

Teaching Two Students with Asperger Syndrome to Greet Adults Using Social Stories™ and Video Modeling

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Abstract We evaluated the effects of Social Stories™ and video modeling for teaching two students with Asperger syndrome to greet school staff. A Social Story™ describing how to greet teaching staff and other adults at school was introduced across participants in a multiple-baseline design. After the students demonstrated they had learned to make a simple greeting (e.g., Hi), video modeling was introduced to teach them to produce a more complex greeting (e.g., Hello. How are you?). The two students learned to greet teachers and researchers, but they did not consistently use the more complex greeting response with the teachers. The results suggest that the Social Stories™ and video modeling interventions were moderately effective in teaching the targeted greeting responses.

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Introduction

Autism spectrum disorder (ASD) is characterized by pervasive social skills deficits that may impair the ability to interact with others (American Psychiatric Association 2000; Church et al. 2000; Fodstad, Matson, Hess, and Neal 2009). Some individuals with ASD have appropriate language and cognitive abilities, but may not possess the skills necessary to participate in social situations and understand the social norms and expectations that govern interactions with others (Attwood 2007). Typical deficits include an absence of appropriate greeting behavior and failure to acknowledge the presence of a familiar person (Hobson and Lee 1998). Such deficits in social greeting appear to be common among individuals with Asperger syndrome, which is currently included as one type of ASD (Attwood 2007).

Because of such deficits, children with ASD may benefit from intervention aimed at teaching appropriate social initiations, such as greeting responses (Church et al. 2000). However, even when social initiations are taught, individuals with ASD often do not engage in ongoing or more complex social interactions such as greeting followed by initiating a conversation (American Psychiatric Association 2000). Failure to initiate and subsequently maintain social interactions likely increases the risk of social isolation and peer rejection (Bellini et al. 2007a; Bellini et al. 2007b; Matson et al. 2009). Thus there is a need to develop these types of social skills in children with ASD to promote their social inclusion (Bellini et al. 2007a, 2007b; Church et al. 2000).

Along these lines, Social Story™ is a promising strategy that has been used to teach social skills to individuals with ASD (Matson et al. 2007; Reynhout and Carter 2006). A Social Story™ intervention involves creating brief stories that describe social situations and what others are thinking or feeling and how to behave in the specific situation. As part of describing how to behave, a good social story would also highlight what social cues the person should look for and how to respond to others (Gray 1998). Previous studies examining the effectiveness of Social Story™ interventions have yielded varying results, but overall, Social Stories™ appear to have a positive effect (Reynhout and Carter 2006; Sansosti et al. 2004). Social Story™ interventions have targeted a range of skills including initiating verbal greetings (Reichow and Sabornie 2009), initiating and responding to interactions (Scattone et al. 2006), and maintaining appropriate social engagement (Delano and Snell 2006; Sansosti and Powell-Smith 2006).

Another strategy that has been used to teach social skills to people with ASD is video modeling (Shukla-Mehta et al. 2010). Video modeling entails showing the participant a video segment demonstrating how to perform a task or behavior. The participant is expected to learn by observing the instructional video segment and repeating the modeled behavior (Bellini and Akullian 2007; Lang et al. 2009). Video modeling has numerous potential advantages over traditional teaching methods. For example, video modeling has been shown to result in the efficient acquisition and generalization of skills (Charlop-Christy et al. 2000; Sigafos et al. 2007). Video modeling has been

effectively applied to teach a variety of social skills including social initiation (Nikopoulos and Keenan 2003), social language in play situations (Maione and Miranda 2006), social engagement (Bellini et al. 2007a, 2007b), and expressive behaviors, such as intonation and facial expressions (Charlop et al. 2010). Video modeling has traditionally been delivered on televisions and computers, but more recently portable devices like laptops and iPods® have been employed because they afford greater flexibility for intervention delivery due to their small size and ease with which they can be transported to different settings. For example, iPods® have been successfully used to deliver video modeling interventions to students with developmental disabilities (Cihak, Fahrenkrog, Ayres, and Smith 2010; Kagohara 2011; Kagohara et al. 2011).

While both Social Stories™ and video modeling have been shown to be individually effective, there is emerging evidence that these two procedures can be successfully combined to teach social skills to individuals with ASD. Sansosti and Powell-Smith (2008), for example, examined the use of a computer-presented Social Story™ and video modeling package to teach social skills to children with high-functioning autism and Asperger syndrome. Similarly, Scattone (2008) combined a Social Story™ intervention with a video modeling procedure to successfully enhance the conversation skills of a boy with Asperger syndrome. The results of these two studies suggested that the combined use of these procedures was successful in teaching participants with ASD. However, because the Social Stories™ and video modeling procedures were implemented simultaneously, it is not possible to ascertain if these procedures would have been effective if used separately or sequentially.

The present study aimed to extend research on the combined use of Social Stories™ and video modeling. These two interventions were applied sequentially to examine if two students with Asperger syndrome could (a) learn to greet adults in the morning using a Social Story™ intervention and then (b) extend the greeting to create an opportunity for further conversation using a video modeling intervention.

Method

Ethical Clearance and Informed Consent

The relevant university ethics committee approved the study and parental consent was obtained for the students' participation.

Participants

The two participants, Jane and Peter, attended the same school classroom in which 25 students were included. The teacher was responsible for general lessons to all students, while Jane and Peter had additional assistance from a teacher aide. Once a week, a substitute teacher taught their class. The teacher reported that the two students did not greet or acknowledge the teaching staff or other adults at the school. Their teacher believed it would be appropriate and desirable for them to learn to greet familiar adults at school in order to promote greater socialization and enhance their communication skills.

Jane was a 10-year-old girl with a diagnosis of Asperger syndrome and Attention Deficit Hyperactivity Disorder (ADHD). She was taking medication for ADHD and could attend to tasks when supervised. Results from the Vineland II (Sparrow et al. 2005) indicated a moderately low adaptive level. Specifically, her age equivalencies on the *Receptive*, *Expressive*, and *Written* communication subdomains were 2:11, 5:6, and 8:0 (years:months). Her age equivalencies with respect to *Interpersonal Relationships*, *Play and Leisure Time*, and *Coping Skills* were 5:11, 6:7, and 7:6. She could engage in simple conversations about daily activities and things she liked. Although Jane had few friends, she was reported to interact appropriately with most peers, but not with adults.

Peter was a 10-year-old boy diagnosed with Asperger syndrome and ADHD. He received medication for ADHD and could attend to tasks for short periods of time. On the Vineland II (Sparrow et al. 2005) his *Receptive*, *Expressive*, and *Written* communication age equivalencies were 2:11, 4:10, and 7:9, while his *Interpersonal Relationships*, *Play and Leisure Time*, and *Coping Skills* age equivalencies were 2:10, 5:3, and 4:7. Peter had a good vocabulary and could engage in basic conversation, but did not seem inclined to do so. He generally interacted with peers appropriately, but was reported to avoid adults.

Setting and Sessions

Baseline, Social Story™, video modeling, and follow-up sessions were conducted in the participants' classroom during lesson breaks or in a separate room when the other students were having lessons. The participants sat at a table with the trainer. For sessions where reliability data were collected, an independent observer sat opposite the trainer. Training sessions occurred two to three times a week with one session per day.

Materials

Stakeholder Questionnaire

A brief assessment questionnaire was created to give the participants, as stakeholders, an opportunity to consent to their involvement in the study and to identify their preferred stimuli to be used in the study. They were also asked if they would like to learn by watching videos on an iPad®.

Social Story™

A Social Story™ was created by the school's ASD therapist and reviewed by two other people with experience in implementing Social Story™ interventions. The story was transferred to a power point presentation and presented on the classroom's computer. After nine sessions, Peter refused to watch the Social Story™ on the classroom computer so it was shown on an iPad® instead because he appeared to be more interested in using the iPad®. The story described the social expectation of people greeting each other at school (see Table 1). Each slide contained one paragraph and a simple illustration. At the end of the presentation, comprehension questions were presented to gauge the participants' attention and comprehension

Table 1 Transcription of the social story and story board for the video modeling segment

Transcription of the Social Story

Whenever people meet for the first time or when they meet for the first time in the day they greet each other.

There are many ways to greet people.

People might say... Good morning!; Hello, how are you?; Hi, what's new?

Everyone does this because it is polite.

All people like being greeted nicely.

Children greet their teacher and other adults at school. We greet adults politely. We can try to say, "hello" or "hi" or "good morning". I will remember to greet my teacher when I arrive at school.

Sometimes I might forget to greet people but that is OK because they can greet me first and I can reply to them nicely.

Story Board for the Video Modeling Segment

Student 1: This is my school. When I see people at school I try to greet them nicely.

Student 1: Hi, how are you?

Student 2: I'm good, thanks. How are you?

Student 1: I'm fine, thank you.

Student 1: Time to check what we learned. What can I say to someone when I first see them?

Student 2: You can say: Hi, how are you?

Student 1: That's right! People like it when you ask them how they are. It's polite.

level. The two comprehension questions were: (a) What do people do when they first see each other? and (b) What can I try to say to adults at school?

Video Modeling

The video was created as a cartoon showing two characters meeting and greeting each other at school. The video was presented on the iPad®. In the cartoon, a female character walked into the school and met a male student. They greeted each other and then explained it was polite to greet people (see Table 1). A comprehension question was included at the end of the cartoon to ensure the participants had attended to the video and understood the material. The comprehension question was: (a) "What can I say to someone when I first see them?"

Experimental Design

The intervention was evaluated in a multiple-baseline across participants design (Kennedy 2005). Participants received four sequential phases: baseline, social story, video modeling, and follow-up.

Response Definition and Measurement

The dependent variable was the presence or absence of partial (simple) and full (complex) greetings that were independently initiated by the students to teachers and the research staff (i.e., trainer and reliability observer). A greeting was recorded

as *partial* if the participant initiated a simple greeting (e.g., “Hi”). A greeting was recorded as *full* if participants used a more complex greeting (e.g., “Hello. How are you?”). If the participants did not initiate a greeting, it was recorded as *none*.

The nature of the skill meant data collection was conducted through naturalistic observation every morning. The teaching staff collected greeting data most days of the week with the exception of days when the participants were absent or school activities prevented them from having a greeting opportunity. The research staff collected data two to three times each week before training sessions. During the Social Story™ phase, the expected greeting was a partial/simple greeting such as “Hello” or “Good morning”. During the video modeling phase, full/complex greetings were expected (e.g., “Hello, how are you?”). The presence/absence and level of greeting (partial/simple or full/complex greeting) was recorded.

Procedure

The general data collection procedure involved the teaching and the research staff waiting 5 s for a greeting initiation from the participants when they first met each morning. The 5 s period began when the child was within a few meters from the greeting partner and eye contact was made. For teachers, the greeting opportunity was usually as the participants arrived in the classroom. For the research staff, it was when they arrived for the training session during a morning break time. The number of greeting opportunities in a day varied depending on the availability of the teaching and research staff. The number of opportunities could range from none (i.e., the student did not meet any of the conversation partners) to four (i.e., when the teacher, teaching assistants, trainer and observer were present on the same day). During baseline, when the teachers and trainer met the participants, they waited for 5 s and if the participants offered no greetings, the teaching and research staff initiated the greeting (e.g., “Good morning, [*child's name*]”) and waited for a reply. After each session, participants were given an opportunity to watch videos and play games on the iPad®. This was intended as a general reward for participating in the session and was independent of their performance during the session.

During the Social Story™ phase, the power point presentation was shown on the computer (iPad® for Peter) by one of the teacher aides. At the end of the presentation, the two comprehension questions were asked to assess if the participants had paid attention and how much of the material they understood. It was programmed so that if the students did not know an answer, they would be presented with the story again and instructed to find the answer. However, this part of the procedure was never required. During the Social Story™ phase, the teaching and research staff continued the data gathering procedure as in baseline by giving students 5 s to initiate a greeting. If the participants did not initiate a greeting, the teaching and research staff greeted them and waited for a reply.

During the video modeling phase, the participants were given the iPad® at the start of the session so they could operate it themselves. Both participants then turned on the iPad®, found the relevant instructional video, and watched it without prompting. The comprehension question was asked to assess the students, understanding. During the video modeling phase, the teaching and research staff continued with the standard

data gathering procedure, but if the participants did not initiate a greeting, the staff used a full greeting (i.e., “Good morning, [child’s name]. How are you?”).

During the follow-up phase, the greeting procedure remained the same as in the previous phase, but no training (i.e., neither Social Story™ nor video modeling) was given to the participants. For Peter, a verbal prompt (e.g., “Can you ask ‘How are you?’”) was introduced by the teachers because he did not consistently greet them. The trainer and observer did not prompt Peter.

Inter-Observer Agreement

Inter-observer agreement (IOA) for the greetings to teachers was collected by other teaching staff (e.g., teacher aids, substitute teacher). The trainer and independent observer collected each other’s IOA data on training session days. Overall, IOA was measured on 46 % and 41 % of the observations for Jane and Peter respectively. Agreement was 100 %.

Procedural Integrity

A checklist was used to verify if the Social Story™ and video modeling training procedures were followed correctly. The independent observer was present on 70 % of sessions and confirmed the procedures were followed 100 % correctly.

Results

Figure 1 shows the cumulative number and level (partial, full) of greetings made by Jane and Peter. Table 2 lists the number and level of greetings the students made to teaching versus research staff for each phase of the study. During baseline, Jane initiated a greeting once with a substitute teacher, but did not greet other teaching

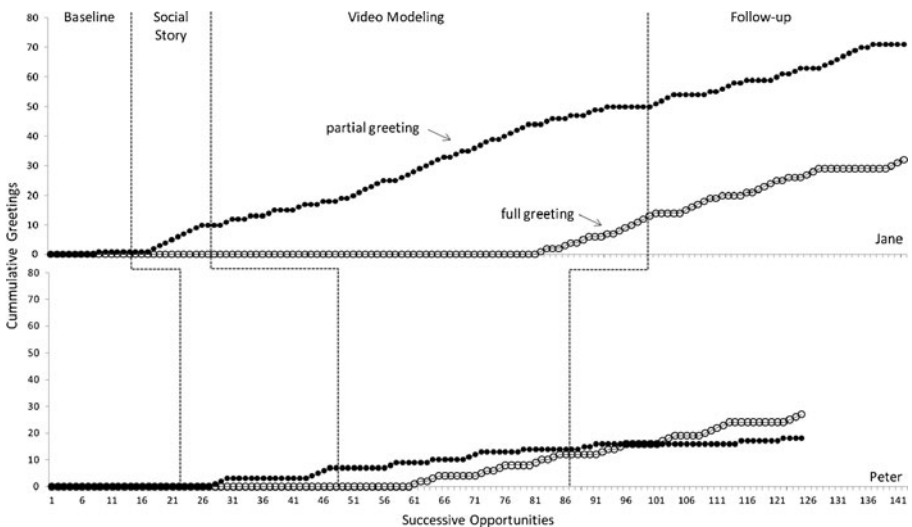


Fig. 1 Cumulative number and level of greetings across sessions and study phases for Jane (upper panel) and Peter (lower panel)

Table 2 Number of student initiated greetings across study phases and communication partners

Greeting level/Phase		Jane			Peter		
		None	Partial	Full	None	Partial	Full
Teaching staff	baseline	11	1	0	21	0	0
	social story	3	9	0	11	7	0
	video modeling	13	26	2	15	3	0
	follow-up	3	21	6	20	4	1
Research staff	baseline	1	0	0	1	0	0
	social story	1	0	0	8	0	0
	video modeling	7	14	10	3	4	12
	follow-up	0	0	14	1	0	14

staff, or researchers. When the Social Story™ intervention was introduced, Jane began to consistently greet adults from the fourth day of training (e.g., “Hello Mrs. D.”). When the video modeling phase began, her performance was variable, but she greeted her teacher on the majority of days (e.g., “Good morning Mrs. D.”). However, she only started using the full greeting (e.g., “Hello Mrs. D., how are you?”) after 11 training sessions (during this time, there were 54 greeting opportunities across teaching and research staff). During the follow-up phase, which started two weeks after the final training session, Jane greeted adults on the majority of days. She greeted the research staff with the full greeting (e.g., “Hello, how are you?”), but most of the time used only the partial greeting with teaching staff (e.g., “Hello Mrs. D.”).

Peter did not initiate any greetings during baseline. When the Social Story™ intervention was introduced, Peter showed an increase in greeting his teacher (e.g., “Hello”), but he did not greet the research staff or other teaching staff. When video modeling was introduced, he began to greet the trainer and observer with a full greeting (e.g., “Hello, how are you?”), but did not extend this full greeting to the teacher or other teaching staff. Throughout most of the video modeling and follow-up phases, he consistently greeted the research staff with a full greeting, but on most occasions did not greet the teaching staff. Any initiations were usually partial greetings, despite the teacher giving him a verbal prompt every day (e.g., “Can you ask ‘How are you?’”). Only once did he initiate a full greeting to his teacher (e.g., “Hello, how are you?”) when he heard another adult greeting his teacher. Interestingly, the number of full greetings over the course of the study was higher than the number of partial greetings.

Discussion

Results suggest both students learned to greet familiar adults at school, albeit with different degrees of success. Both students started greeting the teaching staff when the Social Story™ intervention was introduced. Peter was not consistent in

doing so, but the number of greetings he made was higher during the Social Story™ phase than during baseline. The results also suggest that the video modeling instruction seemed to have some additional beneficial effect by increasing the complexity of greetings initiated by the participants, from partial or simple greetings to full or more complex greetings. After 11 video modeling training sessions, Jane started using the full greeting with the research staff and subsequently the teachers. Peter started using the full greeting with the research staff after only three video modeling training sessions. The increase in the level of greeting observed with the Social Story™ and video modeling interventions were maintained at follow-up.

In addition to initiating more greetings with intervention, the participants consistently replied to greetings from others and answered the comprehension questions correctly. This suggests they had learned to verbally report the expectations associated with greeting people. However, they did not consistently greet the teaching staff. When asked about this, Jane and Peter said they forgot to greet the teacher when they first arrived in the morning. In fact, the days when they did not offer any greeting often coincided with Mondays when the children had been out of the school routine for the weekend.

A number of factors could have influenced the results. The iPad® may have motivated the participants to be part of the study. Both seemed to enjoy using it to watch the instructional videos during the video modeling phase. They were allowed to play games or watch entertaining videos on the iPad® after the sessions, which also appeared to be motivating for them. The stakeholder questionnaire may have also influenced results. It afforded the participants some degree of self-determination by giving them an opportunity to assent to their participation and a choice of what games and videos they could play or watch after sessions.

The participants' motivation to interact with adults possibly had the largest influence on results. Jane seemed eager to engage with people and started greeting adults fairly quickly, whereas Peter did not seem as interested in interacting with adults and was perhaps not as motivated to approach them. In fact, on one occasion, the teacher reported Peter seeing her and then running in the other direction. Thus it appeared that the adults' responses to the children's greetings might have functioned as positive reinforcement at least for Jane. It is possible that by using other instructional consequences (e.g., highly preferred edibles or tokens), we could have better developed and maintained Peter's greeting behavior. However, such reinforcement was not acceptable to school staff.

The participants did not appear to generalize the full greeting response to the teaching staff. The lack of generalization is perhaps not surprising given the fact that social skills are difficult for people with ASD to master (Matson et al. 2007). Some researchers have hypothesized that individuals with ASD have difficulty identifying social cues because responding to emotions and mental states in real-time requires cross-modal information processing (Golan and Baron-Cohen 2006). In any case, there is general consensus that social skills deficits are a fundamental characteristic of ASD (American Psychiatric Association 2000; Matson, et al. 2007). As Bellini et al. (2007b) demonstrated, school-based social skills interventions seem to have, overall, a positive but limited effect and generalization of social skills seems especially difficult.

A limitation in the study design is that we were unable to control a number of potentially confounding extraneous variables. For instance, it was not possible to control the participants' morning schedule before they arrived at school or how other students interacted with them as they arrived. In addition, greeting opportunities did not occur every day because participants missed school or did not meet the teacher before class started. The timing of the training sessions was possibly a limitation as well. Due to time constraints, it was not possible to present the training before the participants had a chance to greet the teacher or the trainer and observer every morning. It would have been desirable to provide the training immediately before the greeting opportunity as this could have facilitated performance of the target behavior as was demonstrated by Chan et al. (2011).

Future research could extend this study with other students and focus on generalizing skills to other people. More research is also needed to examine the efficacy of Social Stories™ and video modeling as strategies to teach social skills. Future research could examine the use of iPads® to teach skills in the settings they are expected to happen. For instance, individuals with ASD could carry the iPad® with them and call up a relevant video or social story as needed, such as when they are about to enter a new social situation.

In summary, this study evaluated a Social Stories™ and video modeling intervention for teaching two students with ASD to greet adults at school. With intervention, the participants learned to greet adults. The study's findings suggest Social Stories™ and video modeling are effective strategies for teaching greeting responses to students with ASD, but generalization may be a problem. In addition, the initial learning phase may be prolonged and some students may require additional motivational/reinforcement strategies for learning to occur and maintain.

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