Embedded Video and Computer Based Instruction to Improve Social Skills for Students with Autism

Amber Simpson
Athens Clarke County Public Schools

John Langone and Kevin M. Ayres
The University of Georgia

Abstract: Effects of combining video and computer based instruction to teach social skills to four students with autism were evaluated with a multiple probe design across behaviors. The teacher designed a computer based program with embedded video clips of peers without disabilities displaying examples and non-examples of the targeted social skills: sharing, following teacher directions, and social greetings. Students were required to discriminate the examples from non-examples displayed in the video clips. Following computer based training, students participated in group activities with peers without disabilities. This allowed for evaluation of social skill acquisition. All students showed rapid improvements in targeted social skills in the natural environment.

Students with autism have significant difficulty with pro-social behaviors (Brady, Shores, McEvoy, Ellis, & Fox, 1987; Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Gonzalez-Lopez & Kamps, 1997; Krantz & McClannahan, 1998; Pierce & Schreibman, 1995). By definition, children with autism exhibit deficits in age appropriate social skills (American Psychiatric Association, 1995). These social skill problems manifest concomitant with difficulties in communication; together they impact the degree to which a student with autism can independently navigate common social experiences. The result of these difficulties can be that formation of friendships for people with autism can be a difficult task (Wing, 1992). Consider for example, how trouble with social greetings may impact a student’s ability to make friends or engage in conversation. Difficulty with initiating or responding to social greetings may differentially impact social opportunities for students with autism. These social needs demand intense, systematic instruction to promote acquisition and generalization of social behaviors that may lead to more integration into the social community (Strain & Hoyson, 2000).

Children with autism have profound weaknesses in social behavior and (Pierce & Schreibman, 1995) some posit that these weaknesses stem from students with autism having a limited capacity to understand social conventions and comprehend the perspective of other people witnessing or experiencing the same situation (Harris, Hardleman, & Alessecrdr, 1990). For students with disabilities as well as for students without disabilities, part of learning social skills comes from watching skilled social models competently perform the target social behaviors. The literature has long suggested that observational learning from models can function as a powerful influence on student behavior (e.g., Bandura, Ross, & Ross, 1961).

Part of extant literature on social skills instruction examines use of peer models to teach social behaviors. For example, peers without disabilities interacting in real-life situations have been shown to be best models for teaching appropriate behavior and promoting generalization (Chandler, Lubeck, & Fowler, 1992; Elksnin & Elksnin, 1998; Hundert & Houghton, 1992; Morgan & Salzberg, 1992; Stokes & Baer, 1977). The majority of research in this area has focused on measuring effectiveness of a prescribed social skills curriculum. Structure of the curricula has varied; for example, curricula have been implemented with typical peer training strategies (Gonzalez-Lopez & Kamp, 1997), role-plays (Bain, Houghton, & Carroll, 1995), script-fading (Krantz & McClannahan, 1998), adult role models on video (Sherer, Pierce, Paredes, Ki-
sacky, Ingersoll, & Schreibman, 2001), and pivotal response training (Pierce & Schreibman, 1995, 1997). These curricula generally consisted of defining the target skills, identifying the environments in which the behavior would occur, modeling the behavior for the student, and training the behavior through a series of simulated role plays (e.g., Elksnin & Elksnin, 1998). The research has spanned a wide range of social behaviors from conversation skills (Ogeltree & Fischer, 1995; Sherer et al.), greetings (Charlop-Christy, Le, & Freeman, 2000), eye gaze (Ogeltree & Fischer), and responding to peers interactions (Norris & Dattilo, 1999).

One difficulty encountered in developing social skills curricula is providing multiple and varying exemplars of situations where the target behavior should be used. Contrived role-plays do not always foster generalization of social skills to everyday situations (Elksnin & Elksnin, 1998). When using social role models to teach target behaviors, interactions of the models often transpire too quickly for the student with autism to notice the relevant characteristics of the behavior (Hundert & Houghton, 1992). A strategy that may assist in teaching social skills and addressing these instructional design weaknesses is anchored instruction (Cognition and Technology Group at Vanderbilt, CTGV, 1990).

Anchored instruction is based on Brown, Collins, and Duguid’s (1989) theory of situated cognition: the belief that knowledge is based in the context in which we learn and use knowledge. With anchored instruction, educators create contextual learning environments that are as similar as possible to the context in which the target behaviors or knowledge would be used. Often this includes the use of video based instruction that can provide multiple exemplars of the targeted learning environment, and will, by virtue of being filmed in the natural environment, depict many of the natural stimuli the student will see when he or she is in a similar real life situation. This concept echoes the literature base that suggests that the generalization of target behaviors is related to the similarities between the training stimuli and the stimuli (or stimulus conditions) targeted for generalization (Stokes & Baer, 1977); thus employing video based simulations will provide representations of the relevant stimuli from the natural environment that may promote generalization to those environments.

By using technology to provide realistic macro contexts and simulate the natural environment in which the knowledge or target social skills will be used, anchored instruction allows educators to provide and control multiple exemplars related to teaching a specific skill (CTGV, 1993). One application of anchored instruction that researchers and practitioners have used is to infuse computer-based instruction with naturally occurring situations and embedded video that students have to engage as part of the instructional sequence (CTGV, 1992). Researchers have evaluated effectiveness of computer based instruction to train a variety of skills: employment-related social skills to adults with severe intellectual disabilities (Morgan & Salzberg, 1992), reading grocery store aisles to persons with moderate intellectual disabilities (Mechling, Gast, & Langone, 2002). Several studies have specifically used video models to teach social skills to students with autism (e.g., Ogeltree & Fischer, 1995; Sherer et al., 2001; Charlop & Milstein, 1989; and Charlop-Christy et al., 2000). To date, a single study has examined combining video and computer technology as a multimedia as a tool for delivering social skills instruction (Hagiwara & Myles, 1999). Hagiwara and Myles’ however, did not demonstrate a very strong relationship between the multimedia based intervention and social skill acquisition. The researchers cited difficulties with the educational personnel serving their participants not fully supporting the program’s implementation in addition to problems with student schedules as possibly interfering with the success of the program.

In the current study, students with autism watched video of appropriate models of the social behaviors embedded in an interactive computer based program. Sherer et al. (2001) have suggested that because viewing video requires the student to focus attention on a monitor, control over a narrow range of stimuli is enhanced and presumably the most relevant stimuli become more salient. Further, vivid video representations may capitalize on visual strengths that students with autism are reported to exhibit (Pierce & Schreibman, 1994).

The purpose of this study was to evaluate effectiveness of computer-based instruction
(CBI) that included video models to teach four students with autism three social behaviors: sharing with others, complying with teacher directions, and social greetings. The CBI program included definition of the target behaviors, video models of these behaviors provided by typical peers in real situations, and opportunity for students with autism to answer questions about the social behaviors. Effectiveness of the intervention was evaluated based on student engagement in the target behaviors during typical small group classroom activities. If effective, pairing CBI with video models will offer customizable, recyclable (teacher can use the same program repeatedly for students with the same needs), engaging, and efficient strategy for teachers of students with autism to use to deliver social skill instruction.

Method

Participants

Four students enrolled in an urban elementary school program for learners with autism participated. Students spent part of their day engaging in curricular activities housed within the special education classroom and part of their day participating in general education classes with peers of the same age. Curriculum emphasized pre-academic, functional and social skills. The teacher presented most activities and instruction in small group formats, occasionally using a one-on-one instructional arrangement to meet diverse needs of her students. In addition to the participants, two general education peers acted as models for the video used in the computer-based instructional program. These peers who served as video models were enrolled in first and second grade general education classes.

Isaiah was 5-years-old and was diagnosed with moderate autism and severe speech and language delay. He had little spoken language except for echolalia. Isaiah’s primary placement was in a class for students with autism and he participated in inclusion activities with a general education kindergarten class. While he usually followed simple verbal directions, he required frequent prompting to complete a task. Typically Isaiah did not initiate the greeting of others or share items. During large and small group instruction he needed adult assistance to follow instructions. He often required hand-over-hand instruction to complete tasks such as writing and basic arithmetic using a calculator. Because he often engaged in self-stimulatory behavior such as spinning, pencil tapping, and hand-flapping, Isaiah required frequent attentional cues to engage in activities. While he could use a mouse to independently manipulate computer programs, adult attention was essential to keep him on task.

Hannah was a 5-year-old student diagnosed with mild autism and a speech delay. Her primary placement was a self-contained classroom for students with autism; however, she was mainstreamed for all special activities with her same-age peers in a general education kindergarten class. Hannah followed directions and participated in activities with few adult prompts. In one-on-one situations she demonstrated some of the social skills targeted in this study, yet she still exhibited deficits in larger group settings (e.g., sharing). Hannah spoke to herself aloud and to other students during teacher directions and subsequently disrupted instructional activities. She engaged in distracting behaviors such as playing with her fingers and making faces during large group instruction. In smaller groups her attention was more focused, especially if she was involved in hands-on activities (e.g., counting objects). Hannah worked at a very slow pace and resisted attempts to increase her rate of work. She was able to independently used computer programs manipulating both the keyboard and mouse.

Marcus was a 6-year-old student diagnosed with mild autism with an accompanying mild speech delay. He was served in a self-contained classroom for students with autism and participated in inclusion activities with his same-age peers in a first grade classroom for music, P.E., art, media and computer activities. Marcus complied with teacher instructions and he participated in all activities that he considered part of his routine. When he was asked to do an activity or follow a direction that was not part of his usual routine he sometimes shouted “No” and “Never.” Teaching staff had to occasionally provide physical guidance for him to complete work or comply with a request. Marcus demonstrated the social skills targeted in this study at low levels prior to the intervention. Academically, Mar-
cus learned new material well with multiple presentations. He was able to independently use computer programs by manipulating the keyboard and mouse.

Kia was a 6-year-old student primarily served in a self-contained classroom for students with autism. As with the other participants, she partook in special activities with her peer group in a first grade class. Kia was diagnosed with moderate autism, which manifest in a severe speech and language delay. While she made attempts to speak, her speech was often unintelligible. Kia demonstrated two of the social skills targeted in this study (e.g., sharing and following directions), however her performance of these behaviors was not independent, as she required verbal prompts to complete these tasks. Generally she worked well in classroom activities, however, she would tantrum (crying and screaming for more than 30 s) if her routine was disrupted or if she was asked to engage in an activity with which she was not accustomed. Kia would also cry when she did not earn a privilege that other students had earned. She was able to use keyboard and mouse to control computer programs.

**Settings**

Baseline and treatment sessions were conducted in the special education classroom where each participant was enrolled for the majority of the day. Each student interacted independently each day for 30 min with the computer-based program that presented the video models. They worked with the program while the computer was situated in a study carrel to reduce distraction. This situation also kept the other participants from previewing the software prior to their treatment phase. The teacher sat next to each participant when they were engaging the computer-based program and used only minimal verbal directions necessary to keep them on task or to provide them with help navigating the program if needed.

Data gathered to determine effectiveness of the treatment occurred during three small-group activities that included only the four target students. Activities presented to the students during these segments were reading, math, and arts/crafts respectively. All activities took place at a kidney shaped table with students sitting around one side of the table and the teacher sitting directly across from them. During the three small group activities each target student had four opportunities to engage in sharing, greeting others and following teacher directions. The primary and reliability observers were situated at opposite ends of the classroom with a clear view of each student to enhance data collection.

**Materials and Models**

*Computer and software.* A PowerMac 5300 was used to present the computer-based instruction with embedded video models. HyperStudio 3.2 (Robert Wagner Publishing, Inc, 1993-98), a presentation software program, was used to develop the instructional program. HyperStudio was chosen because it is commonly found in both special education and general education settings and for its relative ease of use. In addition, it allows teachers to embed video and other multimedia that can be used as models for teaching important skills and concepts. HyperStudio uses the metaphor of stacks (i.e., of note cards) to describe the instructional programs designed by the users.

The stack that was developed for this study consisted of 22 cards. The first card in the stack was a title card that introduced the instruction (e.g., “How to Get Along in School”). The second card in the sequence presented a simple declarative statement about the target behavior in relation to its function (e.g., “One way to get along in school is to share.”). The third card in the sequence presented a short definition in simple language of the target behavior (e.g., “Sharing means to let others use your things.”). Figure 1 is representative of the next four cards in the sequence which each contained video clips of the desired behaviors being demonstrated by the models in structured school activities (e.g., sharing a pencil during a math lesson). The seventh card in the sequence was a summary card that presented the students with still pictures of each of the previously presented video clips. They were then asked to click on each still and watch the embedded movie as an additional chance to view the models.

This same sequence of seven cards was repeated for the other two target behaviors.
(e.g., following directions and greetings). All printed messages for each of the target social skills could also be read to the students using the synthesized speech feature of HyperStudio (i.e., student clicks on the printed message using the mouse and the program phonetically reads the message).

Data collection forms. Data collection forms were designed for two purposes. First, the forms allowed the observers to record whether or not the participants appropriately demonstrated the target behaviors when they were given the opportunity during three daily sessions. For example, during the first session (i.e., a small group arithmetic activity) each participant was given four opportunities each to demonstrate the three target behaviors.

Second, data collection forms also served as the tool for collecting procedural reliability data. During procedural reliability sessions, observers recorded whether the teacher presented each student the opportunity to demonstrate each of the three target behaviors. Essentially, the data collection form served as an opportunity matrix to ensure each student had equal opportunity for responding to each of the three target behaviors.

Peer models and video clips. Two peers of similar age to the participants and without disabilities were used to film the video models depicting appropriate use of the class of social skills (e.g., sharing, greetings, and following directions). The two peers were filmed at the same kidney shaped table located in the classroom where the study was scheduled to take place. The original film of the models engaging in the target behaviors was shot in VHS format. From that original footage, six video models of each of the three target behaviors (18 computer-based movies) were edited and compressed for storage on the computer hard drive. The 18 compressed movies were approximately 4 to 6 s in length and depicted the two peers engaging in appropriate examples of the target behaviors (e.g., sharing a pencil during an academic activity).

Design
A multiple probe design across students was used to assess effects of the computer-based...
video models on the target social skills (Cooper, Heron, & Heward, 1987). Baseline data were collected for each participant over a minimum of three days dependent upon the length of time needed to develop a trend in the data. The treatment was conducted daily and applied sequentially across participants once students were exposed to the computer-based intervention for a minimum of one week. In addition, treatment was introduced to each student subsequent on the previous student demonstrating a significant change in trend and or level of their performance of the target behavior.

Procedure

Students participated in one session for each day during baseline and treatment phases. These daily sessions consisted of 36 trials distributed over the course of the day, with 12 trials occurring in a 45-min morning activity, followed by 12 trials in an activity occurring after lunch, and the final 12 trials occurring in an activity prior to the end of the school day. All baseline and treatment sessions were video taped for analysis.

Collection of video. Two children without disabilities acted as models and were video taped performing the desired behaviors in structured activities that were similar to the activities that the participants engaged in during the baseline and treatment phases. Social scripts were written for each of the three behaviors and these behaviors were demonstrated by the models as part of the each of the three activities that were targeted for the study (e.g., arithmetic, reading and arts/crafts).

Baseline and probe data. Baseline data were gathered daily for each student. Prior to each of the participants (two through four) beginning the treatment phase, probe data were gathered for a minimum of three days to determine the stability of their baseline. The baseline for each participant consisted of data gathered during all three daily activities.

Intervention. The computer-based intervention provided the participants video examples of the three social skills as demonstrated in context (e.g., reading activities) by the models. For each target skill participants had access to four video examples and one additional opportunity to review all the examples at one time (see Materials section for a complete description of the computer-based program). During intervention the participant sat in a study carrel that included the computer and, if needed, the teacher provided verbal directions for navigating through the program. No other instructional procedures were applied outside of the computer-based intervention.

During each activity students were given four opportunities to do each social behavior. Since a behavior by one student inadvertently provided a prompt for the same behavior in other students the teacher used an opportunity matrix to ensure that each session the teacher randomly began the opportunities for each behavior with a different student. The classroom co-teachers checked video taped segments of opportunities to ensure that the matrix was followed and each student was given an equal opportunity for unprompted responses, as a component of procedural reliability.

Dependent Measures and Data Collection

The social skills that were measured were complying with teacher direction, sharing, and use of appropriate social vocabulary. Operational definitions were developed by video taping the interactions of the class. Co-teachers in the class watched the video and documented examples and non-examples of the behaviors to develop the definitions. These were definitions that the observers and data collectors used to record the occurrence or nonoccurrence of the behaviors.

Complying with Teacher Directions: The student will do what the teacher asks the student to do within 15 s of the request. The most frequent requests were to check your schedule, get your materials, begin your work, and return your materials and work.

Greeting Others: The student will initiate a greeting to other students and teachers they encounter in the session. At the beginning of each session the students are expected to greet each member of the group. A wide variety of greetings will be accepted, for example, a wave or saying “Good Morning” will be considered a greeting. However, it is necessary that the student acknowledges
and greets each member of the group individually.

Sharing Materials: The student will allow other students to use the one set of materials allotted for the activity. Each student will need to share one set of materials including a pencil, scissors, glue, and a worksheet with each of the other students in order to complete their work. The student who is in possession of the materials will be asked to share by the other students, as all the students can verbalize the word share and are accustomed to this procedure.

Students had the four structured opportunities to engage in these behaviors three times a day. These times were reading class, math class, and arts and crafts. This allowed for 12 opportunities for each behavior and 36 total opportunities for any desired behavior to take place during the day.

The independent variable was the computer based instructional program to which each student received access. The instructional program allowed each student exposure to the definition of the desired behaviors and access to video clips demonstrating the behavior. It also allowed students to identify examples of the desired behavior. Data were taken each day a week on each student involved with the computer based instructional program using the data collection sheets. The classroom co-teachers took data from video taped segments of the structured activities.

Interobserver Agreement

Several reliability measures were taken in the project. Point by point interobserver reliability was calculated to determine if the students actually performed the behaviors (Cooper et al., 1987). The classroom co-teachers watched video segments of the activities and recorded occurrences of the behaviors with a check in the appropriate box and non-occurrences of the behavior with an X in the appropriate box. The number of agreements between the co-teachers was divided by the total number of opportunities for the behavior to occur (36) and multiplied by 100. Procedural reliability was also checked to ensure that the opportunity matrix was followed and each student had an equal opportunity for unprompted response. The co-teacher viewed the video taped segments to ensure that the matrix was followed.

Results

Reliability

Interobserver reliability was collected in 30% of the probe sessions (once per week) and in 40% of treatment sessions (twice per week). During probe sessions, interobserver agreement for occurrence of the target behaviors was 97.2%. During treatment sessions, interobserver agreement was 100%. Procedural reliability was calculated to ensure that the opportunity matrix was followed. This matrix made sure that each student had equal opportunities to respond during the first trial for each behavior. Procedural reliability as judged by adherence to the matrix was 100%.

Computer Based Instructional Program

All students showed increases from baseline to treatment in their unprompted engagement in the social skills. Figure 2 shows aggregated data of all target behaviors and Figure 3 separates the behaviors to illustrate the individual patterns of performance. The study lasted a total of 24 consecutive school days.

Isaiah showed the lowest frequency of the target behaviors during baseline conditions. When the instructional program was introduced the overall frequency of unprompted social behaviors made a dramatic increase (see Figure 2). The frequency of behaviors continued to rise steadily over the weeks he participated in the program. Overall frequency of the behaviors increased to 35 times during the last day of the treatment condition from an average of 8.6 times during baseline conditions. The largest gains from baseline to completion of intervention were in greetings; this was the area in which Isaiah performed the lowest (see Figure 3). Engagement in sharing made an immediate increase in level from a high during baseline of four opportunities out of 12 to 7 opportunities out of 12.

Hannah’s frequency of engagement in the target behaviors during baseline conditions accelerated from 15 to 22 occurrences with a mean of 18.8 occurrences before the introduction of the intervention. The frequency
with which Hannah performed the behaviors during interaction with the computer based instructional program increased from baseline levels. However, the data does not show a sudden increase with the introduction of the program. Upon introduction of intervention, her levels of following directions increased from 6 opportunities out of 12 to 8, sharing

Figure 2. Aggregated data of performance on the target behaviors.
increased from 8 to 10 and greetings decreased from 8 to 7. Overall, at the conclusion of 15 intervention sessions, Hannah was performing each of the targeted behaviors for 100% of the available opportunities. Marcus showed stable data during baseline
conditions with high levels of social skill performance in greetings and to a lesser extent sharing. With the introduction of the computer based instructional program his frequency of engagement in the target behaviors increased suddenly with his engagement in sharing representing the largest increase. The increasing trend continued while he interacted with the instructional program but he only achieved maximal performance on greeting and sharing. On the final day of the study, Marcus performed 35 of the target behaviors out of the 36 preset opportunities.

Kia exhibited a similar trend in frequency of target behaviors. Here data show a stable baseline and then, upon introduction of the computer based instructional program, her frequency of engagement in the target behaviors significantly increased and continued to rise throughout treatment. Like Marcus she exhibited high levels of unprompted greeting prior to the intervention. During the last two days of treatment Kia performed 34 target behaviors out of 36 opportunities. Her largest gains were with sharing, from highs of 4 out of 12 opportunities during baseline to highs of 10 during intervention, and following directions, with highs of 5 of 12 opportunities during baseline to 10 of 12 during intervention.

**Discussion**

Design and data of this study suggest several implications for future research and evaluation of computer based software programs with embedded video. Though each student increased number of desired behaviors they performed in the contrived settings a few factors should be considered when interpreting these results. Data for some students accelerated through baseline. Some students already had some of the behaviors in their behavioral repertoire. Additionally, the study did not control for observational learning that could have occurred during the table-top activities.

When interpreting results of the present study, consideration must be given to Hannah’s increasing trend in baseline data. The other three students showed stable baseline patterns. However, Hannah’s baseline data began to rise in baseline and continued to increase during the intervention stage of the study. The increasing trend signals possible threats to internal validity and the increase in Hannah’s performance might be attributable to maturation, intervention or some other unidentified variable. This data does not imply a functional relationship between the dependent and independent variables for Hannah. However, each of the other participants had stable baseline data and showed sudden and significant increases in the target behavior after introduction of the intervention thus demonstrating experimental control.

Looking at all participants, baseline data indicated that each student could perform the desired behaviors, though not at frequency levels commensurate with criterion of the study. This fact decreased the potential of this study to demonstrate large changes in student behavior. Kia, for example, was already performing the greeting skill on 10 out of 12 occasions. The artificial ceiling imposed by the number of opportunities to perform the target skill reduced the likelihood that this intervention would be capable of demonstrating a powerful relationship between the computer based video instruction and Kia’s greeting behavior.

While replicating earlier research demonstrating video is effective instructional supplement for increasing student competence with particular social conventions (Charlop-Christy et al., 2000; Charlop & Milstein, 1989; Ogeltree & Fischer, 1995; Sherrer et al., 2001; Taylor, Levin, & Jasper, 1999; Thiemann & Goldstein, 2001), future research should examine use of video to teach new social behaviors that students do not have in their repertoire at the beginning of the study. Additionally, researchers should evaluate the potency of video paired with computer based anchored instruction to strengthen existing behaviors and teach novel social responses. Related to these concerns, comparing the frequency levels of the student engagement in the target social skills to normative samples of the behavior of students without disabilities would extend social validity of the effects of treatment.

Considering the issue of social validity and nearing the social skill levels of peers without disabilities, one should consider the efficacy of expecting students with disabilities to learn social skills in self-contained or segregated settings. This study demonstrated that these students with autism could learn social skills from video of their peers. While Charlop-Christy et al. (2000) attempted to compare the effective-
ness of video to in vivo instruction of social skills, future implementations may combine targeted video training with increased time surrounded in situ by appropriate role models. Thiemann and Goldstein (2001) evaluated effectiveness of peer social skill tutors and the use of video as a self-monitoring component but to date, no research has evaluated the combination of video training (via computer or television) combined with extended time surrounded by peer role models.

Discussion of peer role models and potential learning opportunities that may arise from that experience underscores another potential threat to the internal validity of this study. With a multiple probe design across participants, some participants receive intervention before others. In this study, those students receiving intervention and improving their social skills proficiency participated along side those students not receiving intervention. With this arrangement, the possibility exists that the students not receiving intervention had the opportunity for observational learning by watching those students receiving intervention. Baseline probes for Marcus and Kia just prior to introduction of the intervention, do not support this possibility since for both students their baseline data were stable across the entire condition; however Hannah’s slight increase suggests that she may have been learning the behaviors observationally or from some other source. Researchers should consider using multiple probes across behaviors replicated across students (or settings depending on the target skills), in an effort to begin intervention with all students as soon as possible and guard against threats to internal validity resulting from observational learning for student’s not engaged in intervention.

Two final considerations for this study include examination of maintenance and generalization of social skills. Because of time restrictions, data were not collected to evaluate the durability of treatment effects over time. This data would be important to determine if the frequency of desired behaviors remained at high levels after discontinuation of interaction with the computer based instructional program. Additionally, this data would reveal whether the natural environmental events would take over stimulus control for the target behaviors. This is an important avenue for future research on computer based anchored instruction as these are critical components of an effective social skills program.

In 1969, Baer, Wolfe, and Risley suggested that one of the desired outcomes for applied research is for the result to have generality. In the case of this study and research in this area, the generalization of the targeted behaviors across activities, people and environments beyond those used for training purposes would enhance value of the results. The research base on autism and instruction with video does not offer much insight into generality of social skills learned via video based instruction. Similar to this study, measures are frequently taken in contrived situations that attempt to mirror real life events. Though this was not the purpose of the study, a measure of generalization to different environments would strengthen argument for the effectiveness and efficiency of computer based anchored instruction as a means to teaching social skills.

Overall, data demonstrated that computer based anchored instruction was effective in increasing this frequency for at least three out of the four participants. Behavioral processes through which the students acquired the target behavior are difficult to pinpoint; however, as the video may serve as an establishing operation for the target behaviors. These findings confirm previous research that instruction anchored in a real life context creates significant behavior changes and that peers without disabilities can serve as appropriate models for students with disabilities.

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