# Teaching Elementary-Aged Students with Autism Spectrum Disorder to Give Compliments Using A Social Story Delivered Through an iPad Application

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**Abstract**
*Young children with Autism Spectrum Disorders (ASD) often experience social and communication skill deficits. The purpose of this study was to evaluate the effectiveness of using a social story delivered through an iPad application to enhance giving compliments in three elementary-aged students with ASD. The social story was modified with written description, pictures, and audio support through the application, which allows for customization to create a story. Results indicated that using a social story delivered through an iPad was associated with gains in the number of steps needed for giving compliments. All of the participants demonstrated generalization of the acquired social skill. Recommendation for further research are provided.*

## Introduction

Autism Spectrum Disorder (ASD) is a broad term for a developmental disorder that affects cognition, and it often emerges between the ages of 18 to 36 months (Autism Speaks, 2017). The number of children diagnosed with ASD has increased over the last two decades. The Centers for Disease Control and Prevention (CDC) indicated the prevalence of autism is approximately 1 in 45 in children (Zablotsky, Black, Maenner, Schieve & Blumberg, 2015). Due to the increase in the numbers of children diagnosed with ASD, schools face difficulties teaching these students given their varied and unique characteristics. Typical characteristics of a student with ASD include: (a) difficulties in social interaction, (b) problems with verbal and nonverbal communication, (c) and repetitive behaviors (Autism Speaks, 2017).

An especially difficult issue facing these students is the lack of skills needed for successful social interactions. Social interations are necessary for communication with others and for living a healthy life, such as making friends (Singleton, 1983). Social skills comprise elements that include interaction and communication. There are two types of social communication: (a) verbal, such as talking with peers, and (b) non-verbal, such as eye contact, facial cues, gestures, and touching (Singleton, 1983).

An outcome of having a lack of social interaction skills is that children with ASD have difficulty building relationships with others (Bauminger & Kasari, 2000). Bauminger and Kasari (2000) investigated loneliness and friendship among children with ASD and found that these children have greater loneliness and less satisfaction with their friendships compared to the typical peers resulting in social isolation.

Poor social interaction skills also negatively impact a student's academic achievement in several ways. For example, a student with ASD who displays poor social skills tends to avoid asking the teacher or peers questions when help is needed in understanding instructions for academic tasks (Bauminger & Kasari, 2000; More, 2008). Also, some students with ASD may exhibit behavioral challenges such as aggressive behaviors in the classroom because of decreased social interaction skills, (Hanley-Hochdorfer, Bray, Kehle & Elinoff, 2010). Finally, lack of social skills needed for academic success could intfer with listening, taking turns, following directions, and cooperating with others (More, 2008).

Unlike typical-developing students, who can learn most of these skills through natural interaction and working with others, student with ASD may require specific interventions to require social interaction skills. One method that has shown promise in teaching these skills to students with ASD is the use of social stories. Social stories can effectively represent a wide range of social concepts and skills from which students can learn (Gray, 1998; More, 2008). For example, giving and receiving compliments is an important social skill students need to learn, especially in primary grades. LeCroy (1994) discussed the development of social skills such as giving and receiving compliments and how this skill has positive long term effect in human relationships. The benefits of giving and receiving compliments as discussed on LeCroy' book (1994) were: (a) saying something nice to others to facilitate postive interactions in the futrue, (b) giving and receiving compliments by stating an opinion and then explaining the reason for the compliment, and (c) giving and receiving compliments to build friendly relationships with others. LeCroy (1994) suggested modeling as an procedure to train individuals giving and receiving compliments. Modeling can be presented through a social story.

Gray (1998) in his book argued how social stories assist individuals with ASD to interact successfully in a variety of social situations. Social stories are designed and written in a simple language to explain challenging social situations; they depict visual supports and text from a child’s perspective (Gray, 1998). The use of social stories in the aforementioned studies were effective because they were short, personalized of a particular student, and written from the student's perspective (More, 2008). Social stories allow some customization, such as adding familiar pictures to the story. Children are able to view pictures of themselves and people they know further personalizing the instruction. Such personalization is likely to facilitate a child's knowledge and skill acquisition. because children are more likely to listen and learn from someone with whom they are familiar (More, 2008).

One area of social stories that is less researched is the use of assistive technology. Combining social stories with assistive technology results in a potentially effective teaching tool. More (2008) described digital social stories as an effective and flexible method to create stories

to teach social skills for students with ASD. Teachers use digital social stories to teach students how to manage social situations on a daily basis, such as how to give and receive compliments from others (Litras, Moore & Anderson, 2010; More, 2008).

Digital products like social stories are available now as applications in online stores such as the Kid in Story application. Social story applications allow users to personalize their story by adding features like sound, images, pictures, text, colors, and backgrounds. Adding sound to a social story gains the user's attention, especially if the user has visual and reading difficulties (More, 2008). However, there is a paucity of recent research documenting the effects of such applications (Litras, Moore & Anderson, 2010; More, 2008).

The purpose of the study is to examine the effectiveness of using a social stories application for development of giving compliments to others such as peers and staff on three elementary-aged students with ASD. This study expands the current body of research on the use of social stories to teach social interaction skills by (a) demonstrating how the social stories can be taught to students from an iPad's application called Kid in Story℠; (b) assessing the effect of using pictures taken from the same environment (the school playground) and peers were used as a model in the given social story; (c) evaluating the effectiveness of this intervention in a less-structured settings (i.e., the recess time or playground).

## Method

### Participants

Three students were enrolled in this study and ranged in age 8-10 years. The three students met the following inclusion criteria: (a) diagnosis of ASD; (b) spoke in full sentences or partial sentences; (c) attended general education at least half day; (d) spoke English as a first language; and (e) scored at least average to below-average in an ASD assessment.

All participants were Caucasian male American students in the first, second, and third grade; their pseudonyms are: *Noah, Jacob, David*. Participants attended the resource room about 50% of a school day and they spent the rest of the day in general education classrooms. Special education teachers and paraprofessionals provided the educational supports which varied based on each student's needs; in general, the resource room support included giving direct and specialized instruction, academic remediation, and assistance with homework or other tasks. The general education classroom had similar features as the resource room. All participants had received independent diagnosis of autism by pediatricians and school psychologists. They all have severity of autism on the Autism Diagnostic Observation Schedule, (2nd ed.) (ADOS-2) scaled scores ranging from 72 to 79 (Lord, Rutter, DiLavore, Risi, Gotham & Bishop, 2012), and the Childhood Autism Rating Scale–Second Edition (CARS-2) scaled scores ranging from 30-36.5 (Schopler, Van Bourgondien, Wellman & Love, 2010). These scores indicated the students were in the moderate range of autism symptoms.

**Noah**. He was 9 years and 8 months of age at the beginning of the study. He was in second grade and attended a general classroom 50% of the day and the resource room the remaining part of the day. He was diagnosed with ASD when he was three years old and had scaled scores of 78 on the ADOS-2 and 33 on the CARS-2. A goal on his Individualized Education Program (IEP) was to improve social skills.

**Jacob.** He was 7 years and 1 month of age at the beginning of the study. He was in first grade and attended a general education classroom 50% of the day and the resource room the

remaining part of the day. He was diagnosed with ASD at 18 months and he had scaled scores 72 on ADOS-2 and 30.5 on CARS-2. Two goals on his IEP were to improve social and speech and language skills.

**David.** He was 10 yeas of age at the beginning of the study. He was in the third grade and attended a general education classroom 50% of the day and the resource room the remaining part of the day. He was diagnosed with ASD when he was three years and six months and had scaled scores 79 on ADOS-2 and 35on CARS-2. His IEP included goals in reading, writing, and social skills.

**Settings**

This investigation was conducted during a 15-minutes of a regularly scheduled 20-minute recess time each day and time sampling sheet used to assist the data collection. Sessions were conducted one per day for each student on consecutive school days, 2-3 days per week. A total of 32 sessions were conducted during the baseline, intervention, and generlization conditions. Recess occured on the outside playground, and on some rainy days, inside the resource room. The location of most observations was during the recess time on the playground. All the participints had recess time before the lunch break, Noah and David had recess from 12:10 to 12:30 p.m. and were observed at the same time, while Jacob had recess earlier from 11:10 to 11:30 a.m. Jacob was observed in the morning while Noah and David was observed in the afternoon.

**Materials**

A social story was produced for participants. The story was designed and produced according to methods detailed by Gray (1998) and More (2008). The story was individualized according to participants' needs, which was identfied as giving compliments to others such as peers and staff. Peers without disability were selected to be the model, and their pictures were used in the social story.

The pictures were taken using an iPad camera (version 10.2) and edited using the Kid in Story℠ application. The story was divided up into seven pages including the cover and title pages. Each page introduced one specific step or concept toward the targeted skill, and was introduced within 15 seconds. Each page contained of 1 or 2 words in the heading, and 2 to 3 descriptive writing sentences. Three pictures were taken of the playground from different angles and used as the background of the story pages. There was a white box in the corner of each page to present black text on each page of the story.The written sentences were followed by the model giving a verbal explanation of each step due to support the participants' reading skill. Viewing the story took approximately 1 to 2 minutes, which did not include the time it took to design, edit, and add the stories to the iPad. The script, page numbers are shown in Table 1.

**Table 1. The Social Story shown on the iPad**

| Page | Script |
|---|---|
| 1 | Compliments (the title) |

2 A compliment is a nice and friendly thing to say to someone. When someone gives me a compliment, it makes me happy and smile. I would make other people happy as well. So I will give them compliments when I like what they have.

3 So! When I want to give someone a compliment.
4 I have to look at the person first

5 and then smile.
6 Say something nice about the person, such as "I like your haircut or I like your shoes".

7 Saying a nice and friendly thing through a compliment makes others happy as well as makes me happy.

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**Social stories application**

The Kid in Story℠ Application (version 3.1.0) is designed by Enuma, Inc. (Apple Store, n.d.) and categorized as an educational app in Apple© Store. It is appropriate for children 6 to 8 years old (Apple Store, n.d.).

Pictures were taken of the outside playground and the model was asked to provide actions to represent the specific steps, such as making a smiley face. The resercher also inserted an audio record as a verbal description on each page of the story.

The iPad was used in *kiosk mode,* which did not allow participants to access anything other than the intervention story. A pair of headphones and the iPad loaded with the intervention and story was demonstrated with the participants before the recess time. Participants only had access to view stories once before the recess time.

**Dependent Variable and Measure**

Informal interviews with teachers were conducted, and the teachers filled out the Autism Social Skills Profile-2 (ASSP-2) (Bellini, 2016) on each participant to identify a common and needed social skill for participants to learn. ASSP is an assessment tool and it provides a comprehensive measure of social functioning in children with ASD (Bellini, 2016). All participants scored low on item number 27 "Provides Compliments to Others" of the ASSP-2 (Bellini, 2016) (p. 4), indicating that the student had low ability to give compliments. Based on the information obtained from interviews and the ASSP-2 assessment tool, Giving Compliments (GC) was the primary social skill identified.

GC was task analyzed into five specific steps including (1) body orientation toward communication partner, (2) smile, (3) looking at the person, (4) saying a compliment, (5) if the communication partner say “thank you”, respond “you are welcome”.

Table 2 provides information on the number of component steps of the target social skill taught. The participants were taught the targeted social skill independently before the recess time through using the Kid in Story℠ application on an iPad. A time sampling sheet used to assist the data collection by counting how many times participants were giving compliment to others in each session. The first author conducted observations and data collection.

**Table 2. The Steps for Giving Compliments**

| Targeted skill | Number of steps | Specific steps |
|---|---|---|
| Giving compliments to others | 1 | Body orientation toward communication partner<br>Smile |
| | 2 | Look at the person |
| | 3 | Say a compliment |
| | 4 | If the communication partner says "thank you", |
| | 5 | respond "you are welcome" |

## Design

A multiple-probe design across participants (Gast & Ledford, 2014) was used to assess the effectiveness of using the social skill application on an iPad to teach each participant the social skill of giving compliments to others.

## Baseline

During baseline, observations were conducted during recess time on participants in the outside playground and counted and reported the number of performing giving compliments' steps successfully as occurrence or non-occurrence. Noah and Jacob were observed at the same time and David was observed separately. the playground for a 15-min interval.

## Social story

The researcher used the Kid in Story℠ application to present giving compliments' steps. The intervention was introduced by the researcher and the story was shown to each participant independently before the recess time. The intervention was shown to the participants during the last five minutes before the recess time in their classroom.

## Generalization

The application was not used during the generalization probes. Thus, generalization probes were similar to the conditions during baseline except that the probes were conducted in the lunchroom or the sensory room inside the resource room.

## Procedural Fidelity

Fidelity of baseline intervention and generalization conditions was assessed using a modified treatment fidelity checklist developed by Wragge (2008); the checklist was modified to meet different criteria required by the current study. The frequency of data collection was three times per week (60% of the sessions) during the intervention and generalization conditions for all participants. In both conditions, the percentage of the social story intervention fidelity was 95% (range 90% to 100%).

**Inter-observer Agreement (IOA)**

A checklist was used to record the steps completed for compliments. The researcher conducted observations and a second observer independently collected interobserver agreement (IOA) data. IOA was conducted during 10% of the baseline and 20% of the social story phases only for Noah. An agreement level of 87% (range 86% to 88%) was obtained during baseline and 85% (range 80% to 90%) during the social story conditions (average 85% total). This level of inter-observer agreement is deemed good by (Gast and Ledford).

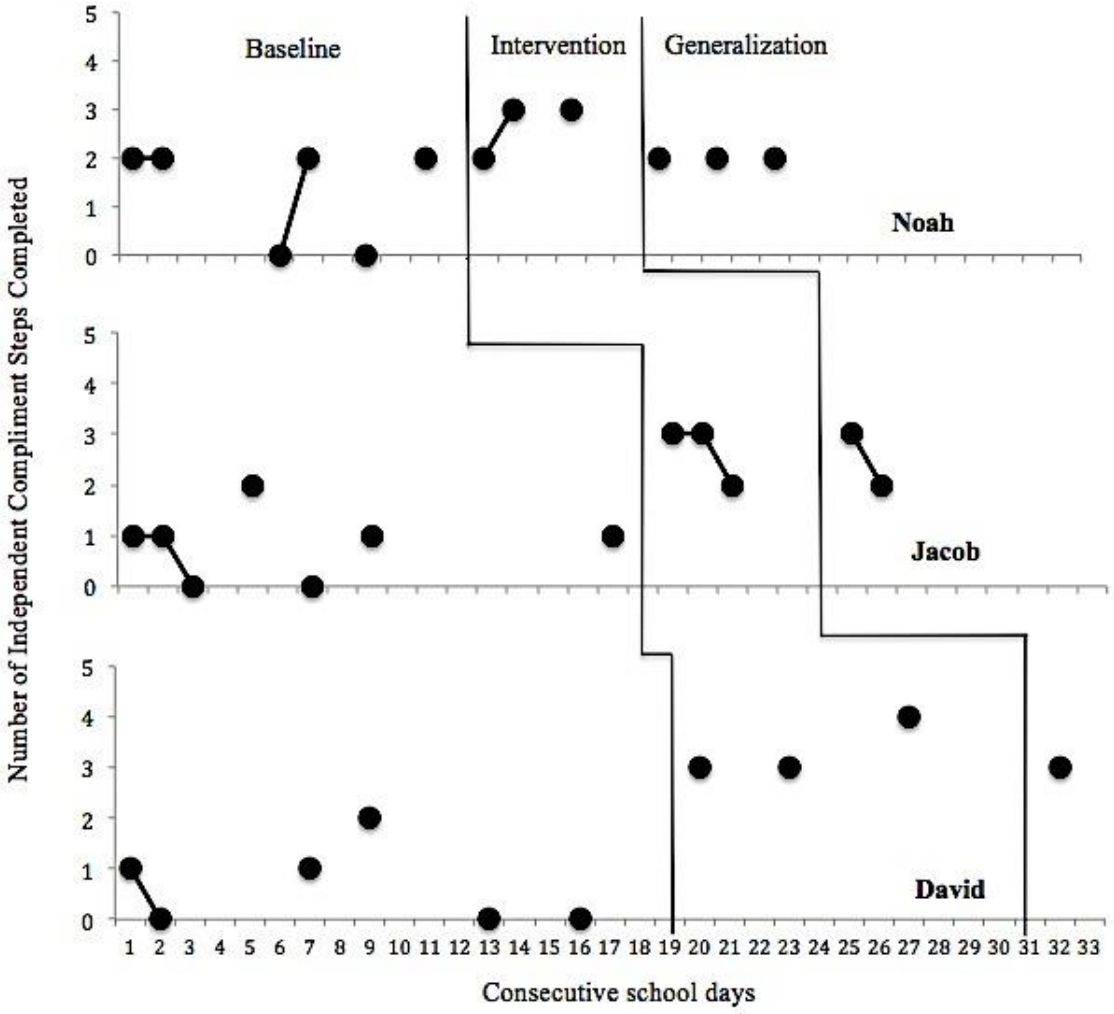


**Figure 1. Results of Multiple-Probe Design Across Three Participants**

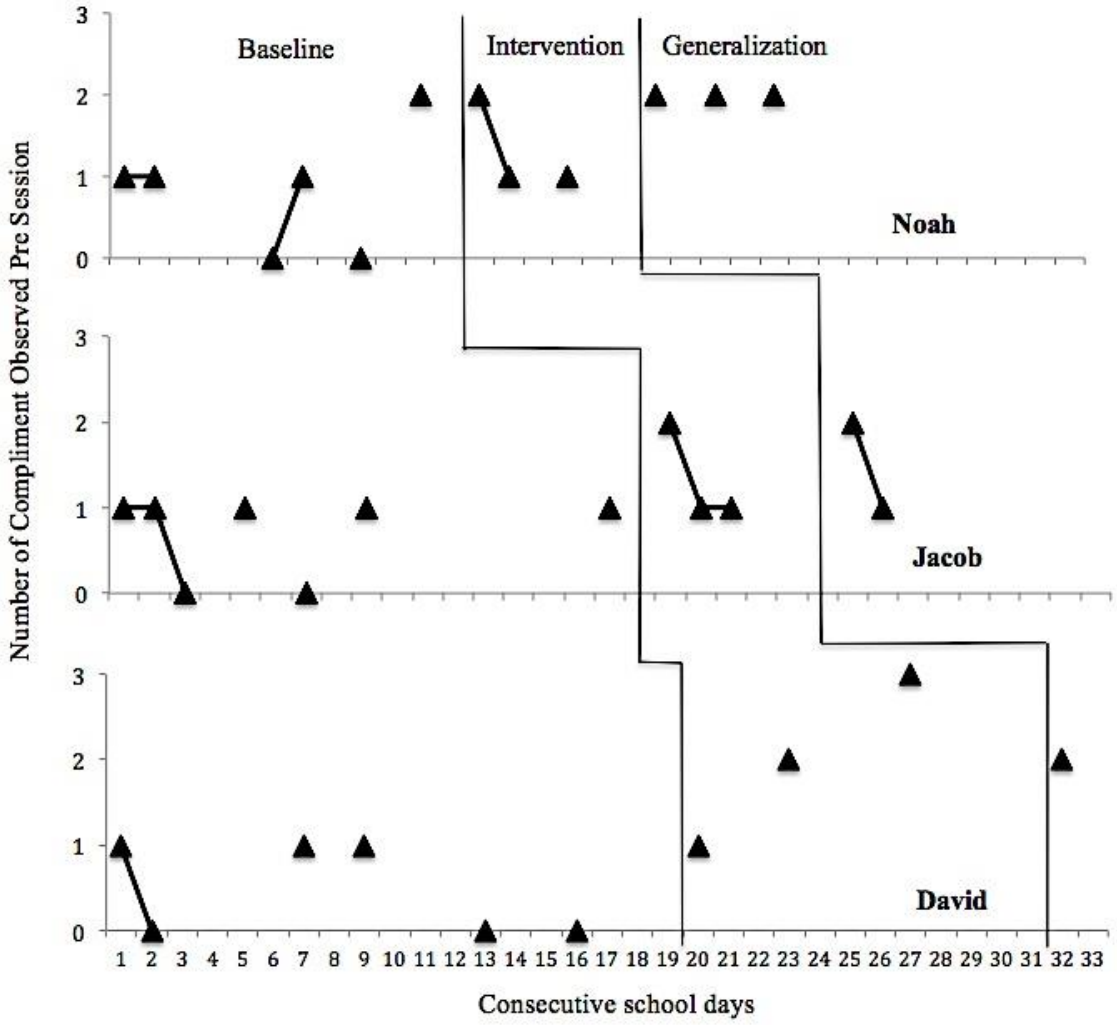


**Figure 2. Results of Multiple-Probe Design Across Three Participants**

## Results

Among the five steps, participants frequently demonstrated the follwoing three steps: (a) smile, (b) saying compliments, and (c) responding "You are welcome" throughout the social story and generalization conditions. Overall, there was improvement in participants' performance of giving compliments to others steps. As shown in Figure 1 and 2, during baseline, Noah successfully emitted 0–2 steps. When the social story was introduced, Noah emitted a range of 2 to 3 steps. Noah emitted 2 steps and maintained giving compliments 2 times per session during generalization. During baseline, Jacob successfully emitted 0 to 1 step. When the social story application was introduced, he emitted 2–3 steps over 3 sessions. During generlization, he emitted 2–3 steps and maintained giving compliments 1–2 times per session. During baseline, David emitted 0–1 steps. When the social story application was introduced, he emitted a range of 2 to 3 steps and maintained giving compliments 2–3 times per session. During generalization, his emitted 2 steps and maintained giving compliments 2 times per session.

As shown in Figure 1 and 2, through visual analysing the data indicated, two common themes emerged: (a) on all graphs trend indicated acceleration across participants, (b) most participants have a low to moderate level of variability. The results indicated that participants met criteria levels of successfully performing three step of giving compliments to others.

The three participants demonstrated overall improvemet in emitted steps from baseline to the social story intervention. This improvement generally maintained during the generalization probe. Participants were rarely performed the compliments steps number 1 "Body orientation toward communication partner" and 2 "Look at the person". This supported that individuals with autism face difficulty to receive or expenses nonverbal cues, such as body language and eye contact (Singleton, 1983).

**Discussion**

Social stories assist students with ASD to better understand and appropriately react in different social situations (Gary, 1998). Social stories has been considered an effective intervention and has been used to improve social and communication skills among individuals with ASD (Hanley-Hochdorfer, Bray, Kehle & Elinoff, 2010). Using a multiple-probe design, a functional relationship was found between social stories using an iPad application, showing an increase in the number of steps correctly completed by each participant. Overall, findings are generally consistent with those of other research exploring social stories and the use of handheld technologies to teach social and communication skills (More, 2008; Sansosti & Powell-Smith, 2008). This study found that teaching students with ASD a social story, which delivered through an iPad application, assist teaching complex social skills, such as giving compliments by breaking the skill down into doable steps.

The literature indicates that teaching social stories have a powerful impact on students at a less-structured environment, such as the ressess time or playground and this helps students to generalize the learning outcome in a social context (Bauminger & Kasari, 2000). Teachers recommended using digital social stories to teach students with ASD social concepts, such as providing compliments to others (Litras, Moore & Anderson, 2010; More, 2008). In this study, the teacher noticed improvements on each of the students' performance of giving compliments to others. The teacher also reported that the social skill application was easy to use and it can be used to teach students a variety of social skills. The teachers and paraprofessionals indicated that the application was flexible and it can be customized to meet the targeted students' needs.

The present study, however, differs in its conclusions and lends limited support for the use of social stories to enhance the social skill of giving compliments in a less-structured environment, such as the outside playground. Elementary-aged participants showed little interest in giving compliments, especially during recess time, even though this study found a positive functional relationship between using the social story on an iPad and improving social skills. Social stories' applications in this context need more examination in terms of which variables may have an impact on outcomes. Moreover, replication over time is necessary to strengthen the external validity of the findings before they can be considered a reliable intervention.

**Social Validity**

Social validity data were obtained from interviewing and observing others around participants, such as teachers, professionals, and peers. After summarizing information from informal interviews, two common themes emerged: (a) participants seemed to enjoy using iPads and (b) it was socially acceptable to use the iPads at school. All participants indicated that they

enjoyed watching the story on the iPads. Noah, Jacob, and David's peers also stated that they thought using iPads was “cool.” David’s teachers said David talked about using the iPad all the time. When examining the social acceptability of using the iPad, students, teachers, and peers stated that it was socially acceptable to use an iPad in the classroom. Also, teachers reported that iPads are avaliable for each student in some classes and they use it in some class activites.

The researcher asked the special education teacher to review the story and specific steps for the targeted skill and to determine if all the intervention materials adequately explained the targeted skill. The researcher frequently collected the feedback from the special education teacher and used it to improve the story and intervention materials. For example, the teachers suggested some complimentary phrases to be taught for participants, such as " I like your haircut". The teacher believes in that teaching the participants certain complimentary phrases will help them to produce more complimentary phrases in the future.

Although benefits to the use of a social story on an iPad were found in this study, several limitations exist. First, it is possible that the outside playground was not an appropriate place to observe the social skill of giving compliments. Students can be distracted in play areas and are less likley to provide compliments. It was observed that particapants were more engaged in talking with peers during lunchtime where more social interactions take place. Future studies should be implemented in controlled area, such as in the classroom.

Second, it is unknown the exent to which the peers contributed to the skill development of the participants. Peers were not trained to provide or seek compliments from the participants in the present study. In order to strengthen engagement in social communication for students with ASD, peers may need to be trained to seek compliments from participants to increase the probability that the social behavior will maintain in the future. Future studies should conduct to train peers to seek compliments from participants and increase their opportunity to exhibit more compliments' steps.

Third, only two of the three participants achieved this criterion level. The participants did demonstrate improvements, with all steps. Mostly, the participants demonstrated the following three steps: (a) smile, (b) saying compliments, and (c) responding "You are welcome" throughout the conditions. Future studies should investigate to find additional supportive steps to better perform the target skill.

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