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Comparing Social Stories™ to Cool Versus Not Cool

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Abstract

In this study we compared the cool versus not cool procedure to Social Stories™ for teaching various social behaviors to one individual diagnosed with autism spectrum disorder. The researchers randomly assigned three social skills to the cool versus not cool procedure and three social skills to the Social Stories™ procedure. Naturalistic probes were utilized to determine the participant's successful demonstration of the various social skills taught with each procedure. The researchers utilized an adapted alternating treatment design to compare the effectiveness of each of the two procedures. Results indicated that the participant acquired all of the skills taught with the cool versus not cool procedure and demonstrated minimal improvements for the skills taught with Social Stories™. Practical implications as well as future research are discussed.

Keywords: autism, cool versus not cool, Social Stories™, social discrimination, social behavior.

Social Stories™ are one of the most commonly implemented interventions (Green et al., 2006) with individuals diagnosed with Autism Spectrum Disorder (ASD). Teachers have reported that they have commonly implemented Social Stories™ within their classrooms and that they perceive them to be effective in changing behavior (Reynhout & Carter, 2009). The National Autism Standards has recognized Social Stories™ as an evidence-based procedure (National Autism Center, 2015).

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Despite the widespread use and perceived effectiveness of Social Stories™, researchers have conducted meta-analyses and have found major limitations in the research. Sansosti, Powel-Smith, and Kincaid (2004) noted that Social Stories™ are commonly implemented with other procedures (e.g., video modeling), making it difficult to determine what procedure was responsible for the change of behavior. Kokina & Kern (2010) conducted a meta-analysis of Social Stories™ and found them to have only minimal effectiveness. Leaf et al. (2015) determined that the methodological rigor of the majority of studies evaluating Social Stories™ has been very weak. Thus, reviews have shown that the effectiveness of Social Stories™ is still unknown.

There have been two studies that have compared Social Stories™ to a behaviorally based intervention known as the teaching interaction procedure (TIP; Kassardjian et al., 2014; Leaf et al., 2012a). In 2012a, Leaf and colleagues compared Social Stories™ to the TIP for six individuals diagnosed with ASD. The TIP consisted of (a) labeling the targeted behavior; (b) providing a rationale of why the student should display the targeted behavior; (c) stating when the participant should display the targeted behavior; (d) breaking the targeted behavior into small behavioral steps; (e) teacher demonstration; (f) the student role-playing the targeted behavior; (g) and the provision of reinforcement throughout teaching. The social story used in the study was a basic social story with comprehension checks and reinforcement. Results indicated that participants reached mastery criterion on 100% of skills taught with TIP and on only 22% of skills taught with Social Stories™.

In 2014, Kassardjian et al. compared TIP to Social Stories™ implemented in a group instructional format. The TIP and the social story were similar with respect to their implementation in the Leaf et al. (2012a) study. The results of that study showed that participants reached mastery criterion on skills taught with TIP and showed no improvement on skills taught with Social Stories™. Thus, the comparative research has shown that TIP is more efficacious than Social Stories™; however, both Leaf et al. (2012a) and Kassardjian et al. (2014) noted that more comparative studies should be conducted with different behavioral interventions.

One behavioral intervention that has been implemented with individuals diagnosed with ASD, has a growing amount of empirical support, and that has not been compared to Social Stories™ is the Cool vs Not Cool Procedure (CNC; Leaf, Dotson, Oppenheim-Leaf, Sherman, & Sheldon, 2012b; Leaf et al., 2012c). CNC is a social discrimination program in which the teacher demonstrates a targeted behavior both the appropriate way (cool) and inappropriate way (not cool). After

each demonstration, the learner is then required to state if the demonstration was cool or not cool and why the demonstration was cool or not cool. An additional step involves having the learner role-play the behavior the cool way.

Leaf and colleagues (2012c) were the first to empirically evaluate CNC to teach various social behaviors to three children diagnosed with ASD. The study implemented CNC initially without role-play and found that participants reached mastery criterion on 50% of skills; when role-play was added, participants reached mastery criterion on an additional 37.5% of skills. Au and colleagues (In Press) found that CNC was also effective when implemented within a small group instructional format. Thus, the preliminary evidence suggests that CNC can be an effective way to teach social behaviors to individuals diagnosed with ASD; however, research is warranted comparing CNC to other procedures. Therefore, the purpose of this study is to compare CNC to Social Stories™ with one individual diagnosed with ASD.

Method

Participant and Setting

Nathan was a 7-year-old Caucasian boy diagnosed with ASD. Nathan comes from an upper middle class family and was included in a typically developing first grade classroom with supports. Nathan's parents and teachers considered Nathan to be "high functioning" as he would display spontaneous language throughout the day, could answer open-ended questions, and was fully conversational with his peers. Although Nathan displayed basic social behaviors (e.g., joint attention, greetings, parallel play) in his natural environment, he seldom independently interacted with his peers. Nathan did engage in tantrums at home when he did not get access to preferred items or activities.

Nathan had a full scale IQ score of 122 (above average), a Vineland adaptive behavior score of 94 (adequate), a Social Skills Improvement System Standard Score of 78 (7%), a Social Responsiveness Standard Score of 56 (normal range for ASD individuals), a Peabody Picture Vocabulary Receptive Score of 121 (92%), and an Expressive One Word Score of 137 (99%). The study took place in a research room within a private clinic which provides behavioral intervention services to individuals diagnosed with ASD. The research room contained a child sized desk and chairs, two couches, a computer, and

two adult desks. Also in the room was a variety of instructional materials (e.g., a whiteboard, paper, books) as well as toys which could serve as potential reinforcers.

Targeted Social Skills, Dependent Variable, and Naturalistic Probes

The researchers selected six different social skills that were randomly assigned to the two teaching conditions; skills were taught in pairs (e.g., one skill with CNC and one skill with social stories). The researchers selected the skills by observing Nathan in his natural environment and determining skill deficits displayed during that observation. The skills were also selected by asking Nathan's parents what skills they wanted taught to Nathan during research sessions. All skills were approved by his parents prior to the first baseline session for each skill. Each skill was tasked analyzed and there were an equal number of steps per skill. Table 1 provides the information about the skills taught.

The main dependent measure was Nathan's accuracy at engaging in the steps of each of the targeted skills during naturalistic probes. The researchers did not prompt or reinforce during naturalistic probes (NPs). During NPs, the researcher set up a situation where Nathan had the opportunity to engage in the targeted behavior. NPs were conducted across all conditions and were utilized to determine mastery criterion, which was set as Nathan correctly engaging in 100% of the steps of a targeted skill across three consecutive sessions. If Nathan reached mastery criterion with one teaching condition but did not reach mastery criterion on the skill assigned to the other teaching condition, then the researchers implemented up to five additional teaching sessions to provide an opportunity for Nathan to reach the mastery criterion with the second teaching condition.

For losing graciously, an adult would beat Nathan in a competitive game and provide 10 s for Nathan to respond correctly. For interrupting, the researcher would instruct Nathan to go up to another adult (who was engaged in a conversation with another person) and ask the adult a question. For the skill of empathy, an adult would pretend to get hurt (e.g., trip and fall) and provide up to 10 s for Nathan to display any of the steps correctly. For the skill of stopping and talking, the researcher and Nathan would walk around the clinic and another adult would ask Nathan a question. The researchers provided up to 10 s for Nathan to respond correctly. For the skill of changing the game when someone is bored, an adult and Nathan would play a game and the adult would provide a cue indicating boredom (e.g., sighing) and wait up to 10 s for Nathan to engage in any of the tar-

Table 1

Targeted Skills

Set	Skill	Taught with	Step 1	Step 2	Step 3	Step 4	Step 5
1	Losing graciously	CNC	General congratulatory statement	Specific positive statement about the game	Asking to play again	Playing a game for a second time	____
1	Interrupting appropriately	Social Stories™	Saying excuse me	Waiting to be acknowledged	Asking the person a question	Saying Thank you and walking away	____
2	Empathy	CNC	Facing the person	Asking if they are ok	Making an empathetic statement	Asking if they can do anything to help	____
2	Stopping to talk	Social Stories™	Stop walking	Face the person	Keep appropriate distance	Answering the question	____
3	Changing the game when someone is bored	CNC	Asking if the person wants to play something else	Saying okay	Asking the person what he wants to play	Getting the game	Playing the game
3	Sportsmanship	Social Stories™	Stating the person's name	Positive statement about what the person is playing	Second positive statement	Clapping their hands	Refraining from any negative statement

geted steps. For the skill of sportsmanship, Nathan would watch the adult play a game on a tablet and wait up to 10 s for Nathan to display any of the targeted steps.

The second dependent variable was the overall percentage of correct responding Nathan engaged in when asked three comprehension questions about the story read during the Social Stories™ condition. The final dependent variable was the overall percentage of correct trials during the CNC procedure in which Nathan discriminated whether a demonstration trial was cool or not cool and why that demonstration trial was cool or not cool.

General Procedure

The study consisted of three conditions (baseline, intervention, and maintenance). The researchers implemented sessions three times a week with sessions lasting up to 20 minutes in length. The first set of skills was taught by one researcher (third author) and the second and third set of skills were taught by another researcher (second author).

Baseline and maintenance. These conditions consisted of the researchers implementing a NP for the skill assigned to CNC and a NP for the skill assigned to the Social Stories™ condition. The order of the NPs was randomized; after the first NP, Nathan had a brief break followed by the second NP. After both NPs were implemented, the research session was finished for that day.

Intervention. The intervention condition began identically to the baseline and maintenance conditions. However, once both NPs were conducted, the researcher gave the participant a 5 min break and then began the two intervention conditions. The order of the teaching conditions was randomly determined ahead of time.

Cool vs. Not Cool Procedure

The researcher began CNC by labeling what skill was going to be practiced (e.g., "We are going to practice changing the game"). Next, the researcher demonstrated the behavior the cool and not cool way while providing the opportunity for Nathan to observe. There were a total of four demonstrations (i.e., two cool and two not cool), the order of which was randomly determined ahead of time. Teacher demonstrations were set up similarly to NPs. During cool demonstrations, the researcher displayed all of the steps of the targeted social behavior. During not cool (incorrect) demonstrations, the researcher either omitted one of the steps or demonstrated one of the steps incorrectly. After each demonstration the researcher had Nathan verbally state if the demonstration was cool or not cool and why it was cool or not cool. The researcher provided general praise (e.g., "good") for correct re-

sponding and general and descriptive corrective feedback for incorrect responding (e.g., "nope, it was not cool because I did not clap my hands").

After the demonstrations, Nathan had the opportunity to role-play the targeted behavior with the teacher. The role-play was set up identically to the NPs. During each session, Nathan role-played the targeted skill, as part of the CNC procedure, until he displayed 100% of the steps correctly on two consecutive role-plays or until there were a total of six role-plays implemented. If Nathan role-played the targeted behavior correctly, the researcher provided specific praise (e.g., "Good job, I loved how you faced the person and asked to play a different game."). If Nathan role-played the targeted behavior incorrectly, the researcher provided specific corrective feedback (e.g., "That is not it, you forgot to get the game.").

Social Stories™

Social Story creation. The researcher created three individualized complete social stories™ (contact the first author for an example of a social story); each story consisted of descriptive, perspective, affirmative, cooperative, control, and directive sentences in the prescribed ratio as described by Gray (2004). The researchers used a book format with one sentence printed at the bottom of a page and a clip art picture centered above the text.

Social Story implementation. Nathan sat directly across from the researcher and the researcher indicated that the researcher was going to start reading the Social Story. The researcher then read each page of the story aloud. After every fourth page the researcher provided praise contingent upon Nathan attending and not engaging in any aberrant behavior. If Nathan was not attending or was engaging in aberrant behavior, then the researcher provided corrective feedback. Once all of the pages were read aloud, Nathan provided the control sentence.

Next, the researcher asked Nathan three comprehension questions. First, the researcher asked Nathan what the book was about. Second, the researcher asked Nathan when he should display the targeted social behavior. Third, the researcher asked Nathan why he should display the targeted social behavior. The researcher provided general praise for correct responding after each question and provided general and specific corrective feedback for incorrect responding following each question.

Design

The researchers used an adapted alternating treatment design replicated across the three sets of skills with a staggered baseline for

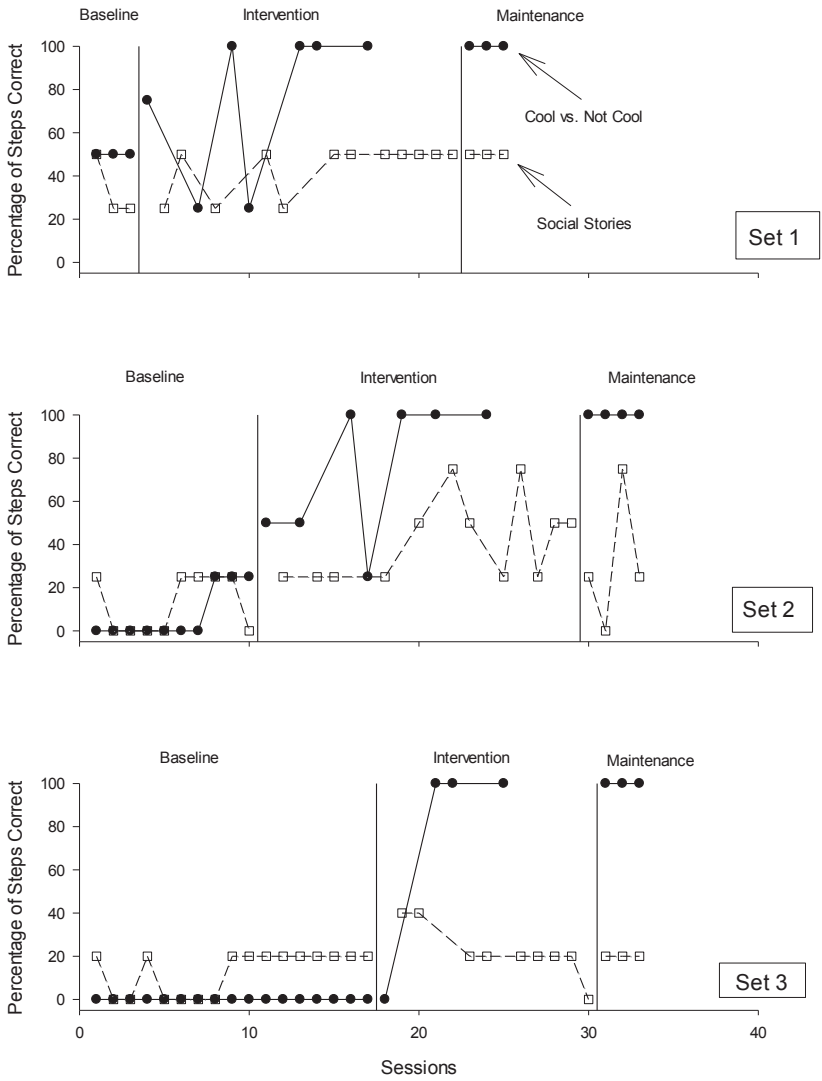

Figure 1. Performance during naturalistic probe.

each set**.** Within an adapted alternating treatment design, functional control is established when there are clear differences in responding across the measures. We staggered the baseline for each condition to show that improvements in behavior overtime would not occur without intervention for both targeted behaviors.

IOA and Treatment Fidelity

One of the researchers recorded the participant's behavior during every daily probe; a second independent observer simultaneously recorded the participant's behavior during 35.1% of daily probes. Interobserver agreement was calculated by dividing the total number of steps in which the observers showed agreement in scoring by the total number of steps. Interobserver agreement across all skills and all daily probes was 98.5% (range, 75 to 100% per session).

To assess treatment fidelity, an independent observer recorded planned teacher behaviors during 33% of CNC teaching sessions and 35.2% of Social Stories™ teaching sessions. Planned experimenter behaviors for CNC were the researcher: (a) demonstrating the cool behavior two times; (b) demonstrating the behavior not cool two times; (c) after each demonstration asking the participant to state whether the demonstration was cool or not cool; (d) asking the participant to state why the demonstration was cool or not cool; (e) providing the correct consequence based upon the participant's response; (f) having the participant role-play the targeted social behavior until he demonstrated the behavior correctly on two consecutive role-plays or a total of six role-plays; and (g) providing the correct consequence based upon the participant's role-play. The researcher displayed correct instructor behaviors during 97.6% of sessions.

Planned researcher behaviors for the social story were the following: (a) the researcher reading each page of the story; (b) the researcher providing feedback after every 4th page; (c) the researcher having the participant provide a control sentence; (d) the researcher asking all three comprehension questions; and (e) the researcher providing the correct feedback after every comprehension question. The researcher displayed correct instructor behaviors during 98.3% of sessions.

IOA data were not collected on the measurement of treatment fidelity.

Results

Skill Acquisition

Figure 1 displays the participant's responding during NPs for the CNC and Social Stories™ procedures for all six skills taught. Across all three sets, Nathan showed low and stable levels of responding during the baseline condition for skills taught with CNC and Social

Stories™. Nathan reached mastery criterion on all three skills taught with CNC within seven teaching sessions. Nathan did not reach mastery criterion on any of the skills taught with Social Stories™ nor did he show substantial improvements from baseline levels. Nathan displayed a high percentage of steps correct for skills taught with CNC during the assessment of maintenance.

Responding During Teaching

CNC. Nathan correctly discriminated and stated why a demonstration was cool or not cool during 71.4%, 85.7%, and 81.3% of opportunities for the targeted skills of losing graciously, empathy, and changing the game when a teacher is bored, respectively. Overall, across all three targeted skills, Nathan correctly discriminated and stated why a teacher demonstration was cool or not cool during 79.2% of trials.

Social Stories™. Nathan responded correctly during 67%, 94.4%, and 96.2% of comprehension trials for the targeted skills of interrupting appropriately, stopping to talk to an adult, and cheering on a friend, respectively. Overall, across all three targeted skills, Nathan responded correctly during 84.8% of all comprehension trials.

Discussion

The results of this study showed that Nathan reached 100% of the skills taught with CNC and none of the skills taught with Social Stories™. The data do indicate some improvement from baseline levels during several of the intervention sessions across the three sets taught with Social Stories™. However, he never displayed more than 80% of the steps correct in any single session. It is unclear why he showed an increase in correct responding in some sessions and not in others. It may be the case that Social Stories™ leads to some improvement in the more basic skill specific steps of social behavior (e.g., facing the person) but may not lead to acquisition of the entire social behavior. This may be one reason why Nathan was able to display some of the behavioral steps of the social behavior but did not display the entire social behavior accurately. It is also possible for potential carryover effects from the CNC sessions; CNC might have resulted in increases in overall attending during the Social Stories™ sessions, which may have resulted in better skill acquisition. Regardless, CNC resulted in higher rates of correct responding than Social Stories™.

Overall, in this study, CNC was more effective than Social Stories™. The results of this study are almost identical to previous research findings suggesting that when Social Stories™ are compared

to other behavioral interventions, the behavioral interventions were shown to be more efficacious procedures (e.g., Leaf et al., 2012a; Kassardjian et al., 2014). This study expanded upon previous comparative research by demonstrating a different behavioral intervention strategy (i.e., CNC) may be more effective than Social Stories™. Additionally, this study expands the previous research by utilizing a complete Social Story as opposed to a basic Social Story (Gray et al., 1993), and still finding no differences in terms of effectiveness for Social Stories™.

These results have several practical implications for those professionals who work with individuals diagnosed with ASD. First, based upon the current results, previous research, and meta-analyses, professionals may wish to consider utilizing a behaviorally based intervention as opposed to Social Stories™. Second, although studies have indicated that Social Stories™ can be effective when combined with other procedures (Sansosti et al., 2004), it is difficult to determine if the behavior change was due solely to the other procedure or the combination with Social Stories™. The research currently available on Social Stories™ suggests that the change more likely may be attributed to the inclusion of the other procedure and, therefore, clinicians should be cautious when using Social Stories™ as a primary intervention or as a component of another intervention. Third, this study demonstrated that Social Stories™ may lead to failure in say-do correspondence. That is, although the participant of this study gave verbal evidence of comprehension of the material within the social story, it was not related to successful performance of the targeted skills.

This study suggests directions for future research. Future researchers should replicate the procedures using single subject designs to a wide range of participants across different demographic characteristics (e.g., lower levels of language, higher levels of aberrant behavior, or lower levels of social behavior) to demonstrate more generalizability across the characteristics of ASD. Also, future researchers could compare the two procedures in a randomized control trial to evaluate even higher levels of generalizability.

Second, only limited generalization measures were taken in this study (i.e., teaching session to naturalistic probes). Future researchers should take more expanded measures of generalization (e.g., probes in school). It should be noted that, anecdotally, it was reported that Nathan generalized two of the skills taught with CNC to natural environments and none of the skills taught with Social Stories™. Finally, future researchers may wish to compare a variety of other procedures (e.g., video modeling, script fading, or peer mediated intervention) to Social Stories™ to identify the most efficacious interventions.

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