Teaching Social Communication Skills Using a Cool Versus Not Cool Procedure Plus Role-Playing and a Social Skills Taxonomy

Justin B. Leaf
Mitchell Taubman
Christine Milne
Stephanie Dale
Jeremy Leaf
Donna Townley-Cochran
Kathleen Tsuji
Alyne Kassardjian
Aditt Alcalay
Ronald Leaf
John McEachin

Autism Partnership Foundation

Abstract

We utilized a cool versus not cool procedure plus role-playing to teach social communication skills to three individuals diagnosed with autism spectrum disorder. The cool versus not cool procedure plus role-playing consisted of the researcher randomly demonstrating the behavior correctly (cool) two times and the behavior incorrectly (not cool) two times, followed by the participants role-playing the behavior. We utilized a multiple baseline design across participants to evaluate the effectiveness of the cool versus not cool procedure plus role-playing. The results of the study indicated that all three participants were able to increase their social communication skills following implementation of the cool versus not cool procedure; however, maintenance varied across the three participants.

Keywords: autism; cool vs. not cool, pragmatics, social communication, social discrimination, social skills

Address correspondence to: Justin B. Leaf, 200 Marina Drive, Seal Beach, CA 90740. Email: Jblautpar@aol.com

Pages 44–63
A hallmark characteristic of individuals diagnosed with an Autism Spectrum Disorder (ASD) is an inability to use communication to socially connect with other people within the individual's environment (Rogers, 2000; Scattone, 2007), often referred to as social communication. Social communication is the communicative behavior (verbal and nonverbal) exchanged between two or more people, also referred to as pragmatic language (Taubman, Leaf, & McEachin, 2011). Although it is important to teach social communicative behaviors to individuals with autism, there are two challenges that professionals and parents may face. First, it may be difficult for parents and clinicians to determine what skills to teach individuals diagnosed with ASD. Second, it may be difficult for professionals and parents to determine what procedures to implement when teaching social behaviors to individuals diagnosed with ASD.

In 2011, Taubman and colleagues attempted to assist parents and professionals by creating a social skills taxonomy, which identified what social skills to teach individuals with autism. The social skills taxonomy consisted of five domains: (a) social awareness, (b) social interaction, (c) social learning, (d) social relatedness, and (e) social communication. Social behaviors under the social communication domain can be defined as both functional verbal and nonverbal expressions that are directed towards another person with the intention of engaging in a reciprocal interaction with that other person. Within social communication, a parent or professional may look at “what is said and how it is said; direct and implied conversation; figurative and literal speech; serious, sarcastic, and humorous statements; tone, inflection, emphasis, and style” (Taubman, 2011, p. 97). Therefore, skills in the social communication domain are meant to improve the communicative and social exchanges between students diagnosed with ASD and their peers. Taubman et al. divided social communication behaviors into basic, intermediate, and advanced specific social communicative behaviors, so that professionals can teach social communication to a wide variety of learners. Although the social skills taxonomy has been utilized as part of clinical intervention for hundreds of individuals diagnosed with ASD in both home and school settings (e.g., R. B. Leaf, Taubman, McEachin, Leaf, & Tsuji, 2011), to date, there have been no empirically based studies that have utilized the social skills taxonomy when selecting social behavior(s) for individuals diagnosed with ASD. Therefore, it is not known if researchers can utilize the social skills taxonomy to select skills to be taught.

The second challenge that professionals and parents face when teaching social behaviors to individuals diagnosed with ASD is selecting an appropriate intervention. Today, there are several interventions
that have been implemented to teach social communication to individuals diagnosed with ASD. These interventions include discrete trial teaching (e.g., Matson, Sevin, Fridley, & Love, 1990), video modeling (e.g., Charlop-Christy, Le, & Freeman, 2000), and script fading (e.g., Krantz & McClannahan, 1993). Despite the implementation of several interventions to individuals diagnosed with autism, it is important for researchers to continue to develop and evaluate new interventions to teach social behavior and social communication skills to identify the most effective and efficient procedures.

One intervention that has been implemented clinically to individuals diagnosed with ASD (R. B. Leaf et al., 2011; J. B. Leaf, Dotson, Oppenheim-Leaf, Sherman, & Sheldon, 2012) and only recently has been evaluated in the research is the cool versus not cool procedure (J. B. Leaf, Tsuji et al., 2012). The cool versus not cool procedure is a discrimination program (J. B. Leaf, Sheldon, & Sherman, 2010) where students have to discriminate whether a demonstrated behavior was either cool (socially appropriate) or not cool (socially inappropriate). There are five general components within the cool versus not cool procedure. First, the teacher demonstrates the behavior in a manner that corresponds with either the cool or not cool way of behaving. Second, the teacher asks the student(s) to discriminate if the demonstration was cool or not cool. Third, the teacher provides the student with reinforcement for correct discriminations or provides corrective feedback for incorrect discriminations of whether the demonstration was cool or not cool. Fourth, the teacher asks the student(s) to state why the demonstration was cool or not cool. Finally, the teacher provides the student with reinforcement for correct explanations or corrective feedback for incorrect explanations of why the demonstration was cool or not cool. In addition, an optional sixth component may include the student appropriately role-playing the social behavior (i.e., the “cool” way).

The cool versus not cool procedure is a discrimination program that has been described in curriculum materials for individuals diagnosed with autism (e.g., R. B. Leaf, McEachin, Taubman, 2012c; Taubman et al., 2011) and has been implemented clinically to teach social behaviors to hundreds of children in home behavioral programs (R. B. Leaf et al., 2011), social skills groups (J. B. Leaf, Dotson et al., 2012), and school programs (e.g., Au et al., 2015; J. B. Leaf, 2010a, 2010b). Despite its widespread use and discussions in non-empirically based literature, there remains little empirical evidence on the cool versus not cool procedure’s effectiveness for individuals diagnosed with autism (J. B. Leaf, Tsuji et al., 2012).

J. B. Leaf, Tsuji et al. (2012) were the first to evaluate the cool versus not cool procedure empirically. The researchers taught a variety
of social behaviors to three individuals diagnosed with an autism spectrum disorder (ASD). The researchers first evaluated the cool versus not cool procedure without participant role-plays; if the participant was unable to reach mastery criterion (i.e., 80% of the steps across three consecutive probes), then a role-play component was added. Results of this study showed that participants reached mastery criterion on 50% of skills without the addition of role-playing and were able to reach mastery criterion on an additional 38% of the skills when role-playing was added.

There could be several behavioral explanations for why the cool versus not cool procedure has been found to be effective both in the empirical research (i.e., J. B. Leaf, Tsuji et al., 2012) and in clinical intervention (e.g., R. B. Leaf et al., 2011; J. B. Leaf, Dotson et al., 2012). First, the cool versus not cool procedure incorporates the teacher modeling the correct behavior, which informs the student of what behaviors he or she should be engaging in and has been found to be an important component in skill acquisition (e.g., Charlop-Christy et al., 2000). Additionally, when implementing the cool versus not cool procedure teachers model the behavior incorrectly. Given that social communication can be complex and highly nuanced, it may be possible that a student does not understand what behaviors they are displaying inaccurately; providing a not cool demonstration will allow them to observe which behaviors they are demonstrating incorrectly and, hopefully, they will then be able to change these behaviors. Third, the cool versus not cool procedure utilizes student role-playing of the desired targeted behavior. This allows the student to receive hands on practice in displaying the desired social behavior and has been a component of many effective procedures (e.g., J. B. Leaf et al., 2009). Finally, the cool versus not cool procedure utilizes both reinforcement and punishment (e.g., corrective feedback), both of which are essential components of changing behavior.

Despite the positive findings of the J. B. Leaf, Tsuji et al. (2012) study, there are several questions that still need to be answered. First, it is not known what effects the cool versus not cool procedure will have on different children and on different skills. Second, in the original J. B. Leaf, Tsuji et al. study, student role-playing was added only if the participant was unable to acquire the targeted social behaviors; therefore, it is not known what the effects would be if student role-playing is added as a mandatory step from the beginning of intervention. Third, no teaching data was presented in the J. B. Leaf, Tsuji et al. study; therefore, it is not known how participants responded during actual teaching. Finally, it is not known if utilizing the social skills taxonomy to select skills based upon participants’ strengths and deficits
would be an effective way to determine target behaviors. Therefore, the purpose of this study was to expand the research on the cool versus not cool procedure by addressing the areas that warrant research (described above).

Method

Participant and setting

Brady was a four-year-old boy diagnosed with Autism Disorder. Brady had a Wechsler Preschool and Primary Scale of Intelligence-IV (WPPSI-III) full scale IQ score of 110, a Vineland Adaptive Behavior Scales (VABS) composite score of 84, and a Social Skills Improvement System-Parent Version (SSIS-P) standard score of 70 (4th percentile). Sally was a three-year-old girl diagnosed with Autism Disorder. Sally had a WPPSI-III full scale IQ score of 125, a VABS composite score of 81, and a SSIS-P standard score of 81 (10th percentile). Hank was a six-year-old boy diagnosed with Autism Disorder. Hank had a WPPSI-III full scale IQ score of 85, a VABS composite score of 72, and a SSIS-P standard score of 74 (4th percentile). All research sessions took place in a clinic room as part of a private agency that provides behavioral intervention to individuals diagnosed with ASD.

Targeted Skills

Each participant was taught one social communicative skill. Each of these behaviors fell under the umbrella of the social communication domain as part of the social taxonomy created by Taubman and colleagues (2011). Each participant’s parents were asked to fill out the Social Skills Improvement System (Gresham & Elliott, 2008) to evaluate if they had a deficit in social communicative behaviors and in overall social behavior. The results of this assessment showed that all participants were under the 15th percentile in overall social behavior (see above) and had below average scores on social communication; thus, all children showed a deficit in social communication.

To select which specific behaviors would be targeted, the researchers and the participants’ clinical supervisors utilized the social skills taxonomy as a guide to select the specific social communicative behaviors. The clinical supervisor was a behavioral therapist who had at least six years of experience working in the field of Applied Behavior
Analysis and its implementation for individuals diagnosed with ASD, and was in charge of program development and staff training.

Using the social taxonomy, each participant’s clinical supervisor and the researcher identified which social communicative behaviors the participant was not currently displaying. Next, the clinical supervisor removed skills that the participant had already received intervention on or that the supervisor had planned to intervene on in the next month. At this point, a final list of possible social communicative behaviors was identified and the researcher asked the participant’s parents which skills they would prefer be addressed; the skills identified by the parents were the skills targeted during this study. Finally, each of the social skills was then task analyzed and broken down into smaller behavioral steps.

Brady was taught to provide verbal support to his friend when his friend was completing a fluency task (e.g., putting blocks in a bucket). Providing verbal support was defined as Brady providing two different positive verbal comments by the time the friend completed the task. Sally was taught how to “chat” with a friend while watching a short YouTube video. Chatting was defined as: (a) Sally making at least one comment about something occurring in the video while the video was playing, (b) Sally making at least one different comment about what happened in the video within 30 seconds of the video ending, and (c) Sally making at least one subjective comment of a qualitative nature (e.g., “I like . . . ,” “The girl’s dress was pretty,” or “That person was funny”) either during the video or up to 30 seconds after the completion of the video. Hank was taught how to interrupt a conversation appropriately. Interrupting appropriately consisted of five behavioral steps: (a) approaching the person he wanted to talk to, (b) not saying anything to the person until within 3 feet of the person he had a question for, (c) saying “excuse me,” (d) asking the person the question only after saying “excuse me” and waiting for a verbal cue (e.g., the person saying “yes”) or a nonverbal cue (e.g., the person looking at him) from the person he or she was interrupting, and (e) saying thank you or acknowledging that he was leaving only after the person answered his question.

**Naturalistic Probes**

The researchers measured mastery of each social skill through naturalistic probes, which were opportunities for the participant to display the targeted skill. For both Brady and Sally, a peer engaged in
a behavior that set the occasion for the participant to display the targeted social behavior. For Hank, three different adults engaged in a behavior that set the occasion for Hank to display the appropriate social skill. The researcher did not prompt or provide reinforcement to the participant during naturalistic probes. Naturalistic probes assessed generalization of the target skills to novel settings and persons, as the peers (for Brady and Sally) and adults (for Hank) utilized during naturalistic probes were not present during the teaching procedure.

For the skill of verbally supporting a friend, Brady and an untrained peer were told that they were going to see how fast the peer could engage in a task (e.g., “We are going to watch how fast it takes for Sam to put all the blocks in the bucket”). Next, the researcher instructed the peer to start the task and scored which steps of the targeted skill Brady successfully demonstrated. Multiple exemplars of the task occurred throughout all conditions of the study.

For the skill of chatting, Sally and a trained confederate peer (trained to not speak until Sally did) were brought into a room and told that they were going to watch a short video (YouTube clip) on the IPad. The researcher then started the short video (i.e., no more than 3 minutes); once the video had completed the researcher told the children that he or she had to finish something and that they should sit until the researcher was done. The researcher then scored which steps Sally successfully demonstrated throughout the probe. Multiple exemplars of the video were utilized throughout all sessions and conditions of the study.

Three adults were required to run the naturalistic probe for interrupting appropriately. During the naturalistic probe, one adult pulled Hank aside and told Hank to ask the second adult a question (e.g., “Ask Justin what time lunch is”). Meanwhile, the second adult and a third adult engaged in a conversation. The first adult scored which of the steps of the targeted skill Hank displayed correctly. The adults and questions varied throughout all sessions and conditions of the study.

**General Procedure and Design**

Research sessions ran five days a week and lasted approximately 20 minutes in length across the four conditions: baseline, intervention, maintenance, and a booster session condition. We utilized a multiple baseline across participants design. Naturalistic probes lasted approximately 60 seconds and the teaching procedure lasted 15 to 20 minutes.
**Baseline**

During the baseline condition for each participant, the researcher removed the participant from his or her clinical therapy session and set up one naturalistic probe (described above). After the naturalistic probe was completed the participant continued with his or her regular clinical therapy.

**Intervention**

The intervention condition consisted of two components: a naturalistic probe followed by teaching using the cool versus not cool procedure plus role-playing. During the intervention condition for each participant, the researcher removed the participant from his or her clinical therapy and set up one naturalistic probe (described above) identical to baseline. After the naturalistic probe was completed the participant continued with his or her regular behavioral intervention for approximately ten minutes. Then, the researcher removed the participant from his or her clinical therapy and implemented the cool versus not cool procedure plus role-play.

The teaching procedure began with the researcher labeling the skill to be practiced (e.g., "We are going to practice interrupting appropriately"). Next, the researcher demonstrated the target skill with a second researcher. The researcher demonstrated the behavior appropriately (cool) two times and inappropriately (not cool) two times, for a total of four demonstrations. All four demonstrations were randomly implemented; therefore, the order of the appropriate and inappropriate demonstrations was always changing. The demonstrations were set up similar to naturalistic probes; however, the adults in the demonstrations were not utilized during the naturalistic probes and no peers were utilized during teaching. During correct demonstrations, the researcher displayed all of the steps of the targeted social behavior. During incorrect demonstrations, the researcher either omitted one of the steps or demonstrated one of the steps incorrectly. The step that the researcher omitted or completed incorrectly was based upon the participant's performance during the naturalistic probe earlier that research session. If the participant displayed 100% correct responding in the naturalistic probe that research session, then the researcher randomly selected a step to omit or display incorrectly.

After each demonstration the researcher asked the participant to verbally discriminate if the demonstration was "cool" or "not cool." If the participant provided a correct discrimination, then the researcher provided a general praise statement (e.g., "Good Job," "Great," or "Way to Go") for correct verbal responding. The researchers did not
provide specific praise as it was a two-choice discrimination and general praise indicated that they discriminated the trial correctly. If the participants discriminated the trial incorrectly, then the researchers provided general corrective feedback (e.g., “That’s not it,” “That is not right,” or “Nope”). The researchers did not provide specific corrective feedback or re-trial the discrimination trial, as each participant would be able to switch their response based on this general corrective feedback.

The participant was then asked to verbally state one reason why the demonstration was either “cool” or “not cool”. The researcher provided similar general praise for correct responding. For incorrect responding, the researcher provided general corrective feedback and provided a verbal statement of why the demonstration was “cool” or “not cool” (e.g., “Nope, that is not right; I did not say excuse me”).

After the four demonstration trials, the researcher informed the participant that it was his or her turn to practice the skill the “cool” way; the participant practiced the skill with the second researcher. The researcher set up the role-play similar to the naturalistic probe; however, the adults in the role-play were not utilized during the naturalistic probes and no peers were utilized during the role-play. After the role-play, the researcher asked the participant if he or she role-played the behavior correctly and provided either praise or corrective feedback (described above) based upon his or her verbal response. The researcher then asked the participant why the role-play was “cool” or “not cool” and provided praise or feedback based upon his or her verbal response (described above). The participant was asked to role-play the skill until he or she demonstrated 100% of the steps on two consecutive role-plays. If the participant role-played the skill incorrectly on two consecutive role-plays, the researcher verbally prompted the participant on the next role-play.

Maintenance

During the maintenance condition for each participant, the researcher removed the participant from his or her clinical therapy session and set up one naturalistic probe (described above). After the naturalistic probe was completed the participant continued with his or her regular clinical therapy. Maintenance probes occurred 5, 6, 13, and 17 days following intervention for Brady. Maintenance probes occurred 3, 4, 8, and 24 days following intervention for Sally. Maintenance probes occurred 7, 8, 10, and 14 days following intervention for Hank.
Booster session

Unfortunately, Brady and Hank demonstrated poor performance during the maintenance condition; therefore, a booster session condition was added to ensure that Brady and Hank could appropriately demonstrate their targeted social skills. During the booster session condition, the researcher removed Brady or Hank from their clinical therapy session and set up one naturalistic probe (described above). After the naturalistic probe, Brady or Hank had to role-play the behavior two times, regardless of how they performed during the naturalistic probe. During the role-play the teacher provided praise for correct demonstrations and corrective feedback for incorrect demonstrations. The researchers elected to only implement the role-playing component, as opposed to role-playing and demonstration, for two reasons. First, the researchers wanted to work on the skill immediately following the naturalistic probe (e.g., in the moment), and a demonstration would require another adult (which was not available), whereas the role-play could be done with the researcher alone. Second, the researchers wanted to systematically fade out the procedure by removing one component to assess whether the skills would maintain with lesser components.

Dependent Variables

Skill acquisition was the main dependent variable in this study. Skill acquisition was determined during naturalistic probes. Mastery criterion was set as the participant displaying 100% of the skill steps across three consecutive naturalistic probes. Naturalistic probes also assessed whether the participants would be able to generalize the skills taught to them to a peer or a different adult. The second measure was the percentage of correct responding during researcher demonstrations (i.e., discrimination and statement of why the demonstration was “cool” or “not cool”). The third measure was the average number of role-plays necessary during each teaching session for the participant to meet the criterion of demonstrating 100% of the skill steps across two consecutive role-plays.

IOA and Treatment Fidelity

A primary observer scored each naturalistic probe and a secondary observer was utilized for IOA. IOA was collected on the primary
dependent variable during 33.3% of probe sessions (range, 27.3% to 38.9% across participants). IOA was calculated by totaling the number of agreements on the scoring of each skill step divided by the total number of agreements and disagreements. IOA for the primary dependent variable was 98% (range, 80% to 100% across sessions) across all probes.

To assess treatment fidelity, an independent observer recorded planned researcher behaviors during 34.7% of teaching sessions (range, 22% to 45.4% across participants). Planned researcher behaviors were: (a) the researcher demonstrating the behavior correctly twice and incorrectly twice, (b) the researcher asking the participant to discriminate whether each role-play was “cool” or “not cool” and why, (c) the researcher providing appropriate feedback based upon participant responding during each demonstration trial, (d) the participant role-playing the behavior until the participant displayed the skill 100% correct across two consecutive probes, (e) the researcher asking the student to rate his or her own performance, (f) the researcher providing appropriate feedback after each role-play opportunity, and (g) the researcher providing prompting after two consecutive incorrect responses. Treatment fidelity was 100% across all sessions.

Results

Skill acquisition

Participant performance during naturalistic probes is displayed in figure 1. During baseline, Brady displayed 0% of the steps for providing verbal support across three consecutive sessions. During intervention, Brady demonstrated variable responding until he reached mastery criterion on the thirteenth naturalistic probe. During the assessment of maintenance, Brady’s performance continually declined until he displayed 0% of behavioral steps across two consecutive sessions. Therefore, a booster session condition was implemented and within two sessions Brady was once again displaying 100% of the behavioral steps across three consecutive sessions. Based upon anecdotal information, incorrect responding during the intervention condition, maintenance condition, and first session of the booster condition was believed to be due to inattention.

During baseline, Sally displayed 0% of the behavioral steps for chatting during nine out of the ten baseline sessions. Sally reached mastery criterion within nine naturalistic probes during the interven-
tion condition. During the assessment of maintenance, Sally showed variable responding, ranging from 40 to 100% of the behavioral steps. Since Sally's responding was at criterion during half of the maintenance probes and was 100% during the final probe, no booster sessions were implemented.

During baseline, Hank displayed less than 40% of the behavioral steps for interrupting during all baseline sessions. The only steps that Hank displayed correctly during baseline were the first two behavioral steps of interrupting (i.e., approaching the person who Hank had to ask a question to and not saying anything to the person until within 3 feet of the person). Hank reached mastery criterion on the 10th naturalistic probe during the intervention condition. During the assessment of maintenance, Hank displayed 100% of the steps during the first naturalistic probe in the maintenance condition and then displayed 40% of the steps on the following three naturalistic probes. Since Hank continued to display low performance during the assessment of maintenance, a booster session condition was implemented; within four naturalistic probes Hank consistently demonstrated 100% of skill steps.

Responding During Researcher Demonstration

Table 1 represents the percentage of teacher demonstration trials where participants were able to correctly discriminate if a teacher demonstration was either cool or not cool. Table 2 displays the percentage of teacher demonstration trials where a participant was able to correctly state why a demonstration was cool or not cool. For Brady, there were a total of 52 demonstrations; overall, Brady was able to correctly discriminate whether the demonstration was “cool” or “not cool” during 98% of all researcher demonstrations and state why a demonstration was “cool” or “not cool” during 96% of all demonstrations. For Sally, there were a total of 36 demonstrations; overall, Sally was able to correctly discriminate whether the demonstration was “cool” or “not cool” during 97% of all researcher demonstrations and state why a demonstration was “cool” or “not cool” during 92% of all demonstrations. For Hank, there were a total of 40 demonstrations; overall, Hank was able to correctly discriminate whether the demonstration was “cool” or “not cool” during 93% of all researcher demonstrations and state why a demonstration was “cool” or “not cool” during 85% of all demonstrations.
Figure 1. Performance during Naturalistic Probes. Along the x-axis are number of sessions (number of naturalistic probes) and along the y-axis is the percentage of steps displayed correctly. Each panel represents a different participant.
Table 1
Percentage of Correct Discrimination during Research Demonstration

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Table 2
Percentage of Participants Correctly Stating Why a Demonstration was Cool or Not Cool

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Table 3  
Number of Participant Role-Plays per Session

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Participant Role-Playing During Teaching

The number of role-plays each participant engaged in during a single teaching session is displayed in table 3. The number of role-plays varied from session to session for Brady. Anecdotally, sessions where Brady was paying better attention required fewer role-plays and sessions where Brady's attention was decreased required a greater amount of role-plays. Brady received a total of 47 role-plays, for an average of 3.62 role-plays per session during the intervention condition. Finally, Brady received a total of 6 role-plays during the booster session condition.

For the majority of sessions, Sally required the minimal number of role-plays (two role-plays); overall, Sally completed a total of 22 role-plays, with an average of 3.4 role-plays per session during the intervention condition. Hank also required the minimal number of role-plays during the majority of teaching sessions. Overall, Hank completed a total of 31 role-plays, with an average of 2.8 role-plays per session during the intervention condition. In the booster session condition Hank completed a total of 6 role-plays.
Discussion

The cool versus not cool procedure is a variation of typical discrimination training (e.g., J. B. Leaf, Sheldon et al., 2010), which has been implemented to hundreds of individuals diagnosed with ASD in community programs (e.g., R. B. Leaf et al., 2011), and school programs (e.g., Au et al., 2015). The purpose of this study was to replicate and expand upon the previous research in the following ways: (a) assess whether the cool versus not cool procedure is effective in teaching a different group of individuals diagnosed with ASD, (b) assess whether the cool versus not cool procedure is effective in teaching new social behaviors, (c) evaluate what the effects would be if role-playing was added to the cool versus not cool procedure, (d) evaluate participants' performances during teaching, and (e) utilize a formal social taxonomy to determine skills to be taught.

The results of this study replicated and expanded upon the original J. B. Leaf, Tsuji et al., (2012) study in several ways. First, like the previous study, all participants were able to reach mastery criterion. Although it took participants up to 13 sessions to reach mastery criterion, this amount of time does not differ from other commonly implemented procedures (e.g., video modeling, teaching interaction procedure, and behavioral skills training). In terms of skill acquisition, the results expand upon the previous research as the procedure was implemented to different children and on different skills, two hallmarks of what it takes to establish a procedure as evidence based (Horner et al., 2005).

Second, and perhaps the biggest expansion of the literature on the cool versus not cool procedure, is that this study included role-playing as a mandatory component from the beginning of intervention. In the J. B. Leaf, Tsuji et al. (2012) study, participants were able to reach mastery criterion on only 50% of skills without the implementation of role-playing; in this study participants were able to reach mastery criterion on 100% of skills when role-playing was added. These results suggest that role-playing may be an important component for skill acquisition and clinicians should consider utilizing role-playing from the beginning of intervention.

Third, this study was able to expand upon the previous research by providing teaching data on participants' responding and role-playing during teaching sessions. The data suggest that participant responding and role-playing were at high levels during all teaching sessions. Fourth, the results indicated that two participants were unable to maintain the skills after teaching had concluded, which differs from the original J. B. Leaf, Tsuji et al. (2012) study. First, the lack of
systematically fading teaching may have contributed to lower performance during maintenance probes. The study involved the researchers implementing teaching every day and then suddenly stopping teaching, which may have resulted in lower rates of correct responding. Thus, it is recommended that teachers systematically fade intervention and that future researchers evaluate the most effective ways to fade intervention. The researchers also did not provide reinforcement during naturalistic probes; therefore, an extinction effect could have taken place. The researchers did not provide reinforcement as it could be a confounding variable (e.g., not knowing if it was the reinforcement or the teaching that attributed to differences in responding); however, in clinical practice it might be advantageous for teachers to provide reinforcement during natural opportunities when the behavior may occur. Finally, the researchers did not provide feedback for inattention, which was hypothesized to be one reason why low levels of responding were demonstrated by one participant during maintenance. Despite the negative findings on the maintenance data, it is still important to report such findings as it does not provide an overrepresentation or an underrepresentation of any procedure (Sham & Smith, 2014).

Finally, the study expanded upon previous studies as it utilized a formal social skills taxonomy (Taubman et al., 2011) to determine which social communicative behaviors to teach all three participants. Therefore, skills were not selected arbitrarily; skills selected were important and applied targets for each individual participant. Future researchers may wish to continue to evaluate methods to utilize the taxonomy in selecting social behaviors for individuals diagnosed with ASD.

The results of this study provide clinicians, teachers, and parents with an additional intervention that can be utilized to teach social communication and social behaviors to individuals diagnosed with autism. The results of this study also start providing empirical support to the effectiveness of a procedure that has been implemented in various clinical settings. Despite the positive findings of the study there are additional questions that should be addressed in future research. First, the intervention was implemented by teachers with years of experience in ABA and implementing the cool versus not cool procedure. It, however, is not empirically known how well a novice teacher would be able to implement the procedure. Additionally, it is not known how much training would need to occur for teachers to be able to implement the procedure with a high degree of fidelity. Anecdotally, it has been our experience that novice teachers are able to implement the procedure with a high degree of fidelity after receiving a short amount of quality training. However, future researchers should evaluate the degree of fidelity that novice teachers demonstrate while
implementing the procedure and what training is required for teachers to become proficient in the procedure.

Second, the cool versus not cool procedure utilizes both correct and incorrect teacher demonstrations of the targeted skills. The incorrect demonstrations are utilized to highlight what behaviors the participants are displaying incorrectly. Although the cool versus not cool procedure utilizes incorrect demonstrations it is not empirically known if such demonstrations are necessary. Third, the researchers utilized corrective feedback as part of teaching. Anecdotally, the students did not display any aberrant behaviors after receiving corrective feedback. Previous research has supported the utilization of corrective feedback and has shown it to be an effective component of teaching (Smith, Mruzek, Wheat, and Hughes, 2006) and in some cases more efficacious than errorless learning (J. B. Leaf, Sheldon et al., 2010). Nevertheless, future researchers should evaluate if corrective feedback is a necessary component of the cool versus not cool procedure.

In this study the researchers utilized the terminology “cool” versus “not cool” instead of using such terms as correct/incorrect, which may be more accurate. The researchers utilized the words “cool” and “not cool” as we felt it was more natural for children to use this terminology and may be less stigmatizing than using words such as “correct” or “incorrect.” However, it should be noted that the words “cool” and “not cool” can be used interchangeably and, anecdotally, we have seen words such as “wicked”/“not wicked” or “spot on”/“your off.” Finally, the cool versus not cool procedure has been clinically implemented in school districts and classrooms (e.g., Au et al., 2015). Future researchers may wish to evaluate the procedure within these settings.

In addition to these areas of future research there are several limitations that should be addressed by future researchers. First, only low levels of generalization were assessed in this study. Teaching occurred without peers or adults who were utilized in naturalistic probes. Thus, naturalistic probes were able to assess generalization to different people. Although this study did evaluate generalization, probes were still contrived situations within the confines of the research environment; future researchers should evaluate higher levels of generalization by probing skills in more natural environments and with individuals who the participant might come in contact with in their home or community. Second, no formal measures of social validity were taken. Third, no long term maintenance of skills was assessed, which should be addressed by future researchers. Finally, the cool versus not cool procedure plus role-play consists of many components and it is not clear which component or combination of components was responsible for a change in behavior.
Regardless of these limitations, this study provides some preliminary evidence that the cool versus not cool procedure in conjunction with role-plays may be an effective procedure to teach social communicative behaviors for individuals diagnosed with ASD. Given the importance of teaching social communication to individuals with ASD and the need to find the most efficacious procedures, future researchers should compare the cool versus not cool procedure to other commonly implemented procedures to identify the most effective and efficient procedures to teach social communication behaviors to individuals diagnosed with ASD.

References


