Evaluation of the Effects of Social Cue Cards for Preschool Age Children with Autism Spectrum Disorders (ASD)

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Abstract

The purpose of this study was to develop and investigate the effects of Social Cue Cards on the social communication skills of three preschool age children with Autism Spectrum Disorders (ASD). Using a multiple-baseline across-participants design, Social Cue Cards were implemented and direct observations of participants' identified target behaviors were conducted. The results indicated that Social Cue Cards were effective for improving the rates of social communication behaviors for all participants. In addition, all three participants demonstrated maintenance of skills at a two-week follow-up. Generalization of skills was also assessed. This research adds evidence that Social Cue Cards may be a beneficial intervention for children with ASD in the general education environment.
Keywords: autism, Social Cue Cards, social skills

Introduction

Autism spectrum disorders (ASD) are defined by a pattern of behavioral deficits with one of the primary core features including severe limitations in social reciprocity and communication (Lord & Risi, 1998). Children with ASD infrequently display spontaneous speech, make eye contact, or engage in conversations with other children or adults (MacDuff, Krantz & McClannahan, 1993). Even children at the higher end of the spectrum (considered high-functioning autism or Asperger's Syndrome) have continued difficulty with social interactions. Specifically, these children demonstrate a restricted range of social communication skills such as limited ability to (a) initiate and maintain conversations, (b) request information/materials from teachers and/or peers, (c) listen to and respond to teachers and/or peers, and (d) interact in basic games or other activities (Carter, Ornstein-Davis, Klin, & Volkmar, 2005).

It has been argued that social impairments are the most critical element in the definition of the disorder (Stella, Mundy, & Tuchman, 1999). Further arguments have been made indicating that social excesses and deficits may have some level of independence from other symptom domains of ASD (Charman, et al., 1997). Based on these assumptions, it can be argued that treatments specific to social skills play a central role of intervention for children with ASD. And, given the recent trend toward inclusion in general education, the need for effective intervention techniques to improve social skills of children with ASD has become even more apparent.

One increasingly popular approach to improving social interaction skills in children with ASD is through the use of Social Stories. Social Stories are short, individualized stories intended for children with ASD to provide support in new and sometimes confusing social experiences (Gray, 1993). The norms for behavior in a targeted context, the perspectives of others, and the specific steps for implementing the social skills are instructed and modeled through the short written story. Specifically, a Social Story is written to provide information on what people in a given situation are doing, thinking, or feeling. They illustrate the sequence of social events as well as identify significant social cues and their meaning (Attwood, 2000, p. 90). Social Stories are written and implemented to enhance the child's understanding of the social situation and teach the appropriate behavioral response that can be practiced by the child.

Social Stories are designed to serve a wide variety of purposes and can be particularly helpful in facilitating the inclusion of students with ASD in mainstreamed classrooms (Gray & Garand, 1993). Yet

extant research provides little empirical evidence in support of their efficacy. A literature review and synthesis conducted by Sansosti, Powell-Smith, and Kincaid (2004) located only eight studies relating to Social Story effectiveness. In general, the studies were described as lacking experimental control, with weak treatment effects or confounding treatment variables (Sansosti et al., 2004).

Interpretations of various studies are confounded by a number of variables. Gray (2000) gives clear guidelines on how Social stories should be written. Reynhout and Carter (2006), however, found that 39% of the stories reported in research deviated from the recommended basic or complete Social Story. In addition, 47% of perspective sentences were written from the viewpoint of the person with ASD which is contradictory to the recommended practice of writing perspective sentences from the viewpoint of individuals in the social situation (Gray, 2000, 2003). In addition to providing specific instructions describing how Social Stories should be written, there are specific guidelines used when implementing Social Stories (Gray, 2000, 2003). Gray and Garand (1993) state that comprehension level of the child needs to be checked by performing different techniques such as having the child do a checklist or answer questions about the story after it is read. In more recent guidelines for implementing Social Stories, there is no mentioning on the evaluation of comprehension. For the intervention of Social Stories to be effective, common sense would suggest that the comprehension of the child with ASD is essential. In addition, the use of illustrations was not generally recommended, but subsequent guideline revisions recommend the use of pictures that "reflect consideration of the age and personal learning characteristics of the person with ASD" (Gray, 2003).

Existing studies have frequently combined the use of Social Stories with other, well-validated strategies, such as prompting and reinforcement, thus failing to isolate the effects of Social Stories alone (Reynhout & Carter, 2006; Sansosti et al., 2004) and leaving the effects of the outcomes difficult to ascertain. Additionally, maintenance and generalization issues of Social Stories are inadequately addressed (Reynhout & Carter, 2006).

The extant literature offers limited evidence of positive trends in increasing social behaviors, providing a preliminary indication that Social Stories may be effective with some individuals with ASD (Crozier, 2009). But due to the various procedural guidelines and procedural staff training needs, the implementation of Social Stories by a classroom teacher proves to be difficult. For strategies to have value to teachers of children with ASD in the classroom environment, such interventions should be easily and quickly implemented with very minimal materials. And, with the increased number of students with ASD taught in inclusive environments, more unobtrusive (less stigmatizing) teaching formats that are readily accepted by educators and that can be used in a variety of settings should be considered (Sansosti & Powell-Smith, 2006).

In addition to meeting academic proficiencies emphasized as a part of standards-based educational reform movements (e.g., No Child Left Behind), educational goals for children with ASD will need to include teaching social interaction behaviors, pragmatic communication, and at times, self-help or functional living skills (Sansosti & Powell-Smith, 2008). To be optimally effective, teaching strategies should capitalize on the visual learning strengths of students with ASD to allow for repeated imitation of targeted social skills or behaviors (National Research Council, 2001).

One such user-friendly approach to improving social interaction skills in children with ASD is through the use of social scripts. Research has demonstrated that when children with ASD are taught social scripts through modeling, prompting, and reinforcement, their social interactions with adults and peers increase. For example Goldstein, (2002) suggests that improving social interactions for children with ASD through the use of social scripts may positively affect language skills and peer interactions. Studies have also demonstrated that the use of scripts and visual cues can increase communicative speech

and decrease perseverative speech in children with ASD. The use of visuals such as social scripts also proves to be less invasive and less socially stigmatizing than verbal prompting or reminders. They are also less distracting to other students in the classroom than typical prompting procedures. In addition, such strategies have shown to be accepted by teachers for quick and easy implementation with a minimum of material (Ganz et al., 2008).

Krantz & McClannahan (1998) examined the use of written scripts with three preschool students with ASD who had minimal reading skills. Prior to the study, students initiated only single-word requests for food or toys. The students were taught to follow photographic activity schedules that included the words *look* and *watch me* paired with activities. Students learned to approach adults when those words appeared, say the phrases, and show the adult something they could do (e.g., put on a costume, play with a toy). After the written scripts were introduced, the participants used both scripted and unscripted statements and generalized new skills to various adult respondents and to new activities.

Charlop-Christy and Kelso (2003) also examined the effects of written scripts on cue cards with 6- and 7-year old boys with ASD to improve conversational skills about topics in which they were not immediately engaged (e.g., hobbies, past events). Each cue card contained seven statements and seven questions. Participants were taught to answer and ask questions by reading the cue cards then responding without looking at the cards. Results found that the children did not acquire conversational speech during the baseline phase, however these children were able to reach criterion during the cue card intervention, while also maintaining this skill during testing without the use of cue cards.

Cognitive picture rehearsal is another visual strategy, developed by Groden & Lavasseur (1995) to teach appropriate social behaviors and self-control. The strategy utilizes cartoon-like drawings on index cards combined with positive reinforcement principles. Cognitive picture rehearsal always includes drawings or pictures of three components: antecedents to a problem behavior, the targeted desired behavior, and a positive reinforcer. Through repeated practice of the picture scenes, children with ASD are taught to identify stressful events and learn to use coping strategies. Children with ASD are shown the sequence of cards until they can repeat what is happening in each picture. The sequence is reviewed just prior to the child entering the potentially problematic situation. For example, a cognitive picture rehearsal was developed for Matt, a 7-year old, who would throw tantrums when his teacher told him to get off the computer. Cards 1 and 2 illustrated the antecedent to the problem situation (e.g., Matt is playing on the computer and then the teacher tells him it is time to get off of the computer). Cards 3 and 4 showed Matt engaged in the desired target behavior (e.g., thinking that the teacher will be happy if he gets off the computer and giving him a chance to play the computer later, he then says, “Okay, I’ll get off the computer”.). Cards 4 and 5 showed the positive rewards of Matt engaging in the targeted behavior (e.g., receiving a point on his reward chart and using the computer at a later time for cooperating with the teacher), Organization for Autism Research (2007).

Cognitive picture rehearsal enables the child to acquire a needed skill or response, to recognize when and where to use it, and ultimately to use it independently in appropriate situations. The major focus is the development of self-control and the acquisition of social skills (Groden & Cautela, 1988). For example, if a child responds to criticism by being aggressive or throwing a tantrum, it is helpful for the child to learn the appropriate response “I can change that”, but also learn appropriate relaxation techniques that may help the child cope with the stressful situation (Groden & Cautela, 1988).

Although there is an abundance of literature on the research of visually-cued instruction used for children with ASD, there has been very limited research in the area of cognitive picture rehearsal. Through a comprehensive literature review, only anecdotal and personal reports of cognitive picture rehearsal techniques were found.

Study Rationale and Hypothesis

The purpose of the present study was to apply a novel research-based technology that used a combination of valid treatment approaches to teach social skills within general education environments. Specifically, this study developed and examined the effectiveness of Social Cue Cards on the social communication skills of preschool age children with ASD by (a) demonstrating how visual cues and social scripts combined with positive reinforcement techniques can be implemented into a short story format to teach social skills to children with ASD; (b) incorporating the technology of visual supports into a personalized program that has widespread application, is cost effective, does not interfere with normal classroom procedures, and is less stigmatizing to the student with ASD; (c) demonstrating how a social skills intervention can be implemented in the general education classroom; and (d) evaluating the effectiveness of this intervention in a less structured setting (i.e., free play). In addition, best practice guidelines were developed for educators of children with ASD to assist in designing and implementing individualized Social Cue Cards.

It is hypothesized that, with the implementation of Social Cue Cards, children with ASD will show an increase in appropriate targeted social behaviors with peers. It is also hypothesized that by incorporating the Social Cue Cards in the classroom setting, the Social Cue Cards will prove to be unobtrusive to the classroom and less stigmatizing to the child with ASD. Social Cue Cards will demonstrate how a simple social skills intervention can be easily implemented in the classroom with minimal materials, time, and effort. A multiple baseline design across subjects was utilized in the study. Similar effects for increased targeted social behaviors across all subjects were expected.

Method

Participants

Three male, preschool children participated in this study. Prior to inclusion in the study, all were independently diagnosed by a licensed psychologist and met criterion for *Autistic Disorder* or *Pervasive Developmental Disorder, Not Otherwise Specified* (PDD-NOS). All three children were receiving intensive behavioral intervention in addition to attending a typical preschool setting for at least two days per week.

To meet criteria for the study, the participants needed to be of preschool-age (ages 3 through 6) and currently attending preschool with typically-developing peers. In addition, participants needed to display deficits in their social communicative behaviors with peers.

Rob, age 5, attended a typical preschool classroom four afternoons per week. He received a diagnosis of PDD-NOS. On standardized measures, Rob demonstrated average to above-average performance across all domains. Rob spoke in complete sentences, had an advanced mand repertoire, demonstrated advanced language and play skills, and had above-average reading skills for his age. Aside from these strengths, Rob displayed difficulty with social pragmatic skills and social communication skills.

Ian, age 4, attended a typical preschool classroom 5 days per week. He had been diagnosed with PDD-NOS and demonstrated average performance on standardized measures. Like Rob, Ian spoke in complete sentences, had an advanced mand repertoire, but also displayed difficulty with social

pragmatics. Ian was able to engage in some social activities with his peers (e.g., initiating play, joining in play), but demonstrated difficulty within his social language and communication skills.

Sammy, age 5, attended a typical preschool classroom 3 mornings per week. He had been diagnosed with autism. Like Rob and Ian, Sammy also had an advanced mand repertoire including manding for missing items and manding for information (with adults). Sammy also had advanced receptive skills, independent play skills, and intraverbal skills. On standardized measures, Sammy demonstrated low-average nonverbal intelligence and had relatively impaired delays in communication. However, Sammy was able to converse with adults using simple sentences and could communicate his wants and needs effectively. Sammy also demonstrated emerging initiating skills with adults, but failed to generalize these skills with peers.

In addition to the study participants, three typically-developing males (ages 4-5) were also used in the study to increase practice opportunities of the targeted behaviors. These children acted as peer models for the study participants and were facilitated through play date sessions in the participants' homes.

Settings

The study took place in three separate preschools in a suburban community just west of a large, northeastern city. Observations took place in general education classrooms for children ages 4-6. Each classroom was staged with two certified teachers and included approximately 21 students. Observations also took place in the participant's home during play date sessions. For Ian, play date sessions were located in his school during his behavioral intervention time. The primary settings for the observations were directly related to the identified social behaviors targeted for the study.

Materials

One set of Social Cue Cards was designed for each participant to address their identified target behavior. Each set of Social Cue Cards was constructed on white 3" x 5" (7.6 cm x 12.7 cm) index cards and illustrated the antecedent to the problem social situation, the desired target behavior, and the positive reinforcer (Groden & Lavasseur, 1995). Each Social Cue Card contained cartoon-like drawings (drawn with crayons) and developmentally age-appropriate social scripts (Krantz & McClannahan, 1998). In other words, each Social Cue Card included written statements that the participants were able to understand and repeat. Each set of Social Cue Cards contained a cover page with the title of the desired target behavior and were 4-5 pages in length, including the cover page. The Social Cue Cards were stapled together in sequential order into a small book that was easy to access and read to the participant (see Appendix A).

Data Collection and Response Definition

Data were collected using a frequency measure of independent occurrences of the target behavior during 30-minute observations. Data were calculated by recording the number of independent occurrences of the target behavior as well as the number of opportunities for the occurrence of the target behavior per 30-minute observation session. The percentages of independent occurrences of the target behavior were then recorded for each session. Independent occurrences were scored when the participant engaged in the target behavior without prompting by the trainer. Opportunities for the occurrence of the target behavior were defined as situations in which engaging in the target behavior would be the most appropriate response in the given social situation. Specific target behaviors relating to social communication skills for each participant were identified through interviews with parents and teachers and were consistent with the social skills objectives listed on the child's Individualized Education Program (IEP).

For Rob, *persisting for attention* was defined as any instance in which Rob attempted and persisted to gain a peer's attention by calling the peer's name loud enough for the peer to hear him, tapping the peer on the shoulder, moving in closer proximity of the peer, or any combination of these behaviors. For Ian, *defending self* was defined as any instance in which Ian vocally requested for a peer to stop performing an action, e.g., "stop pushing me" or vocally requested for an item that was taken from his possession, e.g., "give it back". For Sammy, *peer initiation* was defined as any instance in which Sammy said "hi" to a peer, made an appropriate comment to a peer, asked a peer a question, asked a peer to play, or asked to join in play with a peer. To be identified as a *peer initiation*, Sammy needed to initiate an interaction with a peer in which the peer responded to by commenting or by playing with Sammy. Each exchange was identified as one occurrence of the targeted behavior.

Experimental Design

A multiple-baseline across participants design was used to assess the changes in social communication skills across the three participants (Cooper et al., 1987; Kazdin, 1982; Tawney and Gast, 1984). A follow-up phase was added after the intervention phase for each participant. This design allowed for initial demonstration of controlling effects prior to intervention, sequential repeated demonstrations of intervention effects, and maintenance effects of the intervention during follow-up.

Procedure

Identification of Target Behaviors

Targeted behaviors relating to social communication skills were identified through interviews with parents and teachers and were also listed as specific social skills objectives on each participant's Individualized Education Program (IEP). Once a specific behavior was identified for each participant, preliminary observations were conducted. These observations included recording relevant cues of the behavior, antecedent and consequent events, and descriptions of the setting-specific variables for that particular behavior.

Identification of Positive Reinforcers

Positive reinforcers were identified for each participant through observation and reinforcer assessments conducted by the student investigator. For Rob and Ian, the positive reinforcer was a naturally-occurring reinforcer based on the peer's reaction to the target behavior. For Sammy, the positive reinforcer was a token (i.e., happy face) on a token board. Once Sammy received all of his happy faces on his board he could engage in an activity of his choice.

Play Date Sessions

Play date sessions were organized so that an appropriately-matched peer came to the participant's home for weekly 1:1 play sessions. Play date peers were the same age as the participant and were from the same classroom. Each structured play date session lasted for approximately one hour per week and was facilitated by the student investigator or Personal Care Assistant (PCA).

Baseline

During the baseline phase, observational data were recorded for each participant's targeted behaviors. No intervention had occurred prior to or during this period. All baseline observations were

conducted at least two times per week for 30 minutes in duration. If the targeted behavior occurred at any time during the observation, the observer recorded the frequency of the response on the data collection sheet.

Intervention

Social Cue Cards were constructed for each participant by the student investigator. Each set of Social Cue Cards contained the antecedent event (i.e., target social situation), the identified target behavior, and consequent event (i.e., positive reinforcer.

During the intervention phase, the Social Cue Cards were introduced to each student by the student investigator or Personal Care Assistant (PCA) during home programming. The Social Cue Cards were read to each participant and each participant was asked to repeat the content of the cards. The student investigator then asked a set of five simple - who, what, when, where and why- questions to assess comprehension of the Social Cue Cards. All participants answered the comprehension questions with 100% accuracy.

Once the participant was able to demonstrate understanding of the Social Cue Cards, each sequence of cards was reviewed by the participants at least once per school day prior to the targeted event (e.g., free play) and once before each weekly play date session. If the targeted behavior occurred at any time during the observation, the observer recorded the frequency of the response on the data collection sheet and immediately presented the identified positive reinforcer as detailed in the Social Cue Cards.

Observational data during the intervention phase were collected in the same manner as baseline observational data.

Fading Procedure

A fading procedure was implemented following the intervention phase in which each participant's intervention was systematically faded by reducing the frequency of the presentation of the Social Cue Cards by one school day each week. During the first week of the fading procedure, the intervention was in effect for three out of the four school days for Rob, four out of the five school days for Ian, and two out of the three school days for Sammy. During the second week of fading, the intervention was in effect only twice during the week (e.g., Monday and Wednesday) for Rob and Ian, and only once during the week for Sammy. Data collection did not occur during the fading procedure. Following the fading procedure, follow-up data were collected.

Follow-Up

One week following the intervention (after the fading procedure was completed), observations were conducted twice per week at school and once per week during play date sessions to examine the maintenance of the targeted social skills. During this phase, the intervention was not in effect for any of the participants and no other intervention was implemented during this time. Follow-up data were collected in the same manner as baseline and intervention conditions.

Generalization Probes

Since each participant encountered numerous opportunities to interact with peers in settings other than the target setting, generalization of the target behaviors were essential. To assess generalization, generalization probe observations were conducted during the baseline, intervention, and maintenance phases of the study. Observations for the generalization probes were conducted weekly and scored in the same manner as the other observation conditions. The intervention was not in effect during the generalization probe and no other intervention was implemented during this time. Settings for the generalization probes included other unstructured locations where targeted social behaviors could be observed. For each participant this location was on the school playground. For Rob, this location also included Circle Time at school when the students could engage in conversation. For Sammy, this location also included the inside gym at school.

Treatment Integrity

Procedural Reliability

Data were collected, in vivo, by trained observers. All observers received training on observational methods, as well as behavioral definitions. The observers all had at least one year of experience in behavioral observations and applications. To assess fidelity of the intervention, a self-report checklist was present at each of the participant's target setting for the observers to record whether or not the participant received the intervention at the specified time. Procedural reliability was computed as a percentage by dividing the number of days the participant was presented with the Social Cue Cards by the total number of days in the intervention phase and multiplying by 100. For all participants, the treatment integrity was 100%.

Intervention Acceptability

At the completion of the study (after the follow-up phase of the study), teacher and parent acceptability of Social Cue Cards was assessed. Specifically, teachers and parents were asked to fill out an *Intervention Rating Profile-10* (IRP-10; Power, Hess, and Bennett, 1995). The IRP-10 is a 10-item scale that was developed to evaluate the acceptability of an intervention. Reliability of the instrument is .98 (Power et al., 1995). Scores on the IRP-10 can range from 10 to 60, with higher scores indicating a greater acceptance level. For this study, scores on the IRP-10 were well within the acceptable range for all participants. It is also noted that the participants' teachers all indicated that they "strongly agree" that this intervention would be suitable for a child with characteristics similar to the participant and would suggest its use to other families.

Results

Each participant's social communication behaviors were graphed as a percentage of independent occurrences per session. Data collected during baseline, intervention, and follow-up were analyzed visually for changes in mean and level (immediacy of effect) (Kazdin, 1982). Frequencies of targeted social communication skills across baseline, intervention, and follow-up phases for each participant during school sessions are presented in Figure 1. Frequencies of targeted social communication skills across baseline, intervention, and follow-up phases for each participant during play date sessions are presented in Figure 2. For Sammy, an additional intervention phase is displayed to account for modifications that were made to the intervention. Both school data and play date data are presented for Rob and Sammy. Ian, however, did not have opportunity for engaging in the target behavior during his play date sessions; therefore no play date data were recorded or presented for Ian.

During the baseline phase at school, Rob displayed relatively low rates of persisting for attention from peers, with levels ranging from 0 to 17% and an overall mean percentage of .04 (see Figure 1). Upon implementation of the intervention, a prompt increase of persisting for attention behaviors emerged. That is, there was a 60% increase from the last data point of the baseline phase to the first data point of the intervention phase (see Figure 1). This trend continued to the next data point in which Rob reached 100% for independent persisting for attention behavior, a 40% increase from the previous data point. Percentages during the intervention phase ranged from 60 to 100% with the last two data points of the intervention phase reaching 100%. The percentage of Rob's persisting for attention behaviors overall increased to a mean percentage of .86, which was an increase of 82% compared to baseline. At follow-up, Rob maintained this elevated level of performance. Rob demonstrated maintenance of skill acquisition with the mean percentage of 100% (96% higher than baseline).

During the baseline phase of play date sessions, Rob displayed rates of behavior slightly higher than those demonstrated during the baseline phase at school (see Figure 1 and Figure 2). Specifically, a 12% increase was observed. During the baseline phase of play date sessions, rates of persisting for attention ranged from 25 to 33% with an overall mean percentage of .29 (see Figure 2). A rapid increase once again emerged upon the implementation of the intervention. Rob's persisting for attention behaviors increased to levels of 100% for the only two data points of the intervention phase. At follow-up, Rob maintained this level of performance at 100%. Rob demonstrated maintenance of the target behavior with a 71% increase from the baseline condition.

Figure 1, Next Page

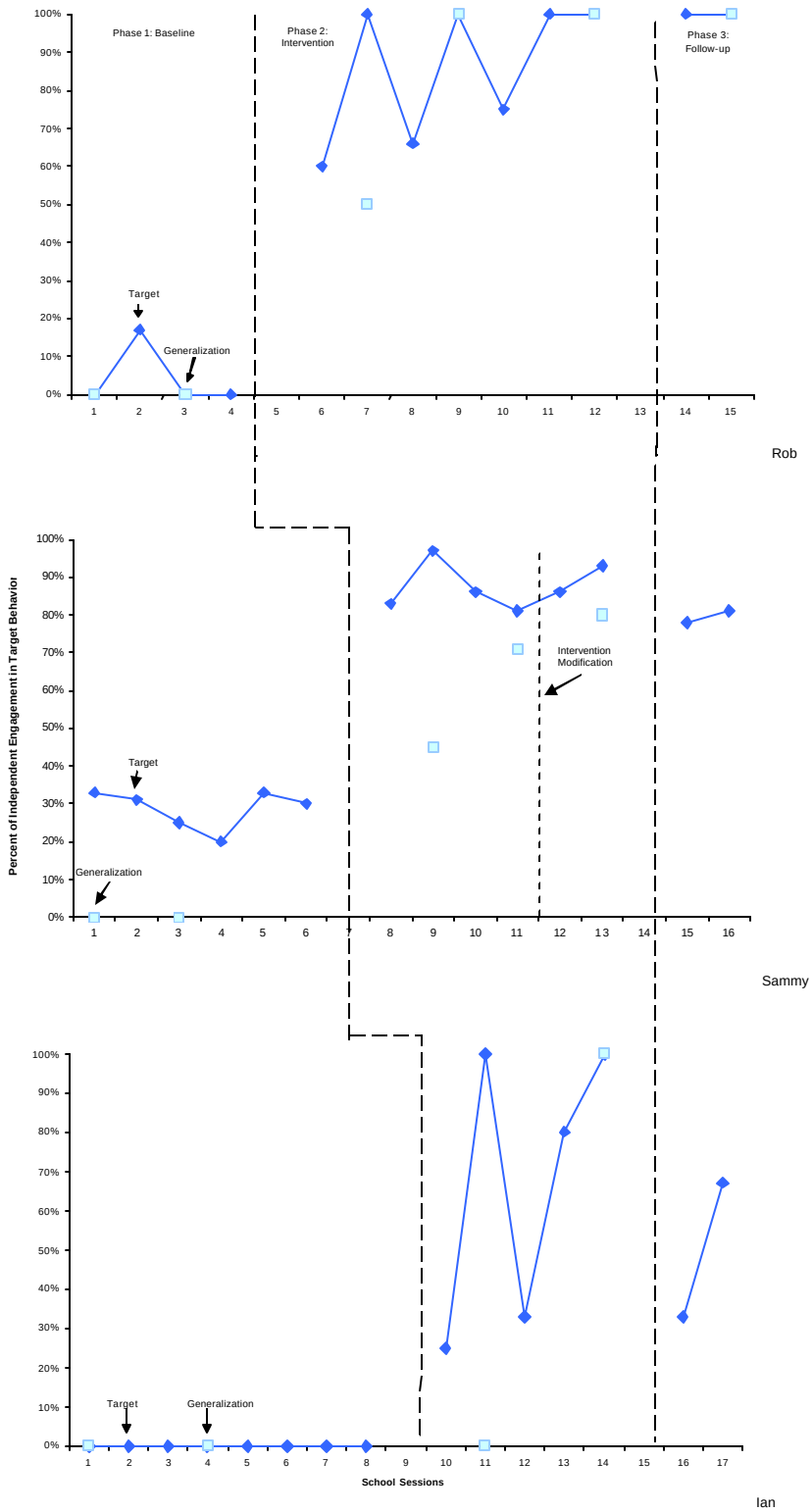

Figure 1. Percentage of Independent Engagement in Target Behaviors across Participants for all Phases.

Sammy displayed relatively consistent, low rates of peer initiating behavior at school prior to the intervention, with an overall mean percentage of .29 (see Figure 1). Like Rob, the target behavior abruptly increased upon implementation of the intervention. A 54% increase in peer initiations occurred from baseline to the first session of the intervention phase. By the second session of the intervention phase, peer initiating behaviors reached a level of .97 (a 68% increase from baseline), but rates slowly declined to a level of .81 by the fourth session. Due to discrepancies during the intervention phase, appropriate intervention modifications were introduced (see Discussion). Upon implementation of these modifications, Sammy's peer initiating behaviors increased slightly from 81% during the intervention phase to 86% during the first session of the intervention modification phase (a 5% increase). This trend continued to the next data point with a high rate of 93%. The overall mean percentage of peer initiations during the intervention modification phase was .90 (a 61% increase from the initial baseline phase). At follow-up, these rates decreased slightly to a mean percentage of .80. However, this rate of performance was in the same range as the intervention modification period with one overlapping data point (at 81%) and rates of the target behavior remained much higher than baseline levels (with a 51% increase). This follow-up effect for Sammy demonstrated maintenance of the target behavior following the intervention.

Sammy displayed slightly higher rates of behavior during the play date baseline phase compared to the school baseline phase, with an overall mean percentage of .39 (see Figure 1). Specifically, there was a 10% increase in rates of peer initiations during the play date baseline phase as compared to the school baseline phase (see Figure 1 and Figure 2). Upon implementation of the intervention, rates of peer initiations increased by 56% going from 30% at baseline to 86% during the first session of intervention (see Figure 2). A slight decline was noted during the second session of intervention, but high rates of peer initiations quickly returned during the remainder of the intervention condition, with rates reaching 95% and 100% by the end of the intervention phase (*M* = .89) Sammy continued to maintain the target skill at follow- up with a mean percentage of .87 (a 58% increase from the baseline condition).

Ian demonstrated rates of defending self at a mean average of 0% during the baseline phase at school. There was an immediate increase in the rate of behavior upon implementation of the intervention. Percentage of defending self quickly increased to 25% during the first session of the intervention and then jumped to 100% during the second session (see Figure 1). Following this high rate of behavior, the percentages of defending self behaviors abruptly decreased to 33% before stabilizing at 80% and 100% by the end of the intervention period. Although data during this intervention phase were variable, the overall mean percentage of Ian's defending self behaviors were .68, which was 68% higher than baseline. In addition, the rates of behavior were consistently increasing by the end of the intervention phase. Follow-up effects for Ian show maintenance of skill acquisition following the intervention phase. Specifically, the mean percentage of Ian defending himself was .50. This change represents an increase of 50% from the baseline condition.

Figure 2, Next Page

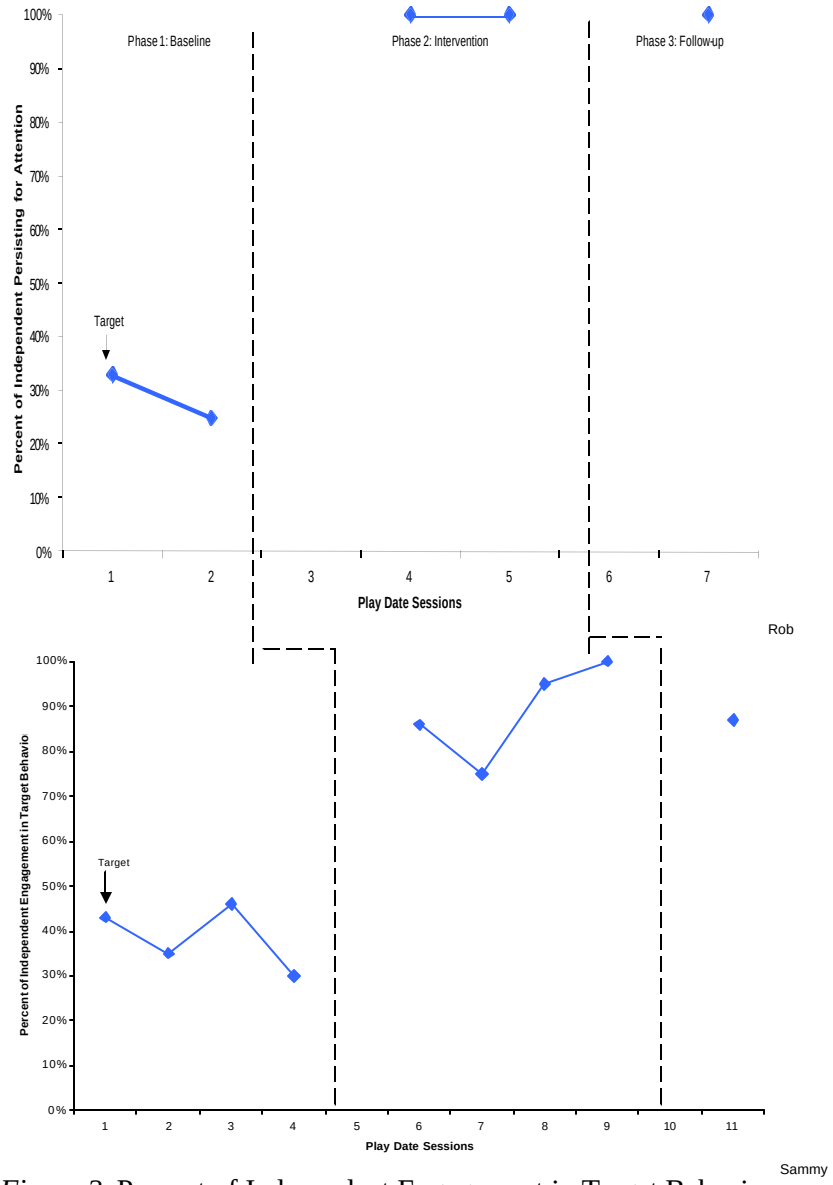

Figure 2. Percent of Independent Engagement in Target Behaviors across Participants for all Phases.

Generalization of Skills

At baseline for Rob, generalization of skills were at 0%, but quickly increased to 50% during the intervention phase (see Figure 1). This trend continued with 100% generalization for the remainder of the intervention condition. The rate of generalization for this period was at a mean percentage of .88, which was an 88% increase from baseline. During follow-up, Rob maintained generalization of persisting for attention behaviors at 100%.

Generalization data for Sammy at baseline were also 0%. An increase in the rate of generalization was also observed for Sammy with the implementation of the intervention (see Figure 1). This increase was supported by a rapidly increasing trend during the intervention phase, with a mean percentage .58. During the intervention modification phase, generalization abruptly increased to 80%. At follow-up, no data were observed or recorded due to limited opportunities for social interaction in alternate settings.

For Ian, generalization of skills remained at 0% even after the implementation of the intervention (see Figure 1). This rate dramatically increased to 100% by the second generalization session. Due to limited opportunities for social interaction in alternate environments, no data were observed or recorded for Ian at follow-up.

Discussion

A Social Cue Cards intervention showed positive effects in increasing specific social communication skills of the three participants. Immediately following the implementation of the intervention, the participants demonstrated improved rates of the target behaviors compared to baseline performance. For Rob and Ian, a dramatic increase in target behaviors was demonstrated at school. Skills were near or at zero during baseline measurements, and upon implementation of the intervention, these rates reached as high as 100%. Rob and Ian maintained these skills throughout the follow-up phase of the study. For Rob, generalization of these skills in alternate settings was also observed. However, for Ian, no opportunities were present to demonstate maintenance of the generalized skill in alternate settings. This may be in part due to the nature of the target behavior and its consequent effects. Anecdotal reports indicate that once Ian was independently engaging in appropriate defending self behaviors, peers were less likely to approach him and engage in inappropriate commenting or actions that would warrant the opportunity for Ian to practice the skill. Punishing effects of the peers' teasing or inappropriate behaviors towards Ian may have been due to this newly acquired assertive behavior. This is also evident in the play date sessions for Ian at school in which zero opportunities to practice the skill emerged. Anecdotally, play was reported as appropriate and it wasn't necessary for Ian to defend himself toward a peer at any time.

Sammy's data at school demonstrated positive improvement in the targeted skill, however a modification to the intervention was necssary . Anecdotal reports indicated that, although there was a rapid increase of Sammy's peer initiation behaviors, not all of these initiations were appropriate. Anecdotally, it was observed that during one particular, highly preferred board game, many of Sammy's initiations were either rote comments or continuous repetition of the rules of the game to his peers. Because of the decline in appropriate commenting with peers, teacher prompting began to occur. There were also discrepancies between observers' definitions of appropriate and inappropriate comments. To make certain that there were no confounding variables to the treatment effect, intervention modifications (i.e., no board games and no teacher prompting) were implemented. Additional training was also provided to the observers on the response definition to ensure that accurate and reliable data were being recorded. Once intervention procedures were modified, Sammy's rates of behavior continued to increase and were maintained throughout the remainder of the study. A continuous increasing trend for generalization of the targeted skill was also present during the intervention and intervention modification phases; however no opportunities to engage in the target behavior during the follow-up phase were present. Anecdotal reports noted that weather conditions (i.e., rain) interfered with play on the playground. Teachers included longer free play time in the classroom or longer Circle Time activities to account for the time lost on the playground. Since free play time was already the target setting, opportunities for generalization of skills to an alternate setting were unavailable.

When school data were compared to play date data, the two participants' rates of behavior demonstrated very similar effects. Both Rob and Sammy demonstrated an increase in the target behavior

during the intervention phase of play date sessions. For Rob, rates of behavior immediately increased from very low rates during baseline to 100%, which was maintained throughout the remainder of the intervention and follow-up conditions. For Sammy, rates also reached 100% by the end of the intervention phase of play date sessions with maintenance of the target skill also demonstrated at the follow-up phase. It is interesting to note that baseline rates of behavior for both participants were at much higher rates during play date sessions when compared to school sessions. Also for play date sessions, rates during the intervention phase were higher and more immediate than rates demonstrated at school. Due to these higher outcomes, it is hypothesized that play date sessions may provide more opportunities for participants to engage in the target behavior. With more practice during a 1:1 interaction, better outcomes are expected. In addition, play dates sessions are facilitated in a more familiar, structured environment with fewer distractions when compared to school. Since it is more difficult for students with ASD to engage with peers during an unstructured activity with multiple distractions, (e.g., free play) play date sessions may be necessary to incorporate prior to generalization of skills into the school environment.

Social Cue Cards demonstrated adequate treatment integrity and were rated as highly acceptable by teachers. When working in applied settings such as schools, variables such as motivation, teacher time, and feasibility can have significant effect on the success or failure of an intervention (Sansosti & Powell-Smith, 2008). Therefore, evaluating factors affecting treatment integrity and acceptability is pertinent. Results of this study demonstrated positive outcomes of an intervention that is not only quick and easy to implement in the classroom, but is also an effective intervention for increasing social communication skills in children with ASD in naturalistic settings. Anecdotally, teachers reported that the Social Cue Cards did not interfere with classroom routines and were unobtrusive to the learning environment. They perceived the intervention as effective and readily accepted. Consideration of these factors may contribute to the high treatment integrity and intervention acceptability found in this study.

This research demonstrates the potential benefits of using a Social Cue Cards intervention to teach prosocial behaviors to preschool age children with ASD in general education environments. This study has expanded on the current body of research in this area by demonstrating how the combination of visual cues and social scripts are combined with reinforcement contingencies to form a short social story. This study offers the additional support for the importance of reinforcement contingencies to aid in the increase of the target behavior. Studies depicting Social Story efficacy have noted that reinforcement contingencies for engaging in appropriate target behaviors are necessary for some participants (Sansosti & Powell-Smith, 2006; 2008). Specifically, some individuals' behaviors may not be immediately reinforced by peers or adults for practicing the target skill. To account for this, Social Cue Cards have a built in reinforcement contingency that provides additional support in teaching the targeted skill.

There are several limitations of this study. First, the multiple-baseline design was across behaviors and participants. This is unfortunatly difficult to prevent in action-research such as this. Consultants working in the filed in the scientist-practitioner model are limited by the individual deficits of the persons they serve. This was the case in this study. The first author worked as an interventionist and consultant for an educational agency, but was also working within the scientist-practitioner model.And, a scientidst noted that changes in practice may be required for the reasons described above. Thus the participants were selected based on the criteria identified, but also because they were convenient. Furthermore, the critical advance of the intervention was the ease with which the cue cards were made. The ease of construction and usability was then shown across the mutliple baseline design. It's also important to note that the cue cards were made to teach the students pro-active skills; skills that enabled the students to access reinfircement.

Another limitation to this research is the lack of interobserver agreement data. Since interobserver agreement ensures reliable and valid meausurement, it would have been extremely beneficial to obtain interobserver agreement data across all observers in the study. A percentage of agreement could have been calculated across all observers to accurately measure the targeted behaviors and reveal consistency with results. It is important to note for future research that interobserver agreement data should be incorporated to increase confidence that the treatment was implemented with a high degee of integrity.

Another considerable limitation may have been the length of time for the overall study. Although the participants' responses increased over the short course of the study, it is unknown whether these responses would continue to be maintained if the study was lengthened. Given the nature of the disability included in this study, it would be an advantage to increase the length of the study throughout the course of at least one school year to examine how the participants would react to extended breaks or to the increased amount of exposure to the Social Cue Cards. Future research could extend the use of Social Cue Cards throughout the school year or longer to determine if participants maintain the results when exposed to the intervention for a longer time.

In addition to the limitation of time, another limitation of this study relates to the limited data that was available. It is difficult to make definitive claims with regard to skill maintenance since follow-up data occurred only two weeks after the intervention had been systematically faded. And given only 1-2 sessions in which maintenance effects were observed, it is difficult to conclude that each participant's skill would maintain over an extended period of time. Again, future research may evaluate the effects of intervention and maintenance over extended time periods.

Although there is a clear experimental effect for Social Cue Cards that is replicated across the three participants, there is still uncertainty in regards to the overall qualitative improvement of the particpants' communication skills. It was noted in this study that Sammy engaged in inppropriate commenting during game playing with peers. Although these were independent peer initiations, they were inappropriate and not readily accepted by peers. In addition, anecdotal reports suggest that the participants may have approached peers at inappropriate times which caused peers to decline or ignore the initiations. And, although participants were observed as engaging in the target behavior, at times they expressed inappropriate volume, tone, or rate within their interactions. Thus, future research in this area may be strengthened by including data collection regarding appropriateness or inappropriateness of engaging in the behaviors targeted with Social Cue Cards.

Additionally, this study would have been strengthened from the use of supports such as child confederates or contrived social opportunities to practice the target skill. Although peer play dates were made available to the participants, peer training could have been implemented to teach the peers to respond appropriately to the participants' behaviors. That is, when the particpants initiated play or attention, the confederates would be prompted to engage in the activity with them or respond appropriately. In addition, more contrived social opportunities could have been implemented to practice the target skills. For example, when practicing a skill such as *defending self*, opportunities are not always available. By contriving situations in which only one toy is available with a group of children or children have to take turns with a game or toy could have been contrived to increase the opportunities for practicing the difficult skill.

Finally, the findings in this study implicate further research in regards to play date sessions. Since play date sessions occurred simultaneously with the school sessions, it is difficult to ascertain whether the play date sessions promoted any generalization effects into the school environment or vice versa. Future research could study the effects of Social Cue Cards on targeted skills during play date sessions alone and then attempt to generalize these skills into the school environment. Anecdotal reports also indicated an

increased level of play and conversation at school with peers that were participating in the play date sessions at home. This could be due to a history of reinforcement that may have been established during the 1:1 interactions in the more structured environment. It would also be ideal to investigate carry-over effects from the play date sessions at home to sessions at school specifically with the one play date peer. Overall, this study evaluated the effects of Social Cue Cards for three preschool age children with ASD. This study demonstrated that the use of Social Cue Cards can increase social communication skills for children with ASD. Results of this research support previous findings with regard to the use of Social Story interventions, socia l script procedures and visual cues for children with ASD, but the use of Social Cue Cards was recognized as a less invasive and less distracting intervention to be used in the classroom. Social Cue Cards proved valuable to teachers by demonstrating how a simple social skills intervention could be easily implemented in the classroom with minimal materials, time, and effort. This research contributes to and extends previous research on social skills interventions for children with ASD and adds evidence that Social Cue Cards may be a beneficial intervention for children with ASD in the general education environment. This information should be used to assist with the development of such interventions as well as provide the foundation for future research.

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