future research should investigate this question.

Future research should evaluate the effectiveness of BST+VSM implemented within the classroom setting. The classroom teachers can be trained to implement the procedures in this more natural setting. Providing treatment directly in the classroom might increase the likelihood of generalization within the classroom. VSM training with

additional peers may also help facilitate generalization across individuals and settings. In

addition, future research should evaluate generalization of the skills in other settings

within the school (i.e. lunch room, playground) perhaps by making videos of the target

student interacting successfully in a variety of school settings. Furthermore, more than

one generalization probe should be conducted per phase to provide stable data within

phase as a better measure of generalization.

In summary, this study showed that video self modeling increased the social

interactions of children with high functioning autism and Asperger's disorder. These

results were found as the participant talked with a peer in the context of a game and

without a game present. The results also showed that the addition of behavioral skills

training resulted in a greater number of social interactions than VSM alone across

participants and contexts. Finally, the results showed that the increases maintained at high

levels for all participants.

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Appendices

Appendix A

Initial Interview Form

Teacher's Name: _____   Date: _____

1. What is the student's name and age? _____

2. Does the student make appropriate eye contact with others when having a

conversation? Y/N

3. Does the student use non-verbal social skills, such as smiling, nodding their head,

or saying brief comments like "uh-huh" when engaged in a conversation with others?

Y / N

4. Does the student consistently respond to questions or comments made by others?

Y / N

5. If so, do they answer with 'on topic' responses with appropriate latency? Y / N

6. Does the student consistently initiate questions or comments with others? Y / N

7. What are some of the student's strengths?

8. What are some of the student's weaknesses regarding social skills?

9. What are some of the student's interests and things they enjoy to talk about?

10. Can you think of one or two of the student's peers (i.e. a classmate they don't

typically talk to) that would be willing to participate in this study with the student, to

help them acquire these skills?

Appendix B

Peer Training: Questions to Facilitate Topics

Participant #:_____

Date/Time:_____

1. What do you like to do after school?

2. Are you a part of any groups (i.e. boy scouts, gymnastics, karate)?

a. What do you do when you are there?

3. Do you play sports?

a. What sport do you play?

4. Do you like video games?

a. What games do you like?

5. What is your favorite class at school?

6. What is you favorite restaurant?

7. Have you been to Busch Gardens?

a. What's your favorite ride?

b. Do you like to visit the animals?

c. Have you been to other theme parks?

8. What is your favorite TV show?

9. What do you like to play with your friends?

Appendix C

Data Collection Sheet

Interval	10-s		20-s		30-s		40-s		50-s		60-s	
1-min	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR
2-min	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR
3-min	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR
4-min	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR
5-min	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR	VI VR	NVI NVR

Appendix D

Teacher Questionnaire

Participant Name: _____   Date/Time: _____

Directions: Please rate the student's current social skills with their peers according to the scale below.

1 = almost never uses the skill   4 = often uses the skill
2 = seldom uses the skill   5 = almost always uses the skill
3 = sometimes uses the skill

1. Eye contact	1	2	3	4	5
2. Non-verbal or minimal verbal responses	1	2	3	4	5
3. Responding to questions and comments	1	2	3	4	5
4. Social initiations	1	2	3	4	5

Directions: Please use the rating scale below each question to answer the question about your student's social skills at this time.

1. How good are the student's social skills, compared to other children their age?

```
     1              2              3              4              5
not very good      fair         average         good        very good
```

2. How successfully does the student interact with peers?

```
      1              2              3            4               5
very unsuccessful  unsuccessful  fairly successful  successful  very successful
```

3. How natural does the student look when interacting with peers (i.e. casual, unprompted)?

```
     1              2              3              4              5
very unnatural   unnatural   somewhat natural   natural      very natural
```

4. How pleased are you with the student's social skills?

```
      1              2              3              4              5
not pleased   a little pleased  somewhat pleased  pleased   very pleased
```

Appendix E

Video Clip Social Validity

Name: _____ Date: _____
Video Clip # _____

After watching the video clip listed above, please circle one answer below each question based on the appropriateness of the student's social interactions with his or her peer.

1. The student in this video exhibited good social skills.

   strongly agree   agree   neutral   disagree   strongly disagree

2. The student and peer looked comfortable talking to each other in this video.

   strongly agree   agree   neutral   disagree   strongly disagree

3. The interaction in the video looked like a normal social interaction for 10yr olds.

   strongly agree   agree   neutral   disagree   strongly disagree

4. The social interactions exhibited by the student in this video seemed natural.

   strongly agree   agree   neutral   disagree   strongly disagree

5. The social skills exhibited by the student in this video were similar to the social skills

   of a typical peer.

   strongly agree   agree   neutral   disagree   strongly
   disagree

Appendix F

Participant Social Validity

Name: _____ Date: _____

1.   Did you have fun being part of this program? **Yes or No**

2.   Did you learn skills that could help you make new friends? **Yes or No**

3.   Did you and your classmate become friends? **Yes or No**

4.   Will you keep hanging out with your classmate after the program? **Yes or No**

5.   What was your favorite part of the program?

_____

_____

Appendix G

Peer Conversation Protocol

Scenario 1: Participant responds

1. Ask a question or make a comment to your friend
2. Look in the direction of your friend
3. Wait for your friend to say something – count to 5 in your head
4. When your friend responds, say something back

Scenario 2: Participant does not respond

1. Ask a question or make a comment to your friend
2. Look in the direction of your friend
3. Wait for your friend to say something – count to 5 in your head
4. If your friend does not say anything after you count to 5, say something else
5. Repeat steps 1-4 until your friends says something back to you
6. When your friend responds, say something back

Scenario 3: Participant initiates

1. Look in the direction of your friend
2. Wait for your friend to say something – count to 20 in your head
3. When your friend says something to you, answer them

Scenario 2: Participant does not initiate

1. Look in the direction of your friend
2. Wait for your friend to say something – count to 20 in your head
3. If your friend does not say anything after you count to 20, say something
4. Repeat steps 1-3
5. When your friend says something to you, answer them

About the Author

Krystal M. McFee was born in Naples, Florida and earned a B.A. degree in Psychology from the University of South Florida in 2007. She was the program assistant for the Center for Autism and Related Disabilities from 2007-2009. She worked at The Louis de la Parte Florida Mental Health Institute as a reliability data collector for the Teaching Pyramid Observational Tools research grant from 2009-2010. She has a passion for working with families and individuals with autism and other developmental disabilities. She is currently a BCaBA and provides in-home therapy for young children with autism.