Hammill Institute on Disabilities

Journal of Positive Behavior Interventions
2019, Vol. 21(4) 199–212
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DOI: 10.1177/1098300719851794
jpbi.sagepub.com
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Coaching Teachers to Promote Social Interactions With Toddlers

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Abstract

Children with or at risk of disabilities engage in fewer and less complex social interactions (SIs) than their typically developing peers. The playground is an ideal setting for teachers to promote SIs among children. However, few studies have examined practical and meaningful strategies for supporting teachers in effectively facilitating SIs. Also, there is a critical dearth of research examining classroom practices for infants and toddlers. A single-case multiple probe design was used to evaluate the effectiveness of a brief training and email performance feedback on toddler teachers' SI prompts on the playground. Results indicated functional relations between training plus general and specific feedback, teachers' use of SI prompts, and levels of child SIs.

Keywords

preschool age group, early childhood, social relationships/interactions, single-case designs

Children with disabilities engage in fewer peer interactions than their typically developing peers (File, 1994; Solish, Perry, & Minnes, 2010), which can lead to delays in social competence and increases in problem behaviors. Delays in social competence and problem behaviors are primary predictors of future peer rejection, academic failure, and long-term social isolation (Frey, Nolen, Edstrom, & Hirschstein, 2005; Jones, Greenberg, & Crowley, 2015). Active facilitation of social competence for young children with disabilities is important, as many of these children display higher rates of problem behaviors, deficits related to establishing friendships, and persistent social delays into adulthood than their typically developing peers (Buysse, Goldman, & Skinner, 2002; Nabors, Willoughby, Leff, & McMenamin, 2001). There is substantial evidence that early delays in social competence and problem behaviors can be ameliorated with early intervention, which should commence as soon as risk factors are identified (Jones et al., 2015; Taylor, Oberle, Durlak, & Weissberg, 2017). Teaching strategies that promote positive social and emotional development, such as adults' use of statements that promote social interactions (PSIs), are essential to prevention of problem behaviors and later social delays (Hemmeter, Snyder, Fox, & Algina, 2016).

Although research supports intervening early with children at risk of developing problem behaviors, most behavioral and social skills interventions are focused on preschoolers (Conroy, Dunlap, Clarke, & Alter, 2005; Joseph, Strain, Olszewski, & Goldstein, 2016). For example, the *Pyramid Model* is a framework using multitiered systems of support for promoting the social–emotional competence of all young children. The Pyramid Model provides a framework to guide practices at three levels: (a) the universal level (i.e., nurturing and responsive relationships and high-quality environments), (b) the secondary level (i.e., teaching strategies for supporting social–emotional skill development and learning), and (c) the tertiary level (i.e., individualized, intensive supports for children with persistence problem behaviors). However, most of the research examining the use of the Pyramid Model has focused on preschool age children and classrooms (Hemmeter et al., 2016). The dearth of social and behavioral research for children younger than 3 years old is problematic, given the importance of early, positive social experiences for improving the developmental trajectory of young children and providing multiple opportunities to develop nurturing and responsive relationships with adults and peers (Branson & Demchak, 2011).

McGee, Morrier, and Daly (1999) described a growing need to address problem behavior and social skill deficits at toddlerhood when children are at a prime stage of potential behavioral change (Huttenlocher, 1984). Social–emotional competence develops within the context of nurturing and

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Action Editor: Maureen Conroy

responsive relationships between the infant or toddler and their primary caregiver (Hunter & Hemmeter, 2009). However, recent decades have shown a dramatic increase in the proportion of toddlers who spend multiple hours per week in child care; currently, six million children below age 3 are in nonparental care (Zero to Three, 2017). Thus, there is a critical need for research regarding effective classroom practices (e.g., PSI) that address toddlers' social competence (Branson & Demchak, 2011; Hemmeter et al., 2016).

Performance-Based Feedback Related to Improving Teacher Behaviors

Research has evaluated the effectiveness of performance-based feedback for changing and improving teachers' behaviors (Alvero, Bucklin, & Austin, 2001; Fallon, Collier-Meek, Maggin, Sanetti, & Johnson, 2015). In a recent meta-analysis, Fallon and colleagues (2015) identified performance-based feedback in educational settings as an evidence-based practice. Likewise, several systematic reviews have identified performance-based feedback as an effective or promising practice for improving teacher intervention fidelity (Solomon, Klein, & Politylo, 2012; Sweigart, Collins, Evanovich, & Cook, 2016). For example, Casey and McWilliam (2011) reviewed related literature in early childhood contexts and found performance-based feedback to be a particularly effective intervention for improving early childhood teachers' use of evidence-based practices.

However, only a handful of the performance-based feedback studies included in these reviews targeted teacher practices specifically related to child social outcomes and even fewer focused on children younger than 3 years old. For example, Barton, Fuller, and Schnitz (2016) found a functional relation between email performance-based feedback and teachers' PSI use in preschool classroom settings. In both, this study and two replications (Barton, Rigor, Pokorski, Velez, & Domingo, 2018; Barton, Velez, Pokorski, & Domingo, 2018), study participants (i.e., early childhood teachers) received specific performance-based feedback (SF; e.g., "You used six descriptive praise statements today!") regarding target behaviors. Only Barton, Velez, and colleagues (2018) included toddler teachers and target PSI behaviors.

Specific Versus General Performance Feedback

SF requires the observer precisely count and record occurrences of the target behavior, which might be unrealistic in early childhood contexts with indigenous supervisors. In some cases, general performance-based feedback (GF; e.g., "I loved how often you prompted children to interact with each other today during center time!") might be more efficient but equally as effective for improving teacher behaviors. Conversely, SF and GF might be used systematically and in tandem to support sustained instructional enhancements. For example, GF might be used initially, and SF provided only when necessary to support sustained change. To date, no performance-based feedback studies conducted in early childhood settings have examined the use of SF and GF within one intervention. Such research is important for establishing a comprehensive understanding of the effectiveness of performance-based feedback in early childhood setting and identifying the SF content necessary for improving teacher practices.

Playground as an Instructional Setting

The playground is an instructional setting that can facilitate physical well-being, gross motor development, communication, and social competence; however, current practice suggests these learning opportunities are not being utilized (Cullen, 1993; Nabors et al., 2001). Targeting social interactions (SIs) on the playground might be particularly efficient and effective, given the types of sustained, predictable, and increasingly complex interactions that can naturally occur. In previous research, teachers' use of PSI statements increased in the classroom setting but did not consistently generalize to the outdoor playground setting (Barton et al., 2016; Barton, Rigor, et al., 2018; Barton, Velez, et al., 2018), which is an ideal context for supporting peer SIs. Although performance-based feedback is useful in increasing teachers' use of PSI in the primary setting, it might need to be provided directly on the playground to PSI.

Researchers also have found that teachers do not view outdoor play as active teaching time (Davies, 1996, 1997; Gossett, 2017), and teachers and parents commonly view academic and other indoor activities as more important than outdoor play (Copeland, Kendeigh, Saelens, Kalkwarf, & Sherman, 2011). Playground time is a part of the early childhood curriculum with multiple opportunities to embed learning trials, especially for young children and those with disabilities (Cullen, 1993; Kern & Wakeford, 2007; Nabors et al., 2001). Teachers might miss opportunities to engage children in learning activities and, when uninvolved (which might be likely given the lack of value as an instructional time), cannot provide safe supervision (Debord, Hestenes, Moore, Cosco, & McGinnes, 2002). Although an extensive body of research has been conducted examining the effects of various interventions on safety, physical education, and active supervision on the playground (Brown, Googe, McIver, & Rathel, 2009; Debord et al., 2002; Schwebel, Summerlin, Bounds, & Morrongiello, 2006), no research to date has examined the use of performance-based feedback specifically targeting the teacher's use of SI prompts among toddlers in outdoor playground settings. Thus, there is a need for research on teachers' use of PSI between toddlers on playgrounds, the maintenance of those behaviors, and the effects on toddlers with, or at risk of, delays in social competence.

To address these gaps in the research, we examined the effects of training and email performance-based feedback on the PSI behaviors of early childhood teachers on playground settings. The following research questions were examined:

Research Question 1: Does the use of a brief training plus GF delivered via email increase the level of teachers' PSI behaviors on the playground?
Research Question 2: Does the use SF delivered via email (after receiving training and GF) increase the level of teachers' PSI behaviors on the playground?
Research Question 3: Do PSI behaviors maintain after the termination of email performance-based feedback?
Research Question 4: Does the use of email performance-based feedback and subsequent increases in teachers' PSI behaviors increase the SIs of toddlers with or at risk of disabilities on the playground?
Research Question 5: Do naïve raters rank SIs on the playground as important and the training and email performance-based feedback feasible for early childhood professionals?

Method

Participants

The study took place in a university-based inclusive early childhood center in middle Tennessee. One classroom was recruited based on the program director's recommendation and all three teachers from the classroom teaching team consented to participate. Their classroom consisted of seven children aged 12 to 18 months. All teacher participants were observed for two 10-min screening observations to measure PSI behaviors prior to starting the study to screen for inclusion criteria. These screenings were conducted on the playground under typical classroom conditions. Participants were excluded from the study if they (a) did not supervise children aged 1 to 3 years, (b) were not part of a playground supervision or teaching team (i.e., were the sole supervisor on the playground), (c) displayed PSI behaviors in more than 50% of intervals across two 10-min observations, or (d) were not willing or able to receive email performance-based feedback. Item (c) was measured using a screening tool developed for this study. The screening tool had 120 5-s intervals; the coach (i.e., first author) marked each interval in which a PSI occurred to document an estimated duration of PSI use. None of the consented teachers were excluded from the study. A questionnaire was given to each teacher participant inquiring about his or her years of classroom experience(s), age, gender, race, the children in their class (i.e., total number of children, ages, and the number of children with disabilities).

Kathleen was a 27-year-old White female who had served as the lead teacher in this classroom for 1 year. Kathleen displayed PSI for 9% of observed intervals during screening observations. Jeannie was a 27-year-old White female who had served as the coteacher for 4 weeks prior to the start of this study. She displayed PSI for 1.8% of observed intervals during screening observations. Anne was a 23-year-old White female who was a graduate student at the university and served as a teaching fellow for this classroom beginning 2 months prior to the start of this study. Anne displayed PSI for 9% of observed intervals during screening observations. Although this study was Jeannie's first experience participating in research at her current placement, Kathleen and Anne had previously participated in a study in which they received training and coaching via email performance-based feedback. The primary researcher (hereafter coach), a White female special education graduate student, served as the coach and primary data collector for all three participants. She was working toward behavior analysis certification and had no previous coaching experience. Her faculty supervisor was a White female with a doctoral degree in special education, behavior analysis certification, and more than 15 years of coaching experience.

Three target children with teacher-reported low levels of SIs on the playground also participated in this study. Consented teachers verbally nominated children from their classroom who had the lowest levels of social competence relative to their peers. Two 10-min observations of each target child were conducted by the coach to confirm low levels of SIs prior to starting the study, which were defined as appropriate vocal or gestural initiations or responses to a peer. An observational screening tool was developed for this study with 120 5-s intervals; the coach (i.e., first author) marked each interval in which an SI occurred to document an estimated duration of child SI. Child participants were excluded if they engaged in SIs for more than 50% of observed intervals. One target child was randomly assigned to each teacher participant.

Jack, Francis, and Vince participated as the three target children for this study. Jack was a 15-month-old White male who often sat alone and watched his peers on the playground. Jack displayed SIs during 3% of intervals during screening observations and was paired with Jeannie for this study. Francis, who was paired with Kathleen for the study, was a 17-month-old White female diagnosed with Aicardi syndrome, a rare genetic malformation that results in seizures and subsequent developmental delays. Francis was immobile and nonverbal at the start of the study, though she began to communicate with teachers and peers via eye contact midstudy. She was observed to engage in SIs during 0% of intervals during screening observations; in addition, her peers were observed to interact with Francis 0% of intervals. Vince was a 17-month-old White male who engaged in

high levels of problem behavior (e.g., biting and pushing peers) during playground time, according to teacher report. Vince displayed SIs during 12% of intervals during screening observations and was paired with Anne for this study. Although neither Jack nor Vince had identified disabilities, both were considered at risk of social delays, given that their social competence was rated substantially lower than their peers by their teachers.

Setting

This study occurred on the participating preschool's playground during the classroom's regularly scheduled morning outdoor time. Seven sessions were conducted in the preschool's gym due to inclement weather (depicted by triangles on Figure 1). One session for Anne took place during the class' afternoon outdoor time. Observations occurred 1 to 5 times per week depending on the experimental condition. The playground was approximately 30 m by 20 m and specifically used by children aged 1 to 3 years with direct access to all toddler classrooms. The area was completely surrounded by a fence and consisted of a swing set, picnic area with bikes and small cars, and a small play structure with developmentally appropriate slides, ramps, stairs, and built-in toys. The indoor gym was a large room with age-appropriate toys and structures. All sessions were required to have at least three children and two teachers present. Teachers, professionals, and students who were not involved in the study engaged in typical playground activities.

Materials

A video camera was used to record teacher and child behaviors. All videos were coded after each session using ProCoderDV (Tapp, 2003). A training presentation was used to train teacher participants on the target behavior, and a study-specific email account was used to email the teacher participants after each session.

Response Definitions and Measurement Systems

The primary dependent variable was PSI, which was defined as a specific verbal prompt from the teacher to elicit an SI from one child directed toward another child. To count as a PSI, the verbal prompt had to follow a specific three-part formula: (a) an attentional cue, (b) a specific prompt for an SI, and (c) the name of the peer. Any instance was coded at the onset of the interaction, or when the teacher first verbally interacted with a child. PSI were measured via timed event recording and recorded as a count per 10-min session, which was converted to rate per minute (see Figure 1). Although we asked teachers to focus on their target child, PSI to all children on the playground were recorded.

In addition, the SIs of the target children were measured as a secondary dependent variable. SIs of the target children were defined individually based on teacher report and screening observations. For all children, these were not contingent on teacher use of PSI. For Vince and Jack, SI included any prompted or unprompted vocal communication with a peer or elicitation of SI toward a peer or group of peers via initiation or response to a peer. For Francis, SIs were defined as any instance of prompted or unprompted peer verbal communication or elicitation of SI to her. This definition was developed in collaboration with her teachers and was based on her current functional repertoire; she was not yet independently initiating to peers or using vocalization to communicate. Child SIs were recorded using timed event recording via ProcoderDV (Tapp, 2003) and reported as rate of SIs per minute. Unlike teachers, children were occasionally not on the playground for the entire 10-min observation. Table 1 lists definitions, examples, and nonexamples of all dependent variables.

Interobserver Agreement

Interobserver agreement (IOA) data were collected for 43% of sessions (range = 33%–50%) for PSI behaviors across each condition for each teacher participant, and 42% of sessions (range = 33%–100%) for child SI behaviors across each condition for each child participant (see Table 2). IOA data were calculated for all dependent variables using the point-by-point method (Ledford, Lane, & Gast, 2018) using the following equation: agreements/[agreements + disagreements] * 100. An agreement for PSI and SI of target children was recorded if the time stamps for the primary coder and IOA coder were within 3 s. Average IOA across conditions and participants was 88% for teacher participant data and 92% for child participant data.

The IOA coder for teacher PSI was a second-year, special education graduate student naïve to the study purpose and conditions; the IOA coder for target child SI was a first-year, special education graduate student naïve to the study purpose and conditions. Each IOA coder was trained using nonstudy practice videos. The training used the following sequence: the coach and coders (a) reviewed the written code manual, (b) reached a consensus score together for two videos, and (c) independently coded at least three videos and discussed agreements and disagreements until percent agreement was at 90% or higher for all videos. During the study, IOA was required to remain above 90% for each participant, condition, and variable. If IOA dropped below 90% at any point during the study, the coach met with and retrained the coder. A retraining session was required for the primary data collection IOA coder 4 times throughout the study.

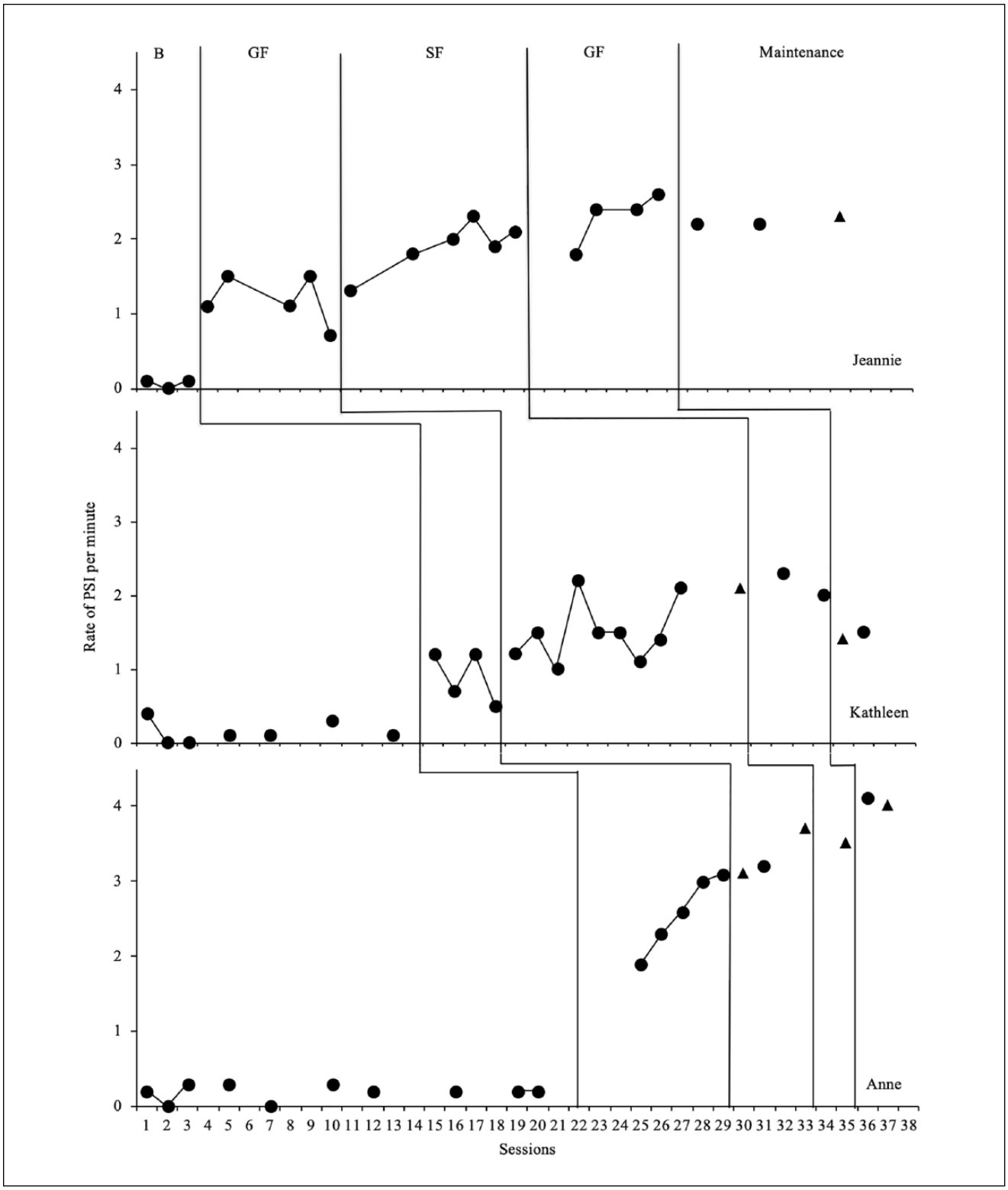

Figure 1. Rate of PSI during sessions across each teacher participant.
Note. Circles indicate sessions conducted on the playground; triangles represent sessions conducted in the school's indoor gym. PSIs = promote social interactions; B = baseline; GF = general performance-based feedback; SF = specific performance-based feedback.

Table 1. Operational Definitions of All Dependent Variables.

Target behavior	Definition	Example	Nonexample
Teacher PSI	An appropriate and specific verbal prompt to direct the attention or actions of one or more children to another child or group of children to elicit a specific SI. The statement must fit the following formula: (a) attentional cue (secondary indicators), (b) specific prompt (cannot be a question), (c) to/with whom	"Joseph, come look at all the new trucks Brian has!" "Here she comes! You can say 'hi' to Janell!" "Look, Phil, there's Kiki, she's pushing the cart! You can push it with her!"	General, nonspecific directions: "Joseph, share your toys." Questions: "Do you want to give Bob a hug, John?" Prompt without attentional cue: "Push the swing!"
Jack and Vince SI	Any prompted or unprompted instance of vocal communication with a peer or elicitation of SI toward a peer or group of peers via (a) initiation, pair with secondary indicator (eye contact, contextually relevant, point, in response to teacher prompt, etc.); or (b) response to a peer, within 5 s of peer initiation	Greeting to peer or adult Sign or vocal requesting (signs or says "Please") Accept toy that was offered by peer Engage in same motor activity with peer, with eye contact Helping a peer (hold hand, push car while peer sits in it, etc.)	Looking at peer engaging in different activity (even if following prompt) Swings on swing next to peer, does not look at peer Rides in front of toy car with peer in the back, makes no eye contact
Francis SI	Any instance of peer prompted or unprompted verbal communication or elicitation of SI toward Francis via (a) initiation with secondary indicator or (b) engaging in same activity next to or across from her	Greeting to peer or adult Extends arm with object toward Francis Engages in motor activity with Francis, with eye contact	Child engages in different activity near/next to Francis

Note. PSIs = promote social interactions; SI = social interaction.

Table 2. Average IOA and Procedural Fidelity Data Across Participants and Conditions.

Component Participant	PSI training (%)	Baseline *M* (range; %)	GF *M* (range; %)	SF *M* (range; %)	Maintenance *M* (range; %)	Total (%)
IOA						
Jeannie	—	100	88 (83–92)	88 (83–92)	84	90
Kathleen	—	100	82 (67–92)	81 (71–87)	83	86
Anne	—	82 (0–100)	90 (88–92)	91	83	87
Jack	—	100	89 (86–100)	88 (86–90)	89	92
Francis	—	94 (89–100)	91 (86–95)	86	80	88
Vince	—	93 (80–100)	95 (91–100)	100	93	95
Procedural fidelity						
Jeannie	100	100	94 (75–100)	100	100	98
Kathleen	100	100	100	100	100	100
Anne	100	100	87.5 (75–100)	100	75	92.5

Note. IOA = interobserver agreement; SI = social interaction; GF = general performance-based feedback; SF = specific performance-based feedback.

Experimental Design and Data Analysis

A multiple probe (days variation; Gast, Lloyd, & Ledford, 2018) across participants design was used consisting of three time-lagged tiers with baseline probes, intervention, and maintenance conditions. A multiple probe design was chosen over a withdrawal design because PSI was not a behavior we wanted to reverse—nor were they necessarily reversible—and the multiple probe design allowed for documentation of a functional relation without withdrawing the independent variable. The coach and her supervisor made experimental decisions using visual analysis of the following data characteristics: level, trend, variability, overlap, immediacy of behavior change, and consistency (Barton, Lloyd, Spriggs, & Gast, 2018). Specifically, condition changes occurred when PSI data were stable. Functional relations were demonstrated by showing behavior change across the three different tiers at three different, but temporally related, points in time. Furthermore, we examined whether data patterns shifted only when the independent

variable was applied to a tier, whereas untreated tiers did not change. The design met contemporary single-case design standards (Kratochwill et al., 2013).

Procedures

Sessions occurred consecutively each day for each participant and 1 to 5 times per week depending on the experimental condition. Sessions for all teachers occurred during the same block of time, and the participant session order was randomly selected via an online random number generator. No participant session occurred in the same order for more than 2 consecutive days. Prior to the start of the baseline condition, each participant was randomly assigned a participating target child. Teacher participants were told who their assigned child was and asked to try to stay near their child for the duration of the session, with the understanding that some situations may not allow for this (e.g., shortage of teachers on the playground, child emergencies). During all sessions, the coach kept the target child in the view of the camera as much as possible, though data collection did not stop if the child left the frame. If a teacher participant was absent for a session, sessions were still conducted for the remaining teachers as long as the minimum requirements were met. If a child participant was absent, data were still collected for their assigned teacher participant. Data were collected, graphed, and analyzed via video by the coach each day sessions occurred.

Baseline. During baseline probes, teacher participants were not provided any training or email performance-based feedback; instead, the coach sent an email to each participant thanking them for participating in the study and informing them of the date of the next session. Baseline sessions were recorded for all three participants for the first 3 days of baseline. When the intervention commenced with the first participant, the coach continued to collect baseline session data for the remaining two participants at least once every five randomly selected days.

PSI training and general feedback. Once baseline data were stable for each teacher participant and prior to introducing email feedback, the coach conducted an individual 10-min PSI training presentation with each participant. The trainings occurred in the private office adjacent to the classroom for Jeannie and Kathleen and in a separate room on the university campus for Anne. The training consisted of four sections: (a) an introduction to and rationale for using PSI on the playground, (b) definitions of PSI specific to this study, (c) examples and nonexamples of PSI on the playground, and (d) description and expectations of email performance-based feedback. Kathleen was sent a screenshot of the definition of PSI from the training presentation via email after the training due to a weekend break between the training session and the first intervention session. GF sessions commenced immediately following the training. GF sessions followed the same procedures as baseline probes with the addition of an email with GF for each participant after sessions. Following stable data in baseline probes and the completion of PSI training for each participant, the coach recorded sessions, coded the participants' behaviors, and sent an email within 24 hr of the related session with the following components: (a) thank you statement for participation, (b) brief and general statement about the participant's use of PSI during the session, and (c) invitation to reply with any questions or comments. General statements included general praise (e.g., "Great job promoting social interactions"), but no specific feedback or examples about the participant's session.

Specific feedback. Specific feedback sessions followed the same procedures as GF sessions, except the email performance-based feedback consisted of the following components: (a) thank you statement for participation, (b) a report of the number of PSI observed during the session, (c) at least one praise statement and specific example of PSI observed during the session, (d) at least one corrective feedback statement and specific example of a PSI component or scenario to work on for the next session, and (e) invitation to reply with any questions or comments. Behaviors chosen as examples for the praise statements and corrective feedback statements were chosen by the coach based on each participant's individual performance.

Return to general feedback. We reintroduced the general feedback condition once PSI data were stable during the specific feedback condition.

Maintenance. After each teacher participant completed their respective GF and SF conditions, maintenance commenced. Maintenance conditions were identical to baseline conditions. Emails consisted of a thank you and the date of the next session. Maintenance sessions for Jeannie were conducted 1, 2, and 3 weeks following the end of the second GF condition. Maintenance sessions for Kathleen were conducted 3 days and 1 week following the end of the second GF condition. Maintenance sessions for Anne were conducted 1 and 3 days following the end of the second GF condition.

Procedural Fidelity

The independent observer for all procedural fidelity was a second-year, special education graduate student naïve to study results. Two types of procedural fidelity data were collected. First, implementation fidelity was measured for the PSI training sessions. This involved determining whether the coach included all required elements during

PSI trainings; the coder indicated whether each element was present or absent. Elements of the PSI training included general training procedures (e.g., time, purpose of training), specific skills teaching (e.g., identifying the components of PSI, trainee generates own example), an explanation of email feedback, opportunities to ask questions, and total duration between 10 and 15 min.

Second, procedural fidelity for experimental conditions was measured for a total of 39% (range = 33%–50%) of sessions across all conditions for each participant. These sessions were randomly selected by the coach and scored by the performance-based feedback coder who reviewed the emails across condition. The procedural fidelity spreadsheet included the components of the emails for each condition; each component was scored as "yes," "no," or "not applicable (NA)." This provided a measure of the accuracy of emails across conditions to record both adherence to experimental procedures and differentiation across conditions (Barton, Meadan-Kaplansky, & Ledford, 2018). The procedural fidelity checklist included behaviors such as the presence or absence of feedback, positive reinforcement for PSI behaviors, and corrective feedback. Procedural fidelity data were calculated using the following equation: number of correct behaviors/(number of correct + incorrect behaviors) * 100. Data were analyzed separately for each participant.

Table 2 provides procedural fidelity data across conditions and participants. Procedural fidelity was 100% for all training sessions (across all three participants). The overall procedural fidelity score was 96%. Average fidelity scores were above 85% (range = 87.5%–100%) for each participant and in each condition, except for the maintenance condition for Anne (75%); the randomly selected session for this scoring was the last email of the study and the coach did not invite the participant to respond with any questions or comments.

Social Validity

We measured social validity in two ways: (a) using a questionnaire and (b) collecting and examining maintenance data. First, we measured the social validity of the goals and procedures using a questionnaire completed by naïve raters. To be included, raters had to meet the following criteria: (a) early childhood teachers or graduate students (to control for familiarity to early childhood contexts) and (b) were unaffiliated with the study or the participants. The questionnaire included two sections. The first section asked naïve raters to rank typical early childhood activities by importance, child engagement, teaching opportunities, and willingness to embed interventions. The second section asked the naïve raters to rate their willingness to receive training and email performance-based feedback and the feasibility of using PSI on the playground. Second, we measured the social validity of the outcomes by examining the maintenance of teacher and child behaviors (i.e., PSI and SI, respectively) after intervention ended using visual analysis.

Results

Teacher PSI

A functional relation between a brief training with follow-up performance-based feedback delivered via email and teacher use of PSI was demonstrated (see Figure 1). We had three interparticipant replications at three distinct, temporally related times. Clear behavior change occurred when GF was provided after a brief training, increased or maintained with SF, and increased or maintained when performance-based feedback ceased.

Jeannie. Jeannie's baseline rates of PSI were low and stable. After the PSI training, data immediately increased to a rate of 1.1 PSI per minute and increased slightly for the first two sessions with some variability. With the addition of SF, Jeannie had an immediate increasing trend in PSI. Although her data overlapped with the previous GF condition, there was an overall increase in rate to about two PSI per min. Data in the subsequent GF condition slightly increased to a rate to about 2.6 PSI per min (range = 1.3–2.6). Finally, during the maintenance condition, data returned to the levels of the SF condition (range = 2.2–2.3). Overall, Jeannie increased use of PSI 10-fold from baseline levels with a training and email performance-based feedback.

Kathleen. Baseline data for Kathleen were low and slightly variable. During the first GF condition, data immediately increased and did not ever overlap with baseline, but were variable with a range of 0.5 to 1.2 PSI per min. Upon introduction of SF, data immediately increased to a rate of 1.2 PSI per min and remained variable with some overlap with the GF condition. However, there was an overall increasing trend (range = 1.0–2.2). During the return to GF condition, Kathleen's data were stable with a slightly decreasing trend (range = 2.0–2.3). During the maintenance condition, data decreased to a level of 1.3 to 1.5 PSI per min.

Anne. Anne's baseline data were low and stable. Anne completed the PSI training and subsequently left school for a week for vacation unbeknownst to the coach; immediately upon returning, her data increased fourfold to 1.9 PSI per min and continued in an upward trend with no overlap with baseline data (range = 1.9–3.1). During the SF condition, Anne's data remained at a high level with slight overlap with the first GF condition. Over the course of three sessions, data continued in an increasing trend (range = 3.1–3.7). During the return to GF condition, Anne emitted 3.5 PSI per min, maintaining levels from the SF condition.

Table 3. Social Validity of the Goals and Procedures ($N = 15$)..

Activity and rankings[a]	Most important	Children are most engaged	Most teaching occurs	Willingness to use intervention
Free play	**1.4**	**1.8**	2.9	**2.3**
Small group	2.9	2.7	**1.6**	2.7
Circle	3.8	3.8	2.3	3.4
Outdoor play	2.9	2.9	4.7	3.5
Snack	5.0	4.1	4.7	5.0
Transitions	5.0	5.7	4.7	4.1
	Willingness to receive training and email PF[b]		Feasibility of PSI on the playground[c]	
Average rating	4.6		4.5	

Note. Bolded scores represent the highest rankings. PF = performance-based feedback; PSIs = promote social interactions.
[a]1 = *highest ranking*, 5 = *lowest ranking*. [b]5 = *extremely willing*, 1 = *not at all willing*. [c]5 = *extremely feasible*, 1 = *not at all feasible*.

Because her data were at a level consistent with the SF condition and higher than the first GF condition, the coach conducted only one session before moving to maintenance. During the maintenance condition, data increased to the highest levels observed at rates of 4.0 and 4.1 PSI per min. By the end of the study, Anne had increased her PSI behaviors more than 20-fold from baseline levels.

Child SI

Rates of total SI for all three child participants were variable but showed an overall increase in total SI, with some overlap upon introduction of PSI training and GF for the teacher participants. Introduction of SF to the teacher participants resulted in an increase in level of total SI for Francis and Vince, and a stable level for Jack. Data for the return to GF condition were slightly lower than the SF condition, but higher than baseline levels for Jack and Francis. Vince, conversely, showed an increase in SI during the return to GF condition. Finally, data remained at a high and stable level during maintenance for Vince, only. Maintenance data for Jack returned to near-baseline levels with a decreasing trend. Although there is a significant amount of overlap in data across all three participants, a functional relation can be inferred between teacher promotions of SIs and total SI by target children due to the overall increase in levels from baseline to GF and SF conditions.

Jack. Jack's total prompted and unprompted SIs were initially high during baseline but decreased in the last two sessions (range = 1.12–0.21). After Jeannie received the PSI training and GF, data for Jack immediately increased and remained at a slightly variable, yet high, level (range = 0.57–1.35). Data for the SF and return to GF conditions, though variable, remained at overall higher levels than baseline with 0.44 to 1.40 SIs per min during SF and 0.37 to 1.50 SIs per min during return to GF. In the maintenance condition, Jack engaged in rates of SI similar to baseline levels (range = 0.3–0.5).

Francis. Total prompted and unprompted peer SIs toward Francis were at an overall low rate (range = 0.0–0.3) with one outlier at 0.9 peer SI per min during baseline. Immediately upon introduction of the training and GF with Kathleen, total rates of peer SI increased to 1.9 peer SIs per minute and subsequently decreased over the course of four sessions to near-baseline levels (range = 0.1–1.9). Once Kathleen moved to SF, peer SI immediately increased and remained at a slightly variable, yet high level (range = 0.9–2.2). Francis was absent from school for the return to GF condition sessions. During Kathleen's maintenance condition, peers engaged in SI toward Francis at a level consistent with the SF condition (1.3 behaviors per min).

Vince. Total SI data for Vince were overall low with slight variability during the baseline condition (range = 0.0–0.93). Upon introduction of PSI training and GF for Anne, data immediately increased to 1.61 SI per min and remained at this level with one outlier (range = 0.27–1.61). In the SF condition, SI levels immediately decreased to a near-baseline level in the first session, but continued on an increasing trend (range = 0.26–2.25). During the second GF condition, rates of SI continued to increase to 2.30 SI per min. Maintenance data decreased but remained higher than the baseline and original GF conditions (range = 1.55–1.69).

Social Validity

Questionnaire. Fifteen naïve raters qualified for and completed the social validity questionnaire (see Table 3). Seven of the 15 raters were female graduate students; eight of the raters were educators (i.e., lead teachers, assistant teachers, paraprofessionals) at the university-based early childhood center at which the study took place. Participants were asked to rank daily classroom activities in order of overall importance, for facilitating children's engagement, by the amount of teaching that occurs, and their willingness to implement a new intervention. Overall, raters ranked free

play as the most important activity for young children, followed by small group, and outdoor play. Transitions and snack were ranked as the least important activities. Small group and free play were rated as the activities in which children were the most engaged, followed by outdoor play. Transitions were ranked as the activity in which children were least engaged. Raters reported that the most teaching occurred during small group; outdoor play, snack, and transitions were ranked as the activities least likely to include instruction. Raters indicated being more willing to use a new intervention during free play, followed by small group and circle time. Outdoor play was ranked as third on importance, third on engagement of children, fourth on amount of teaching, and fourth on willingness to implement a new intervention. Fourteen participants rated their willingness to complete the PSI training and receive feedback with a score of 4 or 5 ("extremely feasible"). One participant rated their willingness with a score of 3 ("somewhat willing"). All 15 raters scored the feasibility of implementing PSI on the playground with a 4 or 5 ("extremely feasible").

Maintenance. Finally, all three teachers maintained use of PSI when performance-based feedback was withdrawn. Anne emitted higher levels of PSI during maintenance than in previous conditions and Jeannie and Kathleen maintained levels consistent with the previous GF and SF conditions. Rates of SI were also higher for Vince and Francis during maintenance compared with previous conditions. However, the limited number of data points restricts interpretations.

Discussion

Research has shown that children with and at risk of disabilities engage in fewer peer interactions, which can lead to future social delays. Although active facilitation of social skills in children through coaching and performance-based feedback has been successful in classroom settings, teachers often do not generalize these skills to the playground (Barton, Velez, et al., 2018), and the playground has been consistently undervalued as an instructional setting (Davies, 1996, 1997; Gossett, 2017). We identified a functional relation between training with performance-based feedback delivered via email and teachers' use of PSI during typical playground activities. Also, the frequency of PSI consistently increased or maintained in level with the introduction of SF and maintained at higher than baseline levels across the return to GF and when performance-based feedback ceased, although the study design did not allow for experimental comparisons between types of feedback and teacher use of PSI. Child SIs were variable across target child participants, but higher rates of teacher PSI yielded an increase in child SIs.

Feasibility of PSI Training and Performance-Based Feedback

The current study utilized a brief 10-min training presentation to teach three teacher participants the behavior targeted for intervention. This training and GF resulted in immediate behavior change for Jeannie, Kathleen, and Anne. These coaching methods are feasible and could be replicated in early childhood settings. The email performance-based feedback allowed participants to have access to and read the performance-based feedback at their convenience and at no cost to them. The performance-based feedback (and specifically the GF emails) was brief and timely. These findings were supported by social validity data, as naïve scorers rated both the training presentation and receiving email performance-based feedback as highly feasible. The use of both GF and SF extends the research on performance-based feedback for teachers supervising young children on the playground (Barton et al., 2016; Barton, Rigor, et al., 2018; Barton, Velez, et al., 2018). Although implementation of GF produced increased levels of PSI compared with baseline across all three teachers, SF resulted in continually elevated levels of PSI for Kathleen with some variability and maintenance of high levels for Jeannie and Anne. GF might be sufficient and related to appropriate enhancements in instructional practices for some teachers (i.e., Jeannie and Anne). In the current study, Jeannie and Anne might not have "needed" SF, but we felt compelled to provide SF, given we had mentioned SF as a study component during the consenting process. Additional replications systematically comparing GF and SF and testing GF alone are warranted.

PSI as Target Behavior

Jeannie, Kathleen, and Anne were coached via email performance-based feedback on PSI, a behavior that has been previously targeted for similar interventions, but in a new setting and with a new population. These findings extend current research because no previous performance-based feedback studies included PSI for children aged 12 to 18 months on the playground (Alvero et al., 2001; Barton et al., 2016; Barton, Rigor, et al., 2018; Barton, Velez, et al., 2018). In addition, sessions were brief and occurred when teachers were already supervising children on the playground; targeting teacher use of PSI on the playground is an achievable goal. Furthermore, the intervention was embedded within an authentic activity—the typical, regularly scheduled playground time—which contributes to the generalizability and external validity of our study.

Child SIs

Overall, our data support the use and need for group child care, especially for toddlers with low social skills and high

challenging behavior. We observed a consistent correlation between levels of PSI and total child SI for Francis and Vince, with large effects by cessation of the study. When Kathleen increased her use of PSI across intervention conditions, peers emitted increased rates of SI toward Francis. Likewise, Vince emitted more SI toward peers when Anne displayed increased levels of PSI. Although Jack emitted overall increased rates of SI during GF and SF conditions, he engaged in similar-to-baseline levels during the maintenance condition. No discernible patterns were found in prompted or unprompted SI data; differences were only observed in total SI data (Figure 2).

Limitations

There were several limitations to consider. First, there was no true generalization. It is possible that the teacher participants performed at favorable levels due to the experimenter's presence during sessions. Researchers should explore ways to measure generalization outside of study sessions when observers are not present. Likewise, although outdoor time is ideal for using PSI, teachers should be using PSI across the day. Future replications should examine teachers' generalized use of PSI across settings and routines.

Second, future replications should consider examining the impact of general or specific feedback on specific instructional strategies rather than using both. In the current study, we hypothesized that specific feedback would be necessary to produce lasting behavior change and, thus, mentioned specific feedback during the consenting process. This limited our ability to examine GF independently (and withhold specific feedback) despite observing robust behavior change with GF alone. We would have preferred to avoid adding specific feedback but could not within the current study. Future replications should be designed to allow for an examination of the most parsimonious intervention needed for improving specific teacher practices. It might be practical and feasible to systematically provide less intensive performance-based feedback (e.g., GF or SF) on critical, discrete teaching practices (e.g., PSI) that promote child social competence. When this type of professional development is implemented systematically, it has resulted in robust improvements in teacher behaviors (Artman-Meeker & Hemmeter, 2013; Hemmeter, Hardy, Schnitz, Adams, & Kinder, 2015).

Third, the measures for child SI might have underestimated their true scores. Because the teacher participants were encouraged, but not required, to stay near their target child, there was no systematic procedure in place for the target children. Although this provided insights to the effects of a low-effort intervention on all children on the playground, a more systematic approach to promoting SIs of the target children may have yielded clearer results. Furthermore, the measures yielded low frequency counts; therefore, even low levels of disagreements often resulted in large percentage changes in IOA. Contextual relevance proved to be a difficult component of the PSI three-part sequence to reliably code; additional replications are warranted.

Fourth, we did not evaluate the quality of PSI emitted by the teachers. Measuring quality changes might have been informative, coders anecdotally noted that the types of PSI used changed over the course of the study. Also, we did not differentially measure PSI statements that resulted in child SIs; anecdotally, they almost always did. In the future, researchers should measure and evaluate the quality and variety of PSI statements used.

Fifth, our study included a relatively limited population within a university-affiliated early childhood center with graduate student implementers, which limits the external validity. Additional replications are warranted by indigenous coaches in community child care settings. Furthermore, replications should be conducted with a diverse sample of teachers and children.

Implications for Practice and Research

Despite the limitations, this study has several additional implications for practice and research. This intervention was low effort and low maintenance relative to other coaching interventions (Artman-Meeker & Hemmeter, 2013), requiring at most a 10-min observation, a brief one-time training, and daily email performance-based feedback. Behavior change occurred immediately and rapidly for Jeannie and Anne, and overall levels increased for Kathleen despite variability in data. This is a reasonable intervention to increase teacher use of PSI and decrease non–child-directed teacher behaviors. However, given we used both GF and SF, the independent impact of GF or SF is unknown and should be addressed in future replications. For example, GF or SF might work better, differently, or more efficiently for specific instructional strategies.

The current study also has implications for the types of children who might benefit from such an intervention. The children in this study varied in their developmental levels and functional repertoires, but all three had increased levels of SI. Additional replications are warranted to examine ways to support teachers of children with severe disabilities and children who are typically developing that engage in problem behaviors or lower levels of SI. Additional research also is needed to evaluate the effects of this target behavior and intervention on teachers supervising varying ages of children on the playground. This study solely evaluated the intervention on teachers supervising toddlers (ages 12–18 months).

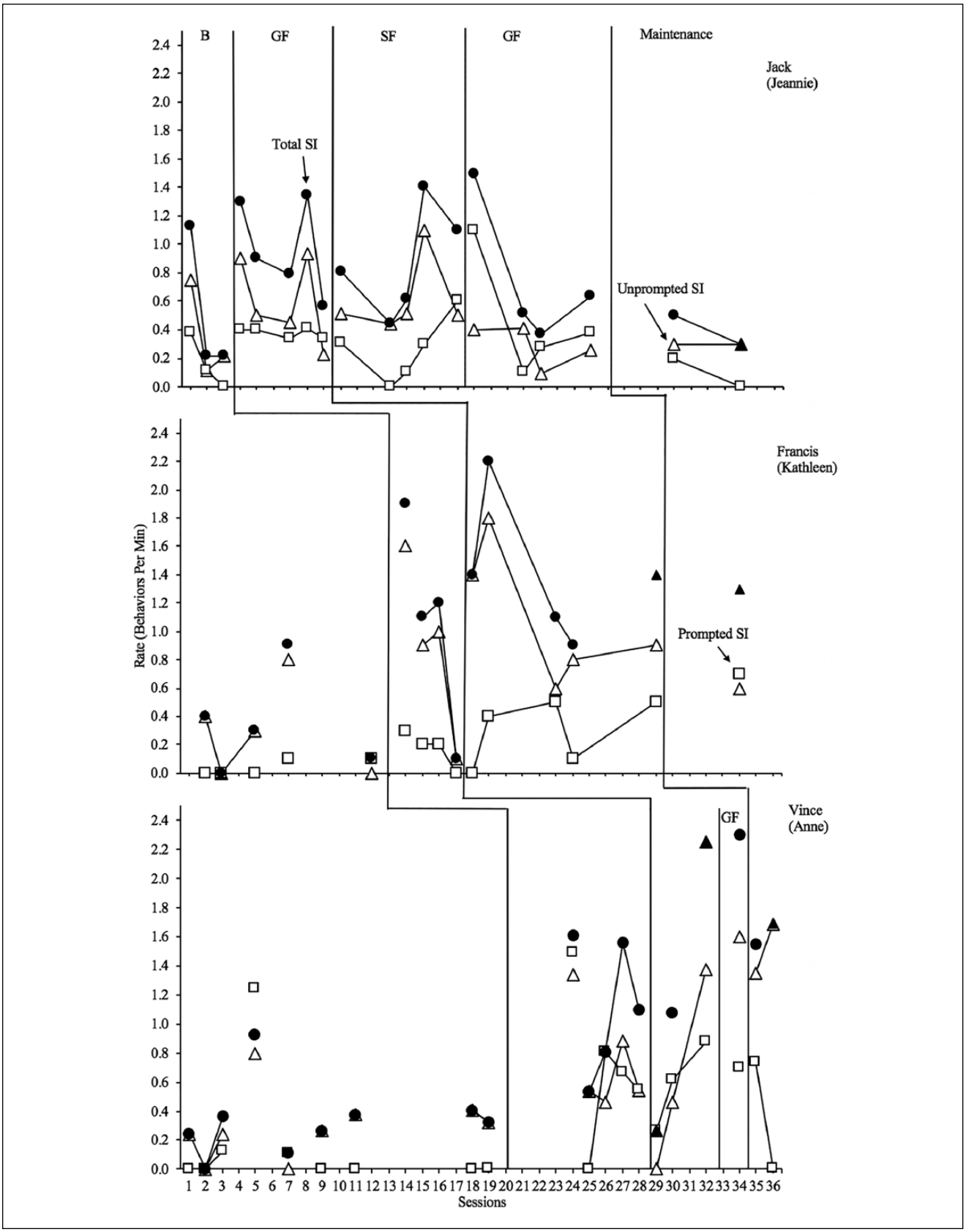

Figure 2. Rate of prompted, unprompted, and total SI for each child participant.
Note. SI = social interaction; B = baseline; GF = general performance-based feedback; SF = specific performance-based feedback.

Conclusion

We examined a low-effort intervention targeting teachers' use of PSI among children and their peers on the playground. Results of this study indicated a functional relation between training plus general and specific feedback, teachers' use of PSI, and levels of child SIs. Furthermore, the goals, procedures and outcome measures supported these findings, strengthening the social validity of this study. Future research should continue to systematically replicate this study to develop and test the most effective ways to support child social competence on the playground and across activities and routines in early childhood settings.

Acknowledgments

The authors would like to acknowledge the children, families, teachers, and staff of the Susan Gray School, and the Special Education graduate students at Peabody College whose participation and support made this study possible.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Preparation of this article was supported in part by the U.S. Department of Education, Office of Special Education and Rehabilitative Services, Grants H325D140308 and 325K140110. However, the opinions expressed do not necessarily reflect the policy of the U.S. Department of Education and no official endorsement should be inferred.

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