

ORIGINAL ARTICLE

Teaching social behaviour to individuals diagnosed with autism spectrum disorder using the cool versus not cool procedure in a small group instructional format

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ABSTRACT

Background Children with autism spectrum disorder have impairments in social behaviours that require systematic intervention. The purpose of this study was to evaluate the cool versus not cool procedure implemented in a small group (dyad).

Method The cool versus not cool procedure consisted of the researcher demonstrating the targeted behaviour both correctly and incorrectly and having the participants discriminate the demonstration. If the participants were unable to reach mastery, additional components were added. The researchers utilised a multiple-probe design to evaluate the cool versus not cool procedure.

Results Results indicated that participants were able to reach mastery criterion on some of the social skills with the demonstration alone whereas some skills required either role-playing or feedback during probes.

Conclusions The results showed that the cool versus not cool procedure was somewhat effective in increasing social behaviours; however, some skills required additional components for participants to reach mastery criterion.

KEYWORDS

Cool versus not cool; discrimination learning; group instruction; social skills

Introduction

For an individual to be diagnosed with an autism spectrum disorder (ASD) they must display a qualitative impairment in social behaviours (American Psychiatric Association, 2013). Researchers have shown that individuals diagnosed with ASD have deficits in eye contact (Phillips, Baron-Cohen, & Rutter, 1992), responsiveness (Dawson & Adam, 1984), and joint attention (Charman et al., 1997). Researchers have also shown that individuals diagnosed with ASD have fewer friends, and when they do have friendships they are of a lower quality (Bauminger & Kasari 2000). The lack of social behaviour may lead to negative outcomes associated with ASD, including depression (Stewart, Barnard, Pearson, Hasan, & O'Brien, 2006), loneliness (Bauminger & Kasari, 2000), and suicidal ideation (Mayes, Gorman, Hillwig-Garcia, & Syed, 2013). Thus, it is important that teaching social behaviour be included as part of an intervention plan.

Fortunately, social skills interventions are a common component of intervention plans for individuals diagnosed with ASD. There are a wide variety of interventions that have been empirically shown to be effective

and would be considered behaviour analytic in nature. Many of these procedures utilise either teacher demonstration, student role-playing, or a combination of teacher demonstration and student role-playing; these procedures include video modelling (e.g., Charlop-Christy, Le, & Freeman, 2000), discrete trial teaching (e.g., Lovaas, 1987), the teaching interaction procedure (e.g., Dotson, Richman, Abby, Thompson, & Plotner, 2013), and behavioural skills training (e.g., Stewart, Carr, & LeBlanc, 2007).

One behaviour analytic procedure that has been used to teach social behaviours for individuals diagnosed with ASD is the cool versus not cool procedure (Leaf, Taubman, McEachin, Leaf, & Tsuji, 2011; Leaf, Tsuji, et al., 2012). The cool versus not cool procedure is used to teach individuals diagnosed with ASD to discriminate between socially appropriate behaviours ("cool") and socially inappropriate behaviours ("not cool"). The cool versus not cool procedure consists of the following components: (a) the teacher demonstrating the behaviour in a manner that corresponds to either the "cool" (socially appropriate) way of behaving or the "not cool" (socially inappropriate) way of behaving, while the student

observes; (b) the teacher asking the student if the demonstration was “cool” or “not cool”; (c) the teacher providing the student with reinforcement for correct identification or corrective feedback for incorrect identification; (d) the teacher asking the student why the demonstration was “cool” or “not cool”; and (e) the teacher providing the student with reinforcement for correct explanation or corrective feedback for incorrect explanation. The order of the demonstrations can be randomised (e.g., the cool demonstration can occur prior to the not cool demonstration) or varied (e.g., several cool versions may be presented in a row).

An additional component that has been used when implementing the cool versus not cool procedure is having the learner role-play the behaviour the “cool” (socially appropriate) way following the teacher demonstration (Leaf, Tsuji, et al., 2012). Teachers typically only allow the learner to role-play the behaviour the “cool” way for several reasons. First, it allows the student to practise the social behaviour the correct way across different potential scenarios (e.g., train sufficient exemplars), which may result in greater levels of generalisation (Stokes & Baer, 1977). Second, the teacher is given the opportunity to provide reinforcement to the learner contingent upon demonstration of appropriate social behaviours. Third, it ensures that the learner does not receive any inadvertent reinforcement (e.g., social attention) for displaying inappropriate behaviours. After the learner role-plays the behaviour, the teacher provides reinforcement if the student role-played the behaviour correctly or provides corrective feedback if the student role-played the behaviour incorrectly. The teacher then asks why the role-play was “cool” or “not cool” and provides reinforcement or corrective feedback based upon the student’s response. If the student role-played correctly on the first trial, the teaching typically is concluded; however, if the student role-played incorrectly, then they have more opportunities to practise the skill.

Leaf, Tsuji, et al. (2012) were the first to empirically evaluate the utilisation of the cool versus not cool procedure to increase social behaviours for individuals diagnosed with ASD. In that study, three children, with ages ranging from 4 to 9 years old, were taught a variety of social behaviours (e.g., abduction prevention, changing the conversation, and joint attention) using the cool versus not cool procedure. The researcher task-analysed each skill and divided them into smaller behavioural steps. The cool versus not cool procedure initially involved the teacher-modelling component but not the participant role-play component; if, after 10 sessions, the participants were unable to reach mastery criterion (displaying 80% of the behavioural steps

across three consecutive sessions) the researcher implemented role-playing as part of the cool versus not cool procedure. The results of the study showed that participants were able to reach mastery criterion for 50% of the skills taught using the cool versus not cool procedure without role-playing and were able to reach mastery criterion on an additional 37.5% of skills once role-playing was added. Thus, participants were able to reach mastery criterion on 87.5% of all skills taught, demonstrating that the cool versus not cool procedure can be an effective teaching procedure for individuals diagnosed with ASD.

Although the results from the Leaf, Tsuji, et al. (2012) study are promising, these results represent only one empirical investigation; thus, more studies need to be conducted in order to empirically validate that the cool versus not cool procedure is an evidence-based procedure for individuals diagnosed with ASD (Horner et al., 2005). Additionally, there are several questions that need to be addressed in future research projects. One question is whether the cool versus not cool procedure would be effective in a small group instructional format. Second, the cool versus not cool procedure needs to be evaluated with a different and wider variety of participants. Third, the cool versus not cool procedure needs to be evaluated for teaching different skills than in the original Leaf, Tsuji, et al. (2012) study. The purpose of the current study was to expand the research on the cool versus not cool procedure by evaluating the procedure when implemented in a small group instructional format for two children diagnosed with ASD. In doing so we were able to address some of the questions that needed to be evaluated in regard to the efficacy of the cool versus not cool procedure.

Method

Ethical considerations and informed consent

This study went through an expedited review (as the study was considered a part of each of the participant’s “typical” treatment) and was approved by an Autism Partnership Foundation Institutional Review Board that ensured that the participants’ rights were protected. The researchers explained to the participants’ parents the purpose of the study, the procedures, risks, benefits, and the participants’ rights prior to the study and received informed written consent prior to a participant being enrolled in the study. The researchers also explained to the participants that they were going to be working in a group to learn new social behaviours. The researchers ensured that all sensitive information was placed within a secured and locked cabinet. Throughout the study,

pseudonyms are used to protect the confidentiality of the participants.

Participants and confederate peers

Andy, a 3-year-old boy with autistic disorder, had a Wechsler Preschool and Primary Intelligence Scale (WPPSI-III) full scale IQ score of 122 (superior range); a Reynell Developmental Language Scale (RDLS) Verbal Comprehension Age of 3 years 5 months and Expressive Language Age of 4 years 2 months; a Child Behavior Checklist C-TRF Attention Problem T-score of 51 (normal range); and a Social Responsiveness Scale (SRS) overall score of 69 (moderate inference in everyday social interactions). Andy was of Chinese descent but was a native English speaker. Prior to this study, Andy had received 11 months of behavioural intervention for approximately 21 hours per week. Andy did not have any previous history with the cool versus not cool procedure. Andy demonstrated deficits in social behaviour and intervention in this area was warranted.

Edward, a 6-year-old boy with autistic disorder, had a WPPSI-III full scale IQ score of 81 (average range); a RDLS Verbal Comprehension Age that indicated that he had a verbal comprehension of 3 years 8 months and Expressive Language Age of 5 years 1 month; a Child Behavior Checklist C-TRF Attention Problem T-score of 55 (normal range), and an SRS overall score of 77 (severe inference in everyday social interactions). Edward was of Chinese descent but was a native English speaker. Prior to this study, Edward had received 3 years 4 months of behavioural intervention for approximately 28 hours per week. Edward had a previous history with the cool versus not cool procedure. Edward demonstrated deficits in social behaviour and intervention on social behaviour was warranted.

A third participant initially was enrolled within the study and participated in teaching for the first targeted social behaviour. Due to challenging behaviours outside of the research study (i.e., during clinical sessions), that participant was removed from the study and, therefore, his data is not depicted within the study. The researchers made use of confederate peers during naturalistic probes and other peers during generalisation probes. The confederate peers were clients of the agency where the research was being conducted. All confederate peers were individuals diagnosed with ASD, who could be considered higher functioning, and who were higher functioning than the two participants. The peers utilised in generalisation probes were typically developing peers and children diagnosed with ASD with whom both participants frequently had play dates with outside of intervention.

Setting

The study took place as part of a school readiness program (e.g., a small group of children), which focuses on social skills, observational learning, learning-how-to-learn skills, play, language, communication, and academic skills. The school readiness program consisted of three children (Andy, Edward, and another child). The group was conducted in a clinic that provides behavioural intervention to individuals diagnosed with ASD and developmental disability in Hong Kong. The room was 5.7 by 4.3 m and furnished as a preschool classroom (e.g., containing toys, instructional materials, chairs, and tables).

Skills taught

The researchers taught the participants three different social skills that were determined to be areas of need for both participants; areas of need were determined by observing the participant and interviewing the participant's clinical supervisor. The first social skill that was taught to both participants was initiation of game play with a peer. This was defined as the participant looking at the peer and making a verbal statement indicating a desire to play (e.g., "Let's play Swords."). The second skill that was taught to both participants was commenting on a toy or item that a peer showed them. This was defined as the participant engaging in the following steps when a peer showed them a toy: (a) looking at the toy and/or peer, (b) making an appropriate comment about the item shown, and (c) not grabbing the toy or item from the peer. The final skill taught to the participants was gaining a peer's attention. This was defined as the participant: (a) requesting an item from a peer; (b) increasing his voice volume to gain the peer's attention, if the peer did not notice the request; and (c) tapping the peer's shoulder and repeating the request, if the peer still did not hear the request. It should be noted that the three skills varied in difficulty and vocal topography; however, all skills fell within the range of an important class of social behaviour(s).

Dependent variables and measures

The primary dependent variable of this study was each participant's skill acquisition of the three targeted social skills, which were determined in naturalistic probes with a confederate peer (described previously). During naturalistic probes the teacher did not provide any direct instruction to the participant, nor did they prompt, prime, reinforce, or provide feedback based upon the participant's performance; however, if after 15 sessions

the participant did not show improvement on a skill, the researchers did provide feedback during naturalistic probes (as will be described).

For the first skill of initiating play, the naturalistic probe consisted of five trials, with approximately 30 seconds between each trial. During each trial, the confederate peer and the participant sat at a table and the researcher instructed both children that it was “free play time.” The confederate peer would not play with either of the toys and waited 30 seconds to see if the participant would engage in the appropriate behaviour (as previously described). During each trial, the researchers scored whether or not the participant engaged in the appropriate behaviour (as previously described). Mastery criterion for this skill was the participant displaying the appropriate behaviour during 80% of trials for three consecutive sessions.

For the second skill of commenting on toys, a naturalistic probe consisted of five trials, with approximately 20 seconds between each trial. During each trial, the confederate peer walked over to the participant, held up a toy/item in view of the participant, and verbally indicated to the participant that they were showing them the toy or item. The confederate peer waited 10 seconds for a response. If the participant responded, the confederate peer would remain; if the participant did not respond, the confederate peer would walk away. Mastery criterion for this skill was the participant displaying the appropriate behaviour during 80% of trials for three consecutive sessions.

For the third skill of gaining a peer’s attention, a naturalistic probe consisted of three trials, with 30 seconds between each trial. During each trial, the confederate peer and a teacher would work together on a task and the researcher would instruct the participant to retrieve an item from the confederate peer. The confederate peer was instructed not to respond until the participant tapped the peer on the shoulder. The participant had up to 30 seconds to gain the peer’s attention appropriately. Mastery criterion for this skill was the participant displaying the appropriate behaviour during 100% of trials for three consecutive sessions.

Additionally, we measured if participants were able to maintain the skills after intervention. Maintenance probes occurred 1 to 54 days after a participant had reached mastery criterion (stated previously). Furthermore, we evaluated if participants were able to display the three targeted skills with generalisation peers during generalisation probes. Although we called these probes generalisation probes, it should be noted that no baseline data was taken; therefore, it is not clear if the participants actually generalised the skills or if they were already displaying the skills with the generalisation peers prior to

intervention. Generalisation probes were conducted similar to naturalistic probes, except that they were conducted with a different peer; the generalisation peer was instructed similar to the confederate peer. Generalisation probes occurred only during the maintenance condition.

Design

The researchers utilised a multiple-probe design across the three targeted skills and replicated across the two participants (Horner & Baer, 1978). As this study was implemented in a small group instructional format, moving on to a different skill in the multiple-probe design was contingent upon both participants mastering the targeted skill. The participant who met mastery criterion remained in teaching sessions but no longer received naturalistic probes.

General procedures

This study consisted of five conditions: (a) baseline condition, (b) intervention condition, (c) intervention plus role-playing condition, (d) intervention plus role-playing and feedback during naturalistic probes condition, and (e) maintenance condition. Sessions occurred 5 days per week and each session lasted approximately 30 minutes. All sessions were conducted in English by a teacher who was proficient in English. Each day the researchers conducted naturalistic probes (as will be described). During the intervention condition, the naturalistic probes followed the implementation of the cool versus not cool procedure. Only one skill was taught at a time. The same researchers, setting, and confederate peers were used across all conditions.

Baseline

The baseline condition consisted of the participants participating in the regular clinical school readiness program. At the beginning of this program, the researchers implemented naturalistic probes for each of the participants. The researcher would pull out one of the participants to implement one of the naturalistic probes and then would take that participant back to the group. This was continued until the researchers implemented all naturalistic probes, for all targeted skills, for both participants.

Intervention

The intervention condition started with the implementation of the cool versus not cool procedure followed

by naturalistic probes. Intervention started with both participants and the other members of the school readiness program sitting in front of the researcher. The researcher then implemented 10 “cool” versus “not cool” trials (i.e., five “cool” trials and five “not cool” trials). The order of each trial was randomly determined ahead of time. Each demonstration was set up similarly to naturalistic probes except that another adult was used instead of the confederate peer.

Each trial started with a discriminative stimulus (S^D ; e.g., “Ready set action!”). Next, the researcher demonstrated the behaviour either “cool” or “not cool” (described as follows) based upon a random predetermined order. After each demonstration, the researcher asked all participants to rate if the demonstration was either “cool” or “not cool” by holding up a picture sign displaying a happy face (indicating cool) or a sad face (indicating not cool). Participants had approximately 3–5 seconds to respond. Both of the participants had a previous history with using the happy and sad face signs and, therefore, no teaching was required for this study. The participants were instructed to hold up the card at the same time (i.e., chorally). If the participants discriminated correctly, then the researcher provided praise and a token (which could be cashed in after the research session for a tangible item). If the participants responded incorrectly, then the researcher told the participant that they had responded incorrectly by saying “That is not it” and did not provide the participant with a token. Finally, the researcher asked each participant to independently and vocally state why the demonstration was “cool” or “not cool.” Participants had approximately 3–5 seconds to respond. The same consequences were provided for correct and incorrect responding as were provided for correct or incorrect discrimination.

During “cool” trials, the researcher demonstrated the behaviour appropriately, by displaying all steps of the behaviour, in front of the group. For example, if the targeted skill was initiating play, the researcher looked at the other adult and asked the other adult if he or she would like to play the game. During “not cool” trials, the researcher demonstrated the behaviour inappropriately, by omitting one of the steps, in front of the group. For example, if the targeted skill was initiating play, the researcher would not ask the other adult to play with him.

An hour after the intervention occurred, the researcher conducted naturalistic probes for the skills currently in acquisition and, on some randomly determined days, for the skills that were still in baseline or that were in the maintenance condition. Finally, for the skills that were in the maintenance condition the

researchers also conducted generalisation probes at this time.

Intervention plus role-play

If, after 10 sessions, the participant was unable to reach mastery criterion or was not close to reaching mastery criterion (e.g., two sessions of 100% correct responding) then an intervention plus role-play condition was implemented. The role-play component was utilised in the original Leaf, Tsuji, et al. (2012) study and is an established evidence-based procedure.

This condition began identical to the intervention condition (as previously described). Following the 10 demonstration trials, the researcher had each participant role-play the behaviour in front of the group. The participants were instructed to only demonstrate the behaviour the “cool” way. Each role-play was set up similarly to naturalistic probes, except that the participant practised the targeted behaviour with the researcher instead of a confederate peer. After the role-play, the researcher asked the other members of the group to chorally respond (described previously) if the discrimination was “cool” or “not cool” and individually state why the demonstration was “cool” or “not cool.” The researcher provided the same consequences described above to the participants for correctly or incorrectly rating the role-play and stating why the role-play was correct or incorrect. Additionally, the researcher provided a general and specific praise statement (e.g., “Way to go. I love how you did all of the steps [while describing each step].”) to the participant for a correct role-play. The researcher provided corrective and informative feedback (e.g., “That wasn’t it. You forgot to...”) for an incorrect role-play. A participant had to display 100% of the skills correctly across two consecutive role-plays within a given session to conclude role-playing during teaching for that session.

Intervention plus role-play and feedback for naturalistic probes

If after 10 sessions of the intervention condition and five sessions of the intervention plus role-play condition a participant had not reached mastery criterion or was not close to reaching mastery criterion (as previously described), then a reinforcement component was added to the naturalistic probes. This condition was identical to the intervention plus role-play condition; however, the researchers provided the participant with general social praise (“That was cool.”) for correct responding during each trial of the naturalistic probe, and provided the participant with general corrective feedback (“That’s not cool.”) for incorrect responding during each trial of

the naturalistic probe. The confederate peer was present while the researcher gave feedback to the participant.

IOA and treatment fidelity

The researcher scored participant performance during each trial of every naturalistic probe across the three targeted behaviours. A second observer independently scored participant performance during 33.7% of naturalistic probes via videotapes. Interobserver agreement was calculated by totalling the number of trials during which both observers agreed on the participant's response divided by the total number of trials. Interobserver agreement was 92.2% (range: 82.5–100%) across all three targeted behaviours.

To assess treatment fidelity, a research assistant assessed via videotape whether instructor behaviours occurred at the planned times during 25% of teaching sessions. There were a total of six teacher behaviours for teaching sessions with no role-play, which were: (a) demonstrating five trials of “cool” and five trials of “not cool,” as randomly predetermined; (b) asking the participants whether each demonstration was “cool” or “not cool”; (c) asking why each demonstration was “cool” or “not cool”; (d) providing reinforcement or tokens for correct answering; and (e) providing corrective feedback for incorrect responses. There were four additional teacher behaviours assessed during sessions with role-play. These additional teaching behaviours were: (a) having each participant role-play the “cool” behaviour, (b) providing reinforcement or tokens for correctly role-playing, (c) providing corrective feedback for incorrectly role-playing, and (d) having each participant role-play until he had two consecutive correct role-plays. For the feedback during naturalistic probes condition, there were the additional steps of: (a) providing praise for correctly displaying all of the steps during the naturalistic probe, or (b) providing corrective feedback for displaying any of the steps incorrectly during the naturalistic probe. Treatment fidelity was 99.1% across all teaching conditions.

Results

Andy

Figure 1 displays Andy's results for skill acquisition, maintenance, and generalisation probes. Along the X-axis is the number of sessions and along the Y-axis is the percentage of trials that Andy displayed the behaviour correctly. Closed circles represent Andy's performance during naturalistic probes and open squares

represent Andy's performance during generalisation probes. Across all three skills there are several different conditions depicted. The first is the baseline condition (BL), followed by the intervention condition (INT), followed by the intervention plus role-play condition (INT-R), followed by the intervention plus role-play and feedback condition (INT-F), followed by the maintenance condition (MAINT). It should be noted that there is one day of teaching prior to the first data point in the INT, INT-R, and INT-F conditions.

Andy showed low levels of responding during the baseline condition for all three skills. For the first skill, inviting a peer to play (top panel), Andy reached mastery criterion only after the intervention plus role-play and feedback during naturalistic probes condition (third ideation of the procedure) was implemented. For the second skill, commenting on toys (middle panel), and third skill, gaining a peer's attention (bottom panel), Andy was able to reach mastery criterion with the cool versus not cool discrimination procedure alone (first ideation of the procedure). Thus, neither role-playing nor feedback during naturalistic probes was necessary for Andy to reach mastery on two out of three skills. During the assessment of maintenance, Andy displayed 100% of the skills across all probes and all skills. Andy was also able to correctly demonstrate targeted social behaviours at high levels when interacting with novel peers during generalisation probes.

Edward

Figure 2 displays Edward's results for skill acquisition, maintenance, and generalisation. Edward's graph is set up identically to Andy's graph. It should be noted that there is one day of teaching prior to the first data point in the INT, INT-R, and INT-F conditions.

Edward showed low levels of responding during the baseline condition for all three skills. For the first skill, inviting a peer to play (top panel), and the second skill, commenting on toys (middle panel), Edward reached mastery criterion with the cool versus not cool discrimination procedure alone (first ideation of the procedure). For the third skill, gaining a peer's attention (bottom panel), Edward required intervention plus role-play and feedback during naturalistic probes to reach mastery criterion. During the assessment of maintenance, Edward's mean responding was 90%, 80%, and 92.6% for inviting a peer to play, commenting on toys, and gaining a peer's attention, respectively. Edward was also able to correctly demonstrate targeted social behaviours at high levels when interacting with novel peers during generalisation probes.

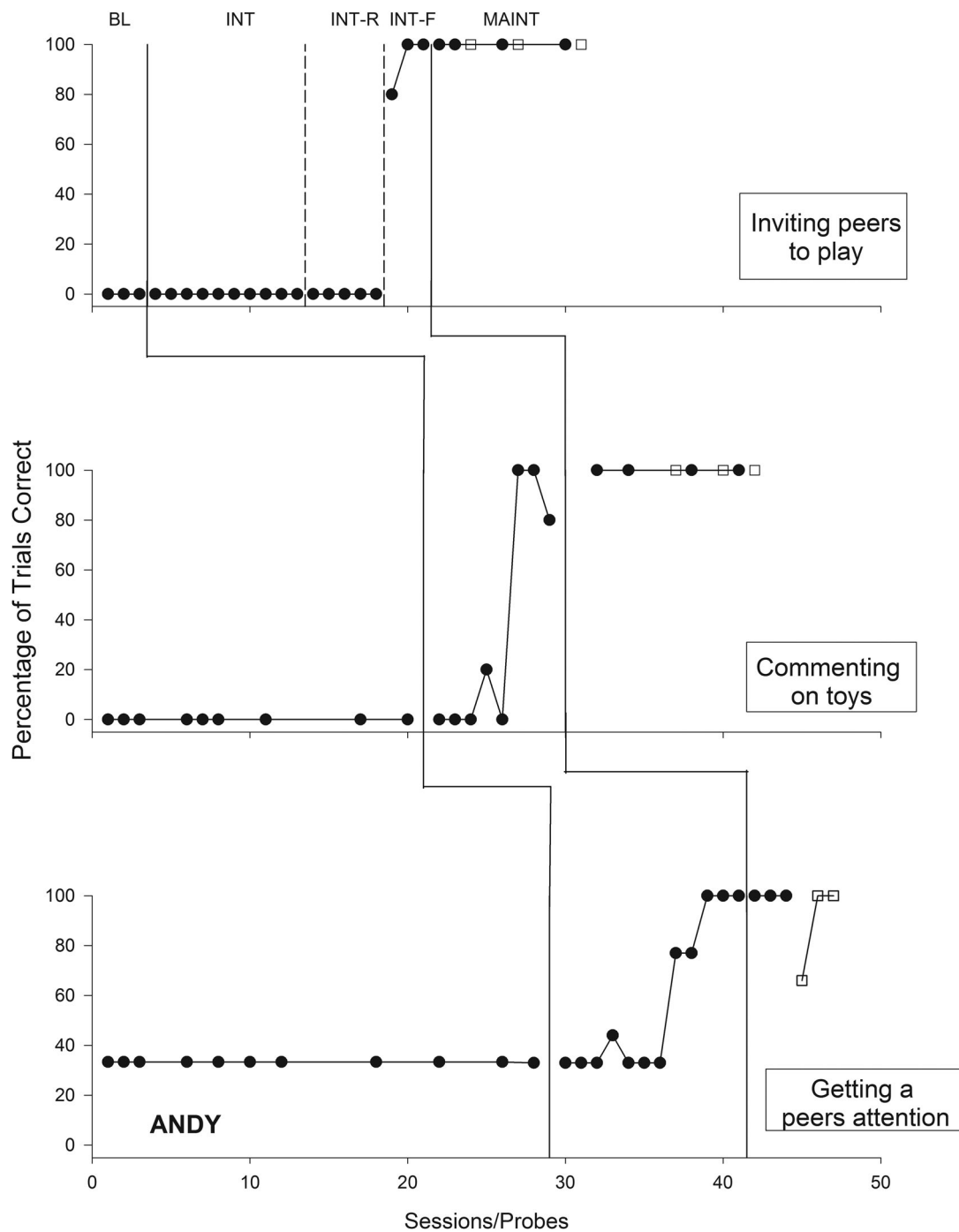


Figure 1. Andy naturalistic probe data.

Results across both participants

In this study we taught three social skills to Andy and three social skills to Edward. Mastery criterion was met on 100% of skills taught across the two participants. Participants were able to reach mastery criterion on 67% of skills with the cool versus not cool procedure that consisted only of teacher demonstration; they were able to reach mastery criterion on the additional 33% of skills when feedback was added during the naturalistic probes.

Additionally, the participants were able to maintain the skills at high rates after intervention had been terminated and displayed the skills with novel peers.

Discussion

Individuals diagnosed with ASD have qualitative impairments in social behaviour, which can affect their ability to have positive social relationships. Therefore, it is

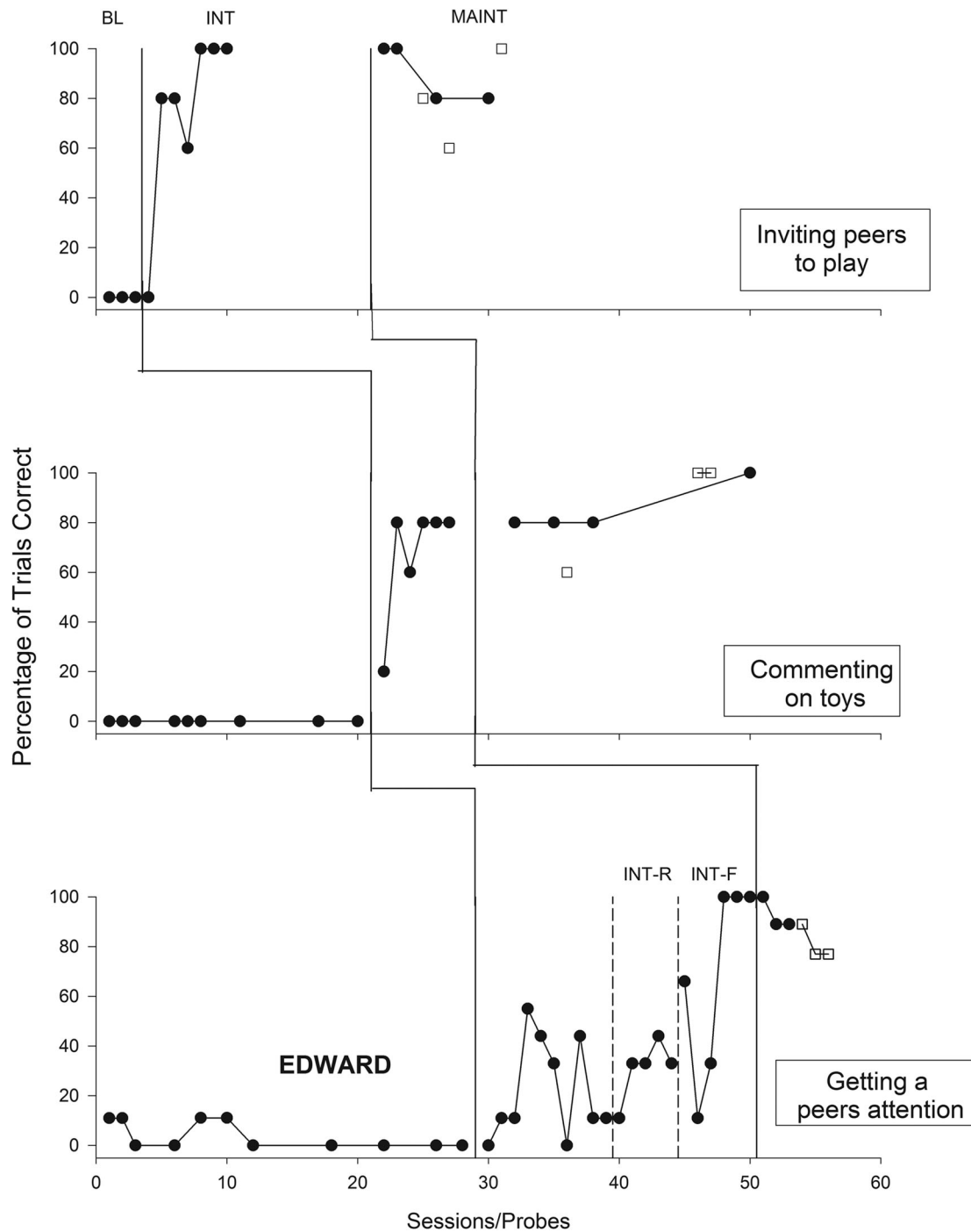


Figure 2. Edward naturalistic probe data.

important for professionals and parents to teach social skills to individuals diagnosed with ASD. This study evaluated an intervention, the cool versus not cool procedure, which has been implemented clinically with numerous individuals diagnosed with ASD and has recent empirical evidence demonstrating its effectiveness (e.g., Leaf et al., 2011; Leaf, Dotson, Oppenheim-Leaf, Sherman, & Sheldon, 2012; Leaf, Tsuji, et al., 2012). The results of the study showed that, for both

participants, the cool versus not cool procedure was effective in changing three social behaviours; however, one skill for each participant did not increase until praise was provided for correct performance during naturalistic probes.

In this study we were able to replicate and expand upon the previous research on the cool versus not cool procedure (Leaf, Tsuji, et al., 2012). First, we replicated the findings of the original study. In the Leaf,

Tsuji, et al. (2012) study, participants reached mastery criterion on 50% of skills with teacher demonstration alone and reached mastery criterion on an additional 37.5% of skills with teacher demonstration plus role-playing; therefore, participants reached mastery criterion on a total of 87.5% of skills. In this study, participants reached mastery criterion on 67% of skills with teacher demonstration alone and the additional 33% of skills with participant role-playing and feedback during naturalistic probes. Therefore, the results of this study, although not identical, are fairly similar and would indicate that either role-playing or role-playing plus feedback may be necessary for some skills. Although these results are promising, it remains unknown which social skills are more likely to reach mastery criterion with teacher demonstration alone and which social skills may need additional components; this question warrants future research.

This study expanded upon the Leaf, Tsuji, et al. (2012) study in two ways. First, the researchers implemented the cool versus not cool procedure in a small group instructional format, providing the first empirical evidence that the procedure can be effective in this type of instructional format. Typically, behavioural intervention for individuals diagnosed with ASD is implemented in a one-to-one instructional format; however, this study demonstrates that a behavioural intervention procedure (i.e., cool versus not cool) can be effective in a small group ($N = 2$) instructional format. If future researchers confirm this finding and are able to expand to larger group instructional formats, clinicians may wish to take advantage of the potential benefits of group instruction when implementing the cool versus not cool procedure, including (a) the opportunity for students to learn observationally from each other, (b) closer resemblance to instructional formats more commonly found in school settings, and (c) more efficacious learning. Still, there are several questions that future researchers should address in regard to the cool versus not cool procedure and group learning. In this study, no measure of observational learning occurred; future researchers may wish to evaluate the observational learning that occurs when the cool versus not cool procedure is implemented in a group instructional format. Future researchers may also want to evaluate the procedure when implemented in a larger group instructional format or in a school setting. Finally, future researchers may wish to compare the effectiveness and efficiency of the cool versus not cool procedure when implemented in a one-to-one instructional format as compared to when implemented in a group instructional format.

Second, this study was an expansion from the original Leaf, Tsuji, et al. (2012) study in that it taught a

different set of participants a different set of skills. For an intervention to be considered evidence based the procedure must be implemented across different participants and different targeted skills (Horner et al., 2005). Therefore, this study provides a preliminary step to evaluating the cool versus not cool procedure with various participants and targeted skills. Future researchers should expand upon this study by evaluating the cool versus not cool procedure with individuals diagnosed with ASD who may be more cognitively impaired. Additionally, future researchers may wish to evaluate this procedure for children who are diagnosed with a disability other than ASD or who are typically developing.

This study is not without its limitations. First, generalisation probes were conducted within the same clinical setting where teaching occurred; therefore, there were no measures of generalisation in more natural settings (e.g., school) and under more natural conditions (e.g., unstructured play). Future researchers may wish to evaluate generalisation both prior to intervention and in more natural settings. A second limitation of the study is that the role-play condition was not effective in increasing behaviours during naturalistic probes. In the previous study (Leaf, Tsuji, et al., 2012), the addition of role-playing was sufficient to increase the target behaviour. Thus, it is not known how effective the role-playing component is, and this should be evaluated in future research. Third, the mastery criterion in this study was not as stringent as previous studies (e.g., Leaf, Tsuji, et al., 2012). Fourth, this study was conducted with a small number of participants ($N = 2$) and the original Leaf, Tsuji, et al. (2012) study was also conducted with a small amount of participants ($N = 3$); therefore, a limitation of the current study and the literature on the cool versus not cool procedure is that only a limited number of participants have been evaluated using the procedure. Future researchers should evaluate the cool versus not cool procedure utilising more participants. A final limitation of the study is that the naturalistic probes occurred after teaching. Although there was a delay of at least one hour, it could be argued that the training sessions may have had a priming effect. Future researchers should implement naturalistic probes prior to the daily intervention sessions as well as expand the settings examined for generalisation.

Finally, the cool versus not cool procedure is similar to other behavioural procedures that are commonly implemented to individuals diagnosed with ASD. These procedures include video modelling, behavioural skills training, discrete trial teaching, prompting and reinforcement, and the teaching interaction procedure. Although all of these procedures are similar to the cool

versus not cool procedure, there are differences (e.g., no rationales provided, discriminating between cool versus not cool, in-vivo modelling). Future researchers may wish to compare the cool versus not cool procedure to other commonly implemented procedures to identify the most efficacious procedures for individuals diagnosed with ASD.

This study showed that the cool versus not cool procedure was effective when implemented in a small group (dyad) instructional format for two individuals diagnosed with ASD. Thus, this study provides teachers, clinicians, and parents another method to teach social skills to individuals diagnosed with ASD. Future researchers should continue to evaluate the cool versus not cool procedure to further determine its effectiveness.

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