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The effect of social stories and peer video modeling to increase social pragmatics in children with autism

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The Effect of Social Stories and Peer Video Modeling to Increase Social Pragmatics

in Children with Autism

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Abstract

The purpose of the present study was to evaluate the use of social stories alone and social stories combined with peer video modeling to teach social pragmatic skills including eye contact, conventional gestures, and appropriate verbalizations to two young children with autism. First, social stories were used alone. The participant read a story designed for a specific behavior to be targeted. Then, social stories were combined with peer video modeling. A video displaying the specific behavior was viewed followed by the social story. Mastery criteria were met when social stories were combined with video modeling for eye contact. In the context of conventional gestures, mastery criteria were met when social stories were presented alone. During baseline, mastery criteria were met for appropriate verbalizations. These findings suggest that social stories alone as well as social stories combined with video modeling, were effective tools for teaching social pragmatic skills.

The Effect of Social Stories and Video Modeling to Increase Social Pragmatics in Children with

Autism

Introduction

Children typically develop pretend play skills in their early, preschool age years.

Children often act out what they know about the world in the context of independent as well as

cooperative pretend play. Many children with developmental disabilities, such as autism, have

little interest in social skills and social communication. The likelihood of spontaneous or

incidental learning of pretend play skills or social skills in the natural environment with peers is

reduced. Particularly, in a public school environment, children with these deficits have difficulty

finding and maintaining friendships. Activities such as snack and lunch time, recess, and

specials (i.e., art, music, physical education, library) are troublesome and can become aversive to

the individual. Teachers do often try to assist these students by providing prompting and verbal

cues, but this can be unfavorable as students may come to rely on the prompts rather than

learning the skills (Krantz & McClannahan, 1998). Having to receive such prompts for social

pragmatics contributes to the social stigma students with autism encounter due to their disorder..

A variety of strategies targeting deficits in social pragmatics for children with autism

have been researched and developed. Video modeling and social stories are two procedures that

have been studied. Each method uses a different means of instruction to target specific social

pragmatic skills.

Video modeling is a teaching procedure that is used to teach children with autism a variety of skills. Typically, a recorded model is presented representing the skills the child is to learn. The model is shown two to three times and the child's performance of target behavior is the dependent variable. Video modeling has been an effective means of teaching a variety of social skills and conversation skills to children with autism. Another effective intervention for children with autism is the use of social stories. Social stories are stories describing a challenging situation and are specifically designed for each individual. Stories are broken down into understandable steps. The stories are highly descriptive and irrelevant information is not included to ensure the point of the story is made clear. Social stories answer questions involving social situations through the use of visuals as well as written text. Important cues involved in social stories include: taking another's point of view, following rules, routines, and events, behavioral expectations, and difficult or abstract concepts.

Video Modeling and Social Skills

Research has shown the effectiveness of video modeling to increase a variety of skills to children with autism and other developmental disabilities. Charlop-Christy, Le, and Freeman (2000) compared the use of video modeling and in-vivo modeling to increase the target behavior of children with autism. The authors evaluated the comparison of the two types of modeling across different tasks, children, and settings. During the video modeling condition, no prompting and no tangible rewards for correct responses were given. After two presentations of the video, the student was tested on acquisition of the target behavior. During the in-vivo modeling condition everything was the same except the students watched live models, rather than a recording, two times and were then tested on acquisition of the target behavior. The authors also evaluated time and cost efficiency of each modeling type. The overall results indicated that

video modeling led to faster acquisition of skills as opposed to in-vivo modeling. The time to train models and to implement the in-vivo modeling condition, as well as the cost, was higher than the amount for the video modeling condition.

Conversation and communication is an enormous deficit across children on the autism spectrum. The effectiveness of video modeling in the acquisition, generalization and maintenance of conversational skills has been examined as well. Charlop and Milstein (1989) assessed four main areas: (a) the effects of video modeling on acquisition of conversation skills, (b) generalization of these skills across people, settings, stimuli and topics of conversation, (c) maintenance of treatment improvements, and (d) changes in the children's speech spontaneity. All three of the participants gained conversational speech after video modeling. Even more notable, the participants' conversational skills generalized during probe sessions. Follow-up probes conducted up to 15 months after acquisition of video modeled conversations demonstrated maintenance for all participants. Spontaneous responding also increased for all participants in the study. The authors also noted that each participant in the study rapidly learned the skills, and hypothesized that this rapid learning was due to the excellent rote memory many children with autism encompass, as well as the children's tendency to echolalically repeat verbalizations.

Sherer, Pierce, Paredes, Kisacky, Ingersoll, and Schribman (2001), amongst other investigations, compared the effectiveness of self versus other as a model when using video as an intervention. Questions were designed for each participant, eight questions for the self-as-model condition, and eight questions for the other-as-model condition. Return responses were also included. Two videotapes were created for each participant: another-videotape and a self-videotape. The results of the investigation suggested that using other as a model is equally

effective as using self as a model.

Video modeling has been used with more complex behaviors to complete sequences of activities previously learned. Nikopoulos and Keenan (2007) designed two experiments looking at (a) video modeling's effect on building a sequence of social behaviors, (b) if history of imitation through video is a necessary prerequisite, (c) if increases in reciprocal play made easier when social initiation has occurred, and (d) generalization and maintenance of the target behavior change. Video modeling was successful in building a sequence of social behaviors in all participants. The authors note the significance involving memory issues. Independent of how much time the participants played, they performed all subsequent behaviors in the absence of any prompts. Responding also generalized across peers and was maintained after 1- and 2-month follow-up periods.

The research done by the previous authors and many others has shown that video modeling is an effective tool to teach children social skills using self as well as others as a model.

Video Modeling and Play Skills

Research has also shown the effectiveness of video modeling in the context of play skills. Children with autism often do not develop the same pretend play repertoires, as do typically developing children. MacDonald, Clark, Garrigan, and Vangala (2005) used video modeling to teach young children with autism to engage with toy sets using longer sequences of actions and verbal narrations. Data sheets were individually developed according to each play set and had sections for motor actions completed and for verbal statements completed. The children participating in the study watched the video model two times and then were immediately directed to play with the items. Participants acquired longer sequences of scripted play. The participants

not only had rapid acquisition of the play actions and vocals, but they also maintained these routines over time. The authors suggest that future strategies should focus on unscripted appropriate play in children with autism.

In 2009, MacDonald, Sacramone, Mansfield, Wiltz, and Ahearn used video modeling to teach reciprocal pretend play with typically developing peers. Adults were used as models in the videotape. Each child with autism was paired with a typically developing child. Results demonstrated that children with autism and typically developed peers acquired the scripted sequences of verbalizations and play actions quickly as well as maintained the skills in follow up probs.

Research accomplished by the previous authors as well as many others has shown video modeling to be an effective means of teaching play skills. Through video modeling children have learned small to larger sequences of play.

Peer Video Models

In much of the prior research adults were used as models in the video-taped segments. However research has shown that peers have also been effective as video models. Taylor, Levin, and Jasper (1999) used video modeling between siblings and an adult. In the video, the sibling and the adult commented while they were engaged with toys. The comments were formed from the script created for each participant. The participant practiced with the adult after viewing the video, and play related statements were reinforced with preferred tangible items. Scripted comments improved for both participants in the study.

Reagon, Higbee, and Endicott (2006) taught a four-year-old boy with autism and his older brother to engage in pretend play scenarios using video modeling. The older brother and a typically developing peer were used as the subjects of the video model. The participant was

presented four play scenarios. The scenarios were taught in sets of two. The first set was a firefighter and a cowboy, and the second set, introduced one-month later, was a doctor and a teacher. The participant and his sibling watched the video model and immediately following were instructed to go play. Follow up sessions were also conducted with a different sibling and the participant's mother. All participants demonstrated an increase in verbal commenting during play activities as well as maintenance and generalization through follow up sessions.

Children have learned social initiation and reciprocal play with their peers through the use of video modeling. Nikopoulos and Keenan (2004) assessed three children's social initiations and reciprocal play with their peers. During baseline the children had no instances of social initiation and decreasing reciprocal play across sessions. The implementation of video modeling increased social initiation and reciprocal play across all three individuals. These skills were also maintained at 1- and 3- month follow-up sessions.

As demonstrated in the previously mentioned research, using peers as a video model is an effective way to teach a new skill. Using peers as a model is also an excellent tool to teach social skills amongst similar peers.

Social Stories

The use of social stories and social sequences has also been shown effective in learning social communication behavior amongst children with developmental disabilities. Social stories are short stories, individualized to the target person, that describe an event, concept, or social skill using an arrangement meaningful for someone with developmental disabilities (Gray, 1994, 2000). Anyone who works, lives, or interacts regularly with the targeted child can write a social story. Social stories can be written for many topics including, but not limited to: emotions, social skills, going out in the community, and rules. A social story itself, as a material, deciphers social

information into text and pictures. The desired result includes a better understanding of the specific topic. Carol Gray developed The Original Social Story Book in 1993 and The New Social Story Book in 2000. Both of her books entail dozens of social stories as well as directions on how to write a social story. The social stories are typically written in the first person. In her book, Gray (1994,2000) also provides a "Social Story Checklist" which anyone can use as a basis in writing their own social story.

Chan and O'Reilly (2008) examined the use of a social stories intervention package on the social communication behaviors of two students with autism. The participants obtained the Social Story package on an individual basis, one to four times per week. The participants read only stories that were related to their particular target behavior. The participant was first instructed to read the story. The instructor then asked three questions, testing for comprehension. The last step was a role-play of the story involving the instructor and the participant. The first participant had an immediate decrease in inappropriate social interaction when the intervention was put into place, and maintained levels during follow-up. This participant also had an immediate increase in raising hand opportunities and a decrease in inappropriate vocalizations. The second participant had an immediate increase in opportunities of raising hand and social interactions. This participant also had results of a decreasing trend in inappropriate vocalizations.

In the study most similar to the present, in order to improve the social pragmatic skills of young boy with developmental disabilities, Scattone (2008) combined social stories with video modeling. The treatment consisted of two parts. The first part of the treatment was for the participant to observe videotaped social stories that involved two adults modeling the targeted conversational skills. The target skills included eye contact, smiling, and initiations. The first

social story focused on eye contact, the second social story focused on eye contact and smiling, and the third story focused on eye contact, smiling, and initiations. After the videotape was presented to the participant, he was then tested on comprehension of the videotape via predetermined questions of which the participant answered with 100% accuracy. The second part of the treatment were 5-min social interaction sessions. Smiling was a difficult skill to master for the participant, but during the generalization probe at school smiling improved moderately from the clinical baseline. Nonetheless, the results indicated that social stories combined with video modeling increased the social pragmatic skills of the participant.

Research Question

The purpose of the present study is to evaluate the use of social stories alone and social stories combined with peer video modeling to teach social pragmatic skills including eye contact, initiations, and conventional gestures to two young children with autism.

Method

Participants

Two students participated in the study. Dennis was 7 years old, in the 2nd grade, and Marie was 9 years old, in the 4th grade. Both children had a diagnosis of autism and were considered high functioning. Both children attended their district public school and had placements in their general education classroom as well as a special education classroom designed for children with autism.

Dennis participated for five hours of his school day in the regular education inclusion setting with one-to-one support from a trained tutor. For one hour a day Dennis spent time in the special education classroom away from distractions. Dennis's communication skills were moderate as compared to other children of his age group. He communicated vocally, using one

to two word statements, as well as full sentences. His sentence usage and pragmatics needed prompting from his tutor in order to interact with his peers effectively. Dennis did engage in vocal stereotypy throughout the day, which interrupted activities in and out of the inclusion setting, as well as challenged his social pragmatic skills.

Marie spent about 5 hours a day in her special education classroom and one hour a day in the general education setting. Her inclusion time included lunch, recess, and attending specials (i.e., music, art, physical education, and library) as well as any community events occurring in the school on a given day. Marie communicated vocally and had similar deficits to Dennis in her social pragmatic skills. She communicated with one or two statements, and used full sentences when given a prompt to do so. Marie also had a trained tutor with her throughout the day who helped her with her academics and encouraged her interaction with her peers from the general education setting.

Social pragmatics was targeted on both participant's Individualized Education Program (IEP). Both students also had previous success using social stories and/or video modeling to modify behavior.

Three peers from each student's general education classroom also participated in the study as peer models and conversational partners. Dennis's peers were 7 - 8 years old, in the second grade, and Marie's peers were 9 – 10 years old, in the fourth grade. The peers were chosen by the teacher because they had showed an interest in helping the students and were known to include the students during school and social activities. These peers were given video release forms that needed to be signed by their parent or guardian in order to participate. The peers were also the models used in the videos of each target behavior. At the end of the

experiment the peers were rewarded with a lunch party and small gifts provided by the author of the study.

Setting and Materials

This study was conducted during each student's separate lunch times. The student's participated in a social skills group called "Lunch Bunch" with peer models from their classroom. Lunch lasted for 20-min and sessions were recorded for five of the 20 minutes. The "Lunch Bunch" took place in the child's general education classroom while the rest of the students ate their lunch in the cafeteria. The students sat at a round table with their peers sitting around them. The teacher conducting the session sat in close proximity to the table, but did not interrupt or provide prompting during any of the sessions. A generalization probe was recorded during baseline in the schools art room.

Materials consisted of a video camera, timer, three social stories, and the peer video model.

Social Stories. The social stories were printed in color and located in a three ring binder. They consisted of a 9-10 page explanation of each target behavior. Each page had a picture of the student and/or the student's peer partaking in the target behavior. Each page had one sentence below the picture. The student read the story two times and then answered three comprehension questions. See Appendixes A, B, and C for complete social stories and comprehension questions.

Peer Video Model. The peer video model shown included only the student's peers partaking in a three minute long conversation about relevant topics such as recess, sports, weekend plans, movies, and music. Each student was given a cue card. The card had the behavior being targeted listed at the very top in bold letters. Underneath there were three topics to discuss, one for each student. Underneath the topic were examples of what to talk about when

discussing the topic listed above. The students sat at the round table without the participant during the lunch period. After the students practiced their conversation enough times, the teacher filmed the students engaging in the target behavior. The teacher set the timer for 45-s. Upon the last 5-s the teacher held a hand up where the students could see and then pointed at them as a cue to switch topics and restarted the timer. The teacher repeated this until the video was completed. See Table 1 for an example of a video model cue card.

Dependent Variables

The three target skills included were eye contact, conventional gestures, and appropriate verbalizations. Eye contact was defined as looking at the conversational partner for at least 1 s and no longer than 30 s. The student's eyes had to be focused directly on the conversational partner and his head oriented in the direction of the partner. Examples included sitting next to the conversational partner with head directed towards the partner and eye contact maintained for longer than 1 s. Non examples included sitting next to the peer with head and eyes directed at the table or irrelevant peer instead of the conversational partner for longer than 1 s.

Conventional gestures were defined as any appropriate movement of the hand, head, or body in relation to what the student was speaking of during the conversation. Examples included shaking of the head up and down when agreeing with a statement or saying "yes" to a statement. Putting hands up in the air while saying or to suggest saying "I don't know" is another example. Non-examples included shaking hands in the air wildly or shaking of the head back and forth while another peer is talking about what they are having for lunch.

Appropriate verbalizations were defined as any unprompted question or statement relevant to the conversational topic and directed at the conversational partner. Examples included, "Are you going to play four-square or soccer today?" or "I really like to play that game

too!" when referring to what they will do at recess. Non-examples included "Can I look at your shoes?" or "We don't touch other peoples clothes", when referring to what they will do at recess.

Measurement and Interobserver Agreement

Data on social pragmatics were collected during a 5-min observational period 2-3 times a week per student. Data were collected using partial interval recording for each target behavior. Data were summarized as percentage of intervals. Teachers used a stopwatch to cue every 10-s interval. Teachers also recorded the occurrence or non-occurrence of the target behaviors using paper and pencil on a specifically designed data sheet for each 10-s interval in the 5-min session.

Interobserver agreement (IOA) was measured by assessing the level of agreement and disagreement for the occurrences of the target behaviors. Percentages of interobserver agreement were calculated by dividing the number of agreements over the total number of agreements and disagreements and multiplying by 100. Agreement was defined as occasions when the two observers agreed the target behavior occurred in the 10 s interval. Disagreement was defined as occasions when one observer recorded an occurrence and the other observer recorded a non-occurrence in a 10 s interval.

IOA was assessed in approximately 33% of observations. For Dennis, the mean level of IOA for eye contact was 95% (range = 76 - 100), for conventional gestures was 97% (range = 93 - 100), and for appropriate verbalizations was 90% (range = 60 - 100). For Marie, the mean level of IOA for eye contact was 92% (range = 70 - 100), for conventional gestures was 96% (range = 77 - 100), and for appropriate verbalizations was 89% (range = 70 - 100).

Procedure

Sessions were 5-min long conversations that took place during the 20-min lunch period. They were run two to three times per week per student. "Lunch Bunch" was with 2-3 typical peers from the students' general education classroom. The conversational topics were picked by the student and their peers (i.e., the conversational partners).

Baseline. During the baseline condition, conversations took place without the use of social stories or social stories combined with peer video modeling. The teacher sat off to the side and did work on the computer so as not to interfere with the conversations taking place among the students. The occurrences of the target behavior were recorded during each session.

Social Stories Alone. Social stories were first introduced to the student alone without any video modeling. Before each "Lunch Bunch" began, the student read the social story aloud with the teacher two times. After reading the story was completed, the student was asked three comprehension questions related to the specific story to review what was read (see Appendix 1). If the student did not answer the question correctly he or she was prompted the correct answer with a full verbal model. Following the social story the child entered "Lunch Bunch" with his or her peers and the 5-min recorded session began. Data were collected at a later time through the use of the recording from the video camera present during each session.

Social Stories with Peer Video Modeling. Social stories were combined with video modeling in the second experimental condition. At the beginning of the video, the social story was displayed and narrated by the teacher. Following the narration, the student's peers modeled the target skills during a 3-min video taped conversation. Once the student completed watching the video they were again asked three comprehension questions related to what they had viewed. If the student answered the question incorrectly the same procedure as the first condition was

provided (i.e., a full verbal model of the correct answer). After the video was viewed and questions were answered the child entered "Lunch Bunch" with his or her peers and the 5-min recorded session began. Data were collected at a later time through the use of the recording from the video camera.

  Mastery Probes. Mastery criteria was based on the average occurrence of each target behavior in a video taped conversation of the student's peers alone during lunch time. Dennis's mastery criteria for eye contact was 80%, 30% for conventional gestures, and 50% for appropriate verbalizations. Marie's mastery criteria for eye contact was 80%, 25% for conventional gestures, and 50% for appropriate verbalizations. Once the student met mastery criteria for the target behavior, two mastery probes were conducted. Each mastery probe was run the same way baseline was run. Conversations took place without the use of social stories or social stories combined with video modeling.   Data were collected at a later time through the use of the recording from the video camera.

  One last mastery probe was conducted to measure generalization. The students sat in their regular cafeteria setting with the same typical peers from "Lunch Bunch". At this time the rest of their peers were also in the cafeteria eating their lunch. The teacher sat to the side and collected in-vivo data during this time.

Experimental Design

  A multiple baseline across behaviors was used to assess effectiveness of the interventions-- social stories and social stories plus video modeling. Baseline data were collected simultaneously for all target behaviors. Social stories were introduced in a staggered fashion beginning with eye contact, and then systematically applied to conventional gestures, and then appropriate verbalizations.

Results

Dennis. Figure 1 depicts Dennis's data throughout the study. The mean level of eye contact during baseline for Dennis was 15% of intervals (range = 10 – 23), 36% (range = 10 - 66) during intervention with social stories alone, and 66% (range = 50 – 87) during intervention of social stories combined with video modeling. During probe sessions Dennis demonstrated eye contact during 80% and 80% of each session. Dennis's mean eye contact during maintenance was 91% (range = 73 – 100). A generalization probe was conducted in the children's cafeteria during their regular lunch shift. Dennis maintained eye contact during this probe in 86% of opportunities.

The mean level of conventional gestures during baseline was 9% of intervals (range = 0 – 20), and 29% (range = 10 – 43) during intervention with social stories alone. Dennis met mastery criteria for conventional gestures during the social stories alone phase and it was not necessary to move on the social stories combined with video modeling. During probe sessions Dennis demonstrated the use of conventional gestures during 63% and 67% of each session. Dennis's mean use of conventional gestures during maintenance sessions was 53% (range = 53). Dennis demonstrated conventional gestures in 40% of opportunities during the generalization probe conducted in the cafeteria.

The mean level of appropriate verbalizations during baseline was 56% of intervals (range = 10 - 97). Dennis met mastery criteria for appropriate verbalizations during the baseline phase of the study, therefore it was not necessary to train this behavior. During maintenance sessions Dennis demonstrated appropriate verbalizations in 74% of intervals (range = 60 -83). Dennis demonstrated appropriate verbalizations in 76% of
 opportunities during the generalization probe conducted in the cafeteria.

Dennis's typical peer's range of performance for each behavior is shaded in grey. A split middle line of performance was calculated for each behavior as well to better show experimental control throughout the study (i.e., dotted lines).

Marie. Figure 2 depicts Marie's data through out the study. The mean level of eye contact during baseline for Marie was 18% of intervals (range = 13 – 30), 44% (range = 33 - 53) during intervention with social stories alone, and 73% (range = 46 – 93) during intervention of social stories combined with video modeling. During probe sessions Marie demonstrated eye contact during 87% and 93% of each session. Marie's mean eye contact during maintenance sessions was 95% (range = 83 – 100). A generalization probe was conducted in the children's cafeteria during their regular lunch shift. Marie maintained eye contact during this probe in 100% of opportunities.

The mean level of conventional gestures during baseline was 12% of intervals (range = 0 – 30), and 39% (range = 20 – 57) during intervention with social stories alone. Marie met mastery criteria for conventional gestures during the social stories alone phase and it was not necessary to move on to social stories combined with video modeling. During probe sessions Marie demonstrated the use of conventional gestures during 53% and 60% of each session. Marie's mean use of conventional gestures during maintenance was 52% (range = 47 - 57). Marie demonstrated conventional gestures in 43% of opportunities during the generalization probe conducted in the cafeteria.

The mean level of appropriate verbalizations during baseline was 38% of intervals (range = 3 - 80). Marie met mastery criteria for appropriate verbalizations during the baseline phase of the study, therefore it was not necessary to train this behavior. During maintenance sessions Marie demonstrated appropriate verbalizations in 77% of intervals (range = 67 - 83). Marie

demonstrated appropriate verbalizations in 63% of opportunities during the generalization probe conducted in the cafeteria.

Marie's typical peer's range of performance for each behavior is shaded in grey. A split middle line of progress was calculated for each behavior as well to better show experimental control throughout the study (i.e., dotted lines).

Discussion

Social stories alone and social stories combined with video modeling both proved to be effective treatments to increase the social pragmatic skills of two young children with autism. For each participant, the percentage of intervals of eye contact that took place for social stories alone increased when compared to baseline, and then further increased when social stories were combined with video modeling. High levels of eye contact were maintained for the remainder of the study once training was complete. For both participants, the percentage of intervals that conventional gestures took place for social stories alone increased when compared to baseline, and conventional gestures were maintained at high levels for the remainder of the study once training was complete. Training was not necessary for appropriate verbalizations. As eye contact and conventional gestures increased in rate, appropriate verbalizations increased as well without ever being trained. Replication was demonstrated across participants.

The present study replicated the results found by Scattone (2008) in which social stories with video modeling increased the social pragmatic skills (i.e., eye contact and initiation) of a young boy with Aspergers. Just as the Scattone (2008) study demonstrated that social stories combined with video modeling was an effective means to increase the rates of eye contact, the present study demonstrated the same for both participants. The present study also replicated results found by Chan and O'Reilly (2008) by showing that social stories followed by

comprehension questions (with out the additional use of a video model) were an effective method for increasing target social pragmatic skills during a conversation.

It was not necessary to use social stories combined with video modeling for conventional gestures and appropriate verbalizations because mastery criteria was met through social stories alone or during baseline. Social stories alone for eye contact resulted in an increasing trend for each participant. When peer video modeling was added the trend accelerated. It is unclear if the participants would have eventually achieved mastery criteria if peer video modeling had not been put into place and the study had continued with social stories alone.

It was observed for both participants that as their level of eye contact increased, so did their level of appropriate verbalizations. When the participants made eye contact with their peers they almost always initiated or responded to that peer as opposed to when they were not making eye contact. It is possible that peer eye contact could have acquired stimulus control over the participants' behavior. Observations have been made in previous literature that one intervention, as in Ahearn et al.'s (2007) study using response interruption and redirection (RIRD), can increase levels of another behavior without it being trained, such as appropriate verbalizations. Koegel et al. (1974) also observed this finding when they blocked stereotypy and observed an increase in appropriate play skills without training.

There were several limitations to this study. First, only two students were available to serve as participants in the study. Other student's available did not meet criteria. Although findings were replicated across the two participants, future research should examine the effects of these interventions using a larger number and possibly across settings.

Second, the participants had conversations with the same 3-4 students throughout the school year. Future research may find it valuable to use different peers throughout different

sessions. Future research may also find it important to collect social validity data before and after the study is completed. It would also be interesting to collect data on inappropriate target behavior as compared to appropriate. For example if the student is making eye contact for longer than 30-s, we would typically refer to it as staring at their peer. Another example would be waving their hands around when trying to use their body in the context of a conventional gesture. It would be interesting to observe if inappropriate occurrences increased along with the appropriate occurrences of the target behavior.

One last limitation to the study was the amount of time it took to complete. Training eye contact for both participants proved to be a longer process than anticipated. Using typical peers in a study meant that time to conduct sessions could only happen when there was school, when the participants were present for school, and during the 180 days of the school year only. Also certain days of the school year are half-days where the students do not eat lunch at school and therefore sessions could not be run on those days. Future research may want to time manage more efficiently so that generalization probes could be run during the regular school year in different settings with different peers.

Another observation important to note during the study was that the typical peers for both participants may have acted as in-vivo models to the participants. During some sessions, the typical peers overheard the social story being read to the participant. The typical peers also practiced the target skills with the teacher in order to film the video model. Once the typical peers understood the behavior targeted they emitted these behaviors on a larger scale then they typically would during a regular lunch period. Therefore the peers may have acted as cues for the participant to emit the target behavior.

In conclusion, social stories alone as well as social stories combined with peer video modeling were both effective interventions for increasing the social pragmatic skills of two children with autism when engaged with their peers.

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Appendix A.

Eye Contact Social Story and Comprehension Questions

My name is X. I like to talk to my friends! I talk to my friends on the playground, in the cafeteria and at Lunch Bunch! When my friends talk to me I look at them so that they know I can hear them. When I talk to my friends I look at them so that they know I am talking to them. My friends look at me too. Looking at my friends face during a conversation lets them know I am listening. Looking at my friends face during a conversatoin lets them know that I like talking to them. I will always look at my friends face when we have a conversation!

Comprehension Questions:

Why should you look at your friends face?

What does looking at your friends face during a conversation let them know?

What should you always do when you have a conversatoin?

Appendix B.

Conventional Gestures Social Story and Comprehension Questions

My name is X. I like to talk to my friends! I talk to my friends on the playground, in the cafeteria and at Lunch Bunch! Sometimes when I talk to my friends I move my body. If I'm saying yes, I move my head up and down. If I'm saying no, I move my head side to side.   If we are having an exciting conversation I might use by body to show how excited I am! If I don't know something, I can use my hands to show it. I can use my hands when I talk for a lot of things like pointing to what I am talking about. When I have a conversation, using my body is a great way to show my friends what I am talking about!

Comprehension Questions:

How can you show your friends your saying "yes" or "no" by using your body?

How else can you use your body when you are having a conversation with your friends?

What is a great way to show your friends what you are talking about when you are having a conversation?

Appendix C.

Appropriate Verbalizations Social Story and Comprehension Questions

My name is X. I like to talk to my friends! I talk to my friends on the playground, in the cafeteria and at Lunch Bunch! My friends talk to me about a lot of different things like recess, the weekends, and what they are doing after school. I can talk to my friends about the same things! I can tell my friends where I am going on the weekend with my family or what toys and games I am going to play when I get home from school. I can tell my friends about my favorite sports, colors, music, and movies too. If my friends ask me a question, I should answer their questions the right way. If I didn't hear them I can say "please say that again". Or if I don't undersatnd, I can say "I don't know". When I'm with my friends talking to them is very important and it is fun too!

Comprehension Questions:

What are some things me and my friends could talk about?

What should I do when my friend asks me a question?

If I dont understand a question what can I say to my friend?

Table 1.

Example Cue Card

EYE CONTACT
Favorite kind of music? - Songs and singers - Dancing to music - Words to songs
Favorite movie? - Favorite part - Favorite character - What other movies do you want to see
What are you doing on the weekend? - Family time - Playing with friends - Special activity/going away somewhere

Figure Captions

Figure 1. Data represents the percentage of intervals eye contact, conventional gestures, and appropriate verbalizations occurred for Dennis. Closed data points represent sessions conducted in the typical classroom and open data points represent sessions conducted in a generalization setting. The shaded area represents the average range typical peers emitted the behavior. Split middle lines of progress (i.e., dotted lines) were drawn to better represent the trend of intervention phases.

Figure 2. Data represents the percentage of intervals eye contact, conventional gestures, and appropriate verbalizations occurred for Marie. Closed data points represent sessions conducted in the typical classroom and open data points represent sessions conducted in a generalization setting. The shaded area represents the average range typical peers emitted the behavior. Split middle lines of progress (i.e., dotted lines) were drawn to better represent the trend of intervention phases..
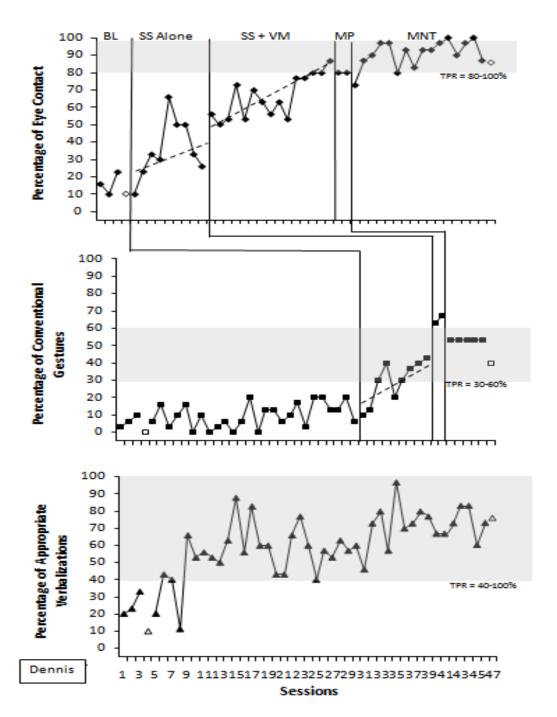
Figure 1.

Figure 2.