

Running Head: INCREASING PLAY AND DECREASING

Increasing Play and Decreasing the Challenging Behavior of Children with
Autism During Recess with Activity Schedules and Task Correspondence
Training

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Abstract

We examined the effects of a teacher implemented playground intervention consisting of activity schedules and task correspondence training on the challenging behaviors and play of 3 school age children with moderate to severe autism. A multiple baseline design across participants was used to evaluate the intervention effects. Results indicated that each of the participants learned to use an activity schedule to follow a schedule of play activities and demonstrated improved play. Moreover, challenging behavior decreased for 2 participants during the intervention and remained at low levels for the third participant. The findings from this study provide support for the use of activity schedules and task correspondence training to reinforce appropriate play and decrease challenging behaviors during recess.

KEYWORDS: activity schedule, autism, correspondence training, picture cues, play, playground, recess

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Children with autism often have delayed or fewer play skills when compared to same age peers (Baron-Cohen, 1987; Libby, Powell, Messer, & Jordan, 1998). Additionally, children with autism often engage in more stereotypic behaviors than other children and demonstrate an insistence on sameness and an inability to cope when preferred activities or routines are changed (American Psychiatric Association (*DSM-IV-TR*), 2000; Wing, Gould, Yeates, & Brierley, 1977). They also tend to demonstrate unusual manipulation of objects, and unusual interest and rigidity regarding objects or routines (Rutter, 1978). Such ritualistic/stereotypic play behaviors can interfere with efforts to teach appropriate play skills (Baker, 2000; Baker, Koegel, & Koegel, 1998; Honey, Leekam, Turner, & McConachie, 2007). Redirection or interruption of stereotypy can occasion challenging behavior (Green & Striefel, 1988). Thus, interventions aimed at teaching play skills and decreasing stereotypic behaviors might be viewed as core features of comprehensive educational programs for children with autism.

Interventions to teach functional and symbolic play have included naturalistic teaching strategies, social stories, reciprocal imitation training, peer-mediated interventions, pivotal response training, play therapy, video modeling

and computer instruction (Brown & Murray, 2001; Machalicek, O'Reilly, Beretvas, Sigafos, Lancioni, Sorrells et al., 2008; Stahmer, Ingersoll, & Carter, 2003). Activity schedules that identify a sequence or schedule of play activities in combination with task correspondence training have also been used to successfully increase functional play for children with autism (Bevill, Gast, Maguire, & Vail, 2001; Morrison, Sainato, Benchaaban, & Endo, 2002). The *correspondence* in task correspondence training involves: (a) having the child state or choose what he or she will do next, (b) providing opportunities for the child to engage in one of several behaviors, and (c) providing reinforcement if the child's subsequent behavior matches what they said or choose earlier. The use of activity schedules and task correspondence training may be useful to promote independent play in school settings where teacher support can be limited (e.g., recess, free play following completion of independent seat work).

For elementary age children, recess is an important time for the development of gross motor and play skills. Additionally, recess offers children an outlet to express behaviors not allowed in the classroom (e.g., playing chase, yelling, acting silly). However, children with autism often lack the social skills needed to initiate, join, or maintain parallel or cooperative play. These children may therefore be more likely to engage in isolated and nonfunctional activities unless structured play interventions are put in place. Moreover, playgrounds present unique challenges for teacher implemented interventions, because

playgrounds often encompass a large physical area, and adult led or structured activities may be less common than in the classroom. In the current study, we evaluated the effects of activity schedules and task correspondence training on the challenging behavior and play of 3 children with autism during regular recess at their school.

Method

Participants

Teachers selected 3 elementary students with moderate to severe autism to participate in this study. The students had limited independent play and social skills and exhibited challenging behavior during recess. Each of the children used one to two word phrases to verbally request preferred items from adults, but never independently communicated with peers. Henry was a 6-year-old Caucasian boy with moderate autism (Childhood Autism Rating Scale, CARS; Schopler, Reichler, Devellis, & Daly, 1980). During recess, Henry engaged in a variety of challenging behaviors including hand flapping, hand biting, screaming, pica (blocked by teachers throughout this study), rubbing the palms of his hands on the ground, and elopement from the playground to nearby classrooms. Henry spent the majority of recess running in circles around the perimeter of the playground while engaging in hand flapping. If a teacher or peer interrupted Henry's behaviors, he would typically scream and aggress. Ethan, a 12-year-old Caucasian boy with severe autism (CARS; Schopler et al., 1980) engaged in hitting, pushing,

kicking, lying on the ground, pica (blocked by teachers throughout the study), and screaming. Ethan's challenging behaviors on the playground were usually preceded by a teacher or peer interrupting or blocking access to a preferred activity, such as swinging. Jeffrey, a 7-year-old Asian American boy with moderate autism (CARS; Schopler et al., 1980) engaged in stereotypic manipulations (i.e., lining rocks up and then dropping them into crevices) of rocks, facial stereotypy (i.e., mouth opening), falling to the ground, and throwing rocks. Jeffrey spent the majority of recess manipulating small rocks and if interrupted he would engage in facial stereotypy, fall to the ground, and throw rocks at teachers and peers.

One teacher and two teaching assistants served as interventionists in this study and implemented all experimental sessions. All of the teachers were female and reported a range of experiences ($M = 5$ years; range = 4 - 6 years) working with students with autism spectrum disorders and related developmental disorders. Each teaching assistant had earned a Bachelor's degree in a field related to special education (i.e., communication science disorders, or psychology) and one of the teaching assistants was currently enrolled in a Master's of Special Education Program. The teacher had earned a Master's of Special Education degree and was a certified special educator.

Sessions and Setting

All sessions were implemented at a private school serving children with

developmental disabilities and autism spectrum disorders. Sessions were conducted on a playground during 30-min morning and afternoon recess. There were typically 10 other children present during recess and approximately four to six teachers were present on the playground. The playground was approximately 13 x 13 m and had typical playground equipment including swings, slides, a wooden fort with climbing equipment, monkey bars, and toys for playing in the sand.

Materials

Color photographs were taken of the eight major playground activities (i.e., slide, swings, monkey bars, rock climbing wall, climbing tires, sand area, cars and ramp, and tunnels) on the playground. One photograph of each of the playground activities was enlarged to 22 x 27 cm, attached to a 22 x 50 cm piece of cardstock, and laminated. Each of these photographs was attached to the corresponding playground structure with Velcro™ ties. Identical, but smaller (4 x 4 cm) photographs of the playground activities were created and laminated for each participant's activity schedule. Clipboards, oriented horizontally with the metal clip to the left, provided a base for each participant's activity schedule. Four 4 x 4 cm squares were drawn in black approximately 8 cm apart on the lower quarter of each clipboard and numbered from left to right (i.e., 1-4). Velcro™ was affixed to the middle of each of the four 4 x 4 cm squares and each of the 4 x 4 cm photographs of playground activities. Velcro™ was also placed below the

laminated picture attached to the corresponding play structure to hold the smaller, corresponding photograph of the playground activity. These activity schedules were used during task correspondence training to teach participants to match the activity schedule photographs to the identical photographs attached to the corresponding playground structure.

Design and Procedure

To evaluate the effects of activity schedules and task correspondence training, a multiple baseline across participants design was used (Kennedy, 2005).

Baseline. During baseline, an activity schedule of play activities was placed on a bench that each of the participants passed as they entered the playground, and each of the eight 22 x 27 cm laminated photographs were attached to the corresponding playground structures. Prior to the beginning of each baseline session, teachers randomly chose four 4 x 4 cm photographs of play activities and placed them within the four numbered squares at the bottom of the participant's activity schedule. The teacher then used graduated guidance to prompt the participant to approach their activity schedule and said, "*Show me what you will play today*". No additional prompts were provided to participants during baseline.

Task Correspondence Training. As in baseline, the intervention session began with the teacher randomly affixing four playground activities (e.g., slide, tunnel, swings, sand area) to the participant's activity schedule. The teacher used graduated guidance to prompt the participant to approach their activity schedule

and said, *“Show me what you will play today”*. The teacher waited 5-s for the participant to point to each of the planned playground activities (e.g., slide, tunnel, swings, sand area) from left to right. If the participant did not respond within 5-s, the teacher used graduated guidance to prompt the student’s completion of the step. Then, the teacher verbally reviewed the participant’s activity schedule, *“You said you’d play on the slide, tunnel, swings, and sand area; Go Play.”* The teacher waited 5-s for the participant to remove the photograph of the first playground activity (e.g., slide) from the activity schedule, and carry the photograph across the playground to the corresponding play area. The teacher waited 5-s for the participant to attach the photograph (e.g., slide) to the photo attached to the corresponding planned play area. If a participant matched the photograph from the activity schedule to an incorrect play area (e.g., tunnel), the teacher used graduated guidance to prompt correct matching. The participant was then expected to play in the planned play area (e.g., slide) for 2 minutes. If a participant began playing in an incorrect play area (e.g., tunnel), the teacher used graduated guidance to prompt play in the planned play area. After the participant was initially engaged in play behaviors appropriate to the play area, the teacher backed away from the participant and did not provide further prompts for the next 2 minutes. During these 2 minutes, teachers collected data on challenging behavior and play. If a participant left the planned play area, the teacher used graduated guidance to prompt their return to the play area, but

instances of challenging behavior were ignored (pica was blocked). At the end of 2 minutes, teachers praised the participant (“*Cool! You played on the slide.*”), and delivered a small edible. Finally, the teacher verbally prompted the participant to, “*Check your schedule.*” If a participant did not stop playing the teacher used graduated guidance to prompt the participant’s return to their activity schedule. These procedures were repeated until a participant had completed all four playground activities (e.g., slide, tunnel, swings, sand area).

Response Definition and Data Collection

Data were collected on the participants’ play, challenging behavior, and correct completion of task correspondence steps. As described above, teachers collected data on play and challenging behavior once a participant had begun playing in a planned play area. Thus, data on play and challenging behavior were collected for 8-minutes during each recess session. Play was defined as engaging in behavior appropriate to the play activity (e.g., sliding on the slide, swinging on the monkey bars) with eyes open and focused on materials or people in the activity area. Play was measured using 10-s whole interval data collection recording procedure. The challenging behaviors for each participant were described earlier in the participant section. Challenging behavior was measured using 10-s partial interval data collection recording procedure.

The performance of participants during correspondence training was evaluated using the task analysis presented in Table 1. Percentage of correct task

correspondence steps performed was evaluated each session. If a participant performed a step within 5-s of the teacher's initial verbal prompt that step of the task analysis was scored correct. If a participant did not initiate the anticipated behavior within 5-s of an initial prompt, or demonstrated the incorrect behavior that step of the task analysis was scored as incorrect. Percentage of correct steps was calculated for each session by dividing the number of steps performed correctly by the total number of steps and dividing by 100%.

Insert Table 1 about here

Interobserver Agreement

A second teacher collected data regarding the occurrence and nonoccurrence of participant behavior (i.e., play, challenging behavior, and task correspondence steps performed). Challenging behavior and play agreement scores were determined using an interval-by-interval method. The number of intervals in which both observers agreed (occurrence plus nonoccurrence) was divided by the total number of intervals (agreements plus disagreements) and multiplied by 100%. Interobserver agreement (IOA) was calculated for 40%, 32%, and 48% of experimental sessions for Henry, Ethan, and Jeffrey, respectively. IOA for play was 94% (range = 83 - 100%); 99% (range = 96 - 100%); and 96% (range = 83 - 100%) for Henry, Ethan, and Jeffrey, respectively. IOA for challenging behavior was 96% (range = 92 - 100%); 96% (range = 90 - 100%); and 96% (range = 88 - 100%) for Henry, Ethan, and Jeffrey, respectively.

Agreement was determined for each step of the task analysis presented in Table 1. The number of steps in which both observers agreed was divided by the total number of steps (agreements plus disagreements) and multiplied by 100%. IOA was calculated for 40%, 32%, and 48% of baseline and intervention sessions for Henry, Ethan, and Jeffrey, respectively. IOA for task correspondence was 98% (range = 85 - 100%); 93% (range = 85 - 100%); and 99% (range = 95 - 100%) for Henry, Ethan, and Jeffrey, respectively.

Treatment Fidelity

A special education doctoral student recorded teachers' implementation of the task correspondence training procedures during 23% of intervention sessions using the task analysis presented in Table 2. The number of teacher behaviors performed correctly was divided by the total number of steps in the task analysis and multiplied by 100% to obtain a percentage correct. The mean correct implementation of the correspondence training procedures was 94% (range = 92 - 97%).

Insert Table 2 about here

Results

Figure 1 shows the percentage of 10-s intervals with challenging behavior and play during baseline and intervention for each participant. Figure 2 shows the percentage of correct task correspondence steps for each participant during baseline and intervention.

Insert Figures 1 and 2 about here

During baseline, 3 participants showed low levels of play and 2 participants (Ethan and Jeffrey) engaged in high and increasing levels of challenging behavior. Mean scores for play during baseline were 0.8%; 8%; and 5% for Henry, Ethan, and Jeffrey, respectively. Mean scores for challenging behavior during baseline were: 46%, 10%, and 47% for Henry, Ethan, and Jeffrey, respectively. Baseline assessment indicates that none of the participants were independent in the use of the activity schedule prior to intervention. Mean scores for the percentage of correct task correspondence steps during baseline were 12% (range = 0 - 40%); 5% (range = 0 - 15%), and 0.6% (range = 0 - 5%) for Henry, Ethan, and Jeffrey, respectively.

The introduction of activity schedules and task correspondence training produced variable results among the participants. Play increased for each participant and challenging behavior decreased for Henry and Jeffrey and remained at low levels for Ethan. However, Jeffrey required more intervention to acquire the correspondence training steps than either Henry or Ethan and continued to engage in challenging behavior while he acquired these steps. Mean scores for play during intervention were 73% (range = 0 - 100%); 92% (range = 73 - 100%); and 59% (range = 15 - 90%) for Henry, Ethan, and Jeffrey. Mean scores for challenging behavior during intervention were 11% (range = 0 - 46%); 9% (range = 0 - 44%); and 17% (range = 0 - 52%) for Henry, Ethan, and Jeffrey.

Each of the participants' play correspondence and use of activity schedules improved, but each participant continued to require a verbal prompt to check their activity schedule between each play activity. Mean scores for the percentage of correct task correspondence steps during intervention were 71% (range = 20 - 100%); 73% (range = 55 - 90%); and 47% (range = 0 - 90%) for Henry, Ethan, and Jeffrey.

Discussion

Prior to intervention, when teachers interrupted the children's stereotypy to prompt appropriate play, each participant engaged in challenging behavior. Following intervention, each participant learned to follow an activity schedule with minimal teacher prompts and challenging behavior including stereotypy decreased for Henry and Jeffrey and remained at low rates for Ethan. These findings are consistent with past research demonstrating that teaching children with autism to use activity schedules can increase task engagement and play correspondence behavior, and decrease challenging behavior (Massey & Wheeler, 2000; Morrison et al., 2002; Pierce & Schreibman, 1994). Additionally, activity schedules and task correspondence training used on the playground may approximate visual strategies used by teachers in the classroom and provide teachers with a way to address some of the unique challenges of teaching play skills during recess. By using similar strategies across environments, teachers may

reduce material preparation time and facilitate generalization of skills to novel environments.

Following this study, teachers maintained the use of activity schedules and prompted completion of the task correspondence steps, except they discontinued the use of edibles. The students played more often on a variety of play structures and maintained low levels of challenging behavior following the study. One possible explanation for the maintenance of the behavior change despite the removal of the edibles is that the initial pairing of the edibles and teacher praise with play helped to establish the reinforcing value of these play activities. Previous research has demonstrated the use of pairing verbal and edibles with appropriate toy play to increase the play skills of children with autism (Nuzzolo-Gomez, Leonard, Ortiz, Rivera, & Greer, 2002). Future research should further examine the role of conditioned reinforcement in the maintenance of appropriate play with this population.

This study has limitations that suggest the need for future research to examine the use of activity schedules and task correspondence training in settings outside of the classroom. Each of the participants continued to require verbal prompts to check their activity schedule in between planned playground activities. Digital watches or timers worn on the clothing of the participants could have unobtrusively prompted them to check their activity schedule between play activities, but the participants in the current study did not tolerate wearing such

devices. In inclusive settings, typically developing peers might be trained to prompt the child with autism to return to their activity schedule upon completion of a play activity. Future research should evaluate the effects of activity schedules and task correspondence training for dyads or small groups of children with and without autism on cooperative play, challenging behavior, and the completion of task correspondence steps.

Furthermore, during intervention each child attempted to choose the order of planned play activities by removing a photograph other than the first or next photograph of the remaining activities. This might have indicated a preference for an activity, but the participants had little prior experience with numbered activity schedules and may have misunderstood the expected order of play activities. Alternatively, the discriminative stimulus, “*Show me what you will play today*” may have signaled a choice of play activities to the participants. Nevertheless, past research suggests that the act of choosing may be a source of reinforcement itself (Tiger, Hanley, & Hernandez, 2006). When compared to teacher choice of activities, allowing children to choose the order of activities may result in improved task engagement and decreased challenging behavior (Reinhartsen, Garfinkle, & Wolery, 2002). Future research should evaluate the effects of teacher choice versus child choice of play activities on subsequent challenging behavior and appropriate play during recess for children with autism.

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severely mental retarded and autistic children. *Journal of Child Psychology and Psychiatry*, 18, 167-178.

Figure Captions

Figure 1. Percentage of 10-sec. intervals with challenging behavior and play.

Figure 2. Percentage of correct task correspondence steps.

Author Notes

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Figure 1

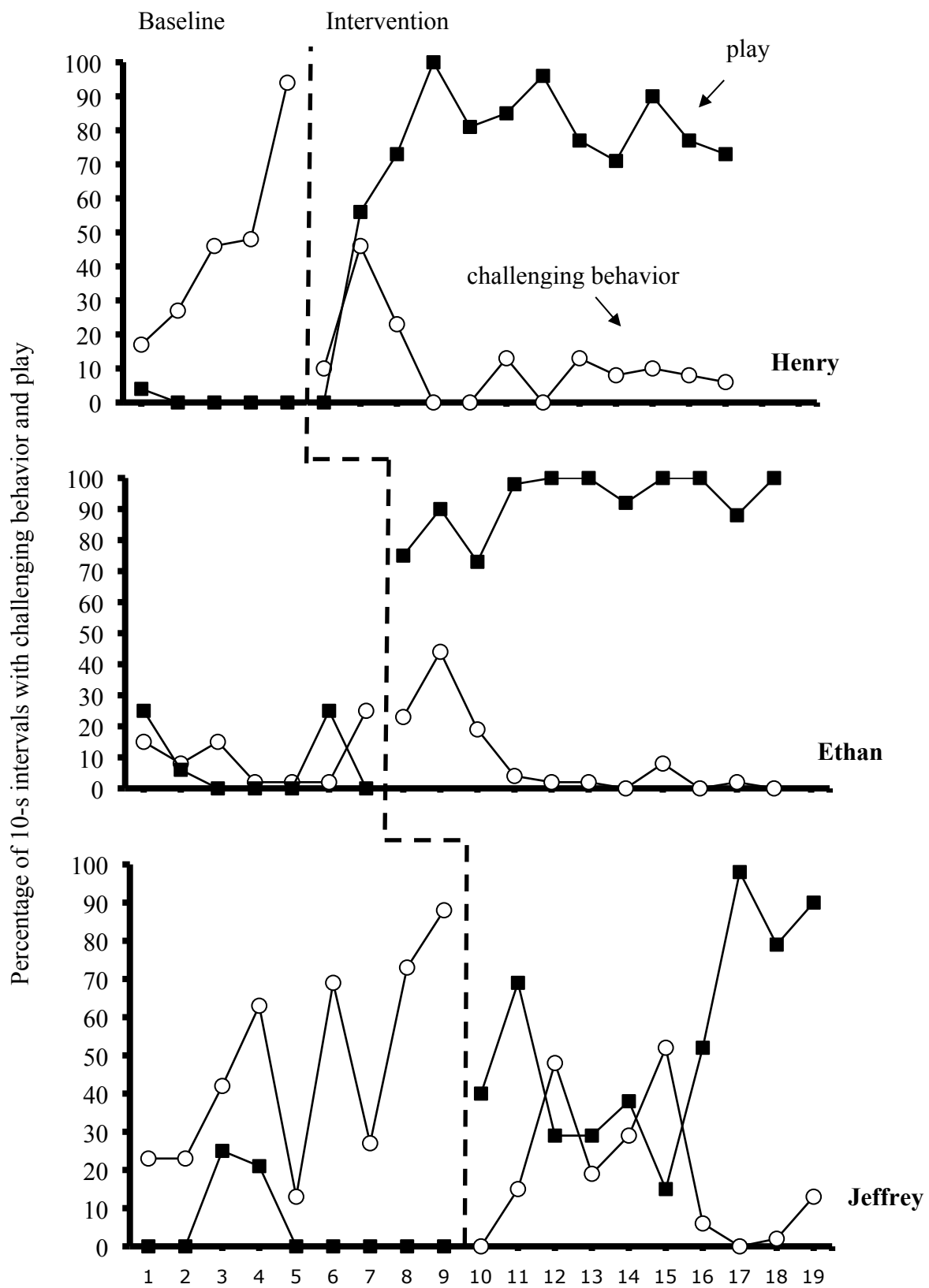


Figure 2

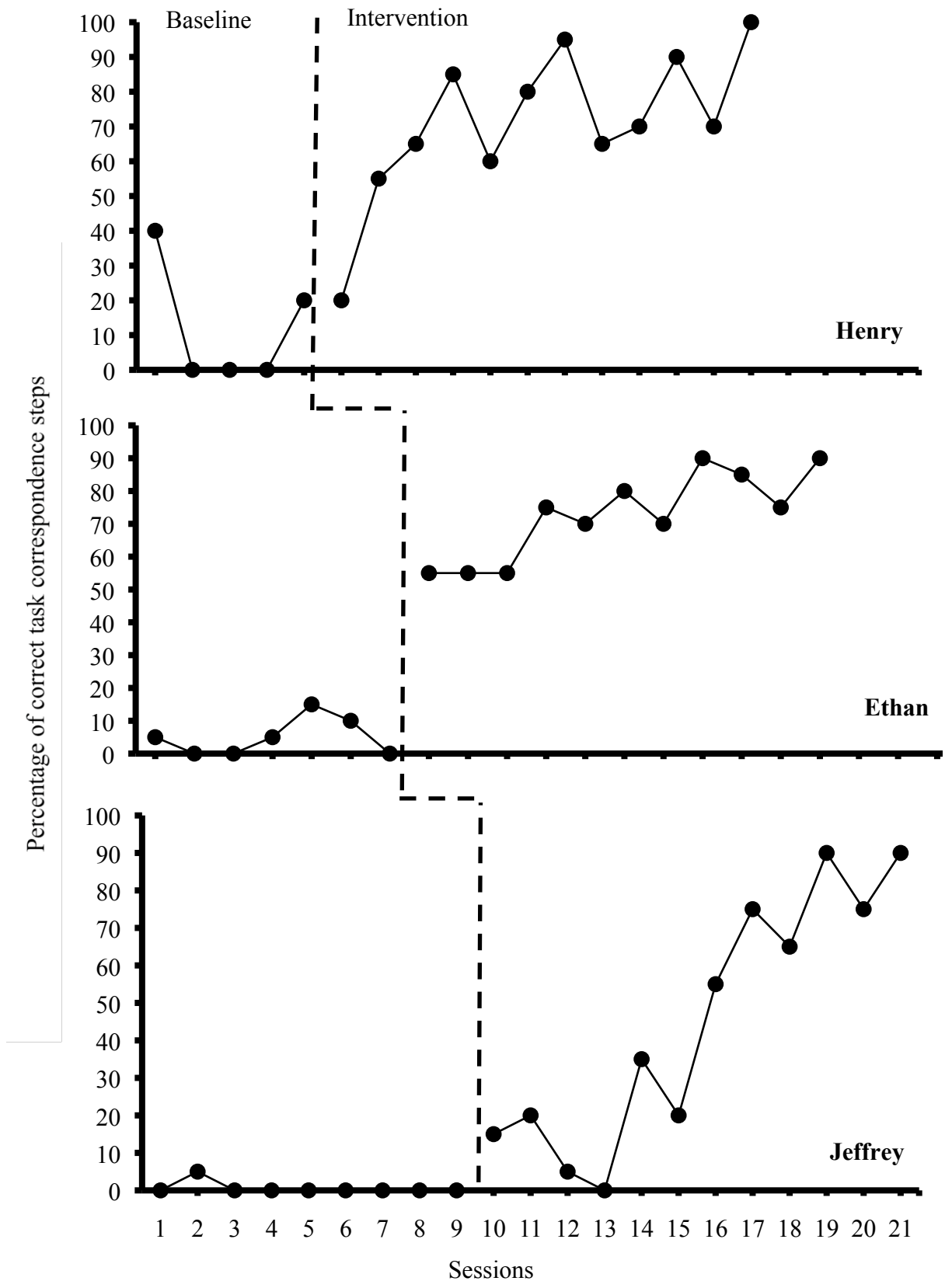


Table 1. Anticipated Participant Behaviors During Task Correspondence Training.

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- 1) Within 5-s the participant points to each of the four play activities (e.g., slide, swing, tunnel, monkey bars) from left to right.
 - 2) Within 5-s the participant removes the photograph of the first play activity (e.g., slide).
 - 3) Within 5-s, the participant takes the photograph (e.g., slide) across the playground and attaches to the corresponding playground structure.
 - 4) Within 5-s the participant begins to engage in play appropriate to the planned play activity.
 - 5) When prompted by the teacher to return to the activity schedule, the participant stops playing and returns to their activity schedule within 5-s.
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Table 2. Anticipated Teacher Behaviors During Correspondence Training.

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- 1) At beginning of intervention session, the teacher randomly affixes photographs of four playground activities (e.g., slide, swing, tunnel, monkey bars) to the participant's activity schedule.
 - 2) Teacher uses graduated guidance to prompt the participant to approach their activity schedule and says, "*Show me what you will play today*", or "*Show me where you will play next*".
 - 3) Teacher waits 5-s for the participant to respond before using graduated guidance to prompt participant to point to each of the play activities from left to right (e.g., slide, swing, tunnel, monkey bars).
 - 4) Teacher says, "*You said that you would play on the slide, swing, tunnel, monkey bars; Go play*".
 - 5) Teacher waits 5-s for the participant to respond before using graduated guidance to prompt the participant to remove the photo of the first play activity (e.g., slide) and take to planned play area.
 - 6) Teacher waits 5-s for the participant to attach photograph (e.g., slide) to the larger photo attached to the corresponding playground structure before using graduated guidance to prompt the participant to attach the photo.
 - 7) Teacher waits 5-s for the participant to begin playing in play area before using graduated guidance to prompt the participant to engage in behaviors appropriate to the play activity.
 - 8) Teacher physically backs away from the participant and collects play and challenging behavior data for the next 2 minutes.
 - 9) At the end of 2 minutes, the teacher praises the participant (e.g., *Awesome! You played on the rock wall*) and delivers a small edible.
 - 10) Teacher verbally prompts the participant to, "*Check schedule*".
 - 11) Teacher waits 5-s for the participant to return to their activity schedule before using graduated guidance to prompt their return.
 - 12) Steps 2-11 are repeated for the remaining playground activities (e.g., swing, tunnel, monkey bars).
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